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March 8, 2021

***VIA FEDERAL EXPRESS AND***
***ELECTRONIC MAIL***

*Melanie.bachman@ct.gov*
*Siting.council@ct.gov*

Ms. Melanie A. Bachman, Esq., Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06501

**Re: Petition of CP NB Solar I, LLC and CP NB Solar II, LLC for a Declaratory Ruling that a Certificate of Environmental Compatibility and Public Need is not Required for the Construction, Operation and Maintenance of a 1 MW AC and a 0.970 MW AC Solar Photovoltaic Electric Generating Facility Located off of Forest Road in North Branford, Connecticut.**

Dear Attorney Bachman:

This office represents CP NB Solar I, LLC and CP NB Solar II, LLC ("Petitioners"). On behalf of Petitioners, I have enclosed one copy of the above-mentioned Petition for Declaratory Ruling as well as the filing fee related thereto.

Please do not hesitate to contact me with any questions.

Very truly yours,

Jesse A. Langer

Enclosures

**STATE OF CONNECTICUT**
**CONNECTICUT SITING COUNCIL**

**RE: PETITION OF CP NB SOLAR I, LLC & CP NB SOLAR II, LLC FOR A DECLARATORY RULING THAT A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED IS NOT REQUIRED FOR THE CONSTRUCTION, OPERATION AND MAINTENANCE OF A 1 MW AC AND A 0.970 MW AC SOLAR PHOTOVOLTAIC ELECTRIC GENERATING FACILITY LOCATED AT 127 FOREST ROAD (CT ROUTE 22), NORTH BRANFORD, CONNECTICUT**

# PETITION FOR DECLARATORY RULING

**March 8, 2021**

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## I. INTRODUCTION AND AUTHORITY FOR REQUESTED RELIEF

In accordance with General Statutes § 4-176(a) and § 16-50k(a), as well as § 16-50j-39 of the Regulations of Connecticut State Agencies, CP NB Solar I, LLC and CP NB Solar II, LLC (collectively, "Petitioners"), respectfully seek a declaratory ruling from the Connecticut Siting Council ("Council") that a Certificate of Environmental Compatibility and Public Need ("Certificate") is not required for the construction, operation and maintenance of a 1.0 megawatt ("MW") alternating current ("AC") and a 0.970 MW AC ground mounted solar photovoltaic ("PV") electric generating facility ("Project") on real property located at 127 Forest Road (CT Route 22) in the Town of North Branford, Connecticut ("Site").

General Statutes § 4-176 (a) provides that "[a]ny person may petition an agency . . . for a declaratory ruling as to the validity of any regulation, or the applicability to specified circumstances of a provision of the general statutes, a regulation, or a final decision on a matter within the jurisdiction of the agency."[1] This provision "confers broad rights on *any member of the public* to file a petition for a declaratory ruling without the need to establish any specific, personal and legal interest in the matter." (Emphasis in the original.) *Bingham v. Dept. of Public Works*, 286 Conn. 698, 706, 945 A.2d 927 (2008).

General Statutes § 16-50k(a) provide in relevant part that:

> the council shall, in the exercise of its jurisdiction over the siting of generating facilities, approve by declaratory ruling . . . the construction or location of . . . any customer-side distributed resources project or facility or grid-side distributed resources project or facility with a capacity of not more than sixty-five megawatts, as long as such project meets air and water quality standards of the Department of Energy and Environmental Protection . . . .

[1] General Statutes § 4-166 (9) defines "person" to mean "any individual, partnership, corporation, limited liability company, association, governmental subdivision, agency or public or private organization of any character, but does not include the agency conducting the proceeding."

As set forth herein, along with accompanying attachments, the proposed Project satisfies General Statutes § 16-50k(a) and would not have a substantial adverse environmental impact.

## II. PETITIONERS AND CONTACT INFORMATION

Petitioners are Connecticut limited liability companies, both formed to develop, construct and operate the two PV facilities. They are wholly owned subsidiaries of Citrine Power LLC ("Citrine"), which is a Delaware limited liability company, with a business address of 55 Greens Farms Road, Suite 200-78, Westport, Connecticut, 06880. Citrine develops and invests in distributed generation renewable energy facilities, with an expertise in large scale commercial and industrial PV systems and small utility scale PV facilities. Citrine and its investors successfully developed, permitted and constructed PV facilities in Middletown and East Hampton (Petition Nos. 1367 and 1396) in which several municipalities were virtual net metering ("VNM") beneficiaries. Citrine brings a unique combination of in-depth local market and regulatory knowledge, risk assessment and underwriting experience. This enables Citrine quickly to assess prospective projects and take the most viable ones through the development cycle.

Citrine owns and develops renewable energy facilities in the states of Connecticut, Illinois, New Jersey and the Commonwealth of Massachusetts. Collectively, the Citrine team has financed more than $170 million of solar assets. Citrine's PV facilities are located on roofs, parking lots or on vacant, unused land including landfills and brownfields. Power generated from these facilities is sold to a variety of customers, including the public service companies, municipalities, schools, businesses and residences via power purchase agreements, community solar arrangements or virtual net metering agreements. Citrine is an active developer of community solar (*i.e.*, shared solar) projects in Massachusetts, New Jersey and Illinois and is working towards participating in the similar programs in Connecticut. Citrine is also a WBENC certified Woman Owned Business.

All correspondence may be addressed to Petitioners' counsel as follows:

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## III. THE PROPOSED PROJECT

### A. Site Selection

Petitioners selected the Site initially based on suitability for a PV facility, which takes into account the size of the PV facility contemplated, existing grades and surrounding topography. Additional important factors include the proximity of a potential site to the electric grid for interconnection, congruence with local planning and zoning and the willingness of the property owner. Once a potential suitable site is located, Petitioners assess the potential adverse impacts to environmental and natural resources, as well as scenic and historical values, and meet with the property owner, local land use and municipal officials as to the desirability, benefits, and cooperation for the development of a PV facility for the selected location. For this Site, Petitioners performed an extensive search and assessment, and obtained input and approval of local officials and the property owner, culminating in the selection of the Site. As set forth herein, the Site would have a minimal impact on the environment and historical and scenic values, while also providing a benefit to the public.

### B. The Site

The Site consists of one parcel commonly known as 127 Forest Road, totaling approximately twenty (+/- 19.68) acres in the Town of North Branford ("Town"). The Site is situated west of Forest Road (CT Route 22), south of Neubig's Way and north of Mill Road in the

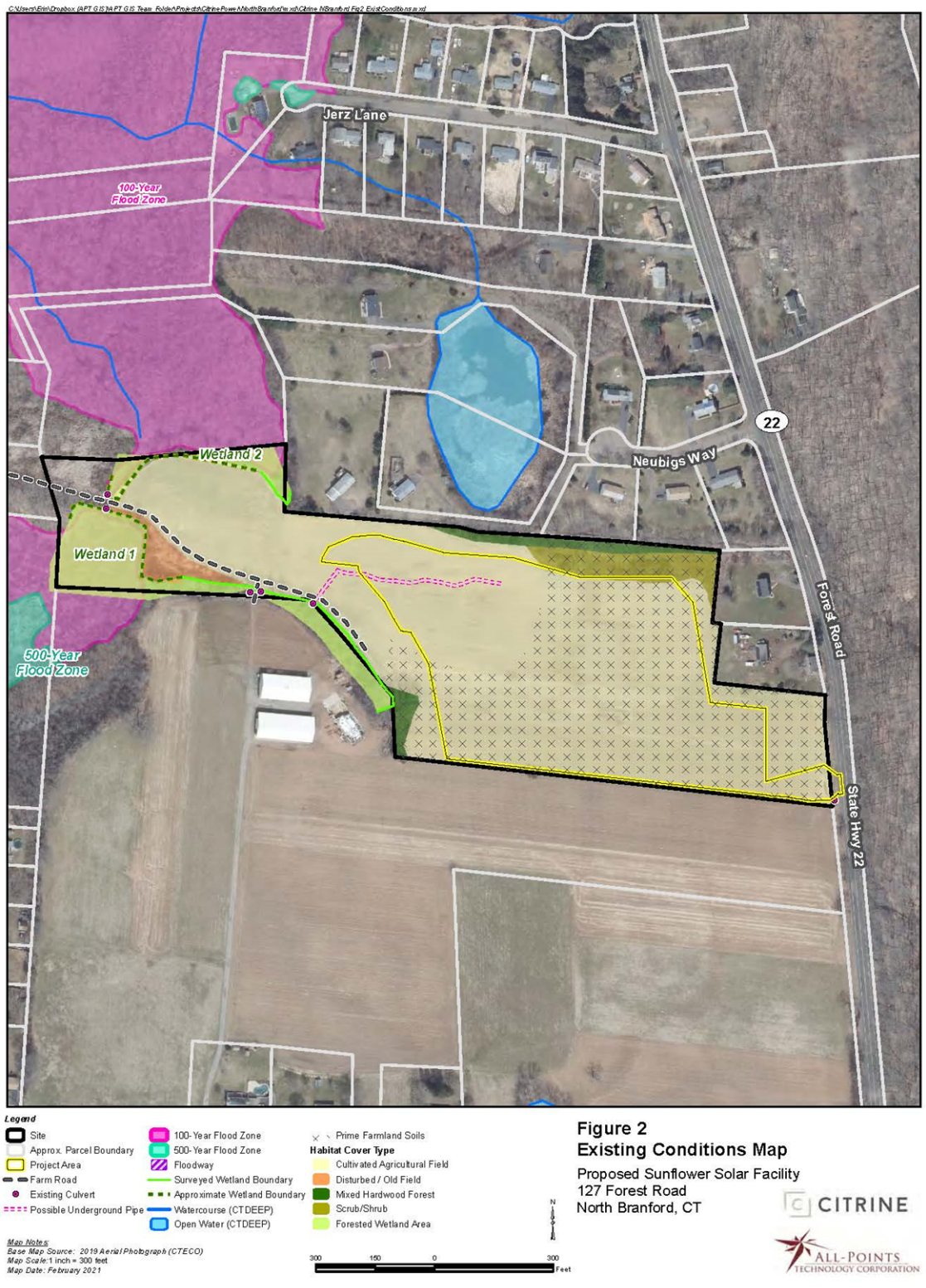
Town's Residential 40 (R-40) zoning district. See Figure 1, *Site Location* below. The Site is undeveloped and used for agricultural purposes.

The Site was recently divided from another parcel to the west, which runs parallel to Marjorie Drive ("127 Forest Road Rear"). The Department of Energy and Environmental Protection ("DEEP") issued a notice of violation for the potential presence of solid waste at the 127 Forest Road Rear parcel. The DEEP agreed to the lot line revision and released the Site, which is not contaminated, from the pending enforcement action for the limited purpose of hosting the Project. A majority of the ground lease revenue shall be used for the sole purpose of investigation, assessment, remediation, removal, or mitigation of solid waste, if any, at the 127 Forest Road Rear parcel and any other properties affiliated with the enforcement action. The development of the Project would neither impede access to the 127 Forest Road Rear parcel nor hinder any environmental assessment and remediation that may be necessary.

The surrounding area is a mix of agricultural land to the south, a mix of undeveloped wooded land and residential development to the north and west, and a large sand and gravel and materials storage operation to the east. Lake Gaillard is located approximately 0.5 miles to the east of the Site. Additionally, there is no record of any agricultural or development rights relative to the Site purchased by the State. Please see the Detailed Site Drawings attached as Appendix A to the Environmental Assessment, which is appended hereto as Attachment 1.

The Site topography gradually slopes down in an east to west direction, with ground elevations ranging from approximately 110 feet above mean sea level ("AMSL") on its east side to approximately 60 feet AMSL to the west. Currently, the Site is accessed via Mill Road. *See* Appendix A to Attachment 1.

## Figure 1 – Site Location



### C. The Project

The Project would consist of two adjacent PV facilities, both of which are subject to lease agreements with the property owner: (1) a 1 MW AC PV facility, owned by CP NB Solar I, LLC and (2) a 0.970 MW AC PV facility, owned by CP NB Solar II, LLC ("PV Facilities"). The PV Facilities are subject to a VNM agreement with Page Farm as the Host Customer, an agricultural end user.[2] The VNM credits that Page Farm receives will offset the majority of the farm's electricity costs. The PV Facilities are also subject to a VNM agreement with the Town, which would receive the remaining VNM credits unused by the farm. In addition, Petitioners have received contracts under the State's low emissions renewable energy certificate ("LREC") program for the Year 9 solicitation from United Illuminating and have secured these contracts via performance assurance payments.

Upon its completion, the PV Facilities would occupy approximately eight acres of the Site, with an additional ±2.0 acres of disturbance beyond the fenced limits, for a total of ±10.0 acres to enable development ("Project Area"). Petitioners anticipate that the PV Facilities would consist of the following components: (a) approximately 6,656[3] Heliene 72M G1 390W photovoltaic modules ("panels"), installed at a tilt angle of 20 degrees; (b) twenty Delta M125 inverters; (c) two pad mounted switchgear units; (d) two 1,000 kVA transformers; and (e) one point of interconnection, with two separate interconnections services as there are two separate PV Facilities.[4] *See* Appendices A and E to Attachment 1.

[2] Petitioners received virtual net metering allocation from United Illuminating under the Agricultural VNM cap.

[3] The one MW system would have 3,354 panels while the 0.970 MW system would have 3,302 panels.

[4] The PV Facilities would consist of these components or those of which are substantially similar depending upon availability.

A ground-mounted racking system, mounted on driven posts, would secure the panels. The leading edge of the panels would be approximately thirty-six inches above the existing ground surface, which would provide adequate room for any accumulating snow to "sheet" off. Any production degradation due to snow build-up has been modeled into the annual system output and performance calculations. *See* Appendices A and E to Attachment 1.

The Project would be surrounded by a seven foot high chain link fence to provide security and comply with the National Electric Code requirements. The fence would rise six inches off the ground[5] to allow for safe passage of small animals and avoid trapping within the Facility. Access to the Site would be through one, twenty foot wide locked chain link gate, with a site identification sign and lock box access for trained emergency personnel. Access to the Project Area would be from a new ±20 foot wide gravel drive located at the southeastern end of the Site from Forest Road (CT Route 22). The new drive would extend west, approximately 330 feet to the PV Facilities' gated fence, and then an additional ±412 feet within the interior of the Facilities to provide access for construction, service, and maintenance vehicles. *See* Appendix A to Attachment 1.

### 1. Utilities and Interconnection

Utilities would extend overhead and connect to the utility distribution pole on Forest Road (CT Route 22). This would require the installation of approximately five new utility poles along the access road. *See id.* Petitioners have commenced an interconnection study with United Illuminating, which is anticipated to be completed in March of 2021. The PV Facilities are currently in the design phase of the interconnection process.

[5] The chain link security fence would have an overall height of 7.5 feet above final grade with the 6-inch gap proposed.

### 2. Construction

Subject to regulatory approvals, Petitioners anticipate construction over approximately four months in 2021. Construction would commence with initial site preparation work, consisting of installation of erosion and sedimentation ("E&S") control measures, the laydown area, access improvements including the new access road. The installation of the racking, panels and attendant mechanicals would follow. Fencing and Site stabilization and landscaping would conclude the construction, such as plantings for visual screening; existing grades would remain throughout the Project Area except for where the access road intersects with Forest Road and within the northwest corner where a temporary sediment basin is required during construction. Upon final stabilization, the temporary sediment basin and laydown area would be removed, and the areas restored to existing grade and permanently stabilized. Please see the Construction Schedule and Hours, which is appended hereto as Attachment 2.

### 3. Operation & Maintenance

Petitioners would retain a reputable third-party contractor experienced with the operation and maintenance of similar PV facilities. That contractor would monitor the PV Facilities, which would include continuous remote monitoring, routine maintenance, annual inspections, vegetation management and landscaping, as well as emergency response. Daily monitoring would be conducted via an internet-based data acquisition system, which has the capability to send alarms identifying communication and power generation issues to the extent they occur. Please see the Operations & Management Plan appended hereto as Attachment 3.

### 4. Decommissioning

The Project is designed with a useful life of at least twenty-five years. At the end of that useful life, Petitioners would remove all of the equipment in accordance with the Project's

Decommissioning Plan. The decommissioning process would start with all above grade equipment followed by a restoration of the Project Area. Petitioners would also remove the fencing, utility lines and improvements to the access road if the property owner elects not to maintain them for other purposes. Please see the Decommissioning Plan appended hereto as Attachment 4.

## IV. PROJECT BENEFITS

The Project would further the public policy of the State and benefit the public in several ways. First, the Project would generate much of its power at peak times, when demand for electricity is high, thus providing the electric grid with flexible peaking capacity to ensure stability. This comports with Connecticut's energy policy, codified at General Statutes § 16a-35k, which declares the need to "develop and utilize renewable energy resources, such as solar and wind energy, to the maximum practicable extent." The Project would also assist the State in meeting its mandated obligations under the Renewable Portfolio Standard as a result of LREC allocations received for Year 9 of the Program.

Second, the Project would reduce carbon, thus contributing to the State's carbon-reduction strategies. The Project would not include the removal of any trees; rather, Petitioners propose to plant approximately sixty-five trees for screening purposes. Based on the United States Environmental Protection Agency's carbon reduction calculator, the construction and operation of the Project would be the equivalent of an approximate reduction in 533 passenger vehicles driven annually or the energy use of 284 residences annually. Please see the Carbon Debt Analysis appended hereto as Attachment 5.

Third, the PV Facilities would further the State's VNM program, which incentivizes the use of renewable energy by allowing certain end-use customers, such as agricultural and municipal entities, to assign surplus energy production to other metered accounts. General Statutes § 16-

244u. As referenced in Part III.C, *supra*, the PV Facilities are subject to VNM agreements with Page Farm and the Town.

Finally, the Project would offer local benefits in that it would improve the electrical service for existing and future development in the Town through the availability of enhanced local generating capacity that does not rely on the congested regional electrical transmission networks. Additionally, the Project can be used for education about renewable energy.

## V. COMMUNITY OUTREACH

### A. Collaboration with State and Local Officials

Representatives of Petitioners have collaborated with the Town on an on-going basis. Beginning in March 2020, Petitioners have interfaced with the Town's Economic Development Commission to identify a suitable site. Petitioners consulted with Mayor Bob Viglione and the Town Manager, as well as presented the proposed Project several times to the Town Council and the Economic Development Commission. Petitioners also met with the Town's Engineer and Planner extensively to discuss the proposed Project. On February 17 and 18, 2021, Petitioners also held virtual informational sessions for the owners of property abutting the Site. On March 4, 2021, Petitioners also participated in an informational meeting before the Town's Planning & Zoning Commission.

The Town supports the Project as it would promote renewable energy and allow for important cost savings. As discussed in Part III.C, *supra*, Petitioners and the Town executed a VNM agreement to offset a significant portion of the Town's electricity costs. Please see the Municipal Support Letter appended hereto as Attachment 6.

### B. Congruence with Local Zoning and Planning

The Town's zoning regulations are silent on renewable energy facilities. The Project, however, is consistent with the Town's stated goal to improve sustainability and resiliency with the Town's buildings. POCD, ch. 6 p. 56. The POCD encourages the installation of photovoltaic or other renewable energy systems on public buildings. *Id.; see also* ch. 10, p. 100.

### C. Notice to Abutters, Agencies and Officials

In accordance with §§ 16-50j-40 of the Regulations of Connecticut State Agencies, on or about March 5, 2021, Petitioners sent a notice of its intent to file this Petition, via certified mail, return receipt requested, to each person appearing as a record owner of the host property, those appearing as a record owner of properties which abut the proposed Site and the appropriate municipal officials and government agencies. The service list of abutters and a sample letter to the abutters are appended hereto as Attachment 7; the service list of agencies and officials, as well as one of the letters sent to the Town, are appended hereto as Attachment 8.

## VI. NO SUBSTANTIAL ADVERSE ENVIRONMENTAL EFFECT

General Statutes § 16-50k(a) provides in part that a Certificate is not required if an electric generating facility meets the air and water quality standards of the DEEP and does not have a substantial adverse environmental effect. Petitioners and their consultants interfaced with the relevant agencies, evaluated the potential environmental impacts and integrated mitigation measures into the Project design where necessary. To that end, All-Points Technology Corporation, P.C. ("APT") prepared a comprehensive Environmental Assessment ("EA") concerning the potential adverse environmental impacts. *See* Attachment 1.

### A. Public Health and Safety

The Project would meet or exceed all applicable safety requirements for construction, interconnection and operation applicable to electric generation. The PV Facilities would not consume any raw materials, would not produce any by-products and would be unstaffed during normal operating conditions.

Each employee or consultant working on the Project would:

- Receive required general and Site and Project-specific health and safety training;
- Comply with all health and safety controls as directed by local and state requirements;
- Understand and employ the Site health and safety plan while on the Site;
- Know the location of local emergency care facilities, travel times, ingress and egress routes; and
- Report all unsafe conditions to the construction manager or owner representative.

Additionally, as set forth in Attachment 3, Petitioners would coordinate with municipal first responders concerning responses to emergencies at the PV Facilities.

Construction equipment would be required to access the Site during normal working hours. After construction is complete and during operation, traffic at the Project would be minimal. The PV Facilities would be fenced and gated, with limited access to authorized personnel only.

The solar panels are designed to absorb incoming solar radiation and minimize reflectivity, such that only a small percentage of incidental light would be reflected off the panels. This incidental light is significantly less reflective than common building materials, such as steel, or the surface of smooth water. The panels would be tilted up toward the southern sky at a fixed angle of twenty degrees, further reducing reflectivity. *See* Appendices A and E of Attachment 1.

The Project is not an anticipated source of noise in light of the Project location and minimal noise generating equipment. The only equipment that would generate noise consists of the fans associated with the inverters. While no noise study was completed for the Project, based on the specified inverters and transformers to be used, their locations relative to property boundaries and previous studies completed with similar equipment, sound levels are expected to be below the applicable noise ordinance standards for daytime hours. It is important to note that the inverters are inactive at night. *See* § 3.9 of Attachment 1.

Petitioners submitted the Project location to the Federal Aviation Administrative ("FAA") to confirm whether additional notification or coordination with the FAA is required. On December 1, 2020, the FAA determined that the Project would not be a hazard to air navigation. The FAA Determination of No Hazard is included in Appendix F to Attachment 1.

**B. Air Quality**

The PV Facilities would not generate any emissions. Rather, as discussed in Part IV, *supra*, the Project would contribute to carbon reduction. There would be some potential minimal air emissions incident to construction activities, primarily from the construction vehicles used during installation. These emissions would be temporary and should not require an air permit. *See* § 3.5 of Attachment 1.

**C. Water Resources**

The groundwater underlying the Site is classified by the DEEP as "GAA." This classification indicates groundwater within the area is presumed to be suitable for human consumption without treatment. The Site is not located within a mapped preliminary or final Aquifer Protection Area. *See* § 3.4.1 of Attachment 1.

Based upon a review of the DEEP mapping, the Site is located in Major Drainage Basin 5 (South Central Coastal Basin), Regional Drainage Basin 51 (South Central Eastern Complex), Subregional Drainage Basin 5112 (Farm River), and Local Drainage Basin 5112-00 (Farm River). The Site is also located in a Public Drinking Water Supply Watershed associated with Lake Saltonstall which is owned and operated by the Regional Water Authority. While the Farm River does not directly drain to Lake Saltonstall the Regional Water Authority operates a diversion on the Farm River that directs water to the lake. *See* § 3.4.2 of Attachment 1. Representatives of Petitioners conferred with the Regional Water Authority and they did not express any concern over the Project.

The nearest mapped waterbody to the Project Area is an unnamed pond that is located approximately 200 feet north of the Site and is classified as a Class AA surface waterbody by the DEEP. Designated uses for Class AA surface water bodies include existing or proposed drinking water supplies; habitat for fish and other aquatic life and wildlife; recreation; and water supply for industry and agriculture. *See id.*

The Site is mapped on FIRM PANEL #09009C 0458 J, dated May 16, 2017. Based upon the reviewed FIRM map, the majority of the Site and the entirety of the Project Area are located in an area designated as unshaded Zone X, which is defined as areas of minimal flooding, typically above the 500-year flood level. *See* § 3.3.3 of Attachment 1.

**1. Wetlands**

There are two forested wetlands identified on the Site, neither of which would be adversely impacted by the Project. The wetland areas comprise approximately 1.6 acres altogether. No wetlands or watercourses are present within the Project Area. *See* Appendix A to Attachment 1.

*Wetland 1.* This resource is located 102 feet west of the Project Area and consists of a relatively narrow feature that drains west into a larger wetland system that is part of the Farm River drainage basin. Wetland 1 has been impacted by historic and recent agricultural activities, including: earthen fill material embankments to both the north and south; a culverted farm road crossing located in the central portion of this resource; and, a drainage pipe, apparently from an underdrain located in the adjacent agricultural field to the east, allows for field drainage into Wetland 1. *See* § 3.3.1 of Attachment 1.

*Wetland 2.* This resource is located 149 feet northwest of the Project Area and is the southern extent of a larger forested wetland system that is located off of the Site. This wetland resource drains to the northwest and is part of the Farm River drainage basin system. Wetland 2 has also been impacted by recent and historic agricultural activities as evident by fill material embankments along the southern edge of this wetland system. *Id.*

To promote protection of wetlands and watercourses during construction, safeguards have been developed to avoid unintentional impacts to these resources, including the installation and maintenance of E&S controls in accordance with the 2002 *Connecticut Guidelines for Soil Erosion and Sediment Control*. By implementing these management techniques throughout the duration of construction, any potential adverse impacts to wetland resources would be mitigated. *See* § 3.3.2 of Attachment 1.

The Project would have no direct or indirect impacts to either Wetland 1 or 2 and would maintain a setback of ±100 feet or greater to these resources. Additionally, the majority of the ground beneath the solar arrays would be planted with native grass/vegetation, which would provide ample opportunity for surface water infiltration or reduce the rate of discharge to surrounding resources. *Id*.

### 2. Stormwater

The Project would not require clearing for the proposed solar installation, including the necessary utilities, access drive, and temporary sediment basin, resulting in approximately ±10.0 acres of disturbance. Of these approximate ten acres, 1.3 acres would be temporary and associated with a laydown area and temporary sedimentation basin and would be restored upon completion of construction. Overall, the Project would result in a decrease in stormwater runoff from existing to proposed conditions. Therefore, the Project would not require permanent stormwater management features.

A temporary sedimentation basin is proposed in the northwest corner of the Project Area to manage potential sediment during construction of the Project. Once the Project Area has achieved final stabilization, the temporary sedimentation basin would be removed by re-grading the area to near existing conditions.

Portions of the Project Area that are disturbed during construction would be stabilized with a low growth seed mix, Ernst Solar Farm seed mix or an equivalent. To safeguard water resources from potential impacts during construction, Petitioners must implement protective measures in the form of a Stormwater Pollution Control Plan ("SWPCP") to be finalized and submitted to the Council, pending approval by the DEEP. The SWPCP would include the establishment, maintenance, and monitoring of E&S controls in accordance with the 2002 *Connecticut Guidelines for Soil Erosion and Sediment Control*. *See* § 3.4.3 of Attachment 1.

The Project would require a *General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities* ("General Permit") from the DEEP. Petitioners have initiated a pre-application meeting with the DEEP, and Petitioners will apply for the General Permit. Petitioners expect to meet with the DEEP on or about March 11, 2021 for a

pre-application meeting regarding the General Permit. Please see the Stormwater Report appended hereto as Attachment 9.`

### 3. Water Quality

The Project would not require any potable water uses or sanitary discharges, nor are any liquid fuels associated with the operations of the Project. The Project has been designed to meet DEEP's *Appendix I, Stormwater Management at Solar Array Construction Projects*. *See* § 3.4 of Attachment 1.

The Project would benefit surface water quality through the conversion of cultivated agricultural field to a meadow habitat establishing a permanent vegetative cover. The permanent vegetative cover would reduce the amount of sediment discharge to nearby surface waters. Additionally, Petitioners have designed sufficient setbacks from water resources resulting in no adverse environmental effects on surface water. *See* § 3.4.2 of Attachment 1.

Project development would not require any tree or stump removal. Site preparation for the Project would require minimal grading, which would be limited to construction of the proposed access road and temporary sedimentation basin. Therefore, with the incorporation of adequate protective measures, stormwater runoff from the Project development would not result in an adverse impact to water quality associated with the water resources located on or proximate to the Site. *See* § 3.4.3 of Attachment 1.

## D. Vegetation and Soils

APT reviewed the DEEP's *Forestland Habitat Impact Mapping* [6] which revealed that the Site is not included within an area mapped as core forest. APT also reviewed UConn's Center for

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

Land Use Education and Research's ("CLEAR") Forest Fragmentation Analysis ("FFA")[7] study and, based on FFA criteria, the Site does not contain any forested habitat identified as "core" forest.

While limited forested habitat does exist on the northeastern, southwestern and western extents of the Property, these areas are entirely influenced by "edge" effects due to habitat fragmentation and are not considered core forest habitat. The Project would not result in any impact to forested resources because there are no "core" forests habitats located on the Site and no trees would be removed for development of the Project. *See* § 3.1.3 of Attachment 1.

According to the Connecticut Environmental Conditions Online Resource Guide,[8] the Site contains about 10.3 acres of Prime Farmland Soil area within the eastern and southern portions of the Project Area. Recognizing that the Project has a useful life and could be considered temporary in nature, Petitioners have proposed minimally intrusive methods for construction of the Facility. After its useful life, the Facility would be decommissioned and all of the disturbed areas would be top dressed with native soils and reseeded. The Project would not materially affect Prime Farmland Soils with the implementation of these proposed design strategies. *See* § 3.6.1 of Attachment 1.

**E. Wildlife**

APT consulted with the United States Fish and Wildlife Service ("USFWS") and the DEEP with respect to the potential impact of the Project on wildlife. APT's field survey determined that the Site possesses marginal habitat to support the eastern box turtle, a species of Special Concern, which was confirmed by the DEEP. The DEEP recommended the implementation of a series of construction related protection strategies. APT has developed a protection program involving

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

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

training, exclusion zones and monitoring to prevent unintentional impacts to the eastern box turtle. *See* Appendices B and C to Attachment 1.

Additionally, APT performed an evaluation of possible threatened or endangered species under the Federal Endangered Species Act ("ESA"). The northern long-eared bat ("NLEB") is a listed threatened species known to occur in Connecticut. NLEB tend to roost in trees with a diameter at breast height ("DBH") of three inches or greater. Because the proposed Project would result in the removal of trees greater than three inches DBH, a determination of compliance with the ESA is required. APT completed a determination of compliance. In accordance with the USFWS authorities, the Project would not likely result in an adverse effect or unintentional killing of NLEB and does not require a permit from USFWS. The compliance correspondence is attached as Appendix C to Attachment 1.

**F. Historic and Archaeological Resources**

Heritage Consultants, LLC ("Heritage") prepared Phase 1A Cultural Recourses Assessment Surveys for the Project and submitted it to the State Historic Preservation Office ("SHPO") for review and comment in December of 2020. The Phase 1A Survey concluded that one property listed on the National Register of Historic Places is located within one mile of the Site. However, Heritage does not anticipate any direct or indirect effects from the Project on this property because of its distance from the Site. The Phase 1A is attached as Appendix D to Attachment 1.

Heritage determined that approximately two acres of the Project Area possess some archaeological potential. Those areas are situated on a well-drained level landform located near the Farm River and in the vicinity of several previously identified archaeological sites. Those areas, located within the southern and southeastern portions of the Project Area, may contain

archaeological deposits. *Id.* Therefore, per Heritage's recommendation, Citrine has commissioned a Phase 1B Professional Cultural Resources Assessment and Reconnaissance Survey ("Phase 1B"). Fieldwork for the Phase 1B assessment is currently underway and results of this testing will be submitted to SHPO for its review and, thereafter, filed with the Council.

**G. Scenic Values and Visibility**

No state or local designated scenic roads, recreational areas or scenic areas are located proximate to the Site and, therefore, the Project would neither physically nor visually impact any such areas of interest. Additionally, there are no Connecticut Blue Blaze Hiking Trails located proximate to the Site. *See* § 3.8 of Attachment 1.

The nearest off-Site recreational area is Swajchuk Park located approximately one quarter of a mile to the north while the nearest protected open space parcel abuts the Site in the northwest corner. This protected open space parcel (North Branford Parcel ID 36C 17-10) is undeveloped and managed by the North Branford Land Conservation Trust, Inc. *Id.*

Any potential views of the Project would be limited to one-half mile from the Project Area. The Project would be set back from Forest Road (CT Route 22). The solar panels and racking would not exceed a height of approximately ten feet above the final grade. Limited seasonal views of both the Facility and new utility poles, when the leaves are off of the deciduous trees, could extend up to ±0.5 mile to the north and south and would be from locations that are a mix of both residential and undeveloped parcels. Similar to year-round views, potential views of the Facility would be minimized by its relatively low height and the presence of intervening vegetation while views of the utility poles (most likely the very tops) would be minimized due to their slender profile and consistent character with existing infrastructure along Forest Road. Petitioners have agreed to install visual screening features in select locations around the Facility in order to soften

views from locations along Forest Road and residential locations to the northwest. Additionally, Petitioners have agreed to work with the Town to plant sunflowers around the proposed screening measures as part of the Town's Sunflower Project.

## VII. CONCLUSION

This Petition and the appended attachments demonstrate that the Project satisfies the requirements of General Statutes § 16-50k(a). The Project would meet the DEEP's air and water quality standards and would not have a substantial adverse environmental effect. Petitioners have designed the Project to minimize any potential environmental effect. The net effect of the Project would result in a benefit to the State because of the production of renewable energy, participation in the State's VNM and LREC programs and productive use of agricultural property. Petitioners, therefore, respectfully request that the Council grant this Petition that a Certificate is not required for the construction, operation and maintenance of the Project.

Respectfully submitted by,

CP NB SOLAR I, LLC and CP NB SOLAR II, LLC

By: _____

Jesse A. Langer
UPDIKE, KELLY & SPELLACY, P.C.
8 Frontage Road
East Haven, CT 06512
(203) 786-8317
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TAB

# ENVIRONMENTAL ASSESSMENT

PROPOSED

SUNFLOWER SOLAR PROJECT

127 FOREST ROAD (CT ROUTE 22)

NORTH BRANFORD, CONNECTICUT

NEW HAVEN COUNTY

**Prepared for:**

**CP NB Solar I, LLC & CP NB Solar II, LLC**
**55 Greens Farms Road, Suite 200-78**
**Westport, CT 06880**

**Prepared by:**

**All-Points Technology Corporation, P.C.**
**567 Vauxhall Street Ext. – Suite 311**
**Waterford, CT 06385**

**March 2021**

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# Figures



# Tables



# Appendices

# 1 Introduction

All-Points Technology Corporation, P.C. ("APT") prepared this Environmental Assessment ("EA") on behalf of CP NB Solar I, LLC and CP NB Solar II, LLC (hereinafter referred to as the "Petitioner") for the proposed installation of two (2) solar-based electric generating facilities, with outputs of approximately 1.0 megawatts[1] ("MW") and 0.970MW (collectively, the "Project" or "Facility") located in the Town of North Branford, 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.

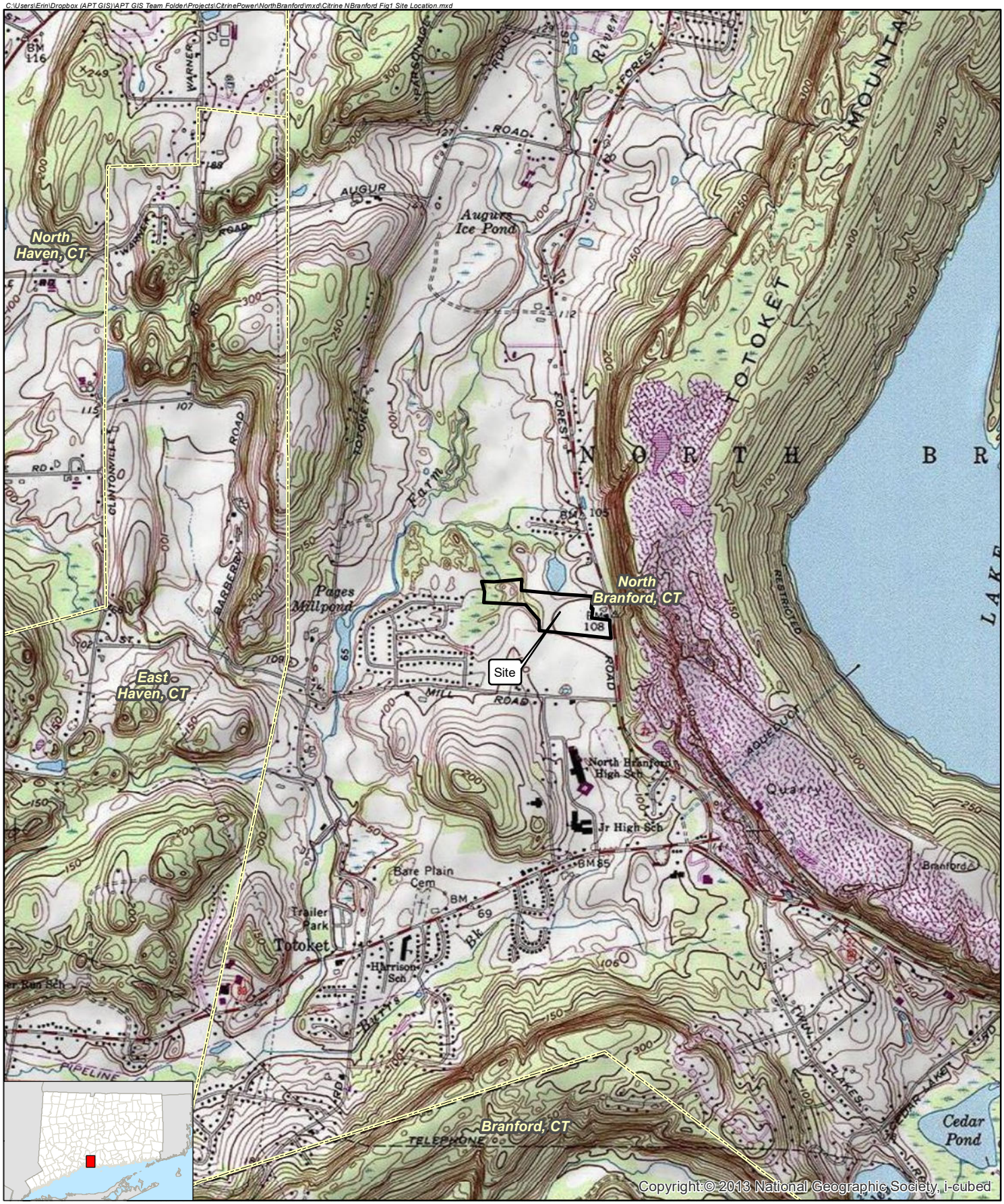
The results of this assessment demonstrates that the proposed development will comply with the Connecticut Department of Energy and Environmental Protection's ("DEEP") air and water quality standards and will not have an undue adverse effect on the existing environment and ecology.

The Project will be located at 127 Forest Road (CT Route 22), an undeveloped, irregularly shaped parcel that encompasses approximately 19.68 acres ("Site"). The privately-owned Site is used for agricultural purposes and is located within the Town's Residential 40 (R-40) zoning district.

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

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

C:\Users\Erin\Dropbox (APT GIS)\APT GIS Team Folder\Projects\CitrinePower\NorthBranford\mxd\Citrine NBranford Fig1 Site Location.mxd




***Legend***

- Site
- Municipal Boundary

**Figure 1**
**Site Location Map**

Proposed Sunflower Solar Facility
127 Forest Road
North Branford, CT

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N

2,000 1,000 0 2,000 Feet

*Map Notes:*
*Base Map Source: USGS 7.5 Minute Topographic Quadrangle Map, Branford, CT (1984)*
*Map Scale:* 1 inch = 2,000 feet
*Map Date: February 2021*

# 2 Proposed Project

## 2.1 Project Setting

The Site is located on the west side of Forest Road (CT Route 22), south of Neubig's Way and north of Mill Road. The Project will be entirely located within the central portion of an agricultural field.

The Site's existing topography gradually slopes down in an east to west direction, with ground elevations ranging from approximately 110 feet above mean sea level ("AMSL") on its east side to approximately 60 feet AMSL to the west.

The surrounding land use is primarily characterized by agricultural land to the south, a mix of undeveloped wooded land and residential development to the north and west, and a large sand and gravel and materials storage operation to the east. Lake Gaillard is located approximately 0.5 mile to the east of the Site.

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

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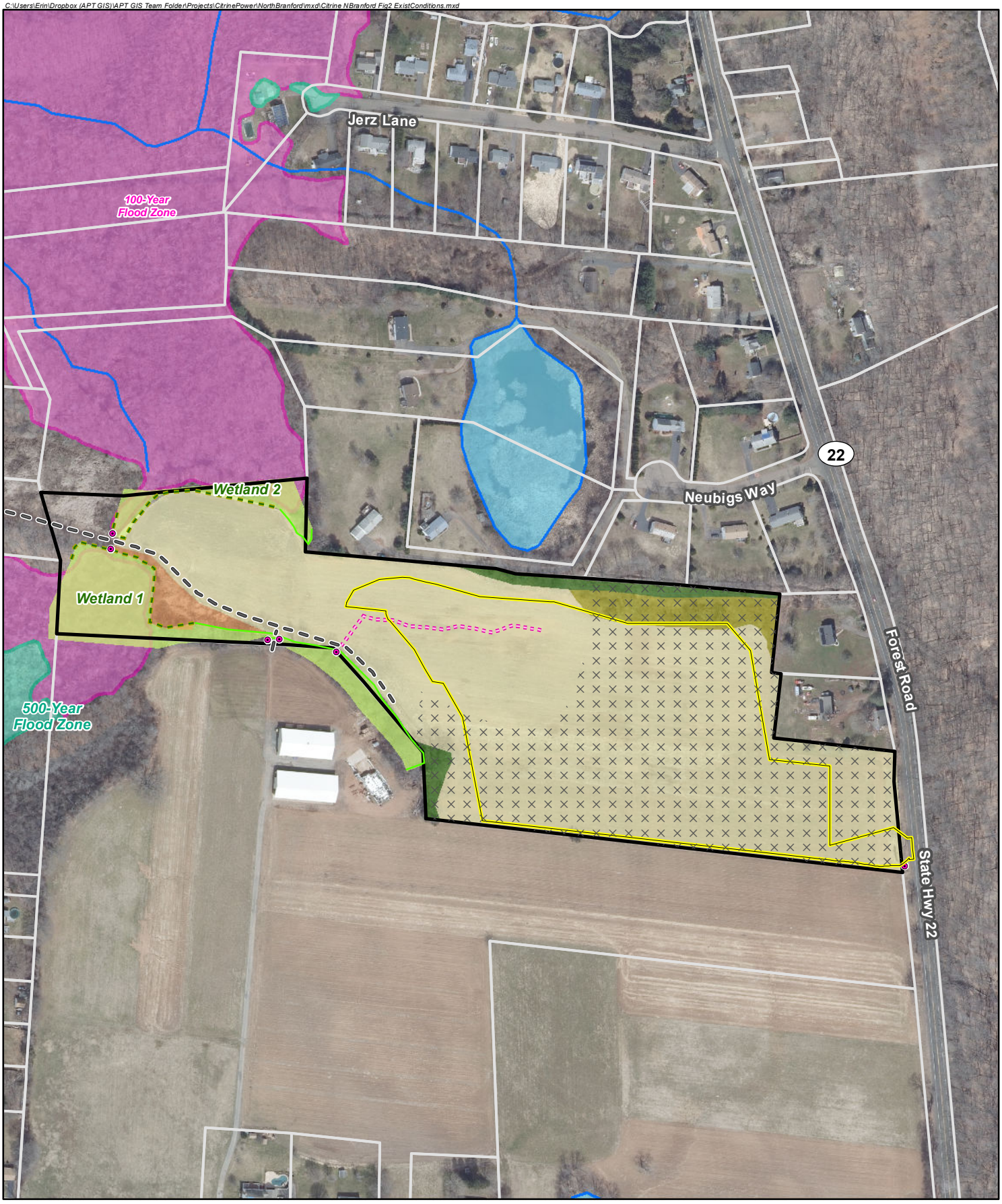


**Legend**

- Site
- Approx. Parcel Boundary
- Project Area
- Farm Road
- Existing Culvert
- Possible Underground Pipe
- 100-Year Flood Zone
- 500-Year Flood Zone
- Floodway
- Surveyed Wetland Boundary
- Approximate Wetland Boundary
- Watercourse (CTDEEP)
- Open Water (CTDEEP)
- Prime Farmland Soils

**Habitat Cover Type**

- Cultivated Agricultural Field
- Disturbed / Old Field
- Mixed Hardwood Forest
- Scrub/Shrub
- Forested Wetland Area

N

300 150 0 300 Feet

*Map Notes:*
*Base Map Source: 2019 Aerial Photograph (CTECO)*
*Map Scale:* 1 inch = 300 feet
*Map Date: February 2021*

# Figure 2
# Existing Conditions Map

Proposed Sunflower Solar Facility
127 Forest Road
North Branford, CT

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## 2.2 Project Development and Operation

Upon its completion, the Facility will consist of a total of 6,656 HELIENE 72M G1 390W photovoltaic modules ("panels"); twenty (20) Delta M125HV inverters; two (2) pad mounted switchgears; two (2) 1,000 kVA transformers, and two (2) service interconnection lines. A ground-mounted racking system will be used to secure the panel arrays. A chain-link security fence will surround the Facility. The fence will rise to a total height of seven and one-half (7.5) feet above grade and will be installed six (6) inches off the ground to allow for safe passage of small animals and avoid trapping within the Facility. Privacy slats and evergreen plantings will be installed along the eastern portion of the Facility, adjacent to Forest Road, and the northwest corner of the Facility. The proposed electrical interconnection will extend overhead along the southern Site boundary to an existing distribution pole located on Forest Road. This will require the installation of approximately five (5) new utility poles. A laydown area will be established within the agricultural field, north of the proposed access road, and west of Forest Road (CT Route 22). Once complete, the Facility will occupy approximately 8.0 acres of the Site with an additional ±2.0 acres of disturbance beyond the fenced limits, for a total of ±10.0 acres ("Project Area"). Of the ±2.0 acres of disturbance beyond the fenced limits, approximately 1.3 acres are temporary and associated with the laydown area and temporary sedimentation basin and will be restored upon completion of construction.

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

The leading edge of the panels will be approximately thirty-six (36) inches above the existing ground surface which will provide adequate room for any accumulating snow to "sheet" off. Any production degradation due to snow build-up has been modeled into the annual system output and performance calculations. The Petitioner does not envision requiring any "snow removal" operations; rather, the snow will be allowed to melt or slide off.

Construction activities within the Project Area will include installing erosion and sedimentation ("E&S") control measures; development of a new access road; grading to incorporate a temporary sedimentation basin; racking and module mounting; electrical trenching; installation of new utility poles; creation of a laydown area; and plantings for visual screening. Existing grades throughout the Project Area will remain except for where the access road intersects with Forest Road and within the northwest corner where a temporary sediment basin is required during construction.

Upon final stabilization, the temporary sediment basin and laydown area will be removed, and the areas restored to existing grade.

The Facility will be unstaffed but will be remotely monitored via Data Acquisition System (DAS); after construction is complete and the Facility is operable, traffic at the Site will be minimal. It is anticipated that the Facility will require mowing and routine maintenance of the electrical equipment one (1) time per year. Annual maintenance will typically involve a maximum of two (2) technicians for a day. Repairs will be made on an as-needed basis.

### 2.2.1 Access

The Facility will be accessed from Forest Road (CT Route 22) via a new ±20 wide gravel drive located at the southeastern end of the Site. The drive will extend west, approximately 330 feet to the Facility's gated fence, and then an additional ±412 feet within the Facility's fenced interior to provide access for construction, service and maintenance vehicles. The new access drive will require minimal grading. The Project will require an Encroachment Permit from the Connecticut Department of Transportation. See Appendix A, *Project Plans.*

### 2.2.2 Public Health and Safety

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

The Facility will be enclosed by a chain-link security fence. The main entrance to the Facility will be gated, limiting access to authorized personnel while one (1) additional gate will be installed along the western fence line to provide access to the western portion of the site as required by the property owner and DEEP. All Town emergency response personnel will have access via a Knox Pad lock.

### 2.2.3 Land Use Plans

The Project is consistent with state and federal policies and will support the state's energy goals by developing a renewable energy resource while not having a substantial adverse environmental effect.[2] The Site is located within the Town's Residential R-40 Zone.

The Town's 2019 Plan of Conservation and Development ("POCD") identifies several objectives that "encourage energy efficiency and sustainable design principals" as well improving sustainability and resiliency by installing "photovoltaic or other renewable energy systems…" The Project's design is consistent with these principles.

Additionally, the Project will benefit the local community by improving the electrical service for existing and future development in the Town through the availability of enhanced local generating capacity that does not rely on the congested regional electrical transmission networks.

[2] Local land use requirements do not apply to this Project.

# 3 Environmental Conditions

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

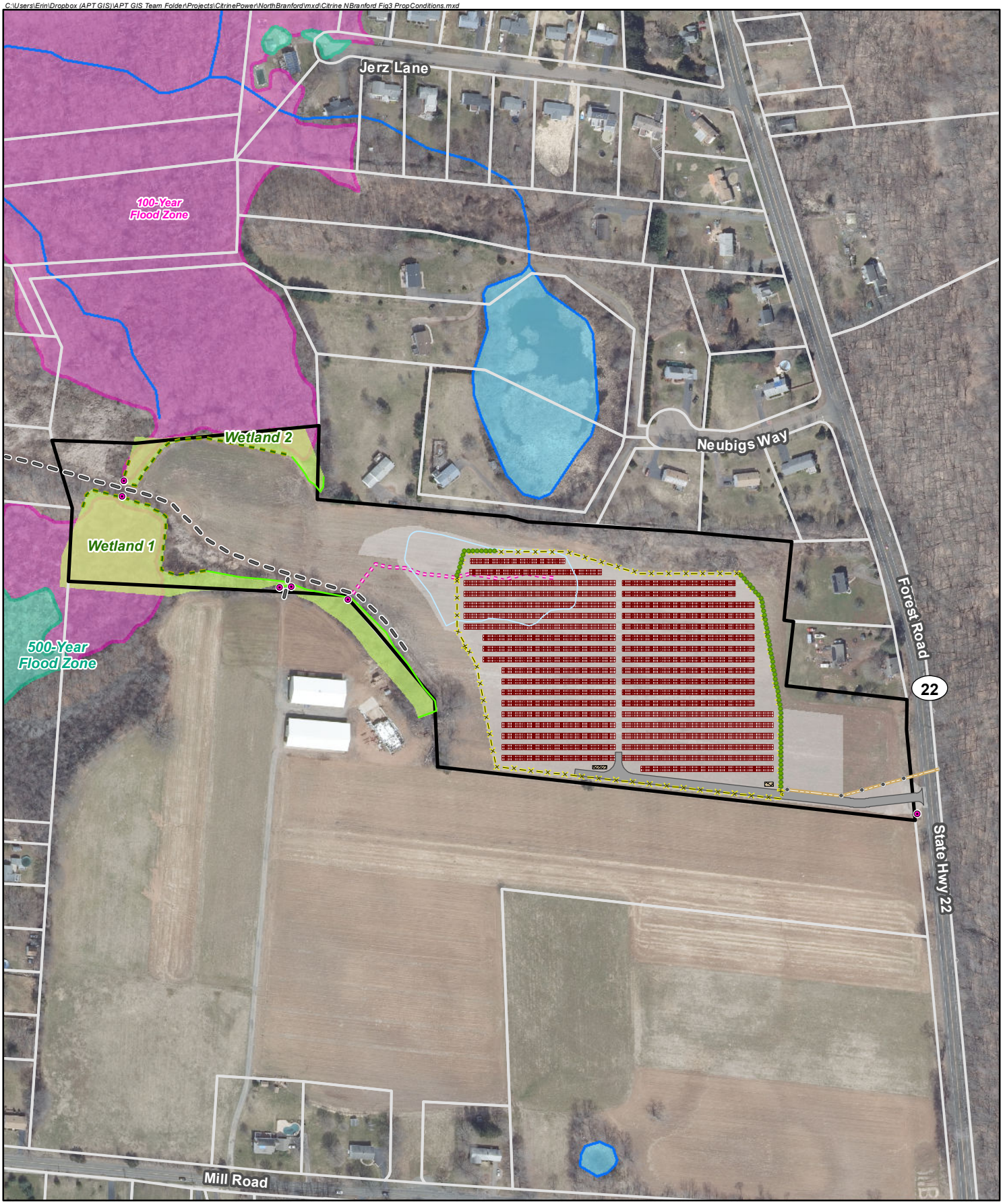
Please refer to Figure 3, *Proposed Conditions Map* for a depiction of the Project and its compatibility with the Site resources discussed herein.

## 3.1 Habitat and Wildlife

Five (5) habitat types (vegetative communities) have been identified on the Site. Transitional ecotones separate these distinct habitat types while interior wetland habitats are also located in proximity to the Project Area. These varied habitats have the ability to support various wildlife species and are as follows.

- Cultivated Agricultural Field;
- Mixed Hardwood Forest;
- Scrub-Shrub;
- Disturbed Old Field; and,
- Forested Wetlands.

Please see Figure 2, *Existing Conditions Map*, for a depiction of each habitat's location on the Site.




**Legend**

- Site
- Approx. Parcel Boundary
- Farm Road
- Existing Culvert
- Possible Underground Pipe
- Watercourse (CTDEEP)
- Open Water (CTDEEP)
- Surveyed Wetland Boundary
- Approximate Wetland Boundary
- Forested Wetland Area
- 100-Year Flood Zone
- 500-Year Flood Zone
- Floodway
- Limit of Disturbance
- Solar Modules
- Conc. Equip. Pad
- Gravel Access Road
- Temp. Sedimentation Basin
- Interconnection Path (OVH)
- Perimeter Fence
- Utility Pole
- Landscape Screening

N

300 150 0 300 Feet

*Map Notes:*
*Base Map Source: 2019 Aerial Photograph (CTECO)*
*Map Scale:* 1 inch = 300 feet
*Map Date: March 2021*

# Figure 3
# Proposed Conditions Map

Proposed Sunflower Solar Facility
127 Forest Road
North Branford, CT

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### 3.1.1 Habitat Types

#### Cultivated Agricultural Field

Cultivated Agricultural Field habitat dominates the majority of the Site and at the time of inspection (October 2020), the northern half of the Site was fallow with exposed soils present. Some remnant vegetation from the past growing season was also present and the southern half was planted with corn and sunflowers.

The majority of the Project Area lies within the Cultivated Agricultural Field and should not result in a significant alteration to the ground underlying the Facility components. Those areas disturbed during construction will be reseeded with a low growth seed mix, Ernst Solar Farm mix or equivalent. Variable growing conditions will result from shading beneath the panel arrays; however, post-construction vegetation maintenance will improve the current management activities within this habitat as a permanent vegetative cover will be established, limiting erosion potential on Site.

#### Mixed Hardwood Forest

The northeast and southwest corners of the Site contain this habitat, as does the far western extent to a lesser degree. These small areas consist of relatively mature second growth deciduous trees.

The Project will not encroach within Mixed Hardwood Forest and as a result, the Project is not expected to have any effect on this habitat.

#### Scrub-Shrub

This habitat occurs in the northeast corner of the Site, immediately south of the Mixed Hardwood habitat. It consists of a small area that was historically cleared in association with the adjacent agricultural field and has not been regularly maintained. As a result, relatively young shrubs, saplings and an herbaceous undergrowth have been established, typical of early successional field edges found throughout southern New England. A small portion of the Project Area (< 0.1-acre) is located within this habitat and Facility development will require only select vegetation removal primarily for construction access and fence installation. Therefore, the Project would have no substantive adverse effect on this area of the Site.

### Disturbed Old Field

This habitat occurs in the western portion of the Site and consists of an area that was historically cleared but not recently maintained, resulting in herbaceous growth typical of field edges throughout southern New England. The Disturbed Old Field habitat is located to the west of the Project Area between the southernmost wetland (Wetland 1; see below) and the existing Cultivated Agricultural Field habitat. No portion of the Project is located within the Disturbed Old Field and therefore, would have no adverse impact to this habitat.

### Wetlands

Two (2) forested wetland areas are located on the Site. The Project will not impact these resources. A more detailed discussion of each is provided in Section 3.3.1.

### Habitat Assessment and Effects

Table 1, *Habitat Areas*, summarizes the total acreages each of the referenced habitats occupy on the Site and the areas that would be impacted by the Project.

**Table 1: Habitat Areas**

| Habitat Areas | | |
|---|---|---|
| Habitat Type | Total Area On-Site (+/- ac.) | Area Affected by Project (+/- ac.) |
| Cultivated Agricultural Field | 15.9 | 9.9 |
| Mixed Hardwood Forest | 0.5 | 0.00 |
| Scrub Shrub | 0.8 | 0.04 |
| Disturbed Old Field | 0.4 | 0.00 |
| Wetlands | 1.6 | 0.00 |

## 3.1.2 Wildlife Habitat

The fenced Facility will be located primarily within the Cultivated Agricultural Field with a small portion of the Project Area (< 0.1 – acre) extending into the Scrub-Shrub habitat. The Cultivated Agricultural Field does not support wildlife habitat in a significant capacity due to routine cultivation of this area and associated agricultural activities.

Development activities associated with the Project will occur along the interface between the Cultivated Agricultural Field and the Scrub-Shrub habitats. Project activities within the Scrub-

Shrub habitat will be limited to selective vegetation removal to allow for the installation of the Facility fence and for maintenance/farm vehicle access.

### 3.1.3 Core Forest Determination

APT reviewed the DEEP's *Forestland Habitat Impact Mapping* [3] which revealed that the Site is not included within an area mapped as core forest. APT also reviewed UConn's Center for Land Use Education and Research's ("CLEAR") Forest Fragmentation Analysis ("FFA")[4] study and, based on FFA criteria, the Site does not contain any forested habitat identified as "core" forest. This is consistent with APT's independent analysis (based on GIS analysis of 2016 leaf-off aerial photography, field observations and professional experience), which indicates that no interior forest block is located on-Site. While limited forested habitat does exist on the northeastern, southwestern and western extents of the Property, these areas are entirely influenced by "edge" effects due to habitat fragmentation and are not considered core forest habitat. As there are no "core" forests habitats located on the Site and no trees will be removed for development of the Project, no impact to core forested resources will occur.

The proposed Facility is under 2 MW and therefore, the Petitioner is not required to obtain a written response from DEEP under Connecticut General Statutes §16-50k(a).

## 3.2 Rare Species

### 3.2.1 Natural Diversity Data Base

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

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

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

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

APT reviewed the most recent DEEP NDDB mapping (December 2020) to determine if any such species or habitats occur partially or entirely on Site. The NDDB mapping reveals that no NDDB polygon exists partially or entirely on Site. Therefore, consultation with NDDB is not required. See Appendix B*, DEEP NDDB Mapping* for location of the nearest NDDB polygon.

### 3.2.2 USFWS Consultation

The northern long-eared bat ("NLEB"; *Myotis septentrionalis*) and Indiana bat (*Myotis sodalis*) are two documented federally-listed threatened species known to occur within the vicinity of the Site. The NLEB's range encompasses the entire State of Connecticut and suitable NLEB roost habitat includes trees (live, dying, dead, or snag) with a diameter at breast height ("DBH") of three (3) inches or greater. Indiana bat is listed due to the Site's proximity to a hibernaculum which may be utilized by this species.

The *Northern long-eared bat areas of concern in Connecticut to assist with Federal Endangered Species Act Compliance map* (February 1, 2016) was reviewed to determine the locations of any known maternity roost trees or hibernaculum in the state. This map reveals that there are currently no known NLEB maternity roost trees in Connecticut. The nearest NLEB habitat resource to the Site is located in North Branford, approximately 1.4 miles to the northeast.

Suitable summer habitat for Indiana bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥5 inches DBH that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors. The proposed Facility, located more than 0.5 mile from the nearest Indiana bat

hibernaculum, would be located primarily within an agricultural field and will not require any tree or forest clearing that would potentially provide or impact Indiana bat summer roosting habitat. Therefore, the proposed activity will have no effect on Indiana bat habitat and no consultation with UFWS is required.

In compliance with the US Fish and Wildlife Service ("USFWS") criteria for assessing NLEB, the Project will not likely result in an adverse effect or incidental take[5] of NLEB and does not require a permit from USFWS. APT consulted with USFWS on February 3, 2021, concerning this determination; if the USFWS does not respond within 30 days then the determination is presumed correct and no further consultation with USFWS is required for the proposed activity.

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

## 3.3 Water Resources

### 3.3.1 Wetlands and Watercourses

An APT Professional Soil Scientist identified two (2) forested wetlands on the Site during a field inspection and wetland delineation survey completed on October 2, 2020. Cumulatively, these wetlands comprise approximately 1.6 acres on the Site. The results of the field delineation are summarized below. The locations of these resources are depicted on Figure 2, *Existing Conditions Map*.

**Wetland 1** is located west of the Project Area. This resource consists of a relatively narrow feature that drains west into a larger wetland system that is part of the Farm River drainage basin. Wetland 1 has been impacted by historic and recent agricultural activities, including: earthen fill material embankments to both the north and south; a culverted farm road crossing located in the central portion of this resource; and, a drainage pipe, apparently from an underdrain located in the adjacent agricultural field to the east, allows for field drainage into Wetland 1.

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

**Wetland 2** is located northwest of the Project Area and is the southern extent of a larger forested wetland system that is located off Site. This wetland resource drains to the northwest and is part of the Farm River drainage basin system. Wetland 2 has also been impacted by recent and historic agricultural activities as evident by fill material embankments along the southern edge of this wetland system.

### 3.3.2 Wetland Impacts

The Project will have no direct or indirect impacts to either Wetland 1 or Wetland 2. The Project Area will maintain a minimum setback of ±100 feet or greater to these resources. See Table 2, *Project Proximity to Wetlands* for distances to wetland resources.

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

Potential long-term secondary impacts to wetland resources associated with the operation of this Facility are minimized by several factors. In addition to maintaining a minimum of 100 feet of separation to the nearest wetland, the development will be unstaffed (generating negligible traffic) with the majority of the ground beneath the solar arrays planted with native grass/vegetation (providing ample opportunity for surface water to infiltrate or slow prior to discharge to surrounding resources). As such, the Project will not have a likely adverse impact to wetland resources.

**Table 2: Project Proximity to Wetlands**

| Project Proximity to Wetlands from Project Area | | |
|---|---|---|
| | Distance (ft.) | Direction (of wetland from Project Area) |
| Wetland 1 | 102 | West |
| Wetland 2 | 149 | Northwest |

### 3.3.3 Floodplain Areas

APT reviewed the United States Federal Emergency Management Agency ("FEMA") Flood Insurance Rate Map ("FIRM") for the Site. A FIRM is the official map of a community on which FEMA has delineated both the special hazard areas and risk premium zones applicable to the community. The Site is mapped on FIRM PANEL #09009C 0458 J, dated May 16, 2017. Based upon the reviewed FIRM Map, the majority of the Site and the entirety of the Project Area are located in an area designated as unshaded Zone X, which is defined as areas of minimal flooding, typically above the 500-year flood level.

The Project Area is not located within a 100- or 500-year flood zone. A small portion of the Site associated with Wetlands 1 and 2 are located in areas designated as Zone AE, which are defined as higher risk flood areas. This area is located within the 100-year flood zone of the Farm River and is elevation 69. The nearest portion of the 100-year flood zone to the Project Area is located approximately 160 feet west of the proposed temporary sediment basin, approximately elevation 75, and ±400 feet west of the fenced Facility.

No special considerations or precautions relative to flooding are required for the Project.

## 3.4 Water Quality

The Facility will be unstaffed and no potable water uses or sanitary discharges are planned. No liquid fuels are associated with the operation of the Facility. The Project has been designed to meet DEEP's *Appendix I, Stormwater Management at Solar Array Construction Projects*. Once operative, the stormwater generated by the proposed development will be properly handled and treated in accordance with the 2004 *Connecticut Stormwater Quality Manual*.

### 3.4.1 Groundwater

Groundwater underlying the Site is classified by the Connecticut Department of Energy and Environmental Protection ("DEEP") as "GAA". This classification indicates groundwater within the area is presumed to be suitable for human consumption without prior treatment.[6]

[6] Designated uses in GAA classified groundwater areas include existing private and potential public or private supplies of drinking water and base flow or hydraulically connected surface waterbodies.

Based upon GIS data maintained by the Connecticut Department of Public Health ("DPH"), the Site is located within the Saltonstall Public Water Supply Watershed. Based upon reviewed CTDEEP mapping, the Site is not located within a mapped (preliminary or final) DEEP Aquifer Protection Area ("APA")

The Project's construction and operation is minimally intrusive by nature and therefore, will not have an adverse environmental effect on ground water quality or watershed areas.

### 3.4.2 Surface Water

Based upon DEEP mapping, the Site is located in Major Drainage Basin 5 (South Central Coastal Basin), Regional Drainage Basin 51 (South Central Eastern Complex), Subregional Drainage Basin 5112 (Farm River), and Local Drainage Basin 5112-00 (Farm River).

The Site is also located in a Public Drinking Water Supply Watershed associated with Lake Saltonstall which is owned and operated by the Regional Water Authority. While the Farm River does not directly drain to Lake Saltonstall, the Regional Water Authority operate a diversion on the Farm River that directs water to the lake.

The nearest mapped waterbody to the Project Area is an unnamed pond that is located approximately 200 feet north of the Site and is classified as a Class AA surface waterbody by the DEEP. Designated uses for Class AA surface water bodies include existing or proposed drinking water supplies; habitat for fish and other aquatic life and wildlife; recreation; and water supply for industry and agriculture.

The Project will have a benefit to the surface water quality through the conversion of cultivated agricultural field to a meadow habitat establishing a permanent vegetative cover. The permanent vegetative cover will reduce the amount of sediment discharge to nearby surface waters. Additionally, sufficient setbacks have been established from water resources resulting in no adverse environmental effects on surface waters and surface water quality. During construction, E&S controls will be installed and maintained in accordance with the 2002 *Connecticut Guidelines for Soil Erosion and Sediment Control*.

### 3.4.3 Stormwater Management

As introduced above, the Project has been designed to meet DEEP's *Appendix I, Stormwater Management at Solar Array Construction Projects*. No tree or stump removal is required for Project development. Site preparation for the Project requires minimal grading, which is limited to construction of the proposed access road and temporary sedimentation basin. The remainder of Project development activities do not require additional grading for the installation of the Facility. *Appendix I* requires calculating a reduction of the Site's Hydrologic Soil Group ("HSG") class by one half (1/2) step (essentially, developing a more conservative evaluation of the proposed conditions versus existing conditions and increasing the estimated amount of surface water runoff). However, the conversion of the existing ground cover from active cultivation to a permanent meadow, including the one half (1/2) step drop of the HSG, results in a decrease in stormwater runoff from existing to proposed conditions. Therefore, the Project will not require permanent stormwater management features.

A temporary sedimentation basin is proposed in the northwest corner of the Project Area to manage potential sediment during construction of the Project. Once the Project Area has achieved final stabilization, the temporary sedimentation basin will be removed by re-grading the area to near existing conditions. If an underground field drain is encountered during construction it will be repaired and/or replaced as required. See Figure 3, *Proposed Conditions Map.* For more detail regarding stormwater management, please refer to the Stormwater Management Report submitted under separate cover.

Portions of the Project Area that are disturbed during construction will be stabilized with a low growth seed mix, Ernst Solar Farm seed mix or equal. To safeguard water resources from potential impacts during construction, the Petitioner is required to implement protective measures in the form of a Stormwater Pollution Control Plan ("SWPCP") to be finalized and submitted to the Council, pending approval by DEEP Stormwater Management. The SWPCP will include the requirements for the establishment, maintenance, and monitoring of E&S controls in accordance with the 2002 *Connecticut Guidelines for Soil Erosion and Sediment Control*. The Petitioner will also apply for a *General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities* from DEEP. The Petitioner has initiated a pre-application meeting with DEEP to discuss the project further.

With the incorporation of these protective measures, stormwater runoff from Project development will not result in an adverse impact to water quality associated with nearby surface water bodies.

## 3.5 Air Quality

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

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

Temporary, potential, construction-related mobile source emissions will include those associated with construction vehicles and equipment. Any potential air quality impacts related to construction activities can be considered de minimis. The Petitioner will encourage contractors to minimize emissions by implementing such measures as limiting idling times of equipment, properly maintaining its vehicle fleet and equipment, and, if necessary, watering/spraying to control dust and particulate releases.

## 3.6 Soils and Geology

Based on a review of publicly-available mapping, surficial materials on and in the vicinity of the Site are comprised of deposits of sand and gravel overlying sand. Soils located on the western portion of the Site (including the western portion of the Project Area) are classified as Pits, indicating a previously disturbed area. Soils located on the eastern portion of the Site (including the eastern portion of the Project Area) are classified as Branford silt loam. Branford silt loams are identified as well-drained outwash coarse-loamy eolian soils deposited over sandy and gravelly glaciofluvial deposits derived from sandstone and shale and/or basalt parent materials.

Bedrock beneath the Site is identified as Shuttle Meadow Formation and is described as a maroon to dark gray, silty shale, siltstone, and fine-grained silty sandstone, generally well and thinly laminated. The Petitioner does not anticipate encountering bedrock during Project development.

Minimal grading is anticipated for construction of the Project and is associated with the proposed gravel access road and installation of the concrete equipment pad, underground electrical conduit, and new utility poles. A temporary sediment basin will be required during construction which

would require grading in the northwestern portion of the Project area. Upon final stabilization, the temporary sediment basin will be removed and the area restored to existing grade.

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

### 3.6.1 Prime Farmland Soils

In accordance with the Code of Federal Regulations, CFR Title 7, part 657, farmland soils include land that is defined as prime, unique, or farmlands of statewide or local importance based on soil type. They represent the most suitable land for producing food, feed, fiber, forage, and oilseed crops. According to the Connecticut Environmental Conditions Online Resource Guide,[7] the Site contains Prime Farmland Soils within the eastern and southern portions of the Project Area. (See Figure 2, *Existing Conditions Map).*

The Project Area has been in agricultural use for much of its recorded history. These continued activities have subjected the majority of the Project Area to routine disturbances associated with plowing and cultivation.

Recognizing that the Project has a useful life and could be considered temporary in nature, the Petitioner has proposed using minimally intrusive methods for construction of the Facility. The use of pile-driven mounts for installation of the solar panels and associated equipment minimizes the need for substantial grading. Some excavation and regrading activities are necessary within areas mapped as Prime Farmland Soils to facilitate the development of the proposed access road but no part of the temporary sedimentation basin will be located within these mapped areas. Topsoil removed from these areas will be segregated from underlying horizons and either stockpiled or spread throughout the Project Area as top dressing for reestablishing vegetation. No topsoil will leave the Site.

After its useful life, the Facility will be decommissioned and all of the disturbed areas will be top dressed with native soils and reseeded. Implementation of these proposed design strategies demonstrates that the Project will not materially affect Prime Farmland Soils.

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

Table 3, *Farmland Soils Assessment* provided below details the amount of farmland soils located on the Site and the proposed effects of the Project.

**Table 3: Farmland Soils Assessment**

| Farmland Soils Assessment | | |
|---|---|---|
| Farmland Soil Classification | Total Area On-Site (+/- ac.) | Area within Project Limits (+/- ac.) |
| Prime Farmland Soil Area | 10.3 | 7.3 |

As the proposed Facility is under 2 MW, the Petitioner is not required to obtain a written response from the Connecticut Department of Agriculture ("DOA") under Connecticut General Statutes §16-50k(a).

## 3.7 Historic and Archaeological Resources

Heritage Consultants LLC ("Heritage Consultants") of Newington, Connecticut, reviewed relevant historic and archaeological information and conducted a pedestrian survey to determine whether the Site holds potential cultural resource significance. Their review of historic maps, aerial images of the Site, and files maintained by the Connecticut State Historic Preservation Office ("SHPO") revealed one (1) National Register of Historic Places ("NRHP") property within one (1) mile of the Site. This resource is not proximate to the Project Area and due to its distance from the Site, no direct or indirect effects from the Project are anticipated.

In terms of archaeological potential, it was determined that approximately two (2) acres of the Project Area are situated on a well-drained level landform located near the Farm River and in the vicinity of several previously identified archaeological sites. This area, located within the southern and southeastern portions of the Project Area, may contain archaeological deposits. Therefore, a Phase 1B Professional Cultural Resources Assessment and Reconnaissance Survey ("Phase 1B") has been recommended.

Fieldwork for the Phase 1B assessment is currently underway and results of this testing will be submitted to SHPO for their review and concurrence.

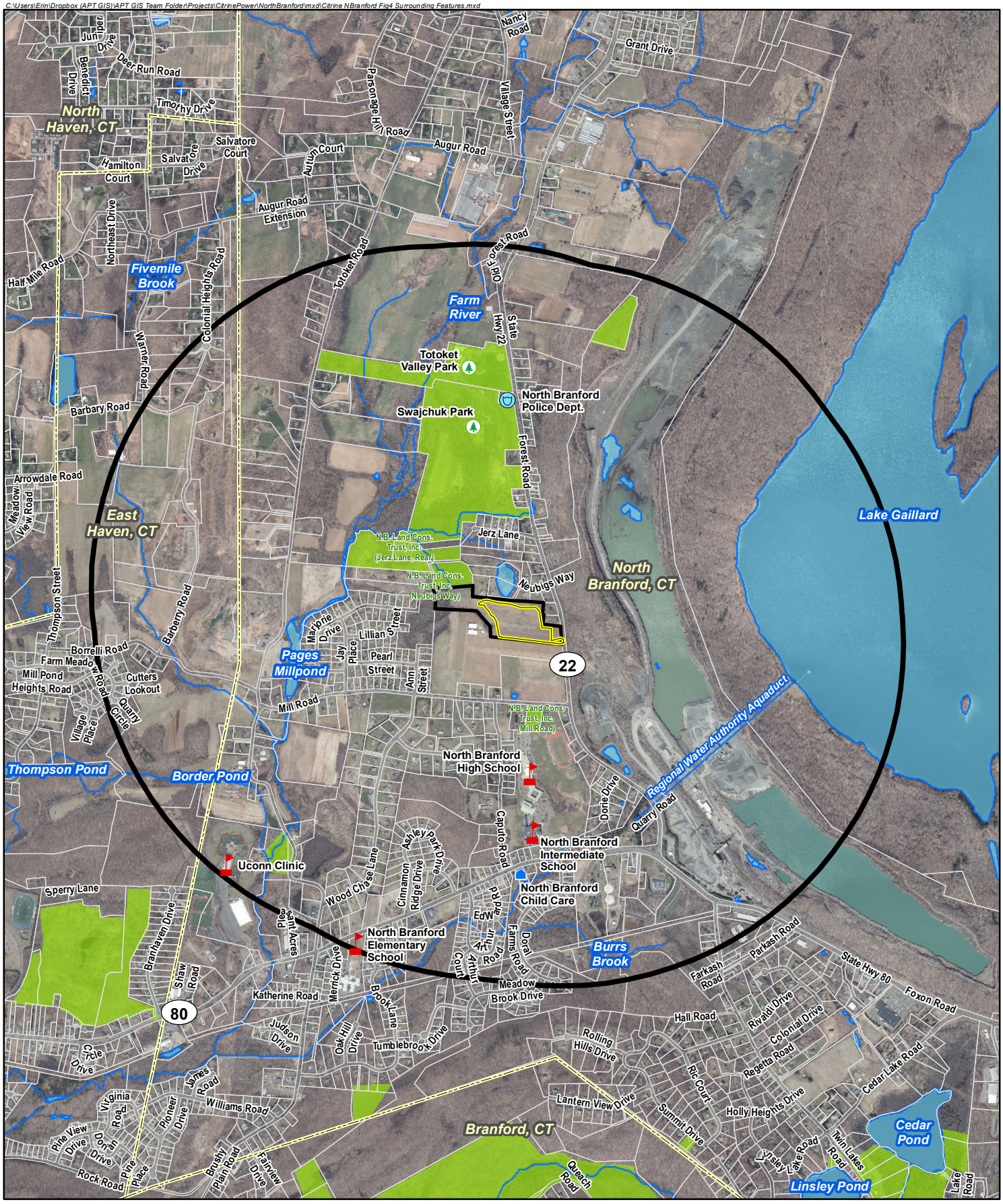
Copies of the Phase 1A Cultural Resources Assessment Survey Reports are included in Appendix D, *Phase 1A Cultural Resources Assessment Survey Report.*

The Petitioner will provide the Council with additional SHPO correspondence regarding the Phase 1B assessment upon receipt.

## 3.8 Scenic and Recreational Areas

No state or local designated scenic roads, recreational areas or scenic areas are located proximate to the Site and therefore none will be physically or visually impacted by development of the Project. Additionally, there are no CT Blue Blaze Hiking Trails located proximate to the Site.

The nearest off-Site recreational area is Swajchuk Park located approximately 0.25 mile to the north while the nearest protected open space parcel abuts the Site in the northwest corner. This protected open space parcel (North Branford Parcel ID 36C 17-10) is undeveloped and managed by the North Branford Land Conservation Trust, Inc. See Figure 4, *Surrounding Features Map,* for other resources located within one mile of the Site.




**Legend**

- 1 Mile Radius
- Site
- Project Area
- Approximate Parcel Boundary
- Municipal Boundary
- Watercourse (CTDEEP)
- Open Water (CTDEEP)

**Surrounding Features**

- School
- Daycare
- Park/Recreation
- Police Dept.
- Municipal and Private Open Space Property

*Map Notes:*
*Base Map Source: 2019 Aerial Photograph (CTECO)*
*Map Scale:* 1 inch = 2,000 feet
*Map Date: February 2021*

N

2,000 1,000 0 2,000 Feet

# Figure 4
## Surrounding Features Map

Proposed Sunflower Solar Facility
127 Forest Road
North Branford, CT

CITRINE

ALL-POINTS TECHNOLOGY CORPORATION

## 3.9 Noise

The majority of the Site is undeveloped. Besides the noise associated with periodic farming activities, no unusual noise sources presently exist.

Construction noise is exempted in the Town's Code, Part II, General Legislation, Chapter 170 – Noise §170-6 Exemptions. During construction of the Facility, the temporary increase in noise would likely raise localized ambient sound levels immediately surrounding the Project Area. Standard types of construction equipment would be used for the Project. In general, the highest noise level from this type of equipment (e.g., backhoe, bulldozer, crane, trucks, etc.) is approximately 88 dBA at the source.

Once operational, noise from the Project will be minimal and meet applicable Town noise standards for a Residential Daytime/Nighttime Zones.[8] The Facility is located within a Residential (R-40) zone and conservatively, the Facility would be considered an Industrial noise emitter to Residential receptors. As such, it is subject to noise standards of 55 dBA during the daytime and 45 dBA at night.

The only noise generating equipment planned at the Facility are the inverters and transformers. Based on the most conservative information provided by specified equipment manufacturers, the loudest proposed equipment are the two (2) 1,000 kVA transformers that will generate a maximum sound level of approximately 58 dBA (measured at 1-foot away).

Sound reduces with distance and the inverters and transformers are inactive at night. The closest property line to the either transformer is approximately 32 feet to the south (currently undeveloped agricultural land) while the nearest residence, located at 148 Forest Road, is located approximately 225 feet to the northeast. Both parcels are zoned Residential (R-40).

APT applied the Inverse Square Law[9] to evaluate the relative sound level of transformers at the nearest property lines. Based on these calculations, nearby receptors are of sufficient distances

[8] Town of North Branford's Code, Part II, General Legislation, Chapter 170 – Noise §170-4 Noise Zone Standards.

[9] Inverse Square Law states that *the intensity of a force is inversely proportional to the square of the distance from that force*. With respect to sound, this means that any a noise will have a drastic drop-off in volume as it moves away from the source and then shallows out.

from the proposed Project-related equipment and noise levels during Facility operation (daytime only) will be below 55 dBA at surrounding property lines.

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

## 3.10 Lighting

The Site is undeveloped; no light sources currently exist.

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

## 3.11 FAA Determination

APT submitted relevant Project information to the Federal Aviation Administration ("FAA") for an aeronautical study to evaluate potential hazards to air navigation based on the several points to define the extent of the Project. The FAA provided Determinations of No Hazard to Air Navigation on December 1, 2020. See Appendix F, *FAA Determination*. Based on this determination, there is no need to conduct a glare analysis.

## 3.12 Visibility

The Facility will consist of 6,656 non-reflective solar panels, measuring approximately 10 feet above final grade, surrounded by a chain-link security fence. In order to soften views from locations along Forest Road and residential locations to the northwest, the Petitioner has agreed to install visual screening features in select locations around the Facility. Privacy slats and visual screening plantings will be installed along the entire eastern fence line of the Facility and a small portion of the northwest fence corner. Residences directly north are separated from the Project Area by an existing forested buffer that may allow seasonal leaf-off views of the Facility from specific locations. Additionally, the Petitioner is committed to working with the Town of North Branford to allow for the planting of sunflowers outside of the Facility, as part of the Town's Sunflower Project.

The proposed electrical interconnection to an existing distribution pole located to the east of the Facility on Forrest Road will require the installation of approximately 5 new utility poles.

The majority of the Site itself is primarily agricultural fields with pockets of wooded areas located to the northeast, west and southwest of the Facility. The Site vicinity, particularly to the south, is generally undeveloped agricultural land devoid of trees while locations to the northwest and east are wooded and undeveloped. Residential developments are located to the north, west, and south of the proposed Facility.

Year-round visibility of the proposed Facility beyond the Site will be primarily from locations to the south, up to and including residential properties located along Mill Road approximately 0.2 mile to the south. Potential views may extend up to approximately 0.5 mile away to the south, southwest and west as elevations begin to rise. Some potential limited year-round views of the new utility poles from locations to the west, south and east may also be experienced, with the farthest locations being to the southwest at distances up to ±0.5 mile away (where the tops of the poles may be visible). The majority of properties with potential year-round views of the utility poles are primarily undeveloped.

Limited seasonal views of both the Facility and new utility poles, when the leaves are off of the deciduous trees, could extend up to ±0.5 mile to the north and south and would be from locations that are a mix of both residential and undeveloped parcels. Similar to year-round views, potential views of the Facility would be minimized by its relatively low height and the presence of intervening vegetation while views of the utility poles (most likely the very tops) would be minimized due to their slender profile and consistent character with existing infrastructure along Forest Road.

The solar modules are designed to absorb incoming solar radiation and minimize reflectivity, such that only a small percentage of incidental light will be reflected off the panels. This incidental light is significantly less reflective than common building materials, such as steel, or the surface of smooth water. The panels will be tilted up toward the southern sky at a fixed angle of 20 degrees, thereby further reducing reflectivity.

A viewshed analysis map developed for this Project depicts areas of potential visibility surrounding the Facility. Representative photo-simulations from four (4) nearby, publicly-accessible locations have also been prepared. Please see Appendix G, *Proposed Conditions Viewshed Map* and *Photo-Simulations*

# 4 Conclusion

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

No tree clearing is required, and no core forest will be affected by the Project. The Project is not expected to result in a significant negative impact to existing habitats or wildlife use of the Site.

A portion of the Project Area is located within mapped prime farmland soils. The Petitioner has designed the Project to minimize disturbances to these soils by proposing minimally intrusive methods for construction and installation of Facility components and limiting the amounts of cuts/fills and grading to the extent feasible. Once the Facility has reached the end of its projected useful life, the panels and equipment can be removed and the Project Area restored.

No wetlands or watercourses will be directly or temporarily impacted by the construction of the Facility. A development buffer of 100 feet has been established from wetlands. E&S controls will be installed and maintained throughout construction in accordance with the 2002 *Connecticut Guidelines for Soil Erosion and Sediment Control*. Implementing these management techniques will mitigate the potential for adverse impacts to surrounding wetland and surface water resources.

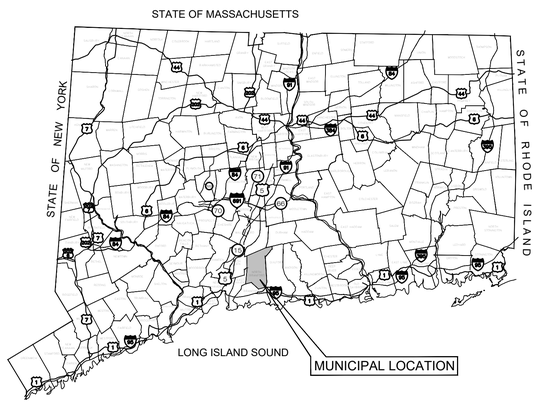
No State-listed species have been identified as potentially occurring within the vicinity of the Site. Northern long-eared bat and Indiana bat was identified as potentially occurring within the vicinity. As no tree clearing is involved in development of the Facility, no adverse impact to these species is anticipated.

Portions of the Facility will be seen from surrounding areas, primarily to the south, including residential properties and nearby public roadways. Screening along the eastern and northwest fence lines will soften views from neighboring properties in those locations. Residences directly north are separated from the Project Area by existing forested buffer that may allow for seasonal leaf-off views of the Facility from specific locations.

Overall, the Project's design minimizes the creation of impervious surfaces. Some regrading will be required for the construction of the gravel access roads and for installing a temporary sediment basin, but the majority of the Project Area will maintain existing grades. The Project has been designed in accordance with the DEEP's *Appendix I, Stormwater Management at Solar Array Construction Projects* and *General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities*. The Petitioner will implement a SWPCP, in accordance with the 2002 *Connecticut Guidelines for Soil Erosion and Sediment Control*, that will include provisions for establishing, maintaining, and monitoring E&S controls and Project development activities throughout construction.

# APPENDIX A

PROJECT PLANS




# CP NB SOLAR I & II, LLC

# "SUNFLOWER SOLAR"

# 127 FOREST ROAD
# NORTH BRANFORD, CT 06472

## LIST OF DRAWINGS



## SITE INFORMATION

| | |
|---|---|
| SITE NAME: | "SUNFLOWER SOLAR" |
| LOCATION: | 127 FOREST ROAD<br>NORTH BRANFORD, CT 06472 |
| SITE TYPE/DESCRIPTION: | ADD (1) GROUND MOUNTED SOLAR PANEL ARRAY W/ ASSOCIATED EQUIPMENT, GRAVEL ACCESS ROAD, AND STORMWATER MANAGEMENT. |
| PROPERTY OWNER: | WHAT TF LLC<br>218 FOXON ROAD<br>EAST HAVEN, CT 06513 |
| APPLICANT: | CP NB SOLAR I & II, LLC<br>55 GREEN FARMS RD, SUITE 200-78<br>WESTPORT, CT 06880 |
| ENGINEER CONTACT: | BRADLEY J. PARSONS, P.E.<br>(860) 663-1697 x208 |
| LATITUDE: | 41°20'33.52" N |
| LONGITUDE: | 72°48'07.66" W |
| ELEVATION: | 82'± AMSL |
| MBLU: | 36C-16 |
| ZONE: | R-40 |
| EXISTING LAND USE: | AGRICULTURAL |
| PROPOSED LAND USE: | COMMUNICATIONS, TRANSPORTATION AND PUBLIC UTILITY USES<br>- LARGE SCALE GROUND MOUNTED SOLAR PHOTOVOLTAIC INSTALLATIONS |
| TOTAL SITE ACREAGE: | 19.678± AC. |
| TOTAL DISTURBED AREA: | 9.96± AC. |
| ACCESS ROAD: | |
| APPROX. VOLUME OF CUT: | 0± CY |
| APPROX. VOLUME OF FILL: | 642± CY |
| APPROX. NET VOLUME: | 642± CY OF FILL |
| TEMPORARY SEDIMENT BASIN: | |
| APPROX. VOLUME OF CUT: | 1633± CY |
| APPROX. VOLUME OF FILL: | 320± CY |
| APPROX. NET VOLUME: | 1313± CY OF CUT |

## USGS TOPOGRAPHIC MAP


SCALE : 1" = 2000'± SOURCE: NRCS NEW HAVEN CT DIGITAL RASTER GRAPHIC COUNTY MOSAIC, 2001


CITRINE
55 GREENS FARMS ROAD
SUITE 200-78
WESTPORT, CT 06880
OFFICE: (203)-557-5554

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


**CSC PERMIT SET**

| NO | DATE | REVISION |
|---|---|---|
| 0 | 03/03/21 | FOR REVIEW: BJP |
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |

**DESIGN PROFESSIONAL OF RECORD**

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

OWNER: WHAT TF LLC

ADDRESS: 218 FOXON ROAD EAST HAVEN, CT 06513

**SUNFLOWER SOLAR**

SITE ADDRESS: 127 FOREST ROAD NORTH BRANFORD, CT 06472

APT FILING NUMBER: CT567130

DRAWN BY: JT

DATE: 03/03/21 CHECKED BY: BJP

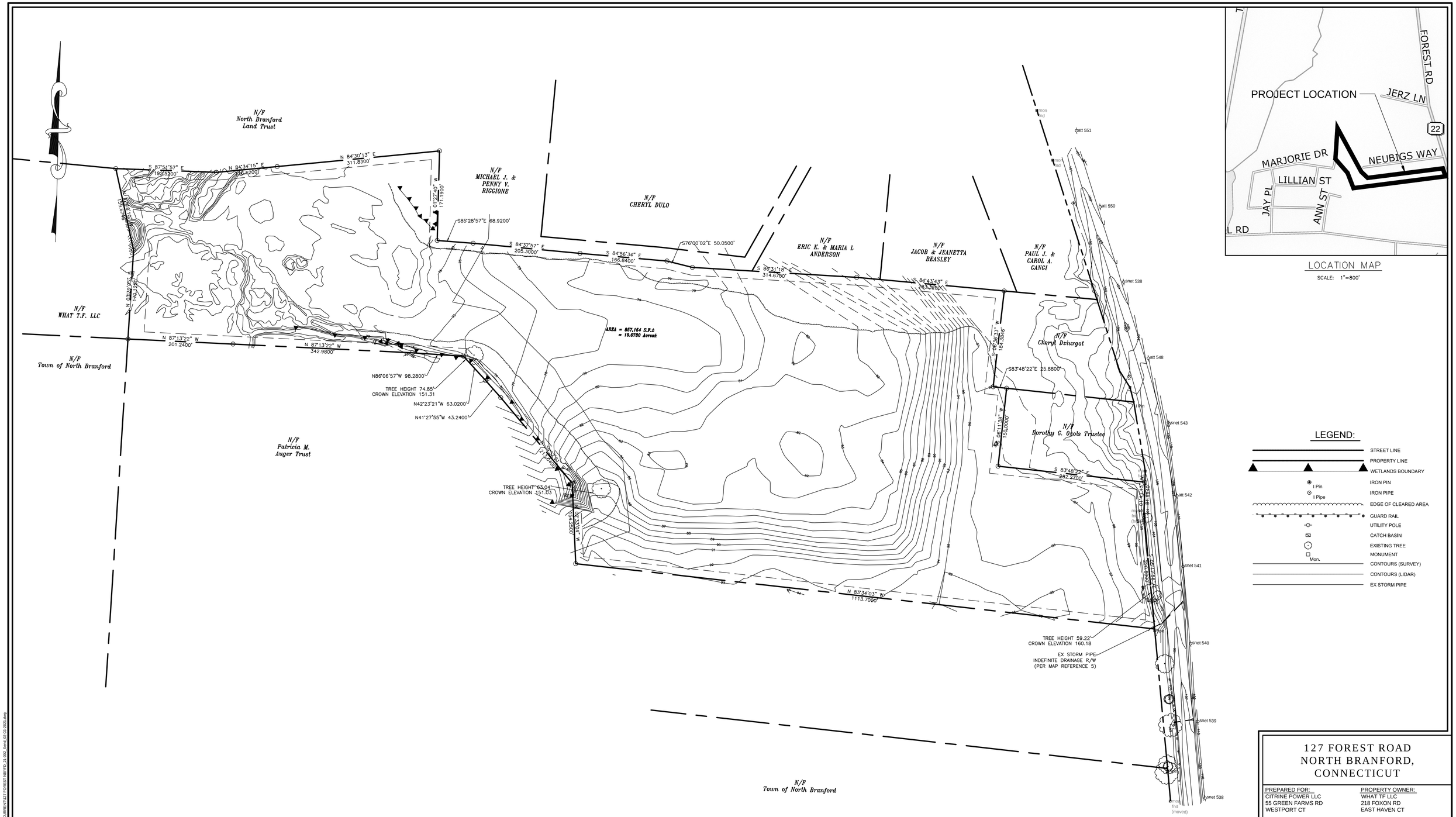
SHEET TITLE:

**TITLE SHEET & INDEX**

SHEET NUMBER:

**T-1**

STATE OF CONNECTICUT BRADLEY J. PARSONS 28025 LICENSED PROFESSIONAL ENGINEER







LOCATION MAP

SCALE: 1"=800'

## LEGEND:

- STREET LINE
- PROPERTY LINE
- WETLANDS BOUNDARY
- IRON PIN (I Pin)
- IRON PIPE (I Pipe)
- EDGE OF CLEARED AREA
- GUARD RAIL
- UTILITY POLE
- CATCH BASIN
- EXISTING TREE
- MONUMENT (Mon.)
- CONTOURS (SURVEY)
- CONTOURS (LIDAR)
- EX STORM PIPE

*LOCATION AND ELEVATION OF UNDERGROUND UTILITIES UNLESS OTHERWISE NOTED IS UNKNOWN AND SHOULD BE FIELD VERIFIED BY CONTRACTOR PRIOR TO CONSTRUCTION*

*ANY USE OR REUSE OF ORIGINAL OR ALTERED CADD DESIGN MATERIALS BY THE CLIENT, CONTRACTOR OR OTHER PARTIES WITHOUT THE REVIEW AND WRITTEN APPROVAL OF AN AUTHORIZED REPRESENTATIVE OF NAFIS & YOUNG ENGINEERS, INC. SHALL BE AT THE SOLE RISK OF CLIENT, CONTRACTOR, OR OTHER PARTY AGREES TO DEFEND, INDEMNIFY, AND HOLD NAFIS & YOUNG ENGINEERS, INC. HARMLESS FROM ALL CLAIMS, INJURIES, DAMAGES, LOSSES, EXPENSES AND ATTORNEY'S FEES ARISING OUT OF THE MODIFICATION OR REUSE OF THESE MATERIALS.*

## REFERENCES:


1. "Resubdivision Map, Big Meadows, Section 2, Sheets 1–3 " Dated July 24, 1987, Scale 1" = 40', By United International Corporation, On file Town Clerk's Office as maps 13–30 A–C.
2. "Augur Property, #105 Mill Rd–Dependent Property Survey" Dated April 10th, 1995, Scale 1" = 100', By Criscuolo–Shepard Associates, PC, On file in Town Clerks Office as map 16–34
3. "Country Estates Subdivision, Owner Nancy Spezzano" Dated July 10th, 1973, Scale 1" = 20', By Arthur W. Syogren, On file in Town Clerls Office as map 7–25
4. "North Branford Estates, Sections 1 & 2, Owned and Develped by North Branford Estates, Located on Mill rd North Branford Conn" Dated June 26th 1956, Scale 1" = 60' & 1" = 100', By M.R. Moody, On file in Town Clerks office
5. "Connecticut State Highway Department, Right Of Way Map, Town of North Branford, Forest Rd, From Mill Rd Northerly to Augur rd Route Number 139 98–09" Dated January 31st, 1938, Scale 1" = 40', By C.B.S.


## SURVEY NOTES:

1. This survey and map have 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 and DATA ACCUMULATION PLAN based on a DEPENDENT RESURVEY conforming to Horizontal Accuracy Class "A-2" and is intended to be used for a Property Survey.
2. Property is located in R-40 zoning district
3. Topographic accuracy class "T-2"

# 127 FOREST ROAD
# NORTH BRANFORD, CONNECTICUT

| PREPARED FOR: | PROPERTY OWNER: |
|---|---|
| CITRINE POWER LLC<br>55 GREEN FARMS RD<br>WESTPORT CT | WHAT TF LLC<br>218 FOXON RD<br>EAST HAVEN CT |

## EXISTING CONDITIONS


*NAFIS & YOUNG ENGINEERS, INC.*
1355 Middletown Avenue
Northford, Connecticut 06472
*Phone: (203) 484–2793*
*Fax: (203) 484–7343*
*Email: nyeng@nafisandyoung.com*


DATE: JANUARY 14, 2021
REV: FEBRUARY 03, 2021

JOB NO. 2020–100 | SHEET NO. 01

# GENERAL NOTES

1. ALL CONSTRUCTION SHALL COMPLY WITH PROJECT DEVELOPER STANDARDS, TOWN OF NORTH BRANFORD STANDARDS, CONNECTICUT DEPARTMENT OF TRANSPORTATION STANDARDS AND SPECIFICATIONS IN THE ABOVE REFERENCED INCREASING HIERARCHY. IF SPECIFICATIONS ARE IN CONFLICT, THE MORE STRINGENT SPECIFICATION SHALL APPLY.
2. IF NO PROJECT CONSTRUCTION SPECIFICATION PACKAGE IS PROVIDED BY THE PROJECT DEVELOPER OR THEIR REPRESENTATIVE, THE CONTRACTOR SHALL COMPLY WITH THE MANUFACTURE, TOWN OF NORTH BRANFORD, OR CONNECTICUT DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, AND BE IN ACCORDANCE WITH ALL APPLICABLE OSHA, FEDERAL, STATE AND LOCAL REGULATIONS.
3. THE PROJECT DEVELOPER IS RESPONSIBLE FOR OBTAINING ALL NECESSARY ZONING, STORMWATER, AND CONNECTICUT DEPARTMENT OF TRANSPORTATION ENCROACHMENT PERMITS REQUIRED BY GOVERNMENT AGENCIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL OBTAIN ALL TOWN OF NORTH BRANFORD CONSTRUCTION PERMITS. THE CONTRACTOR SHALL POST ALL BONDS, PAY ALL FEES, PROVIDE PROOF OF INSURANCE AND PROVIDE TRAFFIC CONTROL NECESSARY FOR THIS WORK.
4. REFER TO PLANS, DETAILS AND REPORTS PREPARED BY ALL-POINTS TECHNOLOGY CORPORATION FOR ADDITIONAL INFORMATION. THE CONTRACTOR SHALL VERIFY ALL SITE CONDITIONS IN THE FIELD AND CONTACT THE PROJECT DEVELOPER IF THERE ARE ANY QUESTIONS OR CONFLICTS REGARDING THE CONSTRUCTION DOCUMENTS AND/OR FIELD CONDITIONS SO THAT APPROPRIATE REVISIONS CAN BE MADE PRIOR TO BIDDING/CONSTRUCTION. ANY CONFLICT BETWEEN THE DRAWINGS AND SPECIFICATIONS SHALL BE CONFIRMED WITH THE PROJECT DEVELOPERS CONSTRUCTION MANAGER PRIOR TO CONSTRUCTION.
5. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS OF ALL PRODUCTS, MATERIALS PER PLANS AND SPECIFICATIONS TO THE PROJECT DEVELOPER FOR REVIEW AND APPROVAL PRIOR TO FABRICATION OR DELIVERY TO THE SITE. ALLOW A MINIMUM OF 14 WORKING DAYS FOR REVIEW.
6. SHOULD ANY UNKNOWN OR INCORRECTLY LOCATED EXISTING PIPING OR OTHER UTILITY BE UNCOVERED DURING EXCAVATION, CONSULT THE PROJECT DEVELOPER IMMEDIATELY FOR DIRECTIONS BEFORE PROCEEDING FURTHER WITH WORK IN THIS AREA.
7. DO NOT INTERRUPT EXISTING UTILITIES SERVICING FACILITIES OCCUPIED AND USED BY THE PROJECT DEVELOPER OR OTHERS DURING OCCUPIED HOURS, EXCEPT WHEN SUCH INTERRUPTIONS HAVE BEEN AUTHORIZED IN WRITING BY THE PROJECT DEVELOPER AND THE LOCAL MUNICIPALITY. INTERRUPTIONS SHALL ONLY OCCUR AFTER ACCEPTABLE TEMPORARY SERVICE HAS BEEN PROVIDED.
8. THE CONTRACT LIMIT IS THE PROPERTY LINE UNLESS OTHERWISE SPECIFIED OR SHOWN ON THE CONTRACT DRAWINGS.
9. THE CONTRACTOR SHALL ABIDE BY ALL OSHA, FEDERAL, STATE AND LOCAL REGULATIONS WHEN OPERATING CRANES, BOOMS, HOISTS, ETC. IN CLOSE PROXIMITY TO OVERHEAD ELECTRIC LINES. IF CONTRACTOR MUST OPERATE EQUIPMENT CLOSE TO ELECTRIC LINES, CONTACT POWER COMPANY TO MAKE ARRANGEMENTS FOR PROPER SAFEGUARDS. ANY UTILITY COMPANY FEES SHALL BE PAID FOR BY THE CONTRACTOR.
10. THE CONTRACTOR SHALL COMPLY WITH OSHA CFR 29 PART 1926 FOR EXCAVATION TRENCHING AND TRENCH PROTECTION REQUIREMENTS.
11. THE ENGINEER IS NOT RESPONSIBLE FOR SITE SAFETY MEASURES TO BE EMPLOYED DURING CONSTRUCTION. THE ENGINEER HAS NO CONTRACTUAL DUTY TO CONTROL THE SAFEST METHODS OR MEANS OF THE WORK, JOB SITE RESPONSIBILITIES, SUPERVISION OF PERSONNEL OR TO SUPERVISE SAFETY AND DO NOT VOLUNTARILY ASSUME ANY SUCH DUTY OR RESPONSIBILITY.
12. THE CONTRACTOR SHALL RESTORE ANY DRAINAGE STRUCTURE, PIPE, CONDUIT, PAVEMENT, CURBING, SIDEWALKS, LANDSCAPED AREAS OR SIGNAGE DISTURBED DURING CONSTRUCTION TO THEIR ORIGINAL CONDITION OR BETTER, AS APPROVED BY THE PROJECT DEVELOPER OR TOWN OF NORTH BRANFORD.
13. THE CONTRACTOR SHALL PROVIDE AS-BUILT RECORDS OF ALL CONSTRUCTION (INCLUDING UNDERGROUND UTILITIES) TO THE PROJECT DEVELOPER AT THE END OF CONSTRUCTION.
14. ALTERNATIVE METHODS AND PRODUCTS, OTHER THAN THOSE SPECIFIED, MAY BE USED IF REVIEWED AND APPROVED BY THE PROJECT DEVELOPER, ENGINEER, AND APPROPRIATE REGULATORY AGENCY PRIOR TO INSTALLATION DURING THE BIDDING/CONSTRUCTION PROCESS.
15. INFORMATION ON EXISTING UTILITIES AND STORM DRAINAGE SYSTEMS HAS BEEN COMPILED FROM AVAILABLE INFORMATION INCLUDING UTILITY PROVIDER AND MUNICIPAL RECORD MAPS AND/OR FIELD SURVEY AND IS NOT GUARANTEED CORRECT OR COMPLETE. UTILITIES AND STORM DRAINAGE SYSTEMS ARE SHOWN TO ALERT THE CONTRACTOR TO THEIR PRESENCE AND THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ACTUAL LOCATIONS AND ELEVATIONS OF ALL UTILITIES AND STORM DRAINAGE SYSTEMS INCLUDING SERVICES. PRIOR TO DEMOLITION OR CONSTRUCTION, THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" 72 HOURS BEFORE COMMENCEMENT OF WORK AT "811" AND VERIFY ALL UTILITY AND STORM DRAINAGE SYSTEM LOCATIONS.
16. NO CONSTRUCTION OR DEMOLITION SHALL BEGIN UNTIL APPROVAL OF THE FINAL PLANS IS GRANTED BY ALL GOVERNING AND REGULATORY AGENCIES.

# SITE PLAN NOTES

1. THE SURVEY WAS PROVIDED BY NAFIS & YOUNG ENGINEERS, INC. DATED FEBRUARY 03, 2021.
2. THERE ARE WETLANDS LOCATED ON THE SITE AS INDICATED ON THE PLANS. WETLANDS BOUNDARIES WERE FLAGGED AND LOCATED BY ALL-POINTS TECHNOLOGY CORPORATION, ON OCTOBER 2020.
3. THERE WILL BE MINIMAL GRADING ON SITE ASSOCIATED WITH THE ACCESS DRIVE AND TEMPORARY EROSION AND SEDIMENT CONTROLS.
4. THE CONTRACTOR SHALL FOLLOW THE RECOMMENDED SEQUENCE OF CONSTRUCTION NOTES PROVIDED ON THE EROSION CONTROL PLAN OR SUBMIT AN ALTERNATE PLAN FOR APPROVAL BY THE ENGINEER AND/OR PERMITTING AGENCIES PRIOR TO THE START CONSTRUCTION. ALLOW A MINIMUM OF 14 WORKING DAYS FOR REVIEW.
5. PROPER CONSTRUCTION PROCEDURES SHALL BE FOLLOWED ON ALL IMPROVEMENTS WITHIN THIS PARCEL SO AS TO PREVENT THE SILTING OF ANY WATERCOURSE OR WETLANDS IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS. IN ADDITION, THE CONTRACTOR SHALL ADHERE TO "EROSION CONTROL PLAN" CONTAINED HEREIN. THE CONTRACTOR SHALL BE RESPONSIBLE TO POST ALL BONDS AS REQUIRED BY GOVERNMENT AGENCIES WHICH WOULD GUARANTEE THE PROPER IMPLEMENTATION OF THE PLAN.
6. ALL SITE WORK, MATERIALS OF CONSTRUCTION, AND CONSTRUCTION METHODS FOR EARTHWORK AND STORM DRAINAGE WORK, SHALL CONFORM TO THE SPECIFICATIONS AND DETAILS AND APPLICABLE SECTIONS OF THE PROJECT SPECIFICATIONS MANUAL. OTHERWISE THIS WORK SHALL CONFORM TO THE STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION AND PROJECT GEOTECHNICAL REPORT IF THERE IS NO PROJECT SPECIFICATIONS MANUAL. ALL FILL MATERIAL UNDER STRUCTURES AND PAVED AREAS SHALL BE PER THE ABOVE STATED APPLICABLE SPECIFICATIONS, AND/OR PROJECT GEOTECHNICAL REPORT, AND SHALL BE PLACED IN ACCORDANCE WITH THE APPLICABLE SPECIFICATIONS UNDER THE SUPERVISION OF A QUALIFIED PROFESSIONAL ENGINEER. MATERIAL SHALL BE COMPACTED IN 8" LIFTS TO 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D 1557 AT 95% PERCENT OF OPTIMUM MOISTURE CONTENT.
7. ALL DISTURBANCE INCURRED TO PUBLIC, MUNICIPAL, COUNTY, STATE PROPERTY DUE TO CONSTRUCTION SHALL BE RESTORED TO ITS PREVIOUS CONDITION OR BETTER, TO THE SATISFACTION OF THE TOWN OF NORTH BRANFORD AND STATE OF CONNECTICUT.
8. IF IMPACTED OR CONTAMINATED SOIL IS ENCOUNTERED BY THE CONTRACTOR, THE CONTRACTOR SHALL SUSPEND EXCAVATION WORK OF IMPACTED SOIL AND NOTIFY THE PROJECT DEVELOPER AND/OR PROJECT DEVELOPER'S ENVIRONMENTAL CONSULTANT PRIOR TO PROCEEDING WITH FURTHER WORK IN THE IMPACTED SOIL LOCATION UNTIL FURTHER INSTRUCTED BY THE PROJECT DEVELOPER AND/OR PROJECT DEVELOPER'S ENVIRONMENTAL CONSULTANT.

# UTILITY NOTES

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

# GENERAL LEGEND

| | EXISTING | PROPOSED |
|---|---|---|
| PROPERTY LINE | | |
| BUILDING SETBACK | | |
| SOLAR SETBACK | | |
| EASEMENT | | |
| TREE LINE | | |
| WETLAND | | |
| WETLAND BUFFER | | |
| VERNAL POOL | | |
| VERNAL POOL BUFFER | | |
| WATERCOURSE | | |
| WATERCOURSE BUFFER | | |
| MAJOR CONTOUR | | |
| MINOR CONTOUR | | |
| UNDERGROUND ELECTRIC | | E E |
| OVERHEAD ELECTRIC | | OH OH |
| GAS LINE | | |
| WATER LINE | | W W |
| BASIN | | |
| SWALE | | |
| FENCE | | X X X |
| LIMIT OF DISTURBANCE | | LOD |
| LIMIT OF CLEARING AND GRUBBING | | LCG |
| FILTER SOCK | | FS FS |
| SILT FENCE | | SF SF |
| BAFFLE | | |


CITRINE

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**CSC PERMIT SET**

| NO | DATE | REVISION |
|---|---|---|
| 0 | 03/03/21 | FOR REVIEW: BJP |
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |

**DESIGN PROFESSIONAL OF RECORD**

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

OWNER: WHAT TF LLC

ADDRESS: 218 FOXON ROAD EAST HAVEN, CT 06513

**SUNFLOWER SOLAR**

SITE ADDRESS: 127 FOREST ROAD NORTH BRANFORD, CT 06472

APT FILING NUMBER: CT567130

DRAWN BY: JT

DATE: 03/03/21

CHECKED BY: BJP

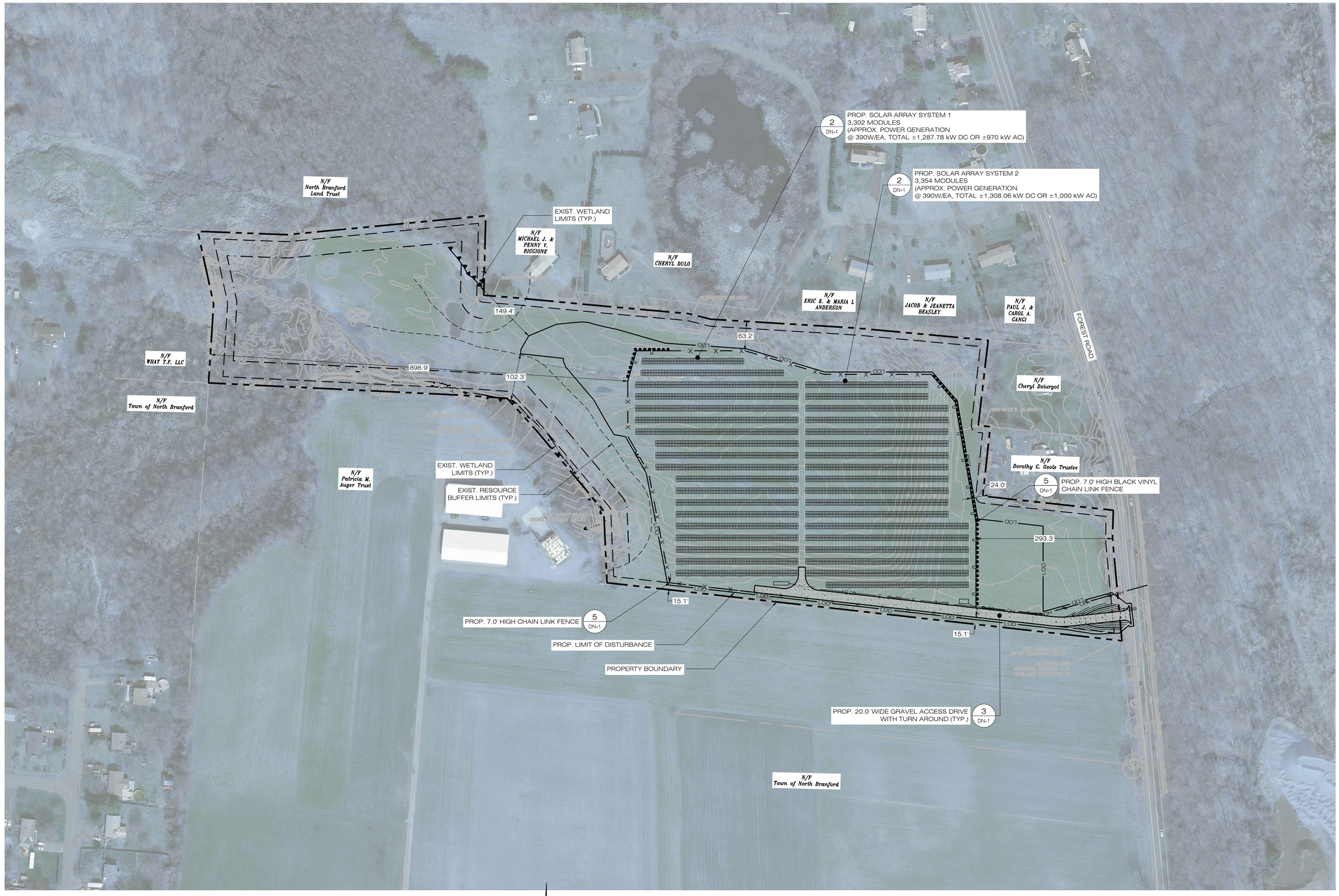
SHEET TITLE:

**SITE NOTES**

SHEET NUMBER:

**GN-1**

STATE OF CONNECTICUT BRADLEY J. PARSONS LICENSED PROFESSIONAL ENGINEER
Jul 2025




1 OP-1 **OVERALL LOCUS MAP**
SCALE : 1" = 100'-0"

100 0 50 100 200
( IN FEET ) 1 inch = 100 ft.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| NO | DATE | REVISION |
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| 0 | 03/03/21 | FOR REVIEW: BJP |
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PROF: BRADLEY J. PARSONS P.E.
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DRAWN BY: JT

DATE: 03/03/21 CHECKED BY: BJP

SHEET TITLE:
**OVERALL LOCUS MAP**

SHEET NUMBER:
**OP-1**

STATE OF CONNECTICUT BRADLEY J. PARSONS 28025 LICENSED PROFESSIONAL ENGINEER

# EROSION CONTROL NOTES

EROSION AND SEDIMENT CONTROL PLAN NOTES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

18. THE SITE WAS DESIGNED TO COMPLY WITH FEDERAL, STATE, AND, IF APPLICABLE, LOCAL STANDARDS, PLUS CURRENT ACCEPTED PRACTICES FOR THE INDUSTRY. ADDITIONAL CONTROLS AND ACTIVITIES MAY BE DEEMED NECESSARY BY THE SWPCP MONITOR DURING CONSTRUCTION AS A RESULT OF UNFORESEEN CONDITIONS AND/OR MEANS AND METHODS. SUCH ITEMS MAY INCLUDE, BUT ARE NOT LIMITED TO: ADDITIONAL FOREBAYS, BASINS, OR UPSTREAM STRUCTURAL CONTROLS, THE USE OF FLOCCULANTS OF FLOCK LOGS TO DECREASE SEDIMENT, DISCHARGE MANAGEMENT SUCH AS ADDITIONAL ARMORING AND FILTERING MEASURES (I.E. STRAW BALES, WATTLES, ETC.), AND HYDROSEEDING WITH RAPIDLY GERMINATING SEED.

19. SEEDING MIXTURES SHALL BE ERNST SOLAR FARM SEED MIX (ERNMX-186) (SEE SITE DETAILS SHEET DN-1), OR APPROVED EQUAL BY OWNER.

CONSTRUCTION OPERATION AND MAINTENANCE PLAN - BY CONTRACTOR

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

SEDIMENT & EROSION CONTROL NARRATIVE

1. THE PROJECT INVOLVES THE CONSTRUCTION OF A GROUND MOUNTED SOLAR PANEL FACILITY WITH ASSOCIATED EQUIPMENT, INCLUDING THE CLEARING, GRUBBING AND GRADING OF APPROXIMATELY 9.96± ACRES OF EXISTING LOT.

THE PROPOSED PROJECT INVOLVES THE FOLLOWING CONSTRUCTION:

A. CLEARING, GRUBBING, AND GRADING OF EXISTING LOT.
B. CONSTRUCTION OF 6,656 GROUND MOUNTED SOLAR PANELS AND ASSOCIATED EQUIPMENT.
B. THE STABILIZATION OF DISTURBED AREAS WITH PERMANENT VEGETATIVE TREATMENTS.

2. FOR THIS PROJECT, THERE ARE APPROXIMATELY 9.96± ACRE OF THE SITE BEING DISTURBED WITH NEGLIGIBLE INCREASE IN THE IMPERVIOUS AREA OF THE SITE, AS ALL ACCESS THOUGH THE SITE WILL BE GRAVEL. IMPERVIOUS AREAS ARE LIMITED TO THE CONCRETE PADS FOR ELECTRICAL EQUIPMENT.

3. THE PROJECT SITE, AS MAPPED IN THE SOIL SURVEY OF STATE OF CONNECTICUT (NRCS, VERSION 18, DEC 6, 2018), CONTAINS TYPE 37C (HYDROLOGIC SOIL GROUP A), 30A (HYDROLOGIC SOIL GROUP B), AND 303 (NO HYDROLOGIC SOIL GROUP RATING). A GEOTECHNICAL ENGINEERING REPORT HAS BEEN COMPLETED BY GEOINSIGHT, DATED NOVEMBER 25, 2020.

4. IT IS ANTICIPATED THAT CONSTRUCTION WILL BE COMPLETED IN APPROXIMATELY 3-4 MONTHS.

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

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

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

8. CONSERVATION PRACTICES TO BE USED DURING CONSTRUCTION:
   A. STAGED CONSTRUCTION;
   B. MINIMIZE THE DISTURBED AREAS TO THE EXTENT PRACTICABLE DURING CONSTRUCTION;
   C. STABILIZE DISTURBED AREAS WITH TEMPORARY OR PERMANENT MEASURES AS SOON AS POSSIBLE, BUT NO LATER THAN 7-DAYS FOLLOWING DISTURBANCE;
   D. MINIMIZE IMPERVIOUS AREAS;
   E. UTILIZE APPROPRIATE CONSTRUCTION EROSION AND SEDIMENTATION MEASURES.

9. THE FOLLOWING SEPARATE DOCUMENTS ARE TO BE CONSIDERED A PART OF THE EROSION AND SEDIMENTATION PLAN:
   A. STORMWATER MANAGEMENT REPORT DATED MARCH 2021.
   B. SWPCP DATED MARCH 2021.

SUGGESTED CONSTRUCTION SEQUENCE

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

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

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

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

PHASE 1

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

5. INSTALL PERIMETER EROSION CONTROL.

6. INSTALL TEMPORARY SEDIMENT BASIN (TSB-1). UPON COMPLETION OF THE INSTALLATION AND STABILIZATION OF THE BASIN AND SWALES, WITH SIGNOFF FROM THE ENGINEER AND REPRESENTATIVE FROM THE CONSERVATION DISTRICT, PHASE 2 WORK UP GRADIENT CAN PROCEED.

PHASE 2

7. INSTALL ELECTRICAL CONDUIT.

8. INSTALL RACKING POSTS FOR GROUND MOUNTED SOLAR PANELS.

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

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

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

12. AFTER THE SITE IS DEEMED TO HAVE ACHIEVED FINAL STABILIZATION, THE TEMPORARY SEDIMENT BASIN (TSB-1) CAN BE REMOVED AND THE AREA RESTORED WITH THE PERMANENT SEED MIXTURE.

13. THE SITE SHALL BE MONITORED ONCE A MONTH FOR TWO FULL GROWING SEASONS (APRIL - OCTOBER).

14. ISSUE NOTICE OF TERMINATION UPON COMPLETION OF MONITORING REQUIRED PER APPENDIX I.

15. REMOVE ALL REMAINING SILT FENCE AND CLEAN UP SITE.


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**DESIGN PROFESSIONAL OF RECORD**

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

OWNER: WHAT TF LLC

ADDRESS: 218 FOXON ROAD EAST HAVEN, CT 06513

**SUNFLOWER SOLAR**

SITE ADDRESS: 127 FOREST ROAD NORTH BRANFORD, CT 06472

APT FILING NUMBER: CT567130

DRAWN BY: JT

DATE: 03/03/21 CHECKED BY: BJP

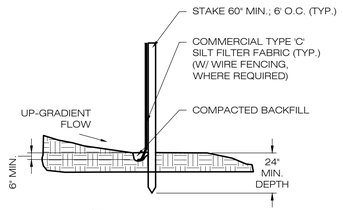
SHEET TITLE:

**SEDIMENTATION & EROSION CONTROL NOTES**

SHEET NUMBER:

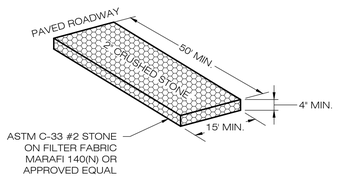
**EC-1**

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

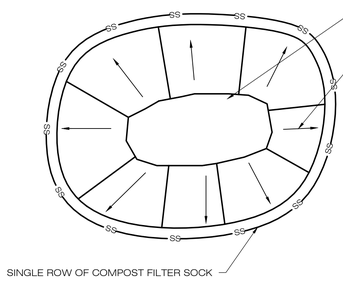



NOTE:
SILT FENCE SHALL BE LAPPED ONLY WHEN NECESSARY PER THE MANUFACTURER RECOMMENDATIONS.

## 1 EC-4 SILT FENCE DETAIL
**SCALE : N.T.S.**

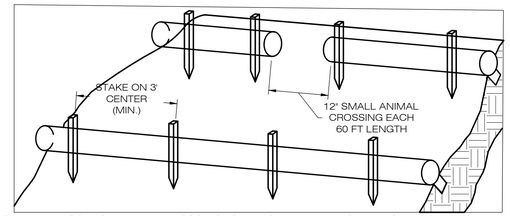



## 2 EC-4 CONSTRUCTION ENTRANCE DETAIL
**SCALE : N.T.S.**



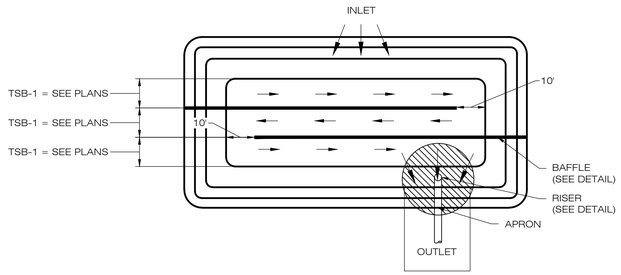

NOTES:
1. ALL EXISTING EXCAVATED MATERIAL THAT IS NOT TO BE REUSED IN THE WORK IS TO BE IMMEDIATELY REMOVED FROM THE SITE AND PROPERLY DISPOSED OF.
2. SOIL/AGGREGATE STOCKPILE SITES TO BE WHERE SHOWN ON THE DRAWINGS.
3. RESTORE STOCKPILE SITES TO PRE-EXISTING PROJECT CONDITION AND RESEED AS REQUIRED.
4. STOCKPILE HEIGHTS MUST NOT EXCEED 35'. STOCKPILE SLOPES MUST BE 2:1 OR FLATTER.

## 3 EC-4 MATERIALS STOCKPILE DETAIL
**SCALE : N.T.S.**

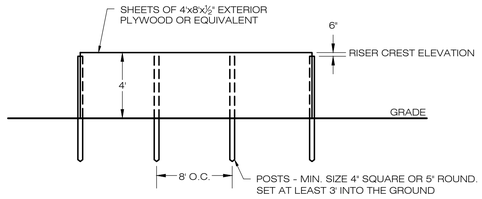



1. BEGIN AT THE LOCATION WHERE THE SOCK IS TO BE INSTALLED BY EXCAVATING A 2-3' (5-7.5 CM) DEEP X 9" (22.9 CM) WIDE TRENCH ALONG THE CONTOUR OF THE SLOPE. EXCAVATED SOIL SHOULD BE PLACED UP SLOPE FROM THE ANCHOR TRENCH.
2. PLACE THE SOCK IN THE TRENCH SO THAT IT CONTOURS TO THE SOIL SURFACE. COMPACT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

## 4 EC-4 COMPOST FILTER SOCK SEDIMENTATION CONTROL BARRIER
**SCALE : N.T.S.**

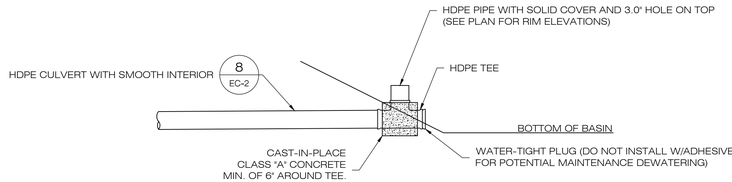



TOP VIEW

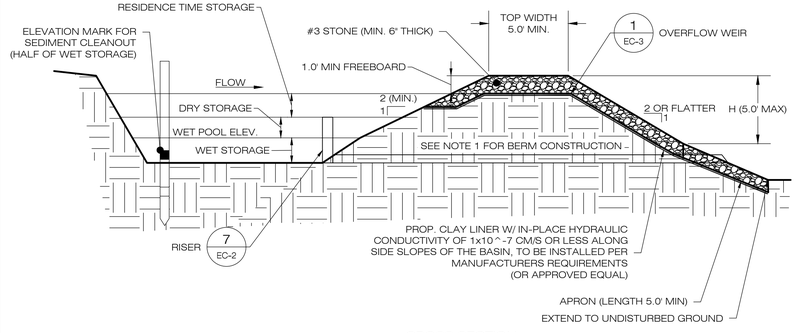



## 6 EC-4 SEDIMENT BASIN BAFFLE
**SCALE : N.T.S.**

| HDPE OUTLET PIPE SIZING TABLE | | | | | | |
|---|---|---|---|---|---|---|
| BASIN | TEE TOP ELEV. (FT) | OUTLET PIPE SIZE (IN.) | OUTLET PIPE LENGTH (FT) | OUTLET PIPE SLOPE (%) | OUTLET PIPE INV. ELEV. AT STRUCTURE (FT) | OUTLET PIPE INV. AT OUTFALL (FT) |
| TSB-1 | 77.00' | 6" | 110' | 0.45% | 76.00' | 75.50' |




## 7 EC-2 RISER DETAIL
**SCALE : N.T.S.**

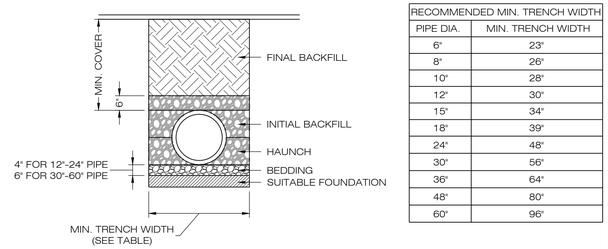



CROSS SECTION

NOTES:
1. BERMS SHALL BE TEMPORARILY SEEDED AND STABILIZED WITH EROSION CONTROL PLAN.
2. SEDIMENT BAFFLES SHALL BE INSTALLED AS SHOWN ON EC-4.
3. SEE TEMPORARY SEDIMENT BASIN SIZING TABLE FOR WET AND DRY STORAGE VOLUMES.

## 5 EC-2 TEMPORARY SEDIMENT BASIN
**SCALE : N.T.S.**

| TEMPORARY SEDIMENT BASIN SIZING TABLE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| NAME | DRAINAGE AREA (AC) | REQ. WET VOLUME (CF) | REQ. DRY VOLUME (CF) | TOTAL REQ. VOLUME (CF) | PROP. BTM. ELEV. (FT) | PROP. OUTLET RIM ELEV. (FT) | PROP. WEIR CREST ELEV. (FT) | PROP. TOP ELEV. (FT) | TOTAL VOL. PROVIDED. (CF) |
| TSB-1 | 13.48 AC | 16,803 CF | 8,402 CF | 25,205 CF | 74.00' | 77.00' | 79.00' | 80.00' | 28,600 CF |




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

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

## 8 EC-2 HDPE STORM DRAINAGE TRENCH DETAIL
**SCALE : N.T.S.**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WWW.ALLPOINTSTECH.COM FAX: (860)-663-0935


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**OWNER:** WHAT TF LLC

**ADDRESS:** 218 FOXON ROAD EAST HAVEN, CT 06513

**SUNFLOWER SOLAR**

**SITE ADDRESS:** 127 FOREST ROAD NORTH BRANFORD, CT 06472

**APT FILING NUMBER:** CT567130

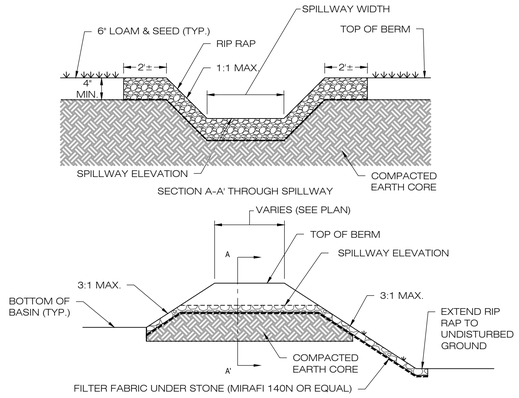
DRAWN BY: JT

DATE: 03/03/21 CHECKED BY: BJP

**SHEET TITLE:**
SEDIMENTATION & EROSION CONTROL DETAILS

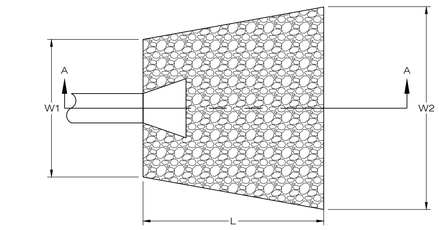
**SHEET NUMBER:**
EC-2

STATE OF CONNECTICUT BRADLEY J. PARSONS 28025 LICENSED PROFESSIONAL ENGINEER



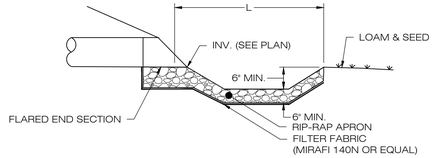

1 EC-3 **OVERFLOW WEIR DETAIL**

**SCALE : N.T.S.**




PLAN VIEW

| FLARED END SECTION SIZING | | | |
|---|---|---|---|
| BASIN | MIN. L (FT) | MIN. W1 (FT) | MIN W2 (FT) |
| TSB-1 | 7.00' | 1.50' | 5.5' |




SECTION A-A

2 EC-3 **FLARED END SECTION**

**SCALE : N.T.S.**

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ADD: 567 VAUXHAUL STREET EXTENSION - SUITE 311 WATERFORD, CT 06385

OWNER: WHAT TF LLC

ADDRESS: 218 FOXON ROAD EAST HAVEN, CT 06513

**SUNFLOWER SOLAR**

SITE ADDRESS: 127 FOREST ROAD NORTH BRANFORD, CT 06472

APT FILING NUMBER: CT567130

DRAWN BY: JT

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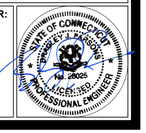
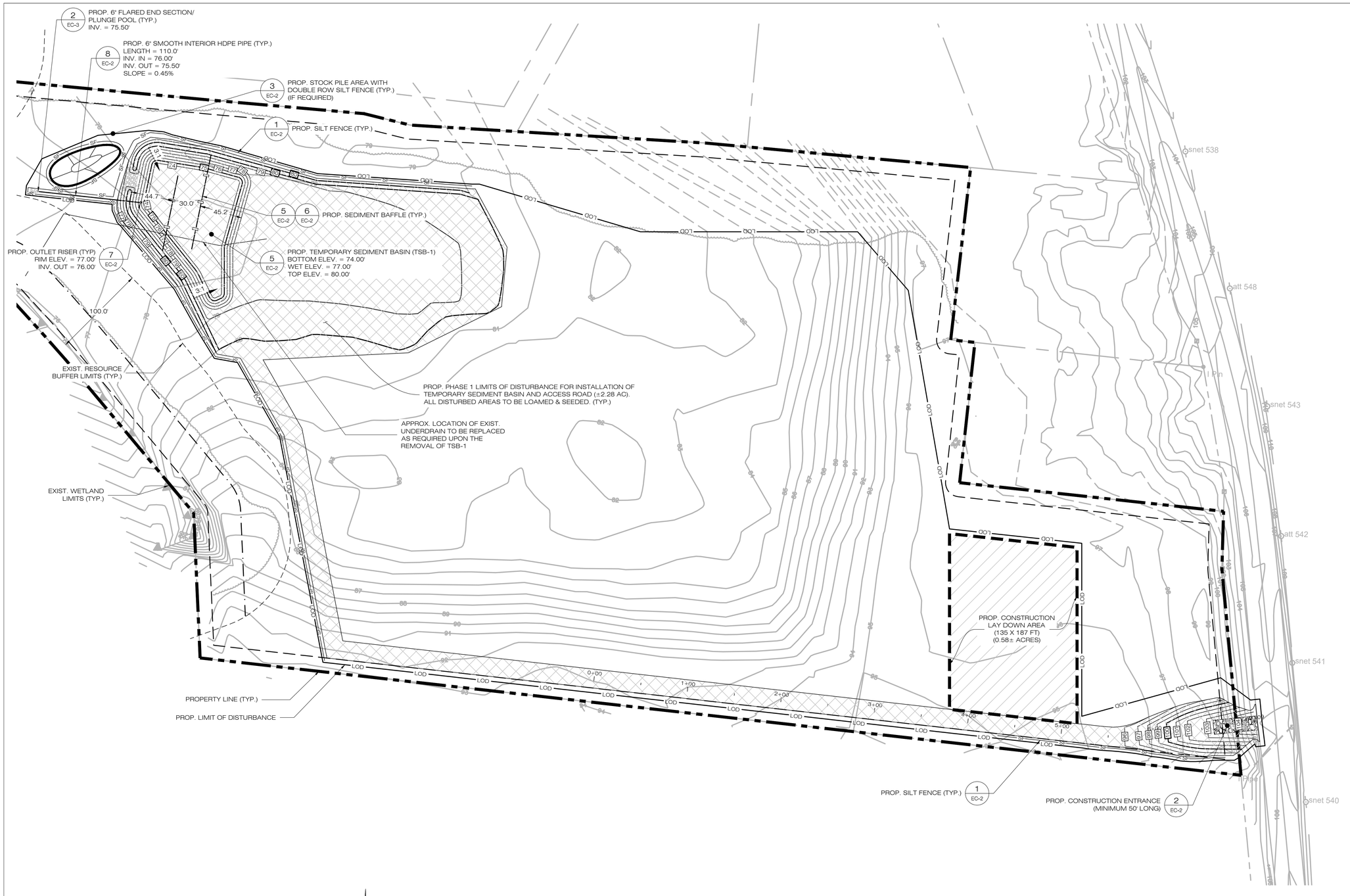
SHEET TITLE:

**SEDIMENTATION & EROSION CONTROL DETAILS**

SHEET NUMBER:

**EC-3**






PHASE 1 CLEARING LEGEND

| CLEARING AND GRUBBING |
|---|

1 EC-4 **PHASE 1 - SEDIMENTATION & EROSION CONTROL PLAN**
**SCALE : 1" = 50'-0"**

50 0 25 50 100
( IN FEET ) 1 inch = 50 ft.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**SUNFLOWER SOLAR**

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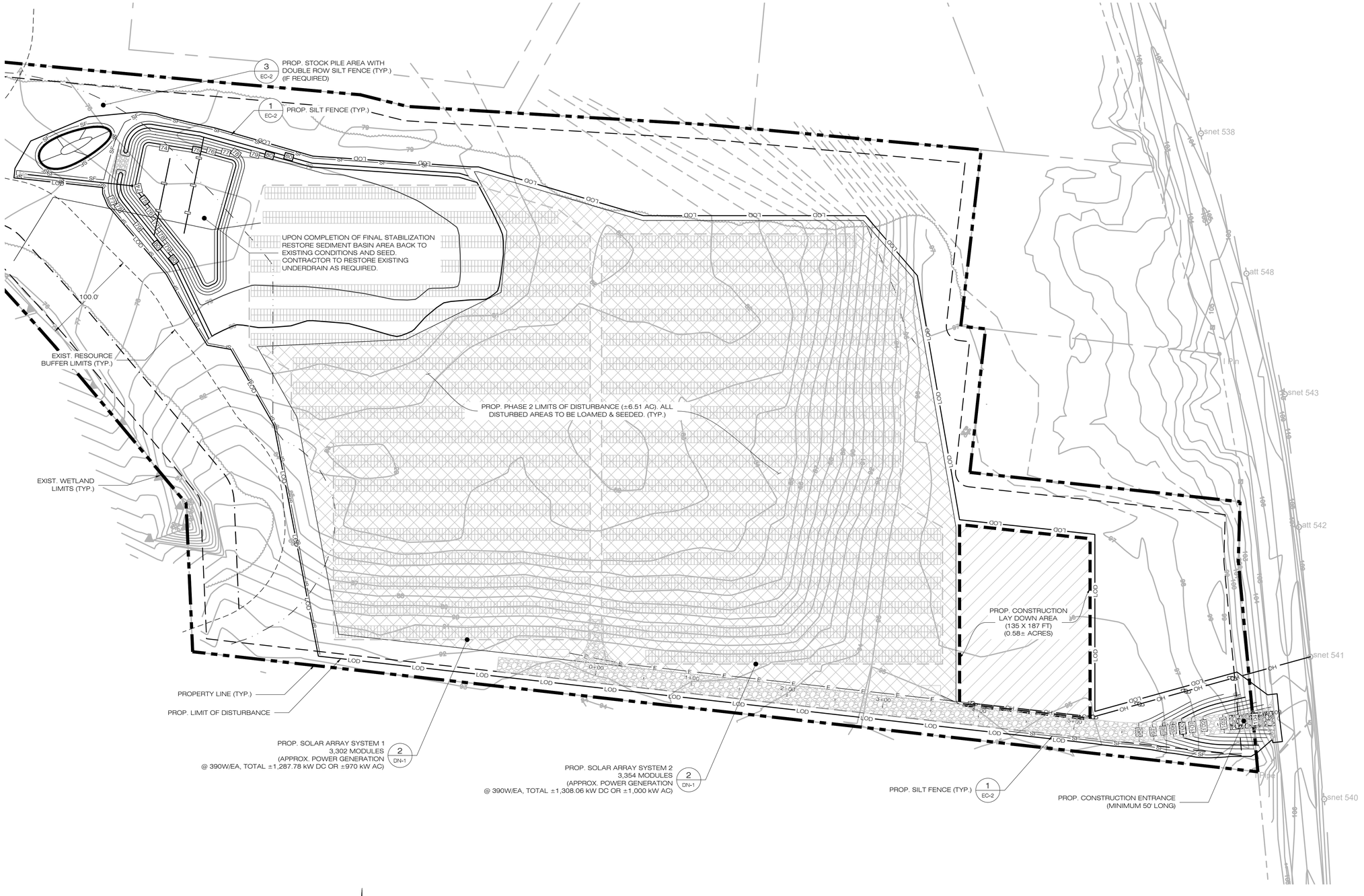
APT FILING NUMBER: CT567130

DRAWN BY: JT
DATE: 03/03/21 CHECKED BY: BJP

SHEET TITLE:
**PHASE 1 SEDIMENTATION & EROSION CONTROL PLAN**

SHEET NUMBER:
**EC-4**

STATE OF CONNECTICUT BRADLEY J. PARSONS No. 25025 LICENSED PROFESSIONAL ENGINEER




PHASE 2 CLEARING LEGEND

| | |
|---|---|
| CLEARING AND GRUBBING | |

1 EC-5 **PHASE 2 - SEDIMENTATION & EROSION CONTROL PLAN**

**SCALE : 1" = 50'-0"**

50 0 25 50 100

( IN FEET ) 1 inch = 50 ft.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**DESIGN PROFESSIONAL OF RECORD**

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ADD: 567 VAUXHAUL STREET EXTENSION - SUITE 311 WATERFORD, CT 06385

**OWNER:** WHAT TF LLC

**ADDRESS:** 218 FOXON ROAD EAST HAVEN, CT 06513

**SUNFLOWER SOLAR**

**SITE ADDRESS:** 127 FOREST ROAD NORTH BRANFORD, CT 06472

**APT FILING NUMBER:** CT567130

DRAWN BY: JT

DATE: 03/03/21 CHECKED BY: BJP

**SHEET TITLE:**

**PHASE 2 SEDIMENTATION & EROSION CONTROL PLAN**

**SHEET NUMBER:**

**EC-5**

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


NOTES:
1. GRADE/SHAPE AREA TO MAINTAIN EXIST. DRAINAGE PATTERNS.
2. CONTRACTOR SHALL REMOVE ALL BAFFLES AND SEDIMENT BASINS AND SWALES.
3. CONTRACTOR TO REPLACE EXISTING UNDERDRAIN THAT WAS REMOVED DURING SEDIMENT BASIN INSTALLATION AS REQUIRED.

1 GP-1 **FINAL GRADING & DRAINAGE PLAN**
**SCALE : 1" = 50'-0"**

50 0 25 50 100
( IN FEET ) 1 inch = 50 ft.

CITRINE
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**SUNFLOWER SOLAR**

SITE ADDRESS: 127 FOREST ROAD NORTH BRANFORD, CT 06472

APT FILING NUMBER: CT567130

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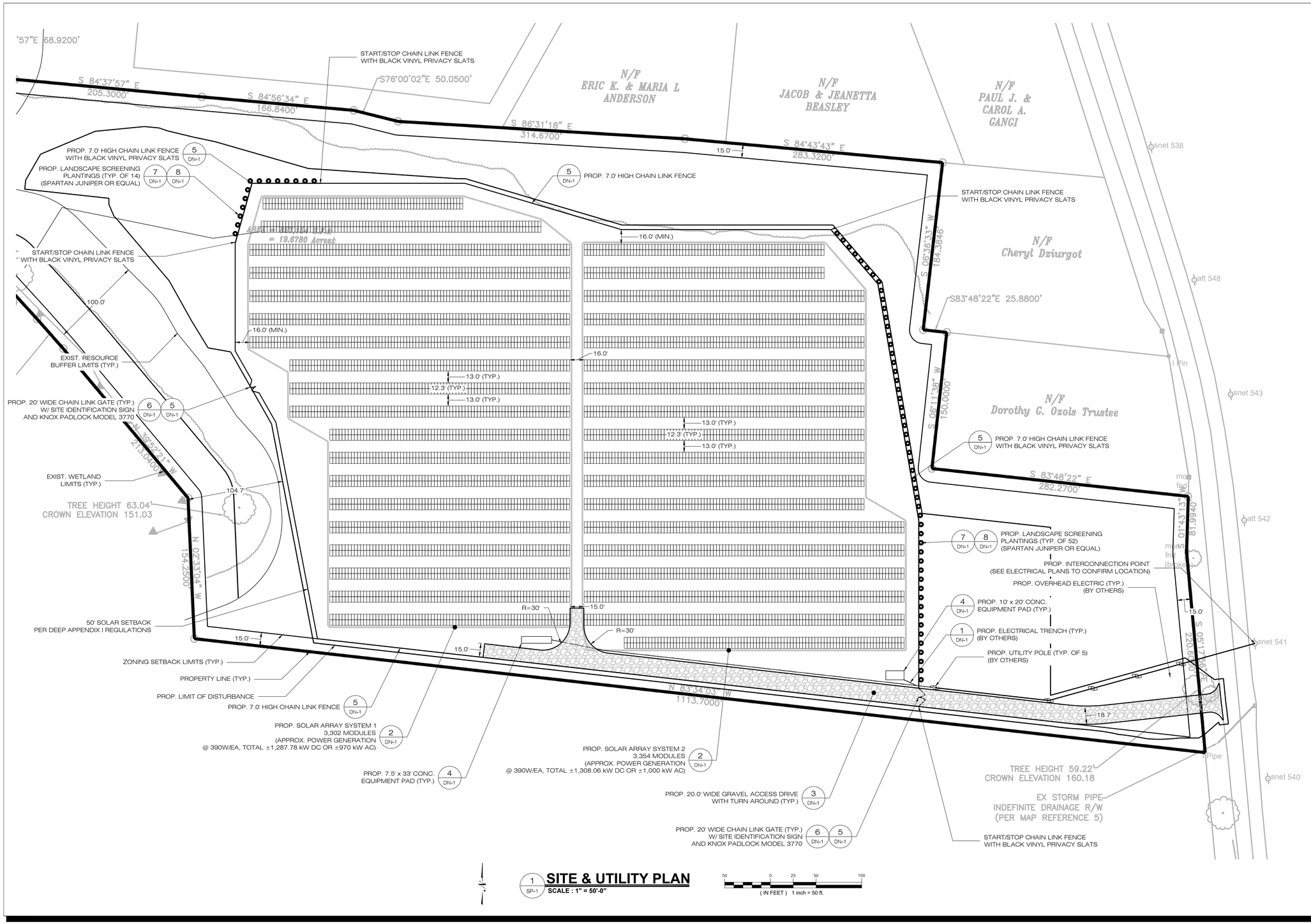
SHEET TITLE:
**FINAL GRADING & DRAINAGE PLAN**

SHEET NUMBER:
**GP-1**

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




1 SP-1 **SITE & UTILITY PLAN**
**SCALE : 1" = 50'-0"**

50 0 25 50 100
( IN FEET ) 1 inch = 50 ft.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**SUITE 200-78**
**WESTPORT, CT 06880**
**OFFICE: (203)-557-5554**

ALL-POINTS TECHNOLOGY CORPORATION

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


**CSC PERMIT SET**

| NO | DATE | REVISION |
|---|---|---|
| 0 | 03/03/21 | FOR REVIEW: BJP |
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |

**DESIGN PROFESSIONAL OF RECORD**

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

OWNER: WHAT TF LLC

ADDRESS: 218 FOXON ROAD EAST HAVEN, CT 06513

**SUNFLOWER SOLAR**

SITE ADDRESS: 127 FOREST ROAD NORTH BRANFORD, CT 06472

APT FILING NUMBER: CT567130

DRAWN BY: JT

DATE: 03/03/21 CHECKED BY: BJP

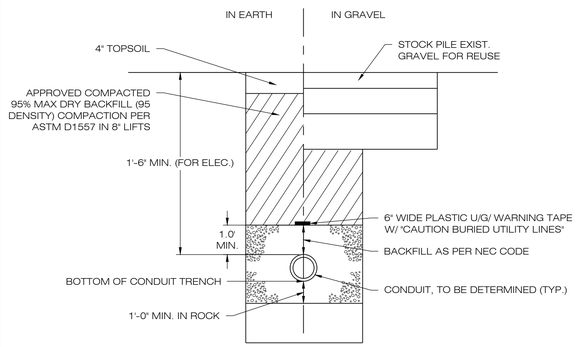
**SHEET TITLE:**

**SITE & UTILITY PLAN**

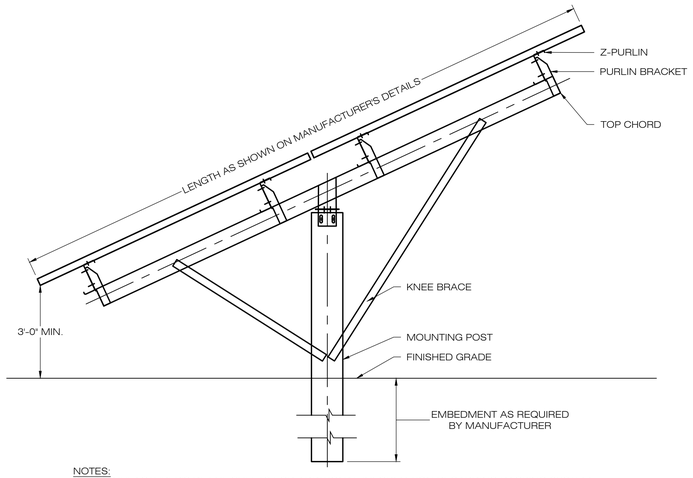
**SHEET NUMBER:**

**SP-1**

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

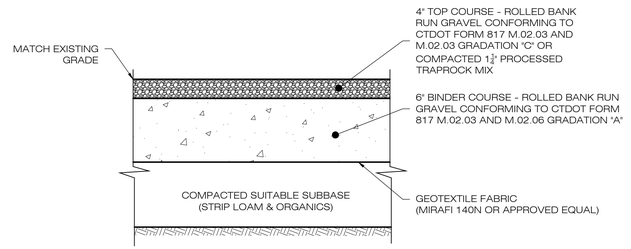



1 DN-1 **ELECTRICAL TRENCH DETAIL**
**SCALE : N.T.S.**



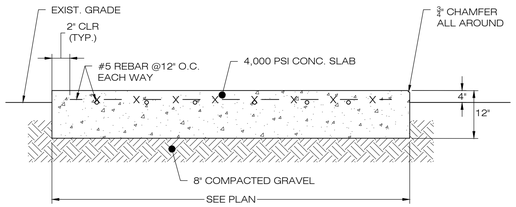

NOTES:
SEE MANUFACTURER'S DETAIL SHEETS FOR ADDITIONAL INFORMATION REGARDING RACKING SYSTEM REQUIREMENTS AND INSTALLATION PROCEDURES. RACKING SYSTEM TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

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

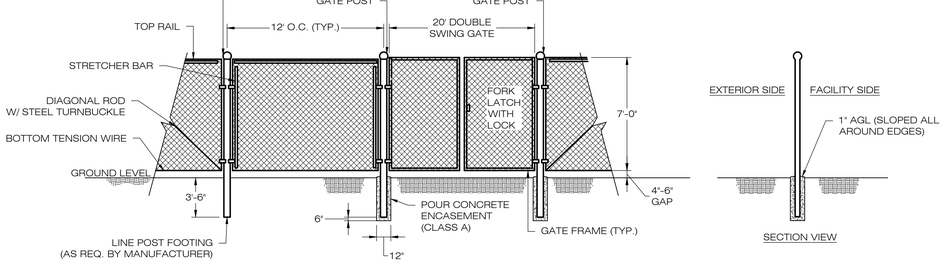



NOTES:
1. SUBBASE MAY CONSIST OF NATIVE MATERIALS IF FOUND ACCEPTABLE BY THE ENGINEER. SUBBASE TO BE COMPACTED TO 95% MAX DRY DENSITY.
2. SUBBASE IS TO BE FREE FROM DEBRIS AND UNSUITABLE MATERIALS.

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




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



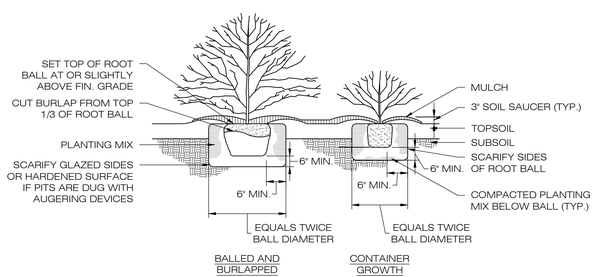

5 DN-1 **CHAIN-LINK FENCE & GATE DETAIL**
**SCALE : N.T.S.**

SUNFLOWER SOLAR

IN CASE OF EMERGENCY
CALL T.B.D.

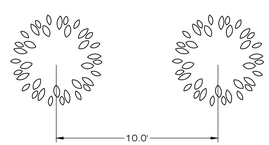
NOTES:
EMERGENCY CALL NUMBER TO BE PROVIDED ONCE DETERMINED.

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




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

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




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

**Ernst Conservation Seeds**
8884 Mercer Pike
Meadville, PA 16335
(800) 873-3321 Fax (814) 336-5191
www.ernstseed.com

**Date: March 01, 2021**

**Ernst Solar Farm Seed Mix - ERNMX-186**

| | Botanical Name | Common Name | Price/lb |
|---|---|---|---|
| 45.50 % | *Festuca rubra* | Creeping Red Fescue | 2.20 |
| 15.00 % | *Festuca ovina var. duriuscula, 'Jetty'* | Hard Fescue, 'Jetty' | 3.52 |
| 15.00 % | *Festuca ovina var. duriuscula, Gladiator* | Hard Fescue, Gladiator | 3.52 |
| 10.00 % | *Festuca rubra ssp. commutata* | Chewings Fescue | 2.70 |
| 5.00 % | *Poa pratensis, 'Selway'* | Kentucky Bluegrass, 'Selway' | 3.08 |
| 5.00 % | *Poa pratensis, Appalachian* | Kentucky Bluegrass, Appalachian | 3.08 |
| 4.50 % | *Trifolium repens, Dutch* | White Clover, Dutch | 4.84 |
| **100.00 %** | | **Mix Price/lb Bulk:** | **$2.85** |

**Seeding Rate:** 6 lb per 1,000 sq ft
Lawn & Turfgrass Sites; Solar Sites

Provide a 2' clearance between the ground and the solar panels. Mix formulations are subject to change without notice depending on the availability of existing and new products. While the formula may change, the guiding philosophy and function of the mix will not.

9 DN-1 **SEMI-SHADE MIX**
**SCALE : N.T.S.**

CITRINE
**55 GREENS FARMS ROAD**
**SUITE 200-78**
**WESTPORT, CT 06880**
**OFFICE: (203)-557-5554**

ALL-POINTS TECHNOLOGY CORPORATION
567 VAUXHAUL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PHONE: (860)-663-1697
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| NO | DATE | REVISION |
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**DESIGN PROFESSIONAL OF RECORD**

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

**OWNER:** WHAT TF LLC

**ADDRESS:** 218 FOXON ROAD EAST HAVEN, CT 06513

**SUNFLOWER SOLAR**

**SITE ADDRESS:** 127 FOREST ROAD NORTH BRANFORD, CT 06472

**APT FILING NUMBER:** CT567130

**DRAWN BY:** JT

**DATE:** 03/03/21 **CHECKED BY:** BJP

**SHEET TITLE:**
**SITE DETAILS**

**SHEET NUMBER:**
**DN-1**

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

# APPENDIX B

DEEP NDDB MAPPING

C:\Users\Erin\Dropbox (APT GIS)\APT GIS Team Folder\Projects\CitrinePower\NorthBranford\mxd\Citrine NBranford NDDB.mxd


***Legend***

- Site
- Municipal Boundary
- Natural Diversity Database (updated Dec. 2020)

## NDDB Map

Proposed Sunflower Solar Facility
127 Forest Road
North Branford, CT

CITRINE

ALL-POINTS TECHNOLOGY CORPORATION

N

2,000 1,000 0 2,000 Feet

*Map Notes:*
*Base Map Source: USGS 7.5 Minute Topographic Quadrangle Map, Branford, CT (1984)*
*Map Scale:* 1 inch = 2,000 feet
*Map Date: February 2021*

# APPENDIX C

## USFWS/NDDB COMPLIANCE STATEMENT

# USFWS & NDDB Compliance Determination

February 21, 2021

Ms. Cela Sinay-Bernie, Managing Partner
Citrine Power, LLC
55 Greens Farms Road
Westport Connecticut 06880

Re: Proposed Solar Photovoltaic Elecric Generating Facility
127 Forest Road, North Branford, Connecticut
APT Project No. CT567130

On behalf of Citrine Power, LLC ("Citrine"), All-Points Technology Corporation, P.C. ("APT") performed an evaluation with respect to possible federally- and state-listed, threatened, endangered or special concern species in order to determine if the proposed referenced solar energy generation facility would result in a potential adverse effect to listed species.

APT understands that Citrine proposes the development of a commercial scale photovoltaic electric generating facility ("Facility") located within a cultivated agricultural field located at 127 Forest Road, North Branford, Connecticut ("Subject Property").

## USFWS

The federal consultation was completed in accordance with Federal Communications Commission ("FCC") rules implementing the National Environmental Policy Act ("NEPA") and Section 7 of the Endangered Species Act through the U.S. Fish and Wildlife Service's ("USFWS") Information, Planning, and Conservation System ("IPaC"). Based on the results of the IPaC review, two federally-listed[1] threatened species are known to occur in the vicinity of the subject property documented as the northern long-eared bat ("NLEB"; *Myotis septentrionalis*) and Indiana bat (*Myotis sodalis*). As a result of this preliminary finding, APT performed an evaluation to determine if the proposed referenced Facility would result in a likely adverse effect to NLEB and Indiana bat.

### *Northern Long-eared Bat*

The proposed Facility would be located in an agricultural field on the Subject Property and will not require any tree or forest clearing to accommodate the proposed Facility; trees potentially provide NLEB habitat. Consultation with the Connecticut Department of Energy & Environmental Protection ("CTDEEP") Wildlife Division Natural Diversity Data Base ("NDDB") revealed that the proposed Facility is not within 150 feet of a known occupied NLEB maternity roost tree and is not within 0.25 mile of a

[1] Listing under the federal Endangered Species Act

known NLEB hibernaculum. The nearest NLEB habitat resource to the proposed Facility is located ±1.4 miles to the northeast in North Branford.

APT submitted the effects determination using the NLEB key within the IPaC system for the proposed Facility (the "Action"). This IPaC key assists users in determining whether a Federal action is consistent with the activities analyzed in the USFWS's January 5, 2016, intra-Service Programmatic Biological Opinion ("PBO") on the Final 4(d) Rule for the NLEB for Section 7(a)(2) compliance.

Based upon the IPaC submission, the Action is consistent with activities analyzed in the PBO; please refer to the enclosed February 3, 2021 USFWS letter. The Action may affect NLEB; however, any take that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o). If the USFWS does not respond within 30 days from the date of the letter (March 5, 2021), one may presume that the IPaC-assisted determination was correct and that the PBO satisfies and concludes Citrine's responsibilities for this Action under ESA Section 7(a)(2) with respect to NLEB. APT anticipated no response will be received from USFWS; therefore, the Action would comply with ESA Section 7(a)(2) with respect to NLEB assuming no response is received.

In addition, Citrine would consider the following USFWS voluntary conservation measures, where appropriate and as the project schedule allows, to reduce the potential for impact to NLEB.

- Conduct tree removal activities outside of the NLEB pup season (June 1-July 31) and active season (April 1-October 31) to minimize impacts to pups at roosts not yet identified. *Not applicable: no tree clearing will occur as Facility is located within cultivated agricultural field.*
- Avoid clearing suitable spring staging and fall swarming habitat within a five-mile radius of known or assumed NLEB hibernacula during the staging and swarming seasons (April 1-May 15 and August 15-November 14, respectively). *Not applicable: no tree clearing will occur as Facility is located within cultivated agricultural field.*
- Maintain dead trees (snags) and large trees when possible. *Not applicable: no tree clearing will occur as Facility is located within cultivated agricultural field.*
- Use herbicides and pesticides only if unavoidable. If necessary, spot treatment is preferred over aerial application.
- Minimize exterior lighting, opting for down-shielded, motion-sensor security lights instead of constant illumination.

*Indiana Bat*

The proposed Facility would be located in an agricultural field on the Subject Property and will not require any tree or forest clearing to accommodate the proposed Facility; trees potentially provide Indiana bat summer roosting habitat. Suitable summer habitat for Indiana bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥5 inches dbh that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors. The proposed Facility would not impact summer roosting or hibernaculum habitat; the proposed Facility is located more than 0.5 mile from the nearest Indiana bat hibernaculum. Therefore, the proposed activity will have no effect on Indiana bat and no consultation with UFWS is required.

**NDDB**

No known areas of state-listed species are currently depicted on the most recent CTDEEP NDDB Maps in the location of the proposed Facility or immediately adjacent areas. Please refer to the enclosed NDDB Map which depicts the nearest NDDB buffer ±0.5 mile east of the Subject Property. Since the proposed Facility and Subject Property are not located within a NDDB buffer area, consultation with DEEP is not required in accordance with their review policy[2] or the Connecticut Siting Council's NDDB review policy.

Therefore, the proposed Citrine Facility is not anticipated to adversely impact any federal or state threatened, endangered or species of special concern.

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

Dean Gustafson
Senior Biologist

Enclosures

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

# USFWS NLEB Letter

# United States Department of the Interior

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

IPaC Record Locator: 476-98947181 February 03, 2021

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

Dear Deborah Gustafson:

The U.S. Fish and Wildlife Service (Service) received on February 03, 2021 your effects determination for the 'Citrine North Branford' (the Action) using the northern long-eared bat (*Myotis septentrionalis*) key within the Information for Planning and Consultation (IPaC) system. You indicated that no Federal agencies are involved in funding or authorizing this Action. This IPaC key assists users in determining whether a non-Federal action may cause "take"[1] of the northern long-eared bat that is prohibited under the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.).

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

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

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

The IPaC-assisted determination for the northern long-eared bat **does not** apply to the following ESA-protected species that also may occur in your Action area:

- Indiana Bat Myotis sodalis Endangered

You may coordinate with our Office to determine whether the Action may cause prohibited take of the animal species listed above.

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

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

**1. Name**

Citrine North Branford

**2. Description**

The following description was provided for the project 'Citrine North Branford':

> The Project will be located at 127 Forest Road (CT Route 22 – “Site”) with the Site consisting of an irregularly shaped parcels that is approximately 19.60 acres. The privately-owned undeveloped Site is currently being used for agriculture and is located within the Residential 40 (R-40) zoning district. The proposed solar installationconsists of two (2) solar-based electric generating facilities, with outputs of approximately 1.0 megawatts (“MW”) and 0.975MW.

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@41.3427961,-72.80222187214247,14z


**Determination Key Result**

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

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

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

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

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

# Determination Key Result

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

## Qualification Interview

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

   *No*

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

   *No*

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

   **Automatically answered**
   *No*

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

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

   *Yes*

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

   *No*

6. Will the action involve Tree Removal?

   *Yes*

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

   *No*

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

   *No*

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

   *No*

# Project Questionnaire

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

1. Estimated total acres of forest conversion:

*0.5*

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

*0.5*

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

*0.5*

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

4. Estimated total acres of timber harvest

*0*

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

*0*

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

*0*

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

7. Estimated total acres of prescribed fire

*0*

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

*0*

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

*0*

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

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

*0*

# NDDB Map


***Legend***

- Site
- Municipal Boundary
- Natural Diversity Database (updated Dec. 2020)

**Attachement A:**
**Overview Map**

Proposed Solar Facility
127 Forest Road
North Branford, CT

CITRINE

ALL-POINTS TECHNOLOGY CORPORATION

*Map Notes:*
*Base Map Source: USGS 7.5 Minute Topographic Quadrangle Map, Branford, CT (1984)*
*Map Scale:* 1 inch = 2,000 feet
*Map Date: February 2021*

N

2,000 1,000 0 2,000 Feet

# APPENDIX D

PHASE 1A CULTURAL RESOURCES ASSESSMENT REPORT

DECEMBER 2020

# PHASE IA CULTURAL RESOURCES ASSESSMENT SURVEY OF THE PROPOSED CITRINE SOLAR CENTER IN NORTH BRANFORD, CONNECTICUT

PREPARED FOR:

ALL-POINTS TECHNOLOGY CORPORATION
567 VAUXHALL STREET EXTENSION – SUITE 311
WATERFORD, CONNECTICUT 06385

HERITAGE CONSULTANTS
55 EAST CEDAR STREET
NEWINGTON, CONNECTICUT 06111

# ABSTRACT

This report presents the results of a Phase IA cultural resources assessment survey for a proposed solar center in North Branford, Connecticut. The solar center will occupy 6.39 acres of agricultural land referred to as the project area; it is located within the eastern third of a larger 26.73 acre parcel of land at 127 Forest Road. The current investigation consisted of: 1) the preparation of an overview of the region's prehistory, history, and natural setting; 2) a literature search to identify and discuss previously recorded cultural resources in the region; 3) a review of readily available historic maps and aerial imagery depicting the access roads and the project area in order to identify potential historic resources and/or areas of past disturbance; 4) pedestrian survey and photo-documentation of the project area in order to determine archaeological sensitivity; and 5) preparation of the current Phase IA cultural resources assessment survey report. The results of the survey indicate that the northwestern portion of the project area, where large scale soil removal has occurred, does not warrant additional archeological investigations. The survey also revealed that approximately 2 acres within the southern and southeastern portion of the project area is situated on a well-drained level landform located near Farm River and in the vicinity of several previously identified archaeological sites. This area, which may contain archaeological deposits, will be impacted by the proposed solar project.

# TABLE OF CONTENTS

# LIST OF FIGURES

# LIST OF PHOTOS

# CHAPTER I
# INTRODUCTION

This report presents the results of a Phase IA cultural resources assessment survey for a proposed solar center in North Branford, Connecticut (Figure 1). All-Points Technology Corporation (All-Points) requested that Heritage Consultants, LLC (Heritage) complete the assessment survey as part of the planning process for the proposed Citrine Solar Project at 127 Forest Road, which will occupy 6.39 acres of agricultural land referred to as the project area; it is located within the eastern third of a larger 26.73 acre parcel of land. The project parcel is bordered to the south by an agricultural field; to the east by Forest Road and forest; to the north by residences; to the west by forest and residences. Heritage completed this investigation on behalf of All-Points in December of 2020. All work associated with this project was performed in accordance with the *Environmental Review Primer for Connecticut's Archaeological Resources* (Poirier 1987), which is promulgated by the Connecticut State Historic Preservation Office.

**Project Description and Methods Overview**

The proposed project will include the installation of rows of solar panels across the entirety of the above-referenced project area. An existing access road extends east from Totoket Road. This Phase IA cultural resources assessment survey consisted of the completion of the following tasks: 1) a contextual overview of the region's prehistory, history, and natural setting (e.g., soils, ecology, hydrology, etc.); 2) a literature search to identify and discuss previously completed cultural resources surveys and previously recorded cultural resources in the region encompassing the project area; 3) a review of readily available historic maps and aerial imagery depicting the project area in order to identify potential historic resources and/or areas of past disturbance; 4) pedestrian survey and photo-documentation of the project area in order to determine their archaeological sensitivity; and 5) preparation of the current Phase IA cultural resources assessment survey report.

**Project Results and Summary**

The background research portion of this undertaking, which consisted of a review of historic maps and aerial images of the project area, as well as an examination of files maintained by the Connecticut State Historic Preservation Office, resulted in the identification of 10 previously identified archaeological sites (Site 99-4, 99-6, 99-9, 99-10, 99-14, 99-20, 99-29, 99-35, 99-37, and 99-38), as well as one National Register of Historic Places Property (the George Baldwin House), within 1.6 km (1 mi) of the project area. All pf the identified resources are generally southwest of the project parcel and construction of the proposed solar facility will not affect any of them directly due to their distance from the project area. However, their presence in the region demonstrates cultural resources do exist in the vicinity of the project area. These cultural resources are discussed further in Chapter V of this document.

In addition to the cultural resources discussed above, Heritage combined data from the historic map and aerial image analysis, and the pedestrian survey to stratify the project area into zones of no/low and/or moderate/high archaeological sensitivity. Upon completion of the above-referenced analysis and pedestrian survey, it was clear that the majority of the 6.39 acre project area retains a no/low potential to yield intact archaeological deposits due to large scale soil removal performed by a gravel business in the late twentieth century. The remainder of the project area, specifically 2 acres in the southern and southeastern portion of the project, consists of cultivated field, with low slopes and well-drained soils in proximity to freshwater and therefore has moderate/high potential to yield intact archaeological

deposits. This area, which may contain archaeological resources, will be impacted by the proposed project.

**Project Personnel**

Key personnel for this project included Mr. David R. George, M.A., R.P.A, who served as Principal Investigator for this effort; he was assisted by Ms. Kelsey Tuller, M.A. who completed the fieldwork portion of the project. Mr. William Keegan, B.A., and Mr. Tevin Jourdain, B.A., provided support services and project mapping. Ms. Christina Volpe, B.A., completed the historic background research of the project and Ms. Elizabeth Correia, M.A., compiled this report.

**Organization of the Report**

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

# CHAPTER II
# NATURAL SETTING

**Introduction**

This chapter provides a brief overview of the natural setting of the region containing the project area. Previous archaeological research has documented that a few specific environmental factors can be associated with both prehistoric and historic period site selection. These include general ecological conditions, as well as types of fresh water sources and soils present. The remainder of this section provides a brief overview of the ecology, hydrological resources, and soils present within the project area and the larger region in general.

**Ecoregions of Connecticut**

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

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

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

<u>South Central Lowlands Ecoregion</u>

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

**Hydrology in the Vicinity of the Project Area**

The project area is situated within a region that contains to several sources of freshwater, including the Farm River, Burrs Brook, and Lake Gaillard, as well as numerous unnamed streams, ponds, and wetlands. With the exception of and Lake Gaillard, which is manmade, these freshwater sources may have served as resource extraction areas for Native American and historic populations. Previously completed archaeological investigations in Connecticut have demonstrated that streams, rivers, and wetlands were

focal points for prehistoric occupations because they provided access to transportation routes, sources of freshwater, and abundant faunal and floral resources.

**Soils Comprising the Project Area**

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

A review of the soils within the project area is presented below. The project area is characterized by the presence of one major soil type, Branford (30A), as well as pits and quarries (303) (Figure 2). Pits and quarries are too disturbed to contain significant archaeological resources. A review of Branford soil shows that it consists of well drained loams; they are the types of soils that are typically correlated with prehistoric and historic use and occupation. A descriptive profile for the Branford soil type is presented below; it was gathered from the National Resources Conservation Service.

Branford Soils (Soil Code 30A)

The Branford series consists of consists of very deep, well drained soils formed in loamy over sandy and gravelly outwash. They are nearly level to strongly sloping soils on outwash plains and terraces. Slope ranges from 0 to 15 percent. A typical soil profile for Branford soils is as follows: **Ap--**0 to 8 inches; dark reddish brown (5YR 3/3) silt loam, light reddish brown (5YR 6/3) dry; weak medium granular structure; friable; common very fine and fine roots; 10 percent gravel; moderately acid; clear smooth boundary; **Bw1--**8 to 18 inches; reddish brown (5YR 4/4) loam; weak medium subangular blocky structure; friable; few fine roots; common earthworm holes and worm casts; 10 percent gravel; strongly acid; gradual wavy boundary; **Bw2--**18 to 24 inches; reddish brown (5YR 4/4) loam; weak coarse subangular blocky structure; very friable; few fine roots; 14 percent gravel; strongly acid; clear wavy boundary, and; **2C--**24 to 65 inches; reddish brown (5YR 4/3) stratified sand and gravel; single grain; loose; 25 percent gravel; strongly acid.

**Summary**

The natural setting of the area containing the proposed Citrine Solar Center is common throughout the South Central Lowlands ecoregion. Streams and rivers of this area empty into the Long Island Sound. Further, the landscape in general is dominated by sandy loamy soil types. In addition, moderate hills interspersed with locally steep areas dominate the region. Thus, in general, the project region was well suited to Native American occupation throughout the prehistoric era. As a result, archaeological sites have been documented in the larger project region, and additional prehistoric cultural deposits may be expected within the undisturbed portions of the proposed project area. This portion of North Branford also was used throughout the historic era, as evidenced by the presence of numerous historic residences and agricultural fields throughout the region; thus, archaeological deposits dating from the last 350 years or so may also be expected near or within the proposed project area.

# CHAPTER III
# PREHISTORIC SETTING

**Introduction**

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

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

The earliest inhabitants of the area encompassing the State of Connecticut, who have been referred to as Paleo-Indians, arrived in the area by ca. 12,000 B.P. (Gramly and Funk 1990; Snow 1980). Due to the presence of large Pleistocene mammals at that time and the ubiquity of large fluted projectile points in archaeological deposits of this age, Paleo-Indians often have been described as big-game hunters (Ritchie and Funk 1973; Snow 1980); however, as discussed below, it is more likely that they hunted a broad spectrum of animals.

While there have been numerous surface finds of Paleo-Indian projectile points throughout the State of Connecticut, only two sites, the Templeton Site (6-LF-21) in Washington, Connecticut and the Hidden Creek Site (72-163) in Ledyard, Connecticut, have been studied in detail and dated using the radiocarbon method (Jones 1997; Moeller 1980). The Templeton Site (6-LF-21) was occupied between 10,490 and 9,890 years ago (Moeller 1980). In addition to a single large and two small fluted points, the Templeton Site produced a stone tool assemblage consisting of gravers, drills, core fragments, scrapers, and channel flakes, which indicates that the full range of stone tool production and maintenance took place at the site (Moeller 1980). Moreover, the use of both local and non-local raw materials was documented in the recovered tool assemblage, suggesting that not only did the site's occupants spend quite some time in the area, but they also had access to distant stone sources, the use of which likely occurred during movement from region to region.

The only other Paleo-Indian site studied in detail in Connecticut is the Hidden Creek Site (72-163) (Jones 1997). The Hidden Creek Site is situated on the southeastern margin of the Great Cedar Swamp on the Mashantucket Pequot Reservation in Ledyard, Connecticut. While excavation of the Hidden Creek Site produced evidence of Terminal Archaic and Woodland Period components (see below) in the upper soil horizons, the lower levels of the site yielded artifacts dating from the Paleo-Indian era. Recovered Paleo-Indian artifacts included broken bifaces, side-scrapers, a fluted preform, gravers, and end-scrapers. Based on the types and number of tools present, Jones (1997:77) has hypothesized that the Hidden

Creek Site represented a short-term occupation, and that separate stone tool reduction and rejuvenation areas were present.

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

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

The Archaic Period, which succeeded the Paleo-Indian Period, began by ca. 10,000 B.P. (Ritchie and Funk 1973; Snow 1980), and it has been divided into three subperiods: Early Archaic (10,000 to 8,000 B.P.), Middle Archaic (8,000 to 6,000 B.P.), and Late Archaic (6,000 to 3,400 B.P.). These periods were devised to describe all non-farming, non-ceramic producing populations in the area. Regional archeologists recently have recognized a final "transitional" Archaic Period, the Terminal Archaic Period (3,400-2,700 B.P.), which was meant to describe those groups that existed just prior to the onset of the Woodland Period and the widespread adoption of ceramics into the toolkit (Snow 1980; McBride 1984; Pfeiffer 1984, 1990; Witthoft 1949, 1953).

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

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

Like their Paleo-Indian predecessors, Early Archaic sites tend to be small and produce few artifacts, most of which are not temporally diagnostic. While Early Archaic sites in other portions 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 based on a series of ill-defined bifurcate-based projectile points. These projectile points are identified by the presence of their characteristic bifurcated base, and they generally are made from high quality raw materials. Moreover, finds of these projectile points have rarely been in stratified contexts. Rather, they occur commonly either as surface expressions or intermixed with artifacts representative of later periods. Early Archaic occupations, such as the Dill Farm Site and Sites 6LF64 and 6LF70 in Litchfield County, 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.

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

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

Dincauze (1976) obtained several radiocarbon dates from the Middle Archaic component of the Neville Site. The dates, associated with the then-newly named Neville type projectile point, ranged from 7,740±280 and 7,015±160 B.P. (Dincauze 1976).

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

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

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

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

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

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

The Terminal Archaic Period, which lasted from ca. 3,700 to 2,700 BP, is perhaps the most interesting, yet confusing of the Archaic Periods in southern New England prehistory. Originally termed the "Transitional Archaic" by Witthoft (1953) and recognized by the introduction of technological innovations, e.g., broadspear projectile points and soapstone bowls, the Terminal Archaic has long posed problems for regional archeologists. While the Narrow-Stemmed Tradition persisted through the

Terminal Archaic and into the Early Woodland Period, the Terminal Archaic is coeval with what appears to be a different technological adaptation, the Susquehanna Tradition (McBride 1984; Ritchie 1969b). The Susquehanna Tradition is recognized in southern New England by the presence of a new stone tool industry that was based on the use of high-quality raw materials for stone tool production and a settlement pattern different from the "coeval" Narrow-Stemmed Tradition.

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

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

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

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

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

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

The Early Woodland Period of the northeastern United States dates from ca. 2,700 to 2,000 B.P., and it has been thought to have been characterized by the advent of farming, the initial use of ceramic vessels, and increasingly complex burial ceremonialism (Griffin 1967; Ritchie 1969a and 1969b; Snow 1980). In the Northeast, the earliest ceramics of the Early Woodland Period are thick walled, cord marked on both the interior and exterior, and possess grit temper.

Careful archaeological investigations of Early Woodland sites in southern New England have resulted in the recovery of narrow stemmed projectile points in association with ceramic sherds and subsistence remains, including specimens of White-tailed deer, soft and hard-shell clams, and oyster shells (Lavin

and Salwen: 1983; McBride 1984:296-297; Pope 1952). McBride (1984) has argued that the combination of the subsistence remains and the recognition of multiple superimposed cultural features at various sites indicates that Early Woodland Period settlement patterns were characterized by multiple re-use of the same sites on a seasonal basis by small co-residential groups.

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

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

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

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

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

Stone tool assemblages associated with Late Woodland occupations, especially village-sized sites, are functionally variable and they reflect plant and animal resource processing and consumption on a large scale. Finished stone tools recovered from Late Woodland sites include Levanna and Madison projectile points; drills; side-, end-, and thumbnail scrapers; mortars and pestles; nutting stones; netsinkers; and celts, adzes, axes, and digging tools. These tools were used in activities ranging from hide preparation to plant processing to the manufacture of canoes, bowls, and utensils, as well as other settlement and subsistence-related items (McBride 1984; Snow 1980). Finally, ceramic assemblages recovered from Late Woodland sites are as variable as the lithic assemblages. Ceramic types identified include Windsor Fabric Impressed, Windsor Brushed, Windsor Cord Marked, Windsor Plain, Clearview Stamped, Sebonac Stamped, Selden Island, Hollister Plain, Hollister Stamped, and Shantok Cove Incised (Lavin 1980, 1988a,

1988b; Lizee 1994a; Pope 1953; Rouse 1947; Salwen and Ottesen 1972; Smith 1947). These types are more diverse stylistically than their predecessors, with incision, shell stamping, punctation, single point, linear dentate, rocker dentate stamping, and stamp and drag impressions common (Lizee 1994a:216).

**Summary of Connecticut Prehistory**

In sum, the prehistory of Connecticut spans from ca. 12,000 to 350 B.P., and it is characterized by numerous changes in tool types, subsistence patterns, and land use strategies. For most of the prehistoric era, local Native American groups practiced a subsistence pattern based on a mixed economy of hunting and gathering wild plant and animal resources. It is not until the Late Woodland Period that incontrovertible evidence for the use of domesticated species is available. Further, settlement patterns throughout the prehistoric era shifted from seasonal occupations of small co-residential groups to large aggregations of people in riverine, estuarine, and coastal ecozones. In terms of the region containing the proposed Project Site, a variety of prehistoric site types may be expected. These range from seasonal camps utilized by Archaic populations to temporary and task-specific sites of the Woodland era.

# CHAPTER IV
# HISTORIC OVERVIEW

**Introduction**

The proposed project area is located within the southwestern area of the town of North Branford in New Haven County, Connecticut. Historically North Branford was a small agricultural community that witnessed a population increase following land development in the early 1950s. Below is a historical overview outlining the history of North Branford and the village of Northford, as well as an historic overview of the proposed project parcel.

**Native American History**

In 1695, the General Court of the Colony of Connecticut granted the town of New Haven the right to sell Quinnipiac lands throughout the limits of the New Haven Colony; much of which was sold by 1720 (Menta 2003). The area known today as North Branford was part of land known as the Totoket Territory purchased from the Quinnipiac indigenous peoples of the region in 1638 by Theophilus Eaton and John Davenport. The Quinnipiac occupied nearly 300 square miles, much of present-day New Haven County, extending 20 miles from present day Long Island Sound in the south, to approximately the center of Meriden in the north. When colonists arrived to settle the region in 1638 the Quinnipiac were comprised of several distinct groups including the Totoket community located within the contemporary bounds of Branford (Menta 2003).

**Eighteenth Century History**

The first colonist house constructed in North Branford was built by Captain Jonathan Rose in 1680; it was erected in the section formally known as Hop Yard Plain. By 1715, the population of the North Branford settlement had grown around what was then known as Sibbie's Hill and was removed from Branford center, still the only meeting house for the community. In 1717, the "Northern farmers living removed from the meeting house" petitioned the General Court in Hartford to become their own society. Their request was denied with the stipulation that Branford send a minister during the winter months each year for three years to provide for the Northern Farm society; town boundaries were formally noted at this time. In 1722, the question of starting a Second Society in North Farms arose once again, with some dispute regarding the boundaries from 1717, and the area's settlers voted to construct a meeting house in May of 1724 (Hill 1918). The Second Society also voted to include a full-time minister, paid for by Branford for the Second Society's agreement to the town's original boundaries (Hill 1918). By 1725 the Second Society was independently established, and Rev. Jonathan Merrick was invited to become the first minister (Hill 1918). Following the establishment of the meetinghouse and church, more settlers came to live in North Farms with some being as far away from the Second Society meetinghouse as the early North Farms settlers were to the Branford meetinghouse.

Members of those settled far away from the Second Society meetinghouse and certainly the Branford meetinghouse, began to petition to become their own society in 1736, but were met with opposition from the Second Society members due to their hesitation in losing the tax money (Hill 1918). In 1745, though, northern farmers in the Second Society won their petition and were able to form the Third Society of Branford, known then as it is now as Northford (Gregan 1998). The Northford meetinghouse was built in 1747 with Warham Williams as the first minister and boundaries between the Second Society and Northford were drawn from west to east leading to Totoket Mountain's north and east ridge (Hill 1918).

By the late 1770s those living north of Branford in the Second and Third societies totaled a population of about 1,000 (Hill 1918). The Connecticut General Assembly increasingly suggested the formation of local militias to combat rebellion against the British. William Douglas, a wealthy merchant and resident of Northford became the leader of a unit of nearly 800 men defending Fort Sterling in Brooklyn, New York. Douglas was later elected to be a representative in the Connecticut Assembly but was called away to New York at the onset of the American Revolution to serve as a Colonel for a group known later as the "Leather Caps" for their locally tanned leather caps (Miller 1982). Approximately 115 men from the Second and Third Societies of Branford served during the American Revolution (Miller 1982).

**Nineteenth Century History**

Following the war, residents in Branford, North Branford, and Northford adjusted their lives to the New Republic, some moving west to new lands while others continued to expand upon their homesteads and enterprises in the area. Branford Harbor was a vital part of this growth, as it served as a trading point for merchants in the West Indies, including those dealing in the Transatlantic Slave Trade (Miller 1982). The primary economy for those living in the Second (North Branford) and Third (Northford) Societies relied on agricultural production, mainly that of wheat, rye, corn, and apples (Gregan 1998). North Branford began diverged from its parent town of Branford in 1797, when leaders of the North Branford kept their school records separate from Branford. Several years later Second Society residents in North Branford petitioned the General Assembly to separate from Branford to become their own town. Their autonomy was denied; however, residents in North Branford persisted on fostering individuality and in 1812 elected to form an Episcopal church, with the church itself erected by 1820 (Miller 1982).

North Branford did not have the advantage of Branford Harbor to facilitate economic growth and new roads were needed to reach the town. In 1812, the Middletown Turnpike was built from New Haven through Northford to Middletown. Passing through the center of North Branford, the Fair Haven Turnpike was built between New Haven and Essex in 1824 (Wood 1919). These routes also provided a means for new residents to establish themselves and between 1820 and 1870 North Branford and Northford witnessed tremendous growth, witnessed by the many new Greek Revival style buildings erected throughout town during that time period. Like many northern towns, the American Civil War promoted industrial growth in North Branford which by this time included a paper mill and brass furnishing company (Miller 1982). North Branford residents did participate in the war, sending approximately 50 men to serve in the Union Army; the memorial on the Green commemorating those soldiers were one of the first to be erected in the nation in 1867 (Miller 1982).

Northford's industry witnessed a slow decline following the completion of the railroad in 1871, which passed to the west of the village, two miles too short to be useful (Wood 1919). The only business that seemed to sustain itself and thrive in Northford was the paper mill, which became known for being an early center for the production of greeting cards, dubbed the "Christmas card capital of the world" (Miller 1982). With the railroad being at an inconvenient distance, most of North Branford and the village of Northford reverted to farming and as the twentieth century approached the population declined going from 1,025 in 1880 to 825 in 1900 (Miller 1982).

**Twenty and Twenty-First Century History**

The early twentieth century brought renewed prosperity to North Branford and the village of Northford. In 1910, the Shoreline Electric Railroad Company built a line through North Branford center and throughout the whole of New Haven County. The trolley system thrived there for a short period of time, but ultimately failed in 1919 following a fatal accident that killed 19 people (Miller 1982). The establishment of the New Haven Trap Rock Company quarry in North Branford in 1914 facilitated

population growth by providing worker housing. Many of the new residents working there, who were migrants from western and central Europe, were practicing Catholics. In 1920, the Catholic population had swelled and warranted the construction of a church, which was completed in 1925 adjacent to North Branford center (Miller 1982). The year 1925 was a pivotal one in the town's history and makeup. In 1925, the New Haven Water Company acquired land between Totoket Mountain and Sea Hill for the purpose of building a new reservoir. The Lake Gaillard dam was complete in 1933 and cost the town a quarter of its total land as well as the town's access to North Guilford (Miller 1982).

The population in 1930 was approximately 1,329 residents and when the town celebrated its 100th anniversary in 1931, 3,000 people attended the festivities from surrounding communities (Miller 1982). As seen in many rural agricultural towns throughout Connecticut, the most impactful period of change in North Branford occurred in the 1950s and 1960s when the population grew from 1,438 in 1940 to 10,778 in 1970 (Miller 1982). Suburban housing developments facilitated much of this growth, and additional schools were constructed; in 1964, another Catholic Church, St. Monica's, was constructed in Northford. Further improvements were made to the town in the mid-twentieth century with the addition of the Edward Smith Library constructed in 1957 and the town's first police force established in 1970, with the first Police Station complete in 1975 on Forest Road. In 1965, Totoket Valley Park was established along the Farm River near Northford and in 1976 the town purchased 77 acres of land along the Branford River, aptly naming the park North Farms (Gregan 1998). Since this time North Branford and the village of Northford has retained its rural, small-town feel.

**Historical Overview of the Project Area**

The proposed project area is located on Forest Road (CT Route 22) in North Branford, Connecticut and is located to the northwest of the village of Northford. On an 1854 historic map, the proposed project area appears to the west of present-day Forest Road and displays the name "D. Russell," indicating a homestead at the edge of the indicated project parcel (Figure 3). According to the 1860 United States Federal Census David Russell, then age 55, was a farmer with a real estate value of $8,000 and personal estate value of $550. Living with Russell in 1860 was his wife Betsey Russell, age 53, their daughter Emily, age 21, and a schoolteacher named Theodore Dutton, age 19 (Census 1860). On the 1868 historic map D. Russell is once again represented as owning the parcel (Figure 4). According to the 1880 United States Federal Census, David Russell was then a 75-year-old retired farmer, a widower, and the father-in-law to George H. Munger age 53, who is listed as the head of household (Census 1880). Also listed as living with David Russell is his daughter Emily Munger, age 42, and her daughter Helen R. Munger, age 16 (Census 1880). David Russell died in 1881 and is interred within Bare Plain Cemetery in North Branford alongside his wife Betsey Norton Russell, who died in 1871 (Find A Grave Index, 2012). The Russell farm and homestead are visible on the 1934 historic aerial photograph with the homestead just outside of the proposed project parcel along Forest Road (Figure 5). It is clear based off of this aerial image that the farm was still in operation, though Russell's son-in-law George H. Munger had died in 1915. Though not within the project parcel, according to the town of North Branford the house located at the present-day 148 Forest Road was constructed in 1785 and is likely associated with David Russell and his father Samuel F. Russell, who served as deacon of the Congregational Church in 1846 (Hill 1918, Town of North Branford Accessor's Office).

The 1951 historic aerial photograph displays little changes from the 1934 depiction of the project area. Secondary reforestation is visible west of the project area with the remainder of the proposed project area remaining purposed for agricultural use (Figure 6). The late-1950s and early 1950s marked the beginning of a shift in land-use and acquisition throughout Connecticut's agricultural communities. Much of the former land used for farming was sold and developed into subdivisions suitable for single-

family dwelling units. The growth of suburban development in North Branford is witnessed between the 1951 and 2019 aerial photographs in which one such subdivision can be seen immediately south and southwest of the proposed project parcel (Figure 7). However, the land visible within the project area remains cleared and purposed for agricultural use, remaining unaffected by nearby development and unchanged since the early nineteenth century.

**Conclusion**

Historical data indicates that the proposed project is not impact any significant historical or archaeological resources. While there may be evidence of historic stone walls within the vicinity of the project area, these may not be of significant historic importance.

# CHAPTER V
# PREVIOUS INVESTIGATIONS

**Introduction**

This chapter presents an overview of previous archaeological research completed within the vicinity of the project area in North Branford, Connecticut. This discussion provides the comparative data necessary for assessing the results of the current Phase IA cultural resources assessment survey, and it ensures that the potential impacts to all previously recorded cultural resources located within and adjacent to the project area are taken into consideration. Specifically, this chapter reviews previously identified archaeological sites, National/State Register of Historic Places properties, and inventoried historic standing structures situated in the project region (Figures 8 and 9). The discussions presented below are based on information currently on file at the Connecticut State Historic Preservation Office in Hartford, Connecticut. In addition, the electronic site files maintained by Heritage were examined during the course of 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 Connecticut State Historic Preservation Office as well as the electronic site files maintained by Heritage identified ten previously identified archaeological sites (Site 99-4, 99-6, 99-9, 99-10, 99-14, 99-20, 99-29, 99-35, 99-37, and 99-38), as well as one National Register of Historic Places Property (the George Baldwin House) located within 1.6 km (1 mi) of the project area. All resources are generally southwest of the project parcel (Figures 10 and 11). These cultural resources are discussed briefly below.

Site 99-4

Site 99-4, the Bare Plain Site, was identified within a driving range on the north side of Route 80 and 250 m (820 ft) to the east of Harrison School in North Branford, Connecticut. It was recorded in April of 1979 by the Connecticut Archaeological Survey as an Archaic and Woodland Period village encompassing approximately 6 acres of land. At the time of recordation, the site integrity was already destroyed. Previous surface collection resulted in the recovery of quartz small-stemmed projectile points, quartz pentangles, quartz triangles, and quartz chips. Since it has lost integrity, Site 99-4 is not eligible for listing on the National Register of Historic Places based on the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). It will not be impacted by the proposed solar project.

Site 99-6

Site 99-6, or Doody's Farm, was recorded by the Connecticut Archaeological Survey in March 1979 following surface collection by Lyent Russell of the Archaeological Society of Connecticut. The site covers approximately one acre located 60 m (196.9 ft) to the south of Route 80 in a residential portion of North Branford, Connecticut. A total of three bifurcated projectile points, two axe heads, quartz small-stemmed projectile points, and lithic debitage were recovered here, suggesting an Early Archaic Period site. However, Site 99-6 was recorded as destroyed and therefore is not eligible for listing on the National Register of Historic Places based on the qualities of significance as defined by the National

Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). It will not be impacted by the proposed solar project.

Site 99-9

Site 99-9 was recorded as the Page Farm site by the Connecticut Archaeological Survey in March 1979. Landowner Robert Page surface collected the site, which measures approximately two to three acres in size. Site 99-9 is located 90 m (295.3 ft) to the west of Totoket Road in North Branford, Connecticut. It was determined to be an Archaic and Woodland Period camp site based on the recovery of small-stemmed quartz projectile points, two flint side-notched projectile points, and flint and quartz debitage. Site 99-9 was recorded as retaining fair integrity. It was never subjected to professional archaeological survey and was not assessed applying the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). It will not be impacted by the proposed solar project.

Site 99-10

Site 99-10 is the Pages Millpond site in North Branford, Connecticut on the east side of Totoket Road, 500 m (1,640.4 ft) north of Mill Road. The site area covers approximately 0.5 acres of land and is located in a cultivated field. The Connecticut Archaeological Survey recorded the site in March of 1979 and found it to be mostly destroyed. Lyent Russell and Lewellyn Burr surface collected the site and recovered Brewerton side-notched and small-stemmed quartz projectile points, as well as a retouched flint scraper and quartz debitage. The site form describes Site 99-10 as a camp site from the Archaic Period that was not assessed applying the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). It will not be impacted by the proposed solar project.

Site 99-14

Site 99-14 is located south of Mill Road in North Branford, Connecticut, covering approximately one acre of agricultural land. It was surface collected by local collectors and Archaeological Society of Connecticut member Lyent Russell. Then, the Connecticut Archaeological Survey recorded it in March 1979. Surface collection resulted in the recovery of a notched jasper projectile point, several axe heads, a small ulu, and an atlatl weight. Site 99-14 was determined to be an Archaic and Woodland village site that was mostly destroyed. It was not assessed applying the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]) and it will not be impacted by the proposed solar project.

Site 99-20

The site form for 99-20 lacks any information besides that the site is named the Totoket Road site and that it is located in North Branford, Connecticut. Nevertheless, Site 99-20 will not be impacted by the proposed solar project.

Site 99-29

Site 99-29 is the Arthur Court site in North Branford, Connecticut, an Archaic and Woodland Period camp site. The Connecticut Archaeological Survey recorded the site in April 1979 following surface collection of quartz small-stemmed projectile points, quartz triangles, a flint triangle, and a flint straight-stemmed projectile point. Site 99-29 was recorded as destroyed and therefore is not eligible for listing on the National Register of Historic Places based on the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). It will not be impacted by the proposed solar project.

Site 99-35

Site 99-35 was recorded as the Burrs Brook Site by Anna Graves of the Public Archaeology Laboratory, Inc., (PAL) on May 30, 2001. PAL tested the site earlier that month and identified a low density of quartz and siltstone chipping debris within plowed and intact B subsoils, as well as a small hammerstone in subsoil. This site is located south of Foxon Road in North Branford, Connecticut and was determined to be a camp site from an unknown time period. Site 99-35 was not assessed applying the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]) and it will not be impacted by the proposed solar project.

Site 99-37

Site 99-37 was also recorded by Anna Graves of the Public Archaeology Laboratory, Inc., (PAL). PAL completed testing and site examination excavation at this location in May and December 2001. Survey was conducted in an approximately 50 square meter area at a bend in the pipeline easement behind Water Authority property in North Branford, Connecticut. Phase I testing resulted in the identification of a low density of quartz chipping debris and a charcoal stain. Phase II excavation revealed scattered historical materials in the plow zone and a thin scatter of prehistoric artifacts, mostly lithic chipping debris. In addition, one quartz biface was recovered. The site was partially disturbed by pipeline and power line development, but otherwise retained good integrity. However, artifacts could not be associated with any specific time period or culture and no cultural features were identified. Therefore, PAL determined that Site 99-37 was not significant enough to warrant further testing and pipeline construction continued. This site will not be impacted by the proposed solar facility.

Site 99-38

Site 99-38 is the Farm River Site, which is located to the east of Totoket Road and south of Mill Road in North Branford, Connecticut. Anna Graves of the Public Archaeology Laboratory, Inc., (PAL) recorded Site 99-38 in January 2002 following testing and excavation by PAL in 2001 as part of the Islander East Pipeline Project. Phase I testing resulted in the recovery of one quartz Levanna projectile point and lithic chipping debris, while Phase II excavation revealed scattered quartz and unidentified lithic chipping debris, one piece of corded and coarse tempered aboriginal pottery, an unidentified lithic core, a worked quartz flake, an unidentified quartz projectile point tip, and a second quartz Levanna projectile point. These findings suggest a Middle to Late Woodland Period camp site. However, artifacts were in disturbed contexts and were thinly spread across the landscape. Therefore, PAL determined that Site 99-38 lacked significance and that pipeline construction could continue without further testing. Site 99-38 will not be impacted by the proposed solar facility.

The George Baldwin House

The George Baldwin House is located at 530 Foxon Road, North Branford, Connecticut. It was listed on the National Register of Historic Places by Bruce Clouette on May 12, 1976. The house is a one-and-a-half story Greek Revival residence with a shallow-pitched hip roof, likely built in the 1830s. The facade of the house features a central portico with a window to either side, fluted Doric columns, and broad entablature. The George Baldwin House is attributed to architect Ithiel Town, and therefore holds significance under Criterion C. Clouette records that “Despite its small size, it has the strength, balance and control which are at the heart of Classicism.” The George Baldwin House will not be impacted by the proposed solar facility due to its distance from the project area.

**Summary and Interpretations**

The review of previously completed research in the vicinity of the proposed project area and the analysis of cultural resources recorded nearby, indicates that the larger project region likely contains

additional historic cultural deposits and structures. This suggests that additional archaeological sites may be situated within the project area. These may include sites related to the historic development of the area, as well as earlier sites which could potentially add to the understanding of Native American settlement and subsistence patterns in this area and the greater region as a whole.

# CHAPTER VI
# METHODS

**Introduction**

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

**Research Framework**

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

**Archival Research and Literature Review**

Background research for this project included a review of a variety of historic maps depicting the proposed project area. This involved an examination of USGS 7.5' series topographic quadrangles; an examination of aerial images dating from 1934 through 2019; review of all archaeological sites, National and State Register of Historic Places, and inventoried historic standing structures on file with the Connecticut State Historic Preservation Office. Also reviewed were electronic cultural resources data maintained by Heritage. The intent of this review was to identify all previously recorded cultural resources situated within and immediately adjacent to the project area and to provide a natural and cultural context for the project region. This information 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 historic maps, aerial imagery, and information related to previous archaeological investigations, were gathered from the Connecticut State Historic Preservation Office. 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, National and State Register of Historic Places properties, and inventoried historic standing structures within the general vicinity of the project area.

**Field Methodology and Data Synthesis**

Heritage also performed fieldwork for the Phase IA cultural resources assessment survey of the project area associated with the proposed solar project in North Branford, Connecticut. This included pedestrian survey, photo-documentation, and GPS recordation of the part of the project parcel containing the project area. During the completion of the pedestrian survey, representatives from Heritage photo-documented all potential areas of impact using digital media.

# CHAPTER VII
# RESULTS OF THE INVESTIGATION & SUMMARY

**Introduction**

This chapter presents the results of the Phase IA cultural resources assessment survey of the project area in North Branford, Connecticut, as well as a summary of the project. 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 prehistory, history, and natural setting (e.g., soils, ecology, hydrology, etc.); 2) a literature search to identify and discuss previously completed cultural resources surveys and previously recorded cultural resources in the project region; 3) a review of readily available historic maps and aerial imagery depicting the project area in order to identify potential historic resources and/or areas of past disturbance; 4) pedestrian survey and photo-documentation of the project area in order to determine its archaeological sensitivity; and 5) preparation of the current Phase IA cultural resources assessment survey report.

**Results of Phase IA Survey**

As seen in Figure 1, the project area contains approximately 6.39 acres of land within a larger parcel. The project area is located at 127 Forest Road and is characterized by low slopes. It is situated at approximately 30.5 m (100 ft) NGVD. The predominant soil type located throughout the project area is Branford loams, which are found on slopes of 0 to 15 percent and, as presented in Chapter II of this report, are well drained. Pedestrian survey of the project area revealed that the northwestern portion contained areas of disturbance where large scale soil removal was completed by a gravel business in the late twentieth century (Figure 11). Otherwise, the easternmost portion of the project area, as well as the southern boundary consists of low slopes and well drained soils in close proximity to Farm River, and may still contain intact archaeological deposits (Figure 11 and Photos 1 through 14).

**Overall Sensitivity of the Proposed Project Area**

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 historic maps, aerial images, and data regarding previously identified archaeological sites, National and State Register of Historic Places properties, and inventoried historic standing structure to stratify the project area into zones of no/low and/or moderate/high archaeological sensitivity. In general, historic period archeological sites are relatively easy to identify on the current landscape because the features associated with them tend to be relatively permanent constructions that extend above the ground surface (i.e., stone foundations, pens, wells, privies, etc.). Archaeological sites dating from the prehistoric 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 Native American site choices.

With respect to the potential for identifying prehistoric 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 prehistoric archaeological deposits. Those areas

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

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

The combined review of historic maps, aerial images, and pedestrian survey indicates that while the northwestern portion of the project parcel has been disturbed by a previous gravel operation, the remainder of the project area appears to retain moderate/high archaeological integrity. That is, the results of the cultural resources assessment survey of the project area revealed substantial areas of low slopes and well drained soils within an area situated above and within proximity to wetlands and the Farm River to the west. Soils found throughout the project area are attributed to the Branford series, which consists of loams that generally extend to 65 cm (25.6 in) below surface. While this area has been subjected to soil removal over the years, the portion of the project area shown in red in Figure 11 may still contain intact soil and archaeological deposits beneath the plow zone.

**Project Summary**

Since the northwestern portion of the project area has been determined to have no/low archaeological sensitivity, no archaeological deposits are expected there; thus, no additional examination of this area is needed prior to construction of the proposed solar center. Finally, it has been determined that the remainder of the project area retains a moderate/high potential to contain intact cultural deposits below the plow zone (Figure 11). This area, which may contain intact archaeological deposits, measures approximately 2 acres in size and will be impacted by the proposed project.

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1880 Tenth Census of the United States. Schedule 1 - Inhabitants. HeritageQuest Online. Ann Arbor, Michigan: ProQuest LLC.

Wood, F. J.

1919 *The Turnpikes of New England and Evolution of the Same Through England, Virginia, and Maryland*. Boston: Marshall Jones Company.

Woodford, E. M.

1855 *Smith's Map of Hartford County, Connecticut, from Actual Surveys*. H. & C. T. Smith. Philadelphia.

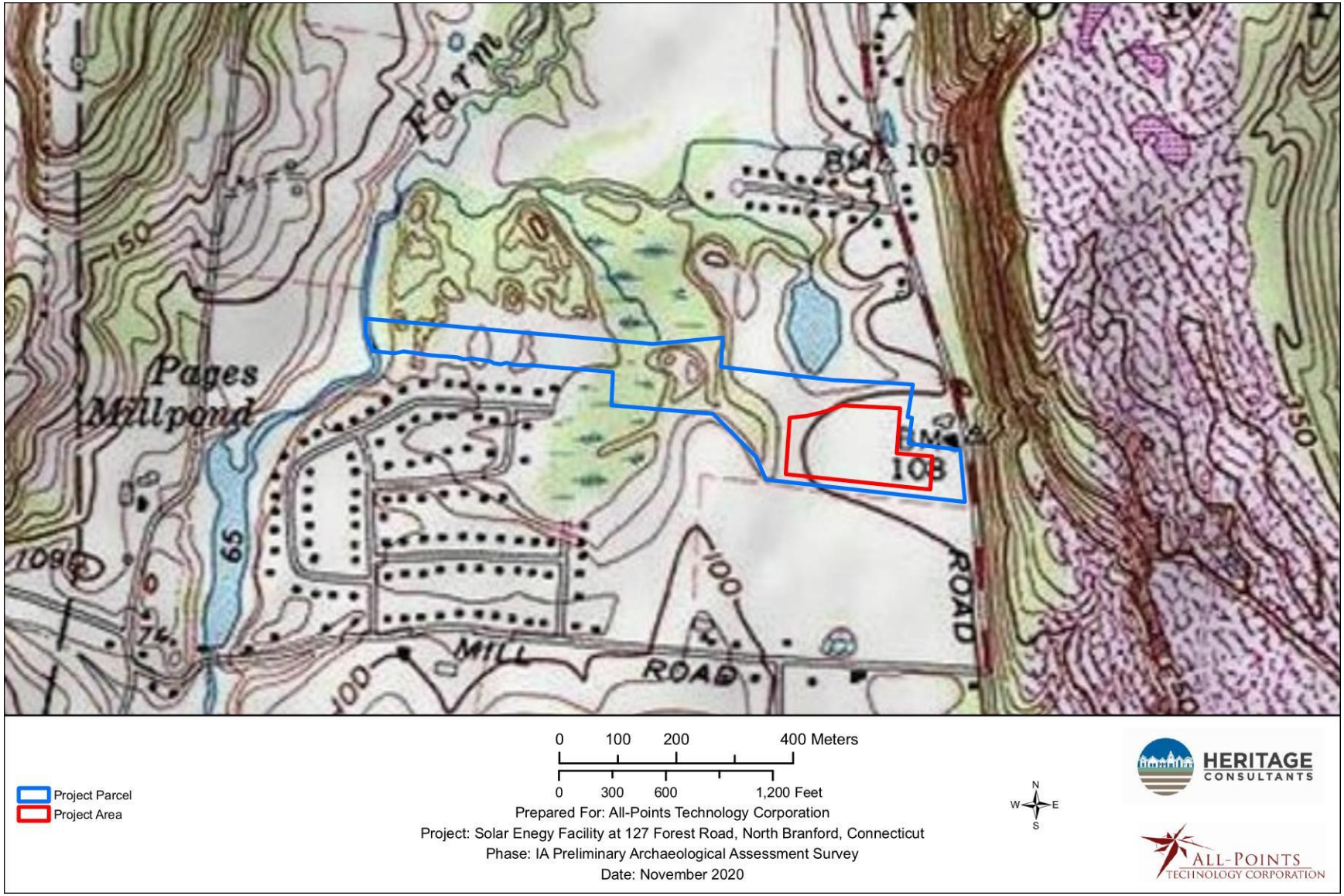



Figure 1. Excerpt from a USGS 7.5' series topographic quadrangle image showing the location of the project area in North Branford, Connecticut.

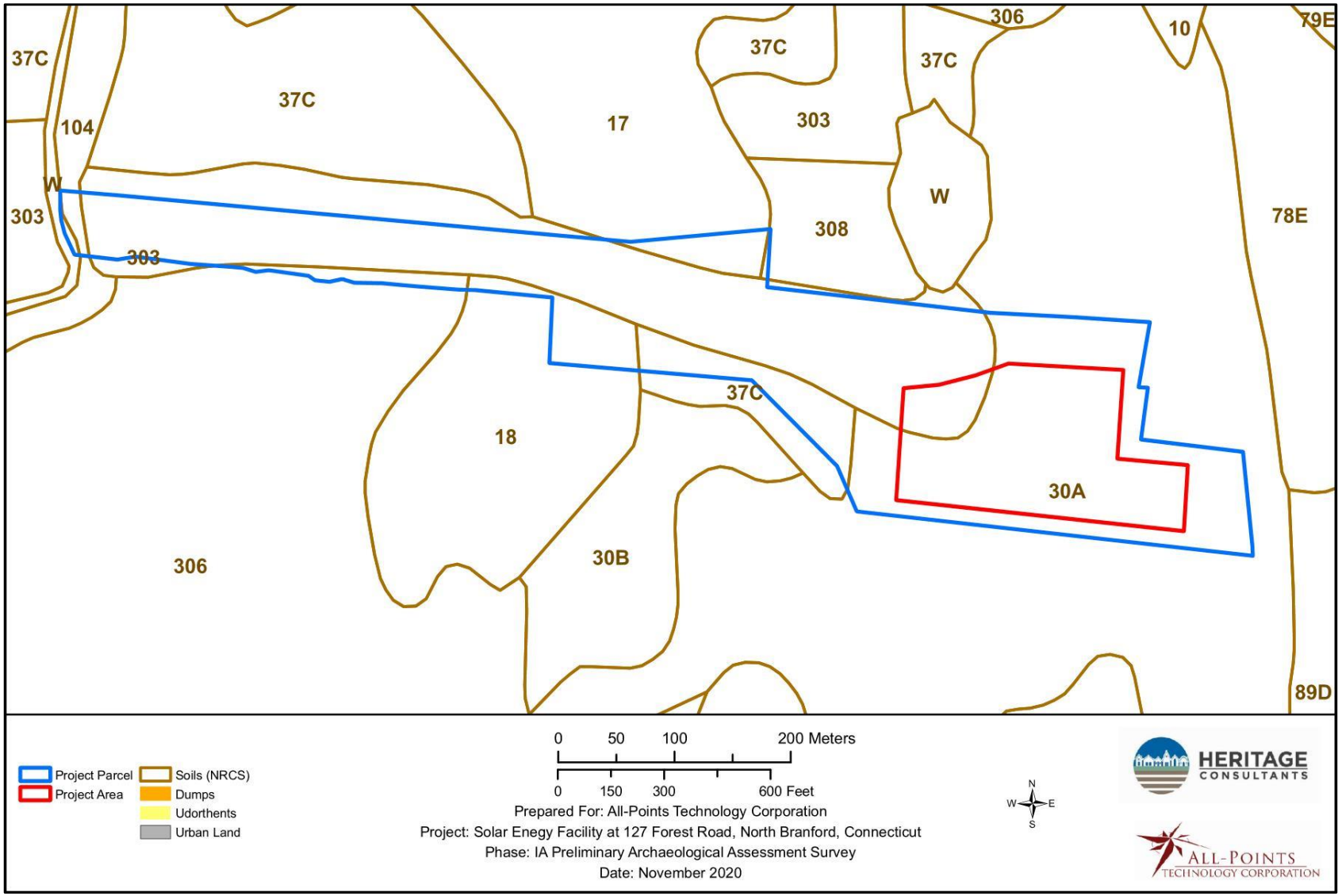



Figure 2. Map of soil located in the vicinity of the project area in North Branford, Connecticut.

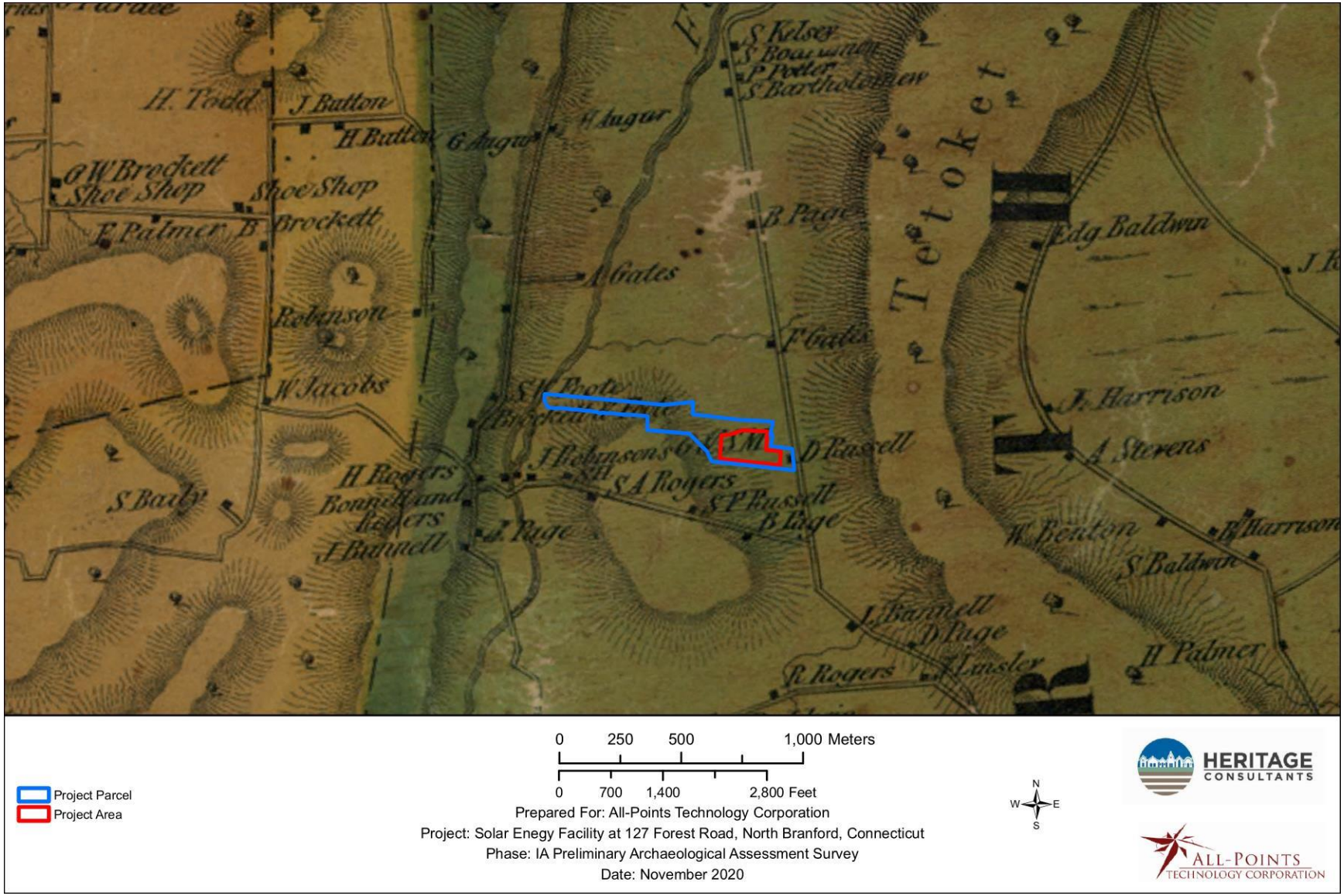



Figure 3. Excerpt from an 1854 historic map showing the location of the project area in North Branford, Connecticut.

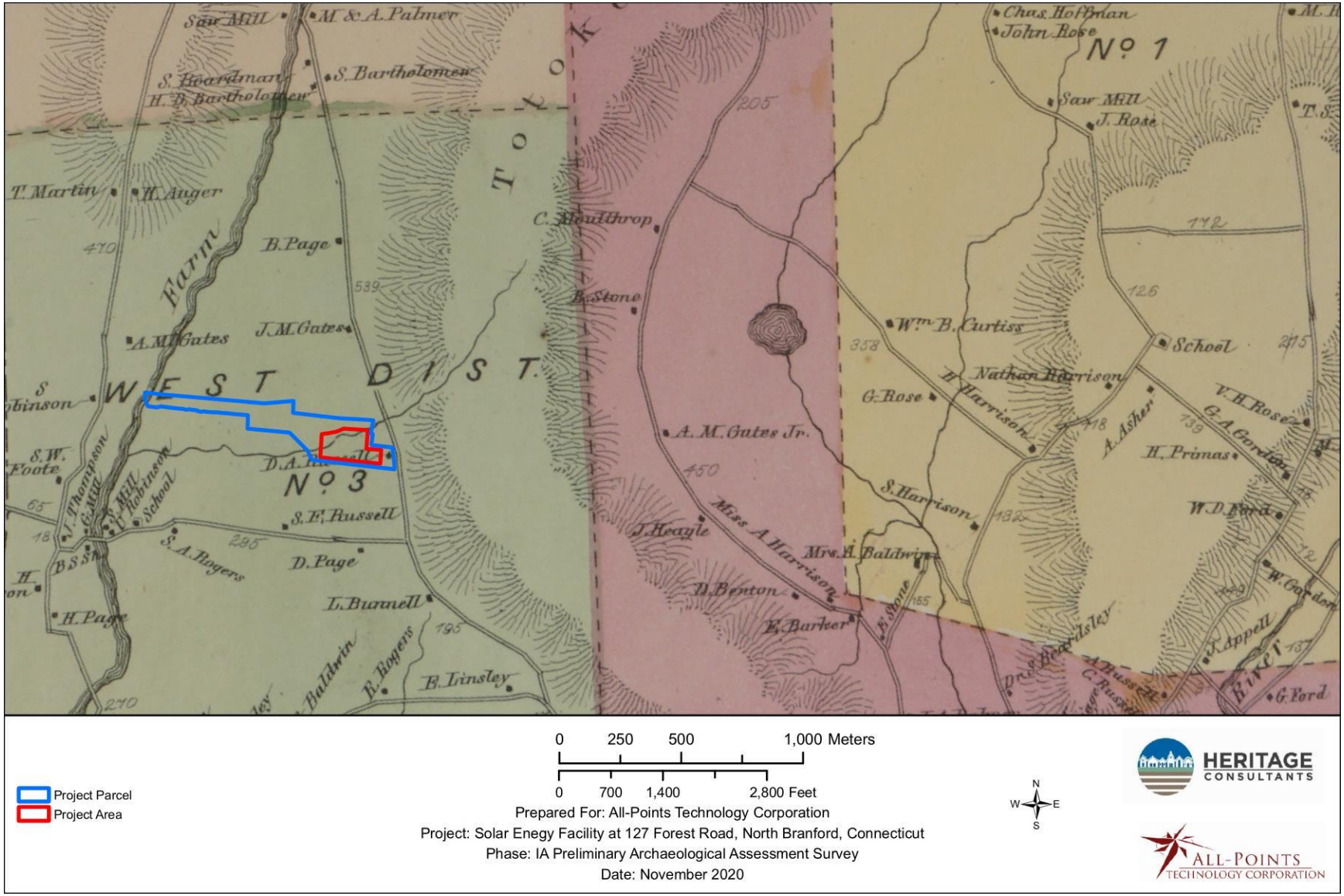



Figure 4. Excerpt from an 1868 historic map showing the location of the project area in North Branford, Connecticut.

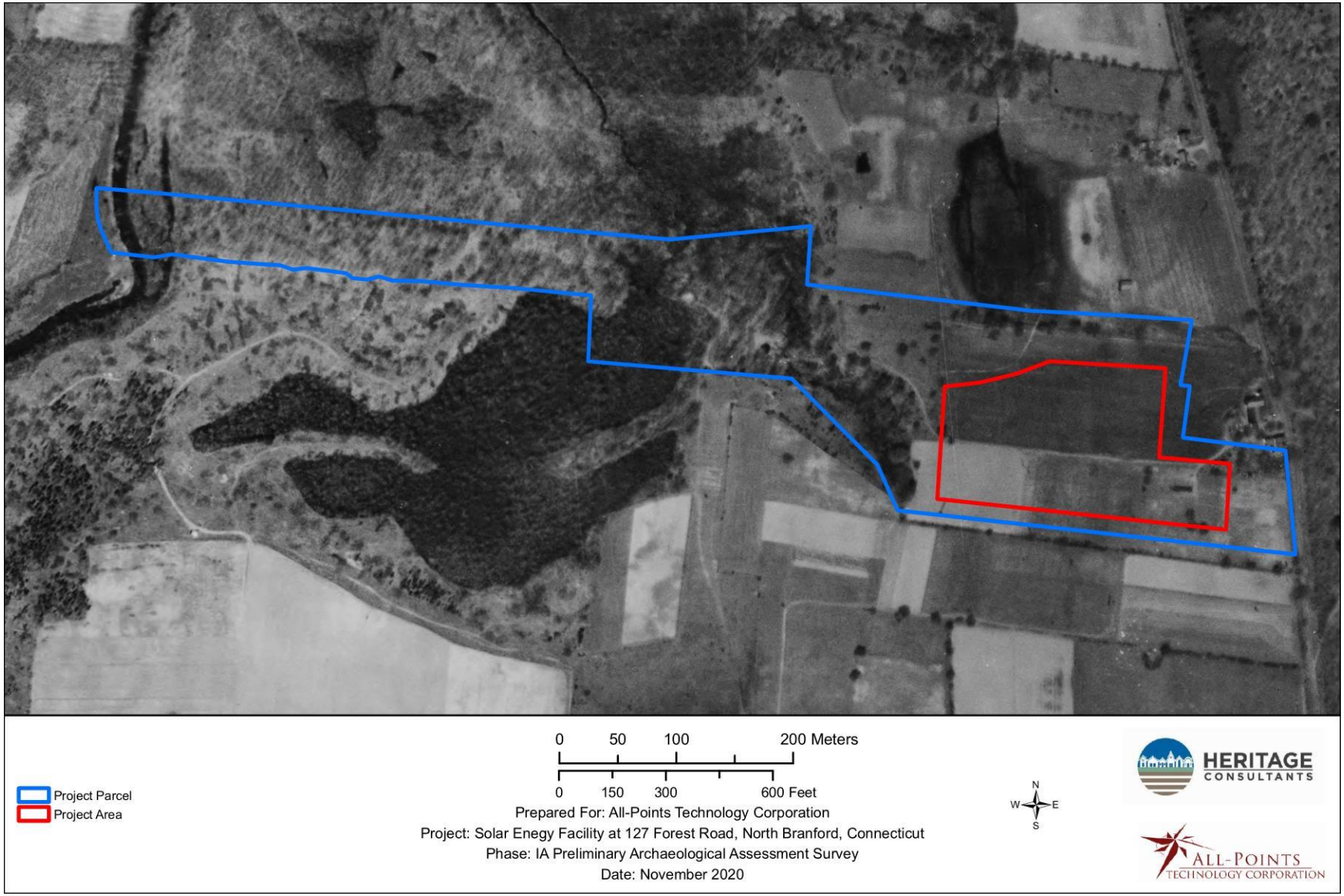



Figure 5. Excerpt from a 1934 aerial photograph showing the location of the project area in North Branford, Connecticut.

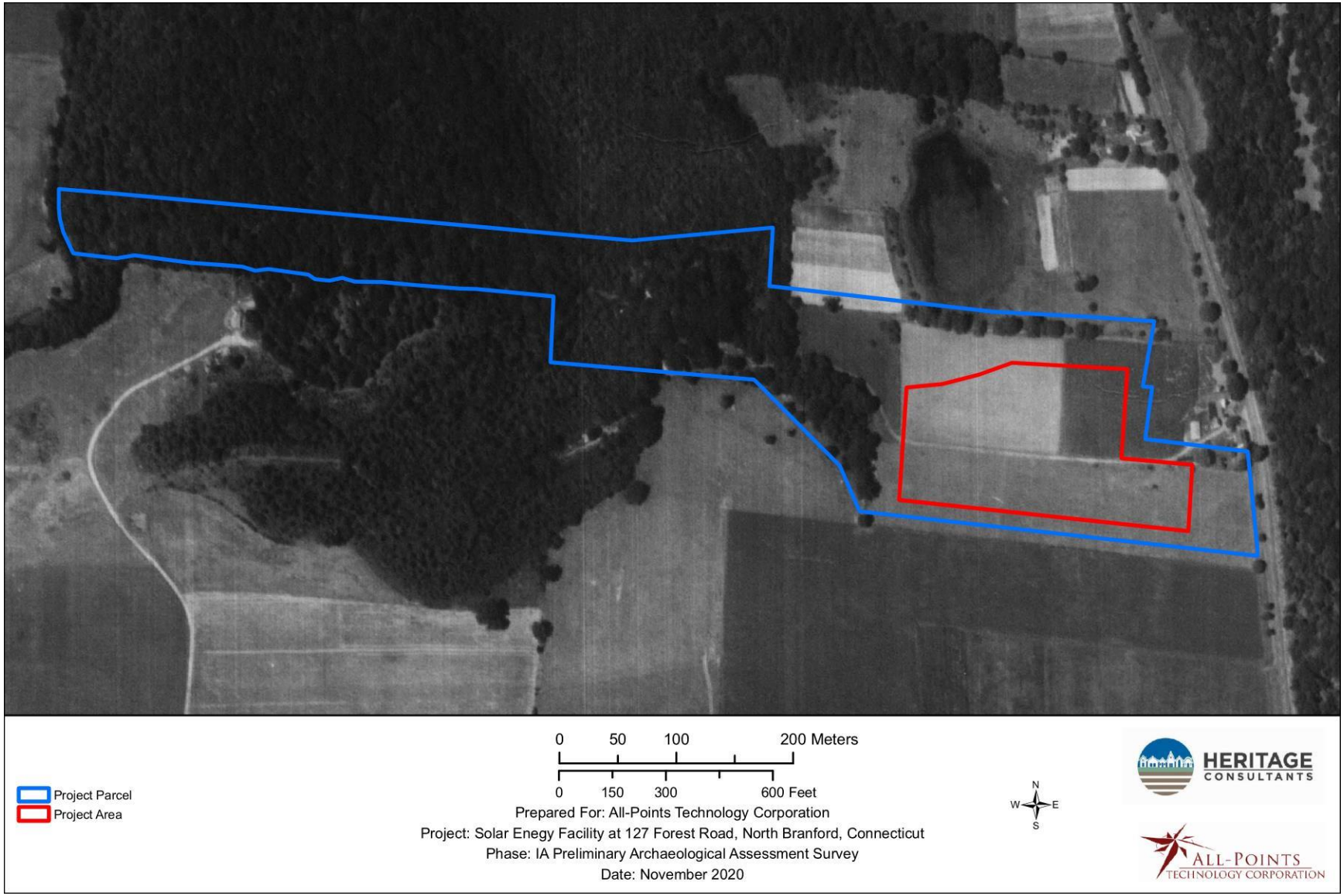



Figure 6. Excerpt from a 1951 aerial photograph showing the location of the project area in North Branford, Connecticut.

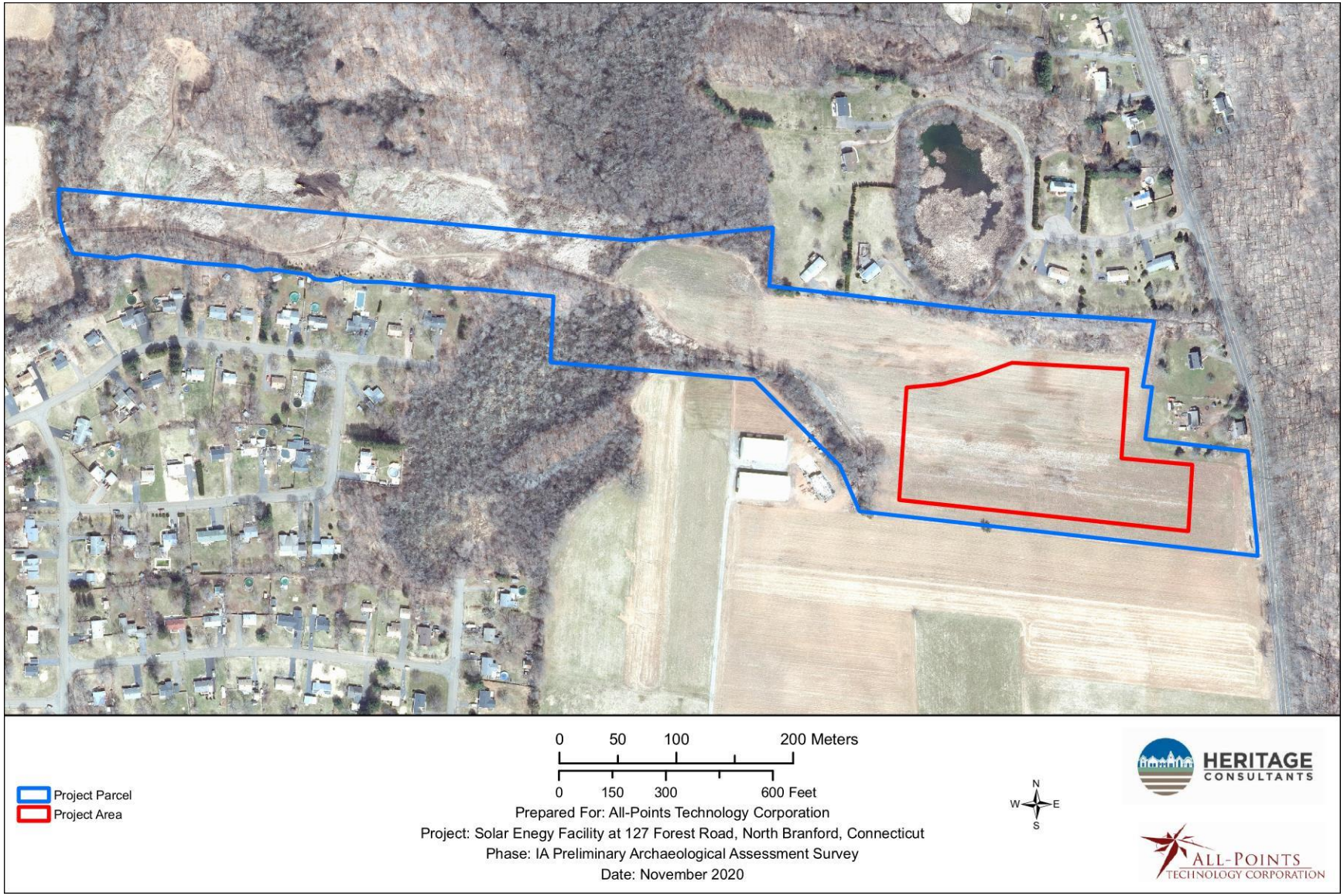



Figure 7. Excerpt from a 2019 aerial photograph showing the location of the project area in North Branford, Connecticut.

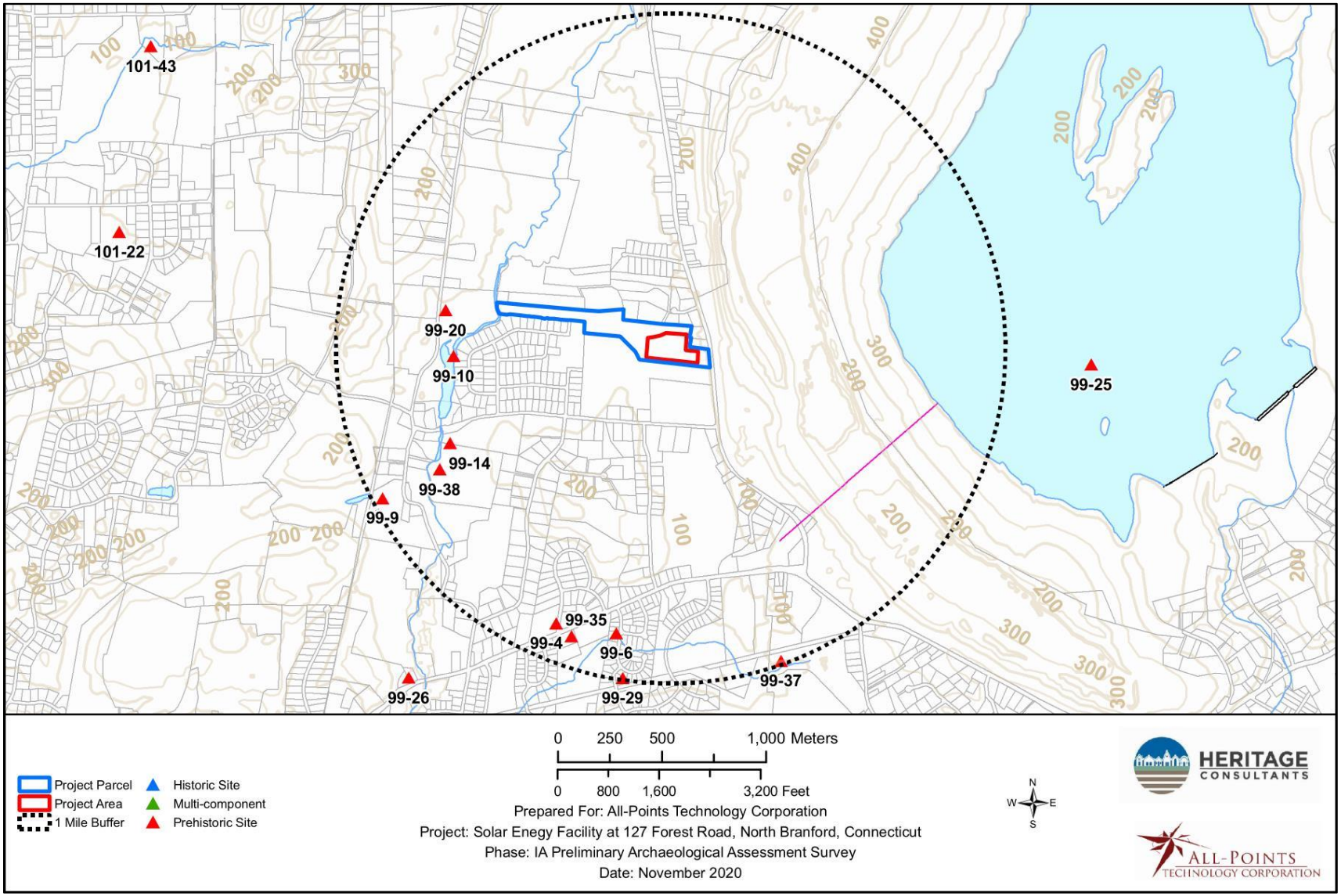



Figure 8. Digital map showing the location of previously identified archaeological sites in the vicinity of the project area in North Branford, Connecticut.

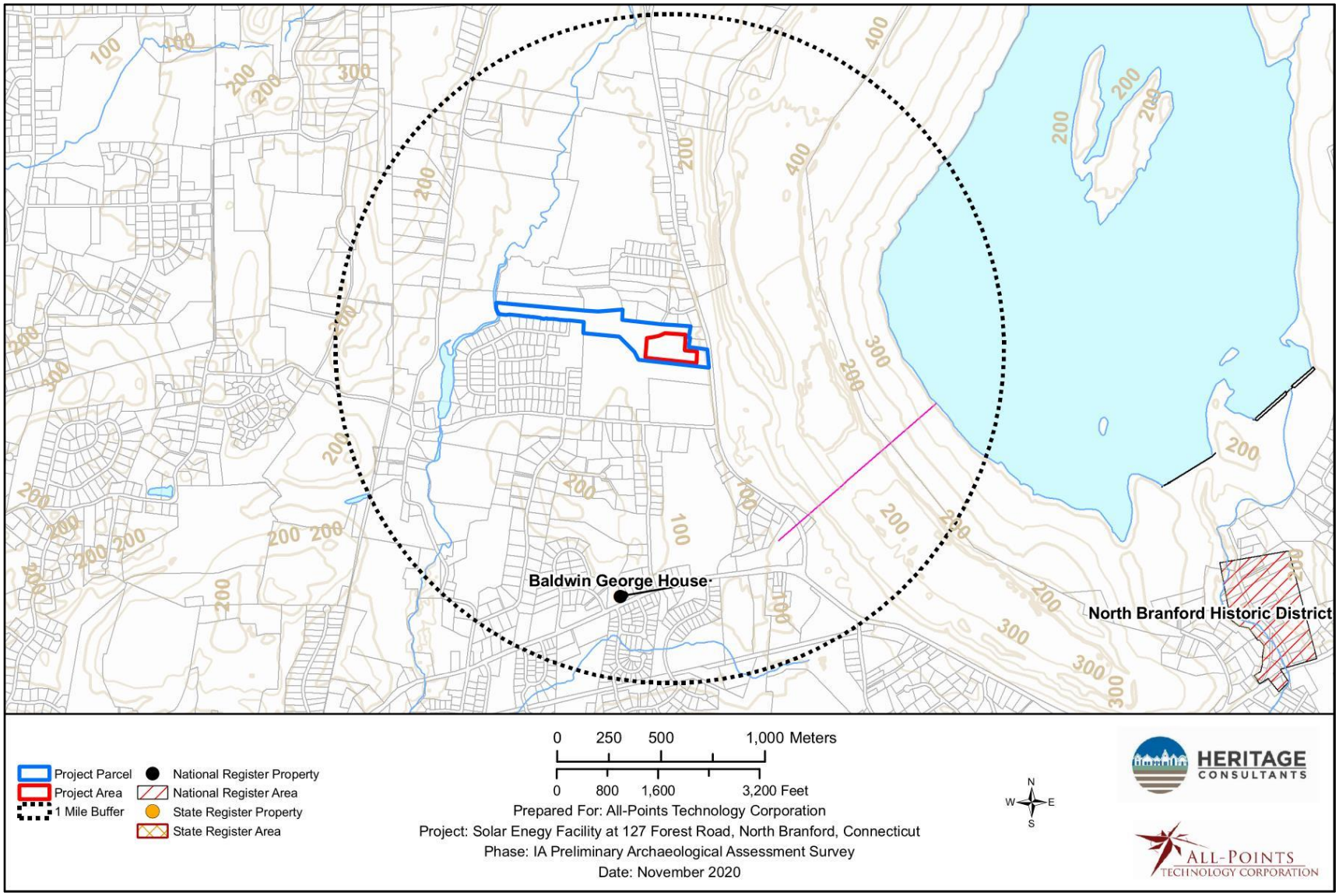



Figure 9. Digital map depicting the locations of previously identified National/State Register of Historic Places in the vicinity of the project area in North Branford, Connecticut.

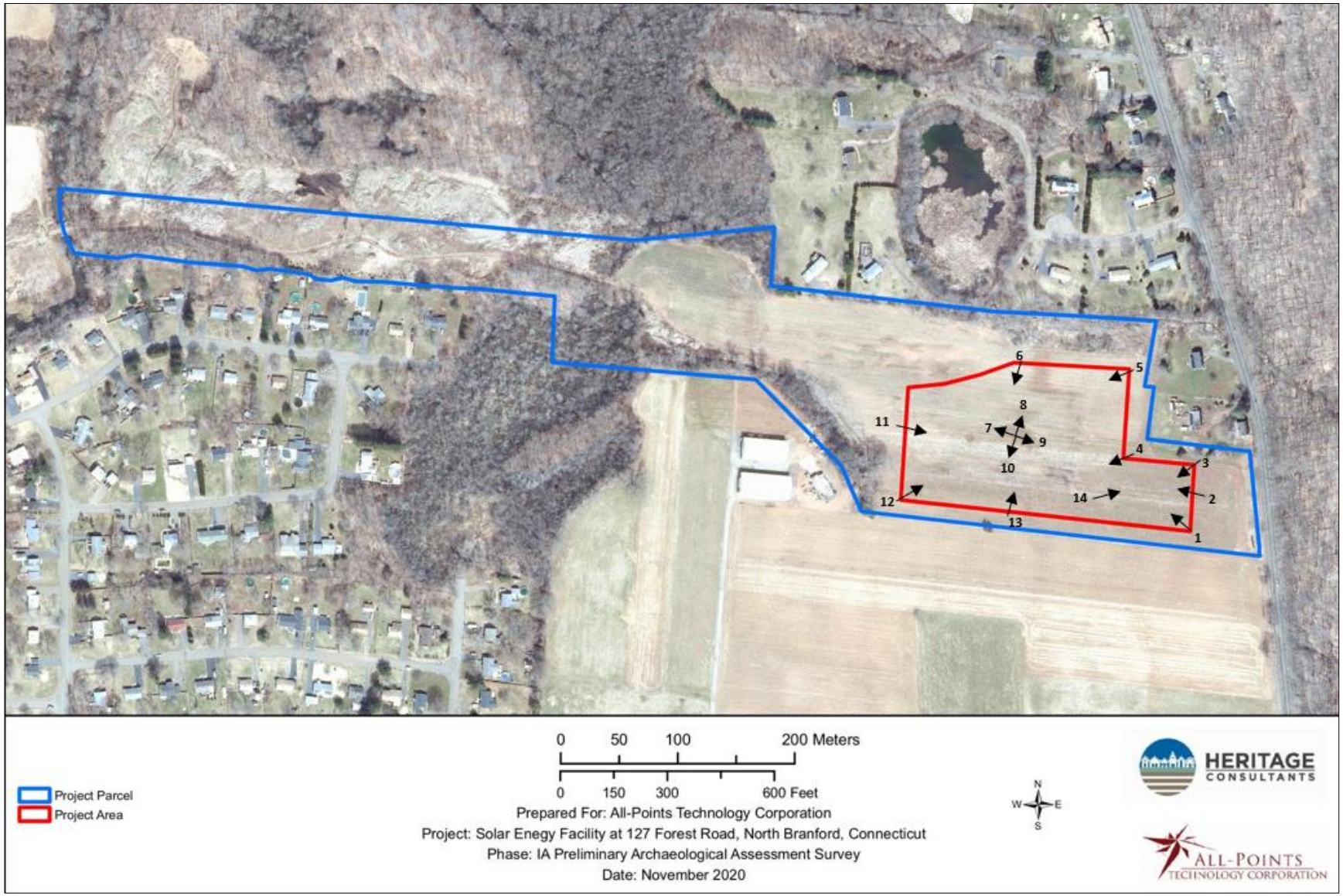



Figure 10. Excerpt from a 2018 aerial photograph showing the locations of photos taken during the Phase IA walkover survey in the vicinity of the project area in North Branford, Connecticut.

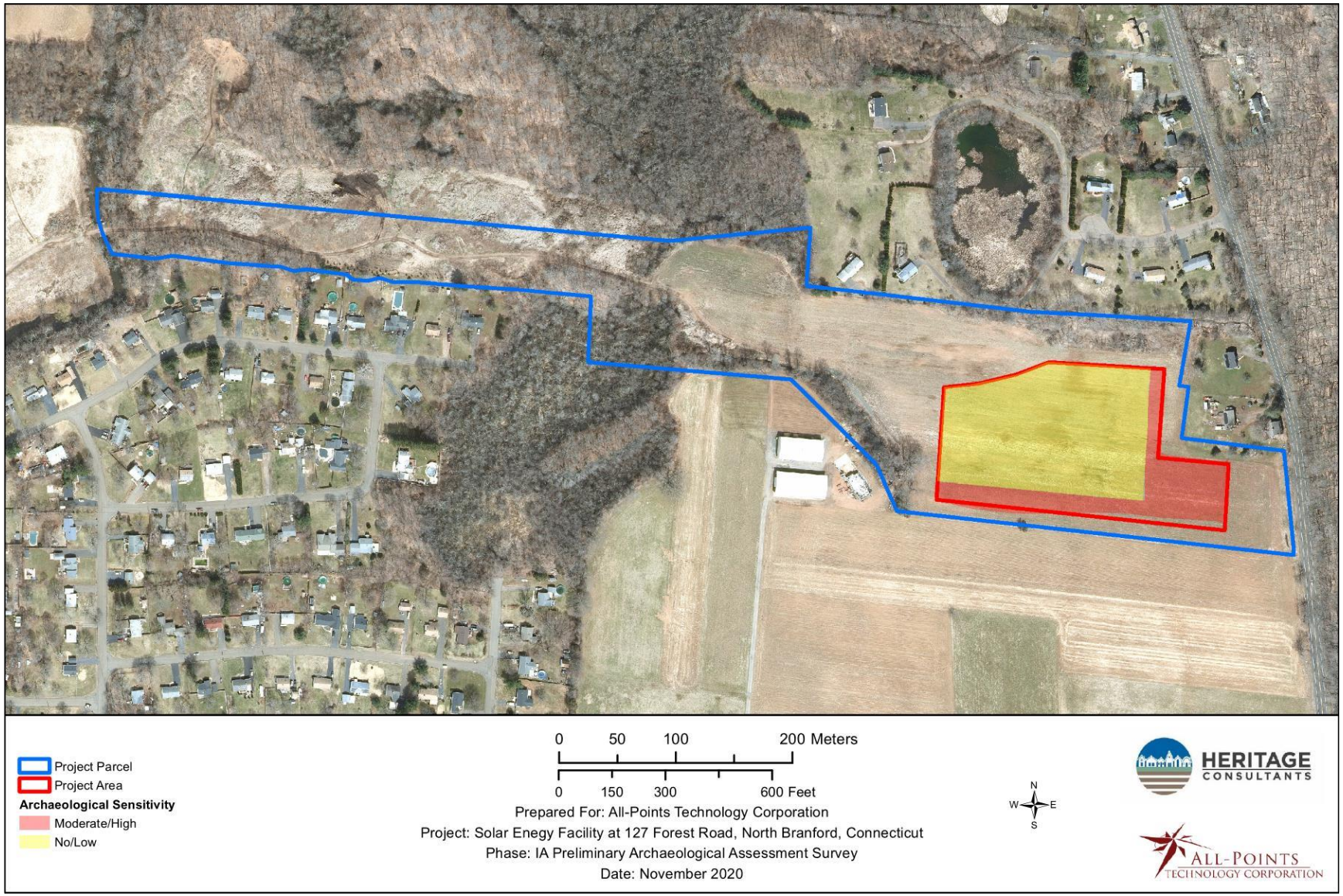



Figure 11. Digital drawing showing areas of no/low and moderate/high archaeological sensitivity within the project area in North Branford, Connecticut.

Photo 1. Overview photo of the project area from the southeastern corner facing northwest.

Photo 2. Overview photo of the project area from the eastern boundary facing west.

Photo 3. Overview photo of the project area from the eastern boundary facing southwest.

Photo 4. Overview photo of the project area from the center of the eastern boundary facing southwest.

Photo 5. Overview photo of the project area from the northeastern corner facing southwest.

Photo 6. Overview photo of the project area from the center of the northern boundary facing south.

Photo 7. Overview photo of the project area from the center facing west.

Photo 8. Overview photo of the project area from the center facing north.

Photo 9. Overview photo of the project area from the center facing east.

Photo 10. Overview photo of the project area from the center facing south.

Photo 11. Overview photo of the project area from the center of the western boundary facing east.

Photo 12. Overview photo of the project area from the southwestern corner facing northeast.

Photo 13. Overview photo of the project area from the center of the southern boundary facing north.

Photo 14. Overview photo of the project area from the eastern-central portion facing east.

# APPENDIX E

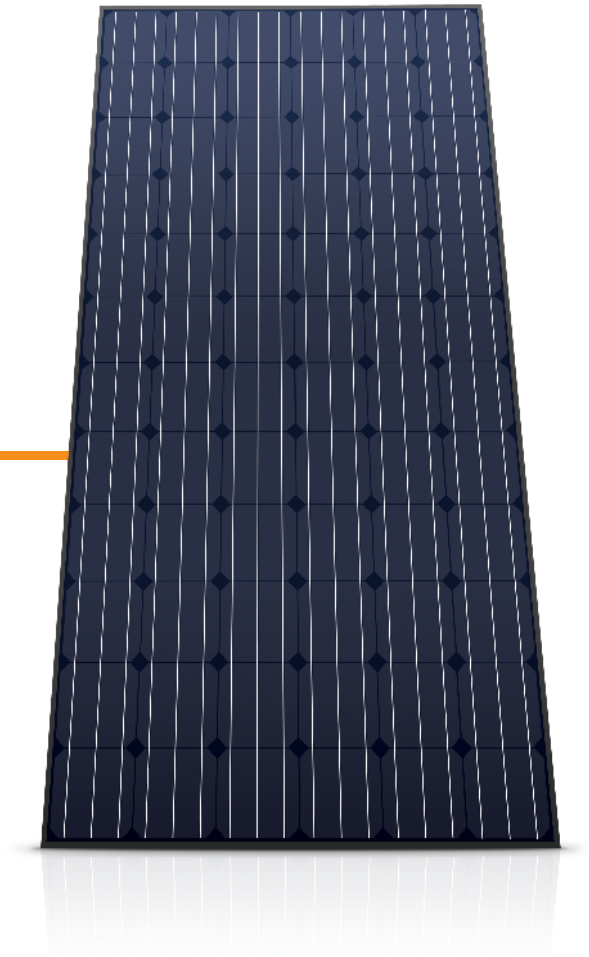
PRODUCT INFORMATION SHEETS

MONO POLY

HELIENE

# 72MBLK G1

72-CELL G1 MONOCRYSTALLINE



390 Wp
MAX POWER OUTPUT

19.62%
MAX EFFICIENCY

10 YEAR
PRODUCT WARRANTY

25 YEAR
LINEAR PERFORMANCE GUARANTEE

HELIENE IS A PREMIER SOLAR MODULE MANUFACTURER, SERVICING THE GROWING SOLAR ENERGY MARKETS OF NORTH AMERICA.

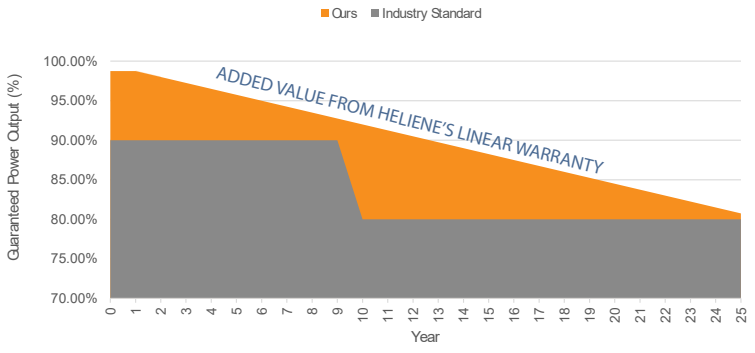
COMBINING PROVEN EUROPEAN TECHNOLOGY WITH NORTH AMERICAN INGENUITY ALLOWS HELIENE TO MAKE A REAL COMMITMENT IN PROVIDING SMARTER ENERGY CHOICES FOR THE FUTURE.

HELIENE
www.heliene.com

- HIGH MODULE CONVERSION EFFICIENCY UP TO 20.21% BY USING PERC MONO CELLS
- AVAILABLE IN 1000V OR 1500V SYSTEM VOLTAGE RATING
- QUALITY MANAGEMENT SYSTEM FOLLOWING INTERNATIONAL STANDARD: ISO9001

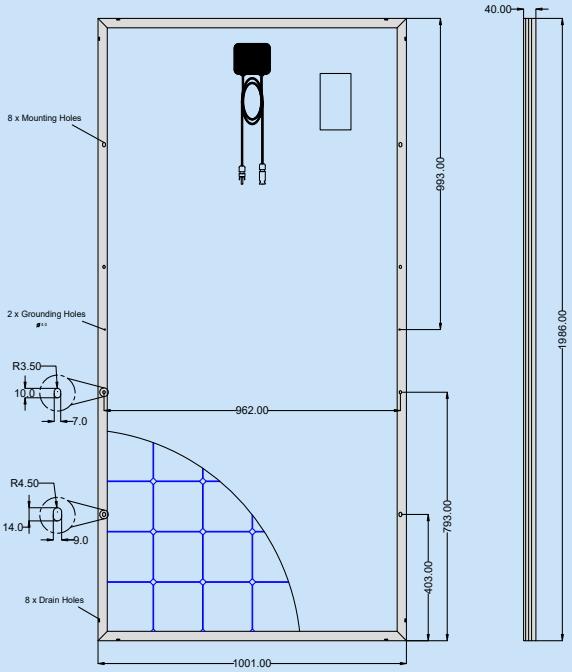
## LINEAR PERFORMANCE GUARANTEE

10 YEAR WORKMANSHIP WARRANTY • 25 YEAR LINEAR PERFORMANCE GUARANTEE

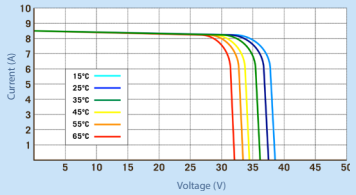


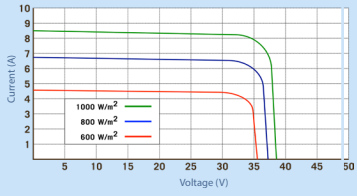
# 72M G1

## DIMENSIONS FOR HELIENE 72M G1 SERIES MODULES




## I-V CURVE FOR HELIENE 72M G1 SERIES




## CERTIFICATIONS


## ELECTRICAL DATA (STC)

| | | | |
|---|---|---|---|
| Peak Rated Power | $P_{mpp}$ (W) | 390 | 385 |
| Maximum Power Voltage | $V_{mpp}$ (V) | 40.11 | 39.81 |
| Maximum Power Current | $I_{mpp}$ (A) | 9.72 | 9.67 |
| Open Circuit Voltage | $V_{oc}$ (V) | 48.94 | 48.62 |
| Short Circuit Current | Isc (A) | 10.24 | 10.18 |
| Module Efficiency * | Eff (%) | 19.62 | 19.37 |
| Maximum SeriesFuse Rating | MF (A) | 20 | 20 |
| Power Output Tolerance | [- 3/+3 %] | | |

STC - Standard Test Conditions: Irradiation 1000 W/m2 - Air mass AM 1.5 - Cell temperature 25 °C
* Calculated using maximum power based on full positive output tolerance [-3/+3 %]

## MECHANICAL DATA

| | |
|---|---|
| Dimensions (L x W x D) | 1986 x 1001 x 40 mm (78.2 x 39.4 x 1.6 inch) |
| Weight | 23.5 kg (51.81lbs) |
| Output Cables | 1.2 m (47.2 inch) symmetrical cables with MC4 type connectors |
| Junction Box | IP-67 rated with 3 bypass diodes |
| Frame | Double webbed 15 micron anodized aluminum alloy |
| Front Glass | Low-iron content, high-transmission PV solar glass |
| Solar Cells | 72 Monocrystalline cells (158.75 x 158.75mm) |

## TEMPERATURE RATINGS

| | |
|---|---|
| Nominal Operating Cell Temperature (NOCT) | +45°C (±2°C) |
| Temperature Coefficient of $P_{max}$ | -0.36%/°C |
| Temperature Coefficient of $V_{oc}$ | -0.31%/°C |
| Temperature Coefficient of $I_{sc}$ | 0.06%/°C |

## MAXIMUM RATINGS

| | |
|---|---|
| Operational Temperature | -40°C - +85°C |
| Max System Voltage | 1000V (*1500V) *Optional |

## WARRANTY

| |
|---|
| 10 Year Manufacturer's Workmanship Warranty |
| 25 Year Linear Power Guarantee |

(Refer to product warranty page for details)

## PACKAGING CONFIGURATION

| | |
|---|---|
| Modules per box: | 26 pieces |
| Modules per 53' trailer: | 780 pieces |

HELIENE72M_Black_G1_P_REV.01

HELIENE

CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

# Three-phase pad-mounted compartmental type transformer

## General

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

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

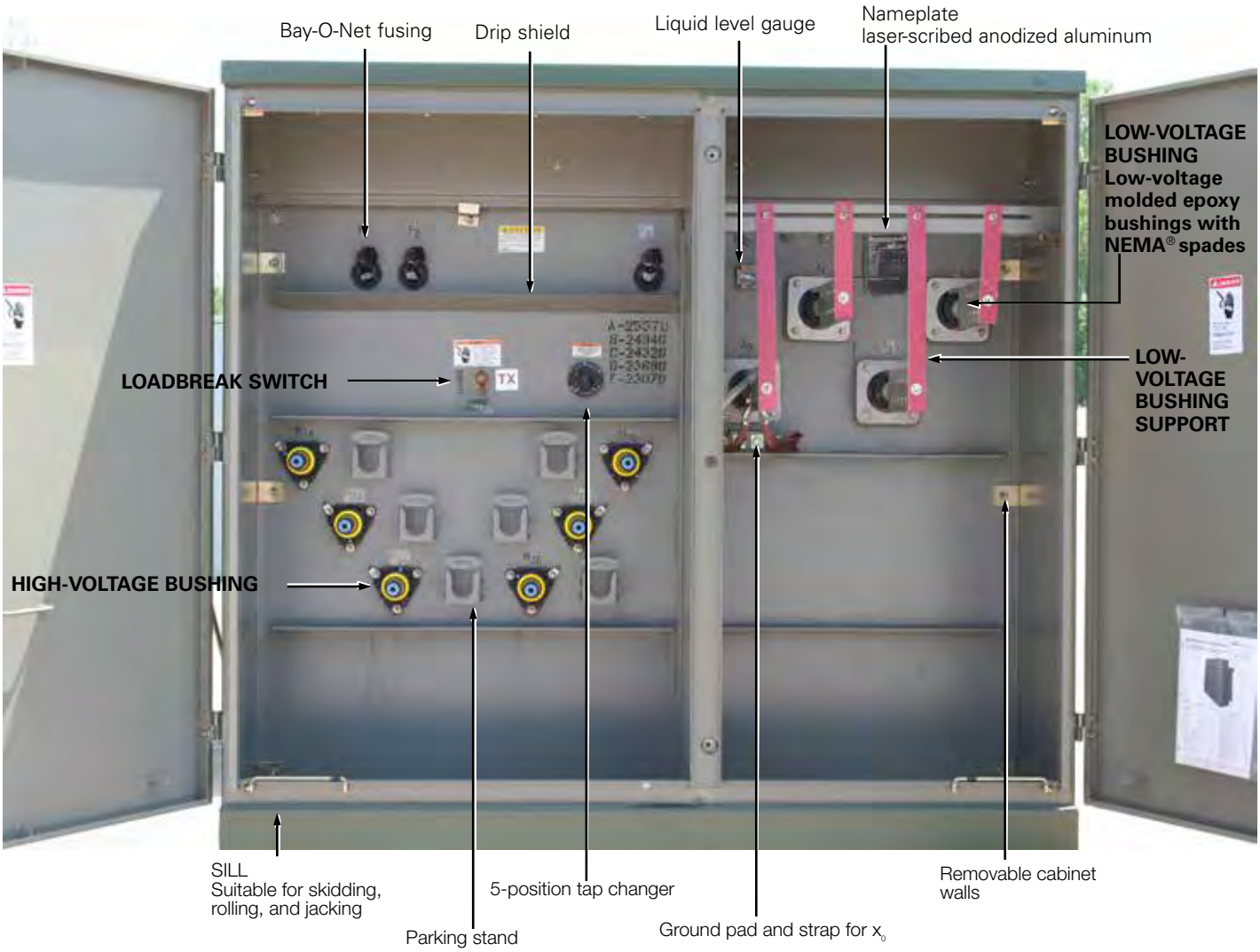



**Figure 1. Three-phase pad-mounted compartmental type transformer.**

**Table 1. Product Scope**

| | |
|---|---|
| **Type** | Three Phase, 50 or 60 Hz, 65 °C Rise (55 °C, 55/65 °C), 65/75 °C, 75 °C |
| **Fluid Type** | Mineral oil or Envirotemp™ FR3™ fluid |
| **Coil Configuration** | 2-winding or 4-winding or 3-winding (Low-High-Low), 3-winding (Low-Low-High) |
| **Size** | 45 – 10,000 kVA |
| **Primary Voltage** | 2,400 – 46,000 V |
| **Secondary Voltage** | 208Y/120 V to 14,400 V |
| **Specialty Designs** | Inverter/Rectifier Bridge |
| | K-Factor (up to K-19) |
| | Vacuum Fault Interrupter (VFI) |
| | UL® Listed & Labeled and Classified |
| | Factory Mutual (FM) Approved® |
| | Solar/Wind Designs |
| | Differential Protection |
| | Seismic Applications (including OSHPD) |
| | Hardened Data Center |

### Table 2. Three-Phase Ratings

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

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

### Table 3. Impedance Voltage

| | Low-voltage rating | | |
|---|---|---|---|
| **Rating (kVA)** | **≤ 600 V** | **2400 Δ through 4800 Δ** | **6900 Δ through 13800GY/7970 or 13800 Δ** |
| 45-75 | 2.70-5.75 | 2.70-5.75 | 2.70-5.75 |
| 112.5-300 | 3.10-5.75 | 3.10-5.75 | 3.10-5.75 |
| 500 | 4.35-5.75 | 4.35-5.75 | 4.35-5.75 |
| 750-2500 | 5.75 | 5.75 | 5.75 |
| 3750 | 5.75 | 5.75 | 6.00 |
| 5000 | | 6.00 | 6.50 |

**Note:** The standard tolerance is ± 7.5%

### Table 4. Audible Sound Levels

| | NEMA® TR-1 Average |
|---|---|
| **Self-Cooled, Two Winding kVA Rating** | **Decibels (dB)** |
| 45-500 | 56 |
| 501-700 | 57 |
| 701-1000 | 58 |
| 1001-1500 | 60 |
| 1501-2000 | 61 |
| 2001-2500 | 62 |
| 2501-3000 | 63 |
| 3001-4000 | 64 |
| 4001-5000 | 65 |
| 5001-6000 | 66 |
| 6001-7500 | 67 |
| 7501-10000 | 68 |

### Table 5. Insulation Test Levels

| KV Class | Induced Test 180 or 400 Hz 7200 Cycle | kV BIL Distribution | Applied Test 60 Hz (kV) |
|---|---|---|---|
| 1.2 | Twice Rated Voltage | 30 | 10 |
| 2.5 | | 45 | 15 |
| 5 | | 60 | 19 |
| 8.7 | | 75 | 26 |
| 15 | | 95 | 34 |
| 25 | | 125 | 40 |
| 34.5 | | 150 | 50 |

### Table 6. Temperature Rise Ratings 0-3300 Feet (0-1000 meters)

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

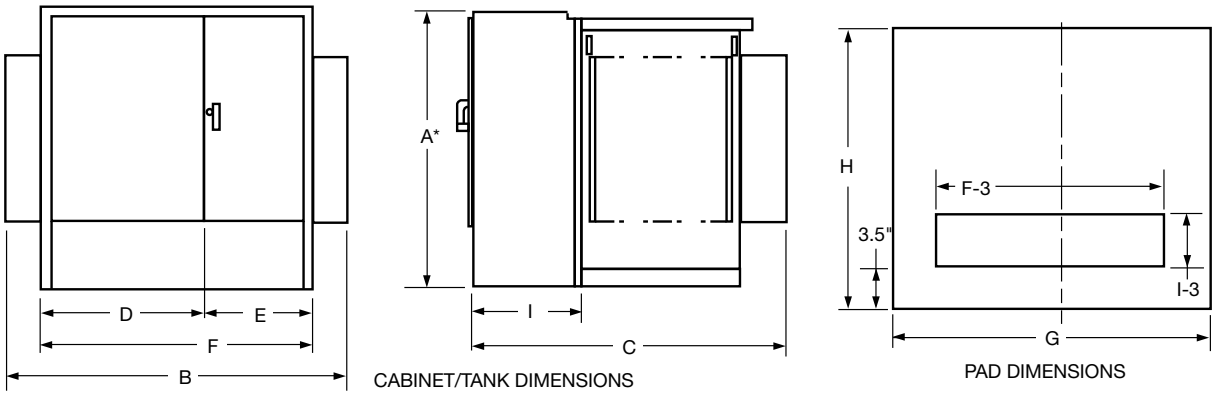



**Figure 2. Transformer and pad dimensions.**

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

**Table 7. Fluid-filled—aluminum windings 55/65 °C Rise[1]**

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

1 Weights, gallons of fluid, and dimensions are for reference only and not for construction. Please contact Eaton for exact dimensions.

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

**Table 8. Fluid-Filled—Copper Windings 55/65 °C Rise[1]**

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

[1] Weights, gallons of fluid, and dimensions are for reference only and not for construction. Please contact Eaton for exact dimensions.

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

## Standard features

### Connections and neutral configurations

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

### High and low voltage bushings

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

### Tank/cabinet features

- Bolted cover for tank access (45-2500 kVA)
- Welded cover with hand hole (>2500 kVA)
- Three-point latching door for security
- Removable sill for easy installation
- Lifting lugs (4)
- Stainless steel cabinet hinges and mounting studs
- Steel divider between HV and LV compartment
- 20" Deep cabinet (45-1000 kVA)
- 24" Deep cabinet (1500-7500 kVA)
- 30" Deep cabinet (34.5/19.92 kV)
- Pentahead captive bolt
- Stainless steel 1-hole ground pads (45-500 kVA)
- Stainless steel 2-hole ground pads (750-10,000 kVA)
- Parking Stands (dead-front)

### Valves/plugs

- One-inch upper filling plug
- One-inch drain plug (45-500 kVA)
- One-inch combination drain valve with sampling device in low voltage compartment (750-10,000 kVA)
- Automatic pressure relief valve

### Nameplate

- Laser-scribed anodized aluminum nameplate

**Figure 3. Drain valve with sampler.**

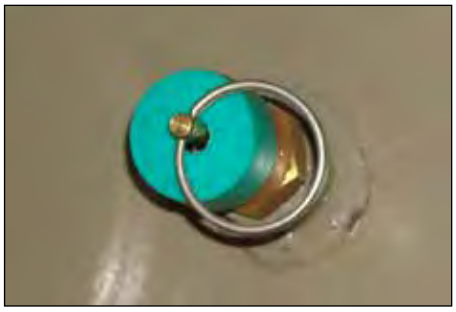


**Figure 4. Automatic Pressure relief valve.**


**Figure 5. Liquid level gauge.**

**Figure 6. External Gauges.**

**Figure 7. External visible break with gauges.**

## Optional features

### High and low voltage bushings

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

### Tank/cabinet features

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

### Special designs

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

### Switches

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

### Gauges and devices

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

### Overcurrent protection

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

### Valves/plugs

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

### Overvoltage protection

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

### Metering/fan/control

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

### Testing

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

### Coatings (paint)

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

### Nameplate

- Stainless steel nameplate

### Decals and labels

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

## Construction

### Core

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

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

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

### Coils

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

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

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

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

### Core and coil assemblies

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

### Tanks

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

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

### Tank finish

An advanced multi-stage finishing process exceeds IEEE Std C57.12.28™-2014 standards. The eight-stage pre-treatment process assures coating adhesion and retards corrosion. It converts tank surfaces to a nonmetallic, water insoluble iron phosphate coating.

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

### Vacuum processing

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

### Insulating fluid

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

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

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

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

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


**Figure 8. VFI transformer with visible break.**

### Pad-mounted VFI transformer

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

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

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

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

### Envirotran™ FM Approved special protection transformer

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

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

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

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

FM
APPROVED

## Special application transformers

### Data Center transformer

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

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

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

### Solar transformer

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

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

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

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

### Wind transformer

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

### DOE efficiency

The United States Department of Energy (DOE) has mandated efficiency values for most liquid type, medium voltage transformers. As a result, all applicable Eaton's Cooper Power series transformers 2500 kVA and below conform to efficiency levels as specified in the DOE ruling "10 CFR Part 431 Energy Conservation Program".

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

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

c UL US
LISTED

### K-Factor transformer

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

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

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

### Modulation transformer

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

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

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

**Figure 9. Modular transformer.**

### Inverter/rectifier bridge

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

## Product attributes

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

### Engineered to order (ETO)

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

### Made in the U.S.A.

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

### Superior paint performance

Protecting transformers from nature's elements worldwide, Eaton's E-coat system provides unrivaled transformer paint life, and exceeds IEEE Std C57.12.28™-2014 and IEEE Std C57.12.29™-2005 standards. In addition to the outside of the unit, each transformer receives a gray E-coat covering in the interior of the tank and cabinet, providing superior rust resistance and greater visibility during service.

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

### Rectangular coil design

Eaton utilizes a rectangular coil design. This winding technique results in a smaller overall unit footprint as well as reducing the transformer weight. The smaller unit size does not hinder the transformer performance in the least. Units have proven short circuit withstand capabilities up to 10 MVA.

## Testing

Eaton performs routing testing on each transformer manufactured including the following tests:

- Insulation Power Factor: This test verifies that vacuum processing has thoroughly dried the insulation system to required limits.
- Ratio, Polarity, and Phase Relation: Assures correct winding ratios and tap voltages; checks insulation of HV and LV circuits. Checks entire insulation system to verify all live-to-ground clearances.
- Resistance: This test verifies the integrity of internal high-voltage and low-voltage connections; provides data for loss upgrade calculations.
- Routine Impulse Tests: The most severe test, simulating a lightning surge. Applies one reduced wave and one full wave to verify the BIL rating.
- Applied Potential: Applied to both high-voltage and low-voltage windings, this test stresses the entire insulation system to verify all live-to-ground clearances.
- Induced Potential: 3.46 times normal plus 1000 volts for reduced neutral designs.
- Loss Test: These design verification tests are conducted to assure that guaranteed loss values are met and that test values are

within design tolerances. Tests include no-load loss and excitation current along with impedance voltage and load loss.

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

**Design performance tests**

The design performance tests include the following:

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

## Thomas A Edison Research and Test Facility

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

# Three-phase pad-mounted compartmental type transformer

**Eaton**
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com

**Eaton's Cooper Power Systems Division**
2300 Badger Drive
Waukesha, WI 53188
United States
Eaton.com/cooperpowerseries


Printed in USA
Publication No. CA202003EN



For Eaton's Cooper Power series three-phase transformer product information call 1-877-277-4636 or visit: www.eaton.com/cooperpowerseries.

Powering Business Worldwide


# PV INVERTER

## Commercial Series / M125HV

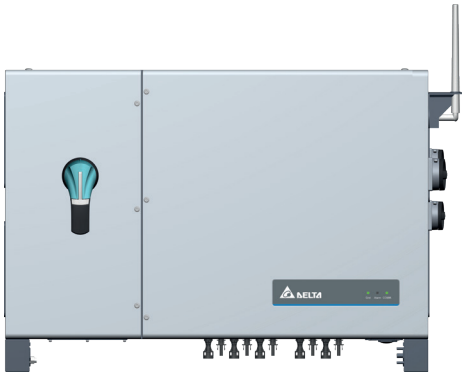
### Features

- High DC input voltage up to 1500 Vdc
- Excellent efficiency performance, >99% peak & 99.0% CEC
- Integral AC & DC switch, type 2 SPD and 20 string fuses
- Electrolytic capacitor free, more than 20 years life
- NEMA 4X protection level
- Integral DC Arc fault detector
- String monitoring
- Operating temp. range -22°~140°F

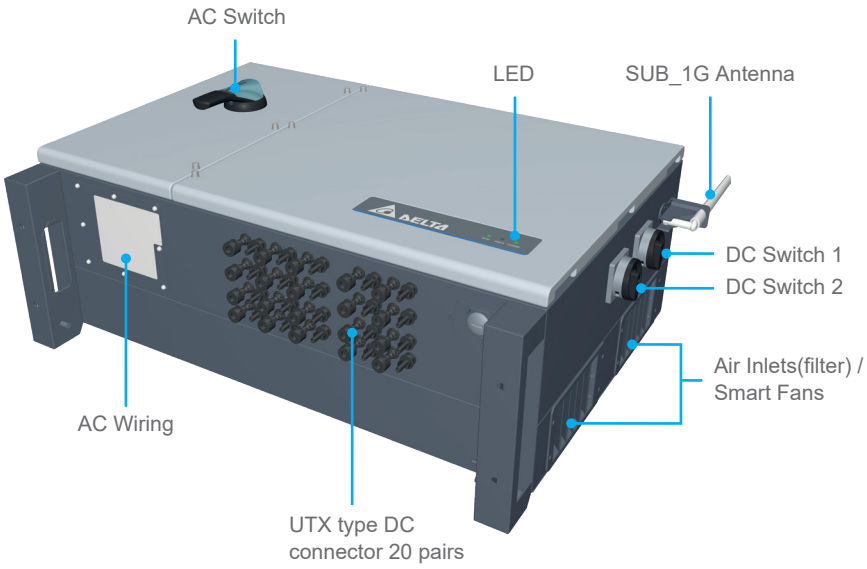
**www.deltaww.com**

# Product Overview

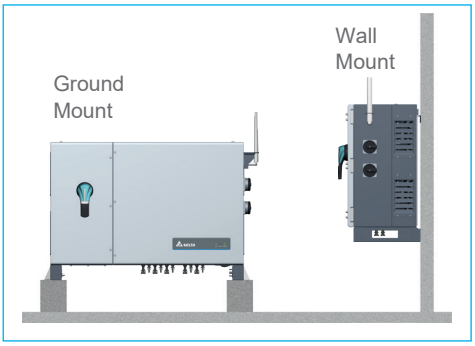
Delta M125HV has excellent power efficiency to reach >99% peak and 99.0% CEC over converting PV energy. It features all-in-one design to integrate string fuses, surge protection devices and DC switch in one unit body. Thanks for electrolytic capacitor free design and NEMA 4X protection, the M125HV is the most reliable and durable inverter than ever.



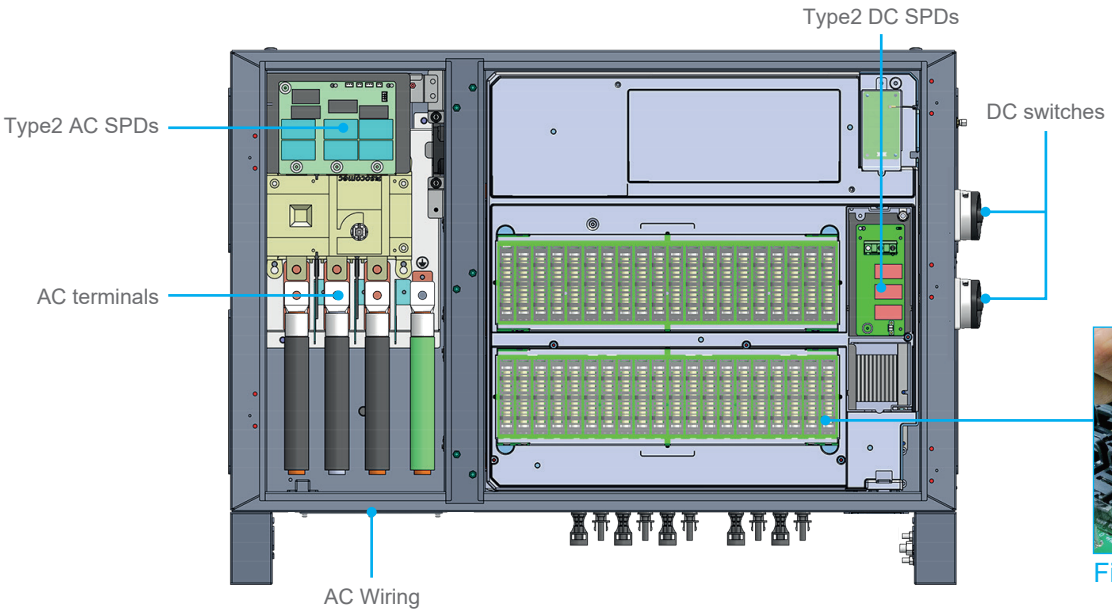
# Form Factor



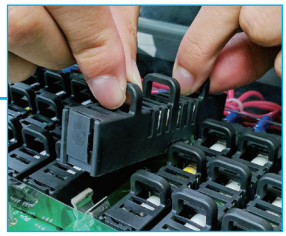

Landscape installation




# Wiring Box Configurations




String fuses



Finger-safe fuse holder

# Specifications

| Model Number | M125HV |
|---|---|
| **DC Input** | |
| Occasionally Max. Voltage | 1500 V |
| Operating Voltage Range | 860 - 1500 V |
| MPP Voltage Range | 860 - 1350 V [1)] |
| Rated Voltage | 1050 V @600Vac / 800 V @480Vac |
| MPP Tracker | 1 |
| Max. Operating Current | 150 A |
| Max. Allowable Array Isc | 320 A |
| String Fuse Provisioned | 20 A / 1500 V PV fuses |
| Connection | 20 pairs of UTX connectors |
| Surge Protection | Type 2 SPD |
| DC Switch | Yes |
| String Current Monitoring | Yes |
| **AC Output** | |
| Rated Output Power | 125 kW @600Vac / 100 kW @480Vac |
| Max. Apparent Power | 140 kVA @600Vac / 110 kVA @480Vac |
| Max. Output Current | 135 A |
| Grid Configuration | 3P / PE |
| Operating Voltage Range | Vac 600V：-36% to 15% / Vac 480V：-20% to +20% |
| Operating Frequency Range | 50 / 60Hz ± 5Hz |
| Power Factor | 0.8 ind - 0.8 cap adjustable (1 - 0.9 at maximum power) |
| Surge Protection | Type 2 SPD |
| Ground Fault Protection | Yes |
| THD | < 3% |
| Connection | Ring terminal lug with Terminal busbar (Max. 150mm$^2$ Cu or Al wire) |
| Night Time Consumption [2)] | < 3.5W |
| **Efficiency** | |
| Peak Efficiency | >99% |
| CEC Efficiency | 99.0% |
| **Information** | |
| Communication Port | RS-485 (Delta / Sunspec) |
| Display | LED (Grid, Alarm, COMM.) |
| **Regulation** | |
| | UL 1741 SA, UL1741, UL1998, UL 1699B<br>IEEE1547, IEEE1547.1, CSA C22.2 |
| **General Data** | |
| Smart Inverter Functionality | Voltage / Frequency Ride through, Volt / Var, Volt / Watt, Power curtailment, Frequency / Watt |
| Operating Temp Range | -22°~140°F, >122°F de-rating |
| Protection level | NEMA 4X |
| Operating Elevation | <9800 ft, Outdoor, wet locations |
| Cooling | Forced air cooling with Smart fan control |
| Noise | 71.5 dBA @1m, Amb25°C |
| Dimension (W x H x D) | 35.4 x 26.1 x 14.5 in |
| Weight | 176 lb |

1) Ambient < 77°F: 860-1350V @600Vac / 690-1350V @480Vac
Ambient < 104°F: 860-1250V @600Vac / 690-1050V @480Vac

2) Night time consumption with standby communication

*All specifications are subject to change without prior notice


**Delta Electronics (Americas), Ltd**

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**Customer Service Technical Support**

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+1-877-442-4832

2020 / 03 / 05

# APPENDIX F

FAA DETERMINATION

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

Aeronautical Study No.
2020-ANE-6575-OE

Issued Date: 12/01/2020

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

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

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

| | |
|---|---|
| Structure: | Crane Point 1 |
| Location: | North Branford, CT |
| Latitude: | 41-20-35.05N NAD 83 |
| Longitude: | 72-48-03.24W |
| Heights: | 90 feet site elevation (SE) |
| | 22 feet above ground level (AGL) |
| | 112 feet above mean sea level (AMSL) |

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

**SEE ATTACHMENT FOR ADDITIONAL CONDITION(S) OR INFORMATION**

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

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

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

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

If you have any questions, please contact our office at (404) 305-6582, or Stephanie.Kimmel@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-6575-OE

**Signature Control No: 457233602-458102997** ( TMP )
Stephanie Kimmel
Specialist

## Additional Condition(s) or Information for ASN 2020-ANE-6575-OE

**Proposal:** To construct and/or operate a(n) Crane to a height of 22 feet above ground level, 112 feet above mean sea level.

**Location:** The structure will be located 6.14 nautical miles northeast of HVN Airport reference point.

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

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

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 M, Obstruction Marking and Lighting, marked-Chapters 3(Marked),14(Temporary),&15.

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

This determination expires on 06/01/2022 unless extended, revised, or terminated by the issuing office.

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.

Temporary structure should be marked with flags in accordance with FAA Advisory Circular 70/7460-1M, chapters 3, 14, and 15.

**Sectional Map for ASN 2020-ANE-6575-OE**

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

Aeronautical Study No.
2020-ANE-6576-OE

Issued Date: 12/01/2020

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

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

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

| | |
|---|---|
| Structure: | Crane Point 2 |
| Location: | North Branford, CT |
| Latitude: | 41-20-34.76N NAD 83 |
| Longitude: | 72-48-02.66W |
| Heights: | 95 feet site elevation (SE) |
| | 22 feet above ground level (AGL) |
| | 117 feet above mean sea level (AMSL) |

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

**SEE ATTACHMENT FOR ADDITIONAL CONDITION(S) OR INFORMATION**

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

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

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

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

If you have any questions, please contact our office at (404) 305-6582, or Stephanie.Kimmel@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-6576-OE

**Signature Control No: 457233603-458102999** ( TMP )
Stephanie Kimmel
Specialist

## Additional Condition(s) or Information for ASN 2020-ANE-6576-OE

**Proposal:** To construct and/or operate a(n) Crane to a height of 22 feet above ground level, 112 feet above mean sea level.

**Location:** The structure will be located 6.14 nautical miles northeast of HVN Airport reference point.

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

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

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 M, Obstruction Marking and Lighting, marked-Chapters 3(Marked),14(Temporary),&15.

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

This determination expires on 06/01/2022 unless extended, revised, or terminated by the issuing office.

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.

Temporary structure should be marked with flags in accordance with FAA Advisory Circular 70/7460-1M, chapters 3, 14, and 15.

**Sectional Map for ASN 2020-ANE-6576-OE**

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

Aeronautical Study No.
2020-ANE-6577-OE

Issued Date: 12/01/2020

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

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

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

| | |
|---|---|
| Structure: | Crane Point 3 (Also HP) |
| Location: | North Branford, CT |
| Latitude: | 41-20-30.84N NAD 83 |
| Longitude: | 72-48-02.66W |
| Heights: | 96 feet site elevation (SE) |
| | 22 feet above ground level (AGL) |
| | 118 feet above mean sea level (AMSL) |

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

**SEE ATTACHMENT FOR ADDITIONAL CONDITION(S) OR INFORMATION**

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

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

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

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

If you have any questions, please contact our office at (404) 305-6582, or Stephanie.Kimmel@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-6577-OE

**Signature Control No: 457233605-458102998** ( TMP )
Stephanie Kimmel
Specialist

## Additional Condition(s) or Information for ASN 2020-ANE-6577-OE

**Proposal:** To construct and/or operate a(n) Crane to a height of 22 feet above ground level, 112 feet above mean sea level.

**Location:** The structure will be located 6.14 nautical miles northeast of HVN Airport reference point.

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

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

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 M, Obstruction Marking and Lighting, marked-Chapters 3(Marked),14(Temporary),&15.

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

This determination expires on 06/01/2022 unless extended, revised, or terminated by the issuing office.

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.

Temporary structure should be marked with flags in accordance with FAA Advisory Circular 70/7460-1M, chapters 3, 14, and 15.

**Sectional Map for ASN 2020-ANE-6577-OE**

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

Aeronautical Study No.
2020-ANE-6578-OE

Issued Date: 12/01/2020

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

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

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

| | |
|---|---|
| Structure: | Crane Point 4 |
| Location: | North Branford, CT |
| Latitude: | 41-20-30.84N NAD 83 |
| Longitude: | 72-48-10.51W |
| Heights: | 93 feet site elevation (SE) |
| | 22 feet above ground level (AGL) |
| | 115 feet above mean sea level (AMSL) |

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

**SEE ATTACHMENT FOR ADDITIONAL CONDITION(S) OR INFORMATION**

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

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

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

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

If you have any questions, please contact our office at (404) 305-6582, or Stephanie.Kimmel@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-6578-OE

**Signature Control No: 457233606-458103002** ( TMP )
Stephanie Kimmel
Specialist

## Additional Condition(s) or Information for ASN 2020-ANE-6578-OE

**Proposal:** To construct and/or operate a(n) Crane to a height of 22 feet above ground level, 112 feet above mean sea level.

**Location:** The structure will be located 6.14 nautical miles northeast of HVN Airport reference point.

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

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

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 M, Obstruction Marking and Lighting, marked-Chapters 3(Marked),14(Temporary),&15.

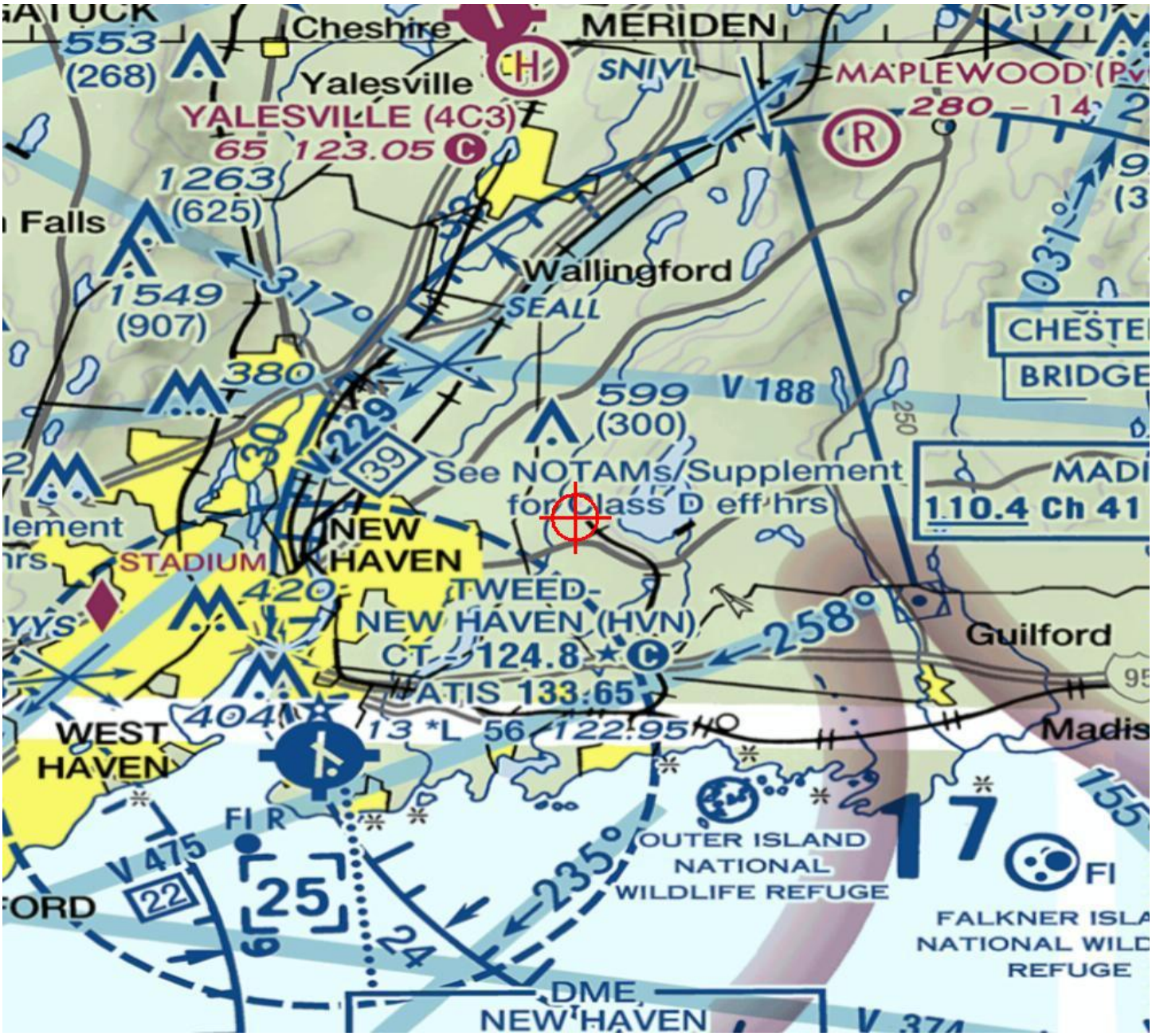
Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the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

This determination expires on 06/01/2022 unless extended, revised, or terminated by the issuing office.

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.

Temporary structure should be marked with flags in accordance with FAA Advisory Circular 70/7460-1M, chapters 3, 14, and 15.

**Sectional Map for ASN 2020-ANE-6578-OE**



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

Aeronautical Study No.
2020-ANE-6579-OE

Issued Date: 12/01/2020

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

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

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

| | |
|---|---|
| Structure: | Crane Point 5 |
| Location: | North Branford, CT |
| Latitude: | 41-20-32.86N NAD 83 |
| Longitude: | 72-48-11.09W |
| Heights: | 83 feet site elevation (SE) |
| | 22 feet above ground level (AGL) |
| | 105 feet above mean sea level (AMSL) |

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

**SEE ATTACHMENT FOR ADDITIONAL CONDITION(S) OR INFORMATION**

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

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

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

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

If you have any questions, please contact our office at (404) 305-6582, or Stephanie.Kimmel@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-6579-OE

**Signature Control No: 457233608-458102995** ( TMP )
Stephanie Kimmel
Specialist

## Additional Condition(s) or Information for ASN 2020-ANE-6579-OE

**Proposal:** To construct and/or operate a(n) Crane to a height of 22 feet above ground level, 112 feet above mean sea level.

**Location:** The structure will be located 6.14 nautical miles northeast of HVN Airport reference point.

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

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

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 M, Obstruction Marking and Lighting, marked-Chapters 3(Marked),14(Temporary),&15.

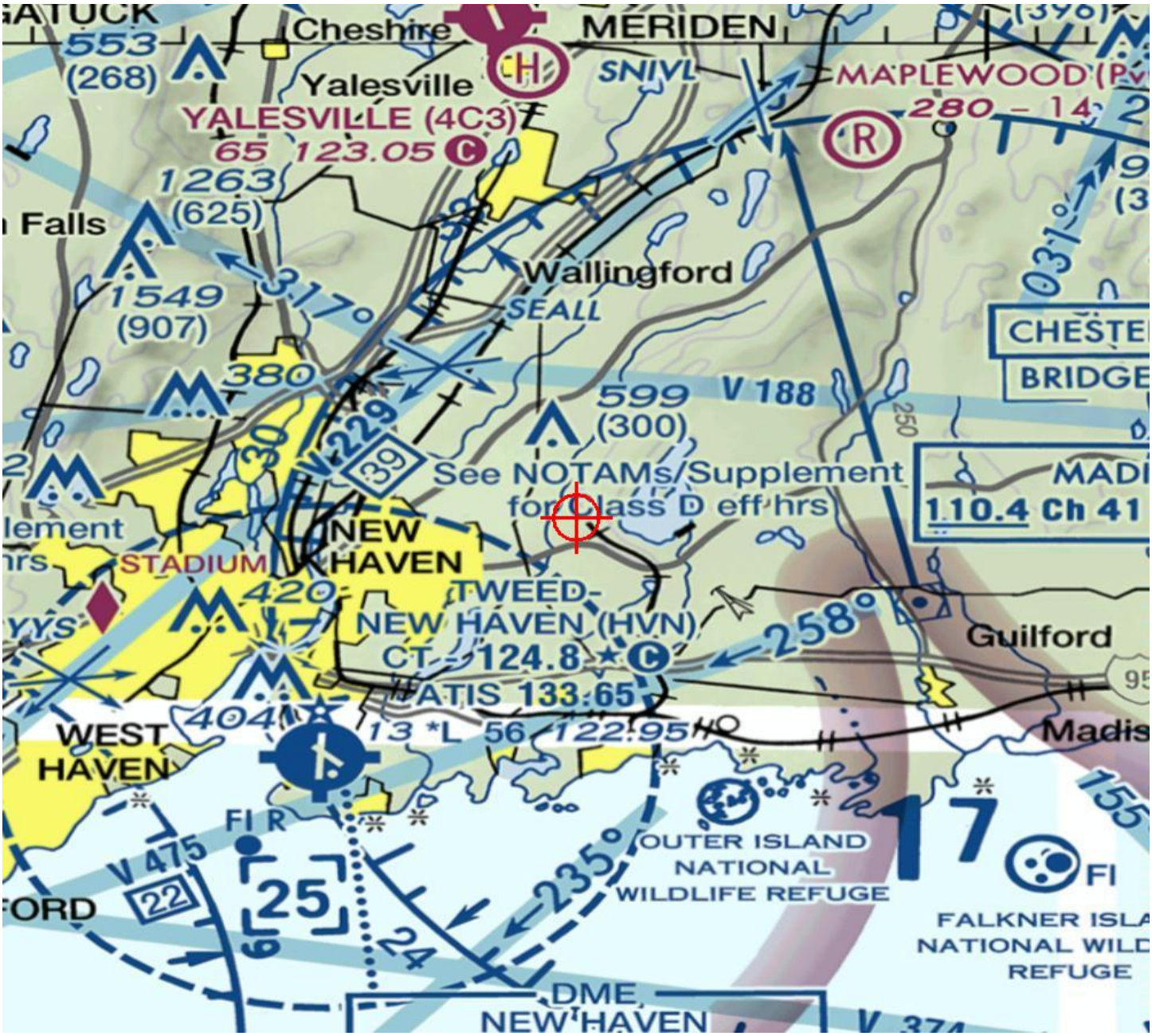
Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the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

This determination expires on 06/01/2022 unless extended, revised, or terminated by the issuing office.

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.

Temporary structure should be marked with flags in accordance with FAA Advisory Circular 70/7460-1M, chapters 3, 14, and 15.

**Sectional Map for ASN 2020-ANE-6579-OE**



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

Aeronautical Study No.
2020-ANE-6580-OE

Issued Date: 12/01/2020

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

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

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

| | |
|---|---|
| Structure: | Crane Point 6 |
| Location: | North Branford, CT |
| Latitude: | 41-20-34.40N NAD 83 |
| Longitude: | 72-48-12.24W |
| Heights: | 80 feet site elevation (SE) |
| | 22 feet above ground level (AGL) |
| | 102 feet above mean sea level (AMSL) |

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

**SEE ATTACHMENT FOR ADDITIONAL CONDITION(S) OR INFORMATION**

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

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

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

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

If you have any questions, please contact our office at (404) 305-6582, or Stephanie.Kimmel@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-6580-OE

**Signature Control No: 457233609-458103003** ( TMP )
Stephanie Kimmel
Specialist

## Additional Condition(s) or Information for ASN 2020-ANE-6580-OE

**Proposal:** To construct and/or operate a(n) Crane to a height of 22 feet above ground level, 112 feet above mean sea level.

**Location:** The structure will be located 6.14 nautical miles northeast of HVN Airport reference point.

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

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

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 M, Obstruction Marking and Lighting, marked-Chapters 3(Marked),14(Temporary),&15.

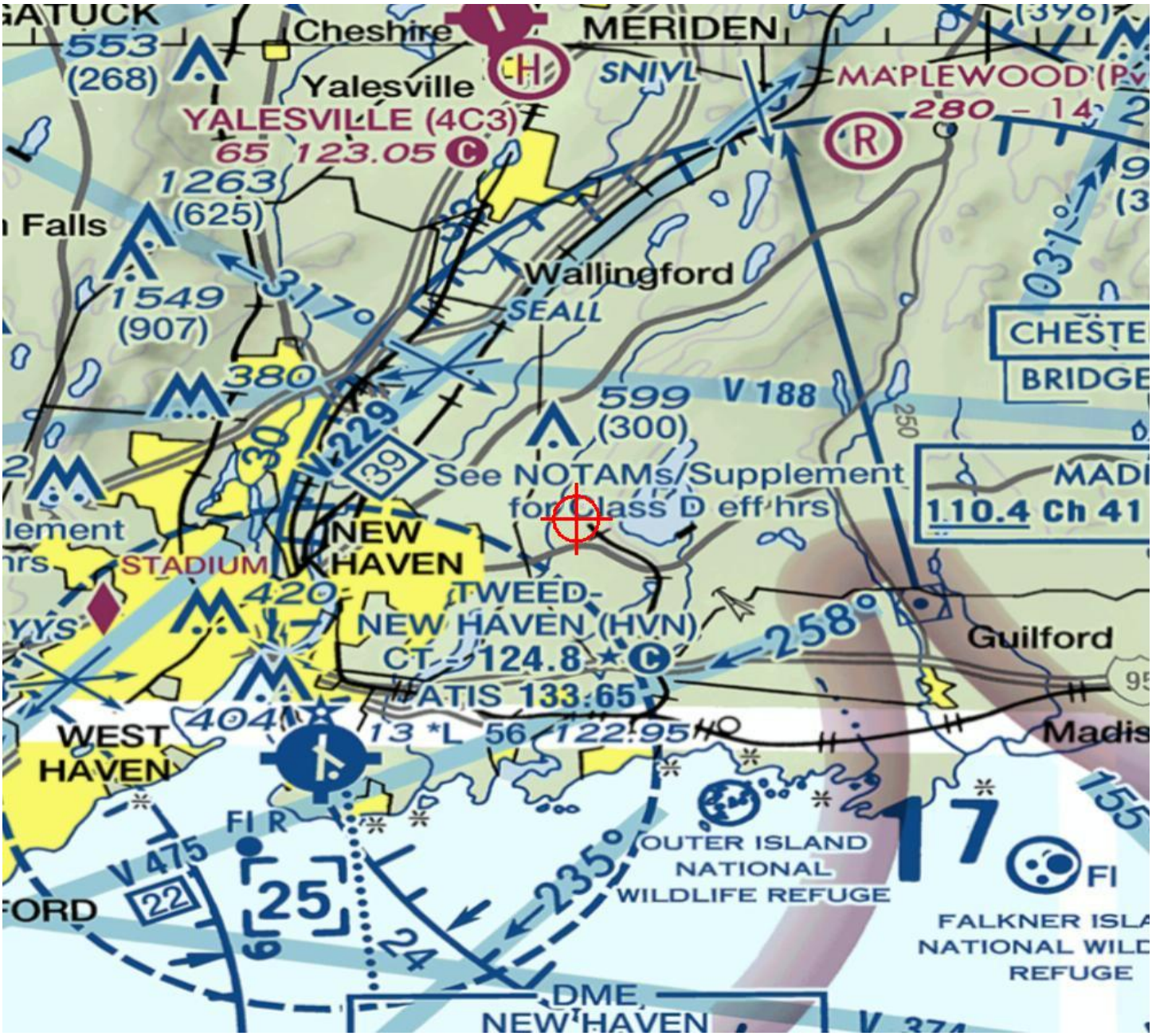
Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the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

This determination expires on 06/01/2022 unless extended, revised, or terminated by the issuing office.

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.

Temporary structure should be marked with flags in accordance with FAA Advisory Circular 70/7460-1M, chapters 3, 14, and 15.

**Sectional Map for ASN 2020-ANE-6580-OE**



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

Aeronautical Study No.
2020-ANE-6581-OE

Issued Date: 12/01/2020

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

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

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

| | |
|---|---|
| Structure: | Crane Point 7 |
| Location: | North Branford, CT |
| Latitude: | 41-20-36.06N NAD 83 |
| Longitude: | 72-48-12.28W |
| Heights: | 79 feet site elevation (SE) |
| | 22 feet above ground level (AGL) |
| | 101 feet above mean sea level (AMSL) |

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

**SEE ATTACHMENT FOR ADDITIONAL CONDITION(S) OR INFORMATION**

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

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

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

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

If you have any questions, please contact our office at (404) 305-6582, or Stephanie.Kimmel@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-6581-OE

**Signature Control No: 457233611-458103001** ( TMP )
Stephanie Kimmel
Specialist

## Additional Condition(s) or Information for ASN 2020-ANE-6581-OE

**Proposal:** To construct and/or operate a(n) Crane to a height of 22 feet above ground level, 112 feet above mean sea level.

**Location:** The structure will be located 6.14 nautical miles northeast of HVN Airport reference point.

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

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

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 M, Obstruction Marking and Lighting, marked-Chapters 3(Marked),14(Temporary),&15.

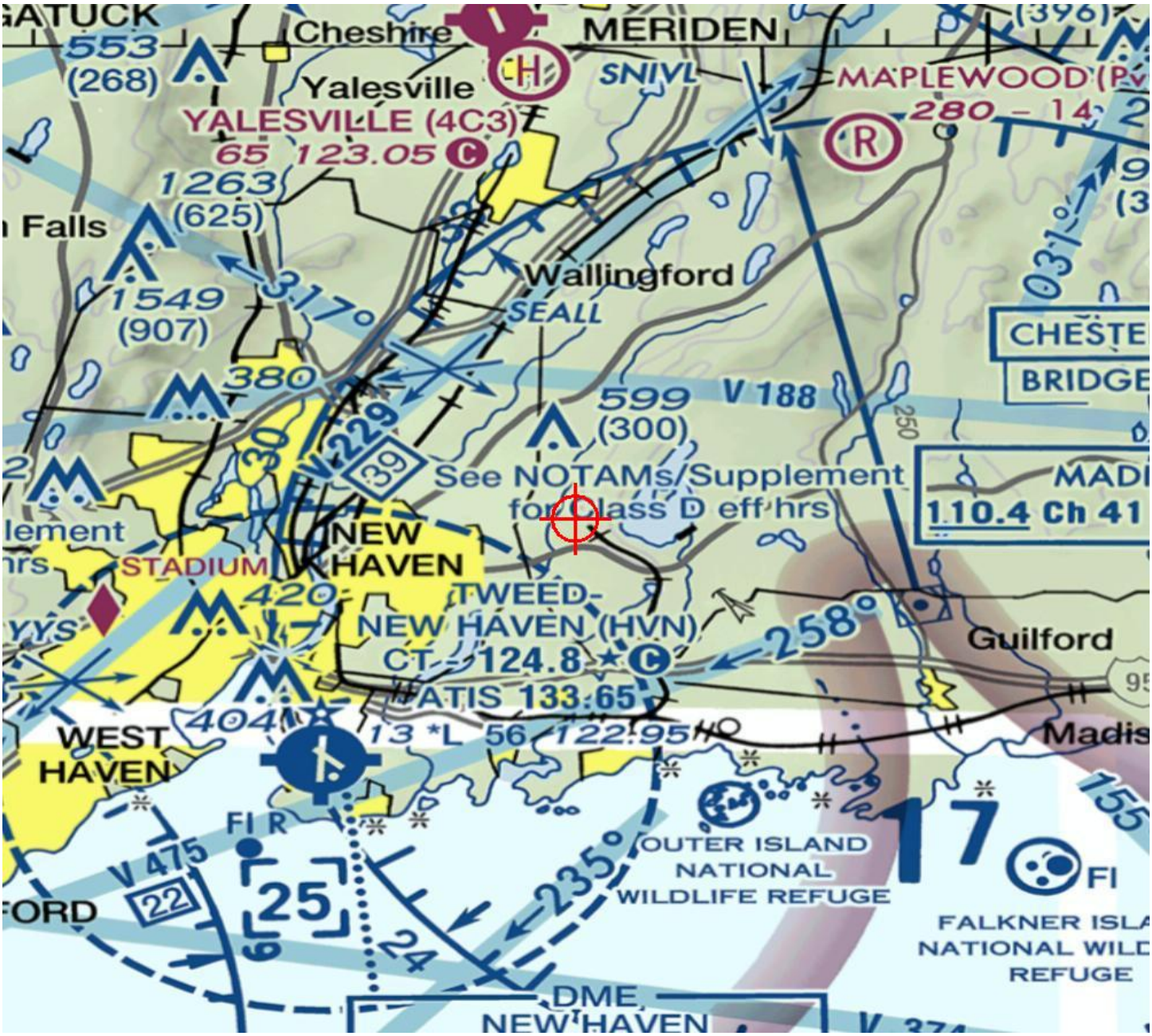
Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the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

This determination expires on 06/01/2022 unless extended, revised, or terminated by the issuing office.

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.

Temporary structure should be marked with flags in accordance with FAA Advisory Circular 70/7460-1M, chapters 3, 14, and 15.

**Sectional Map for ASN 2020-ANE-6581-OE**



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

Aeronautical Study No.
2020-ANE-6582-OE

Issued Date: 12/01/2020

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

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

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

| | |
|---|---|
| Structure: | Crane Point 8 |
| Location: | North Branford, CT |
| Latitude: | 41-20-36.06N NAD 83 |
| Longitude: | 72-48-11.09W |
| Heights: | 80 feet site elevation (SE) |
| | 22 feet above ground level (AGL) |
| | 102 feet above mean sea level (AMSL) |

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

**SEE ATTACHMENT FOR ADDITIONAL CONDITION(S) OR INFORMATION**

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

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

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

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

If you have any questions, please contact our office at (404) 305-6582, or Stephanie.Kimmel@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-6582-OE

**Signature Control No: 457233612-458102996** ( TMP )
Stephanie Kimmel
Specialist

## Additional Condition(s) or Information for ASN 2020-ANE-6582-OE

**Proposal:** To construct and/or operate a(n) Crane to a height of 22 feet above ground level, 112 feet above mean sea level.

**Location:** The structure will be located 6.14 nautical miles northeast of HVN Airport reference point.

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

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

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 M, Obstruction Marking and Lighting, marked-Chapters 3(Marked),14(Temporary),&15.

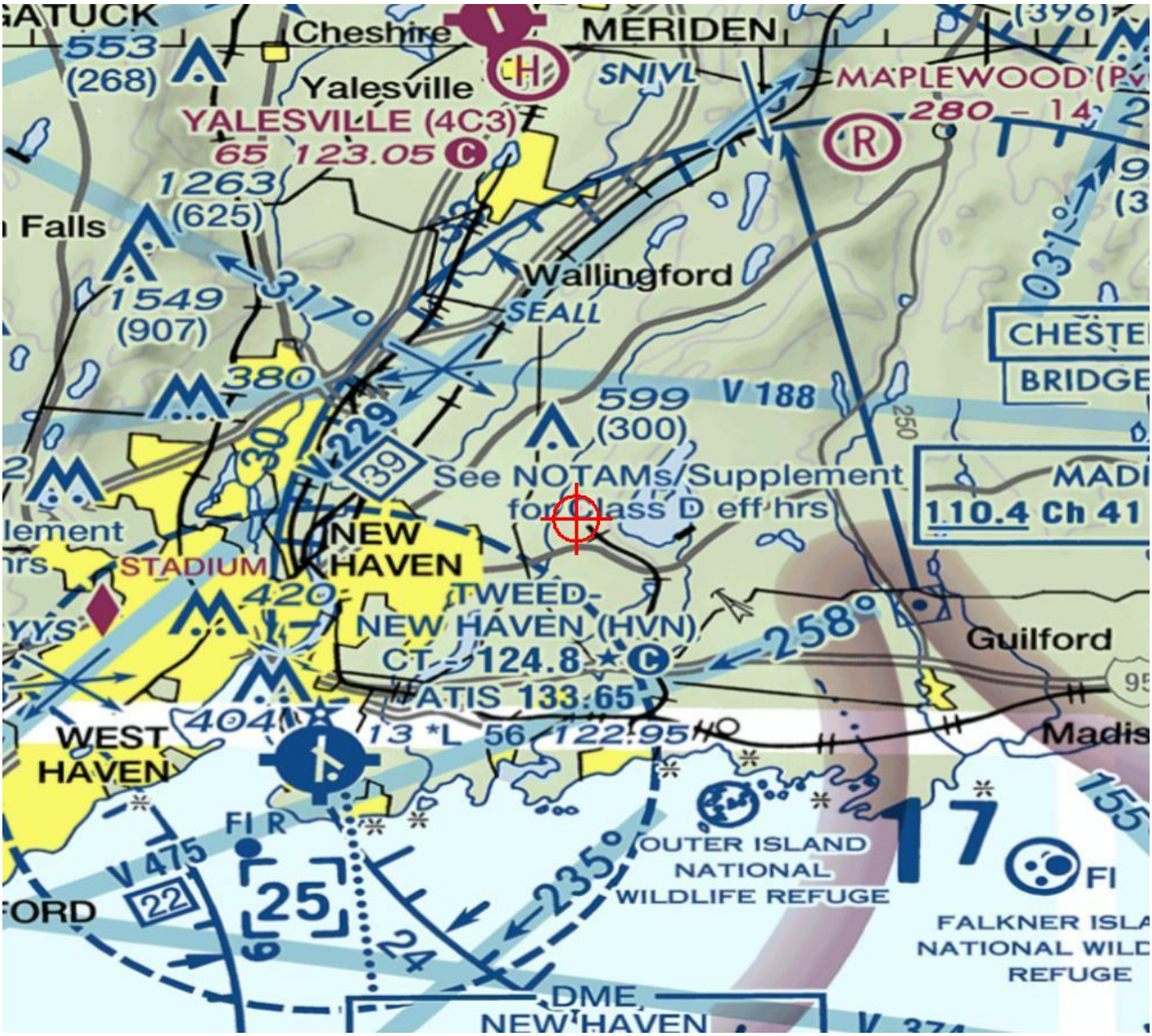
Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the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

This determination expires on 06/01/2022 unless extended, revised, or terminated by the issuing office.

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.

Temporary structure should be marked with flags in accordance with FAA Advisory Circular 70/7460-1M, chapters 3, 14, and 15.

**Sectional Map for ASN 2020-ANE-6582-OE**



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

Aeronautical Study No.
2020-ANE-6583-OE

Issued Date: 12/01/2020

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

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

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

| | |
|---|---|
| Structure: | Crane Point 9 |
| Location: | North Branford, CT |
| Latitude: | 41-20-35.30N NAD 83 |
| Longitude: | 72-48-07.62W |
| Heights: | 82 feet site elevation (SE) |
| | 22 feet above ground level (AGL) |
| | 104 feet above mean sea level (AMSL) |

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

**SEE ATTACHMENT FOR ADDITIONAL CONDITION(S) OR INFORMATION**

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

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

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

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

If you have any questions, please contact our office at (404) 305-6582, or Stephanie.Kimmel@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-6583-OE

**Signature Control No: 457233614-458103000** ( TMP )
Stephanie Kimmel
Specialist

## Additional Condition(s) or Information for ASN 2020-ANE-6583-OE

**Proposal:** To construct and/or operate a(n) Crane to a height of 22 feet above ground level, 112 feet above mean sea level.

**Location:** The structure will be located 6.14 nautical miles northeast of HVN Airport reference point.

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

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

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 M, Obstruction Marking and Lighting, marked-Chapters 3(Marked),14(Temporary),&15.

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

This determination expires on 06/01/2022 unless extended, revised, or terminated by the issuing office.

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.

Temporary structure should be marked with flags in accordance with FAA Advisory Circular 70/7460-1M, chapters 3, 14, and 15.

**Sectional Map for ASN 2020-ANE-6583-OE**

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

Aeronautical Study No.
2020-ANE-6588-OE

Issued Date: 12/01/2020

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

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

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

| | |
|---|---|
| Structure: | Solar Panel Point 1 |
| Location: | North Branford, CT |
| Latitude: | 41-20-35.05N NAD 83 |
| Longitude: | 72-48-03.24W |
| Heights: | 90 feet site elevation (SE)<br>10 feet above ground level (AGL)<br>100 feet above mean sea level (AMSL) |

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

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

This determination expires on 06/01/2022 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 2020-ANE-6588-OE.

**Signature Control No: 457235260-458104768** ( DNE )
Stephanie Kimmel
Specialist

Attachment(s)
Map(s)

**Sectional Map for ASN 2020-ANE-6588-OE**

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

Aeronautical Study No.
2020-ANE-6589-OE

Issued Date: 12/01/2020

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

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

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

| | |
|---|---|
| Structure: | Solar Panel Point 2 |
| Location: | North Branford, CT |
| Latitude: | 41-20-34.76N NAD 83 |
| Longitude: | 72-48-02.66W |
| Heights: | 95 feet site elevation (SE) |
| | 10 feet above ground level (AGL) |
| | 105 feet above mean sea level (AMSL) |

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

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

This determination expires on 06/01/2022 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 2020-ANE-6589-OE.

**Signature Control No: 457235261-458104770** ( DNE )
Stephanie Kimmel
Specialist

Attachment(s)
Map(s)

**Sectional Map for ASN 2020-ANE-6589-OE**

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

Aeronautical Study No.
2020-ANE-6590-OE

Issued Date: 12/01/2020

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

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

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

| | |
|---|---|
| Structure: | Solar Panel Point 3 (Also HP) |
| Location: | North Branford, CT |
| Latitude: | 41-20-30.84N NAD 83 |
| Longitude: | 72-48-02.66W |
| Heights: | 96 feet site elevation (SE) |
| | 10 feet above ground level (AGL) |
| | 106 feet above mean sea level (AMSL) |

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

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

This determination expires on 06/01/2022 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 2020-ANE-6590-OE.

**Signature Control No: 457235262-458104774** ( DNE )
Stephanie Kimmel
Specialist

Attachment(s)
Map(s)

**Sectional Map for ASN 2020-ANE-6590-OE**

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

Aeronautical Study No.
2020-ANE-6591-OE

Issued Date: 12/01/2020

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

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

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

| | |
|---|---|
| Structure: | Solar Panel Point 4 |
| Location: | North Branford, CT |
| Latitude: | 41-20-30.84N NAD 83 |
| Longitude: | 72-48-10.51W |
| Heights: | 93 feet site elevation (SE) |
| | 10 feet above ground level (AGL) |
| | 103 feet above mean sea level (AMSL) |

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

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

This determination expires on 06/01/2022 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.

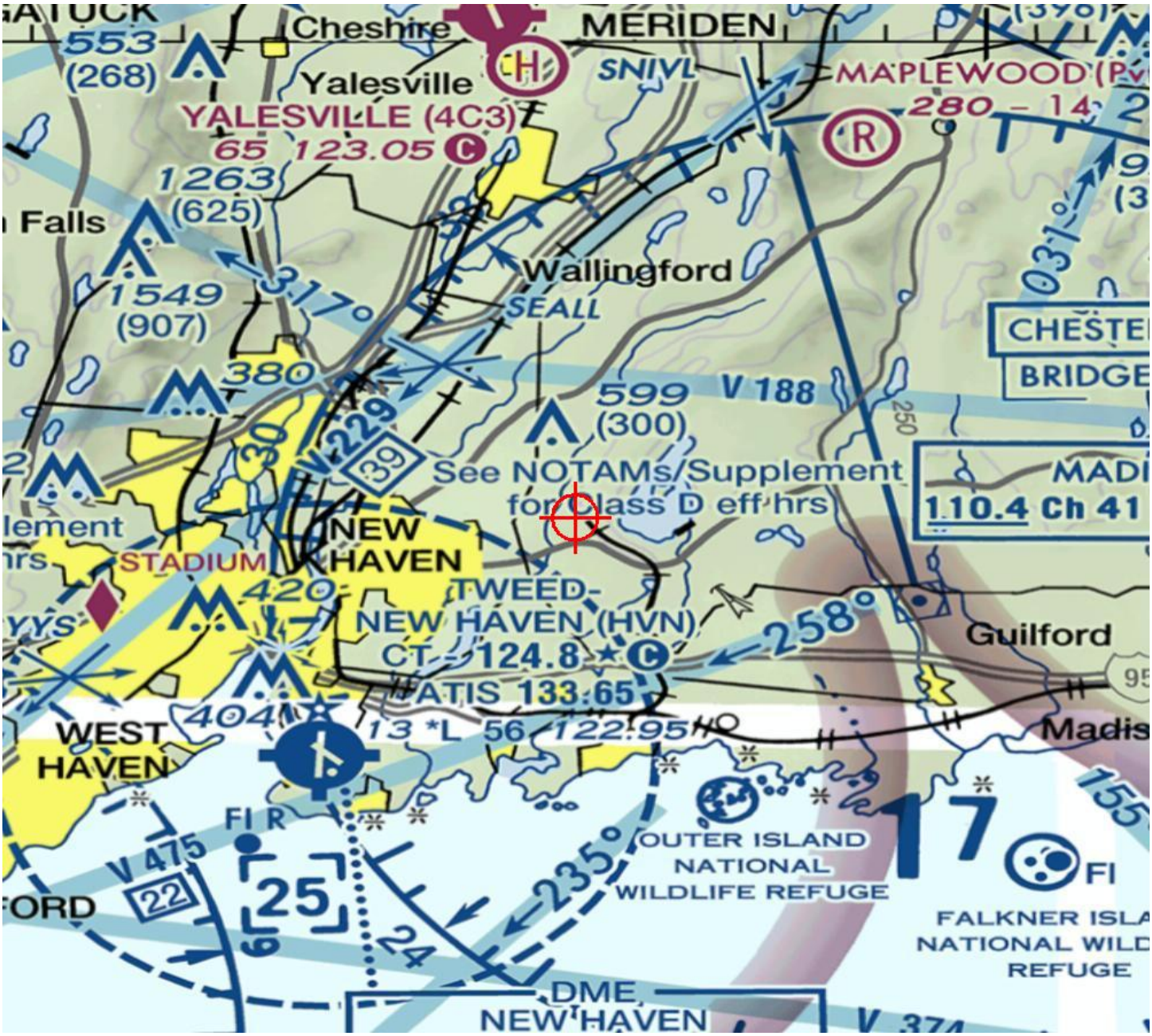
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

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 2020-ANE-6591-OE.

**Signature Control No: 457235263-458104769** ( DNE )
Stephanie Kimmel
Specialist

Attachment(s)
Map(s)

**Sectional Map for ASN 2020-ANE-6591-OE**



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

Aeronautical Study No.
2020-ANE-6592-OE

Issued Date: 12/01/2020

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

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

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

| | |
|---|---|
| Structure: | Solar Panel Point 5 |
| Location: | North Branford, CT |
| Latitude: | 41-20-32.86N NAD 83 |
| Longitude: | 72-48-11.09W |
| Heights: | 83 feet site elevation (SE) |
| | 10 feet above ground level (AGL) |
| | 93 feet above mean sea level (AMSL) |

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

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

This determination expires on 06/01/2022 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.

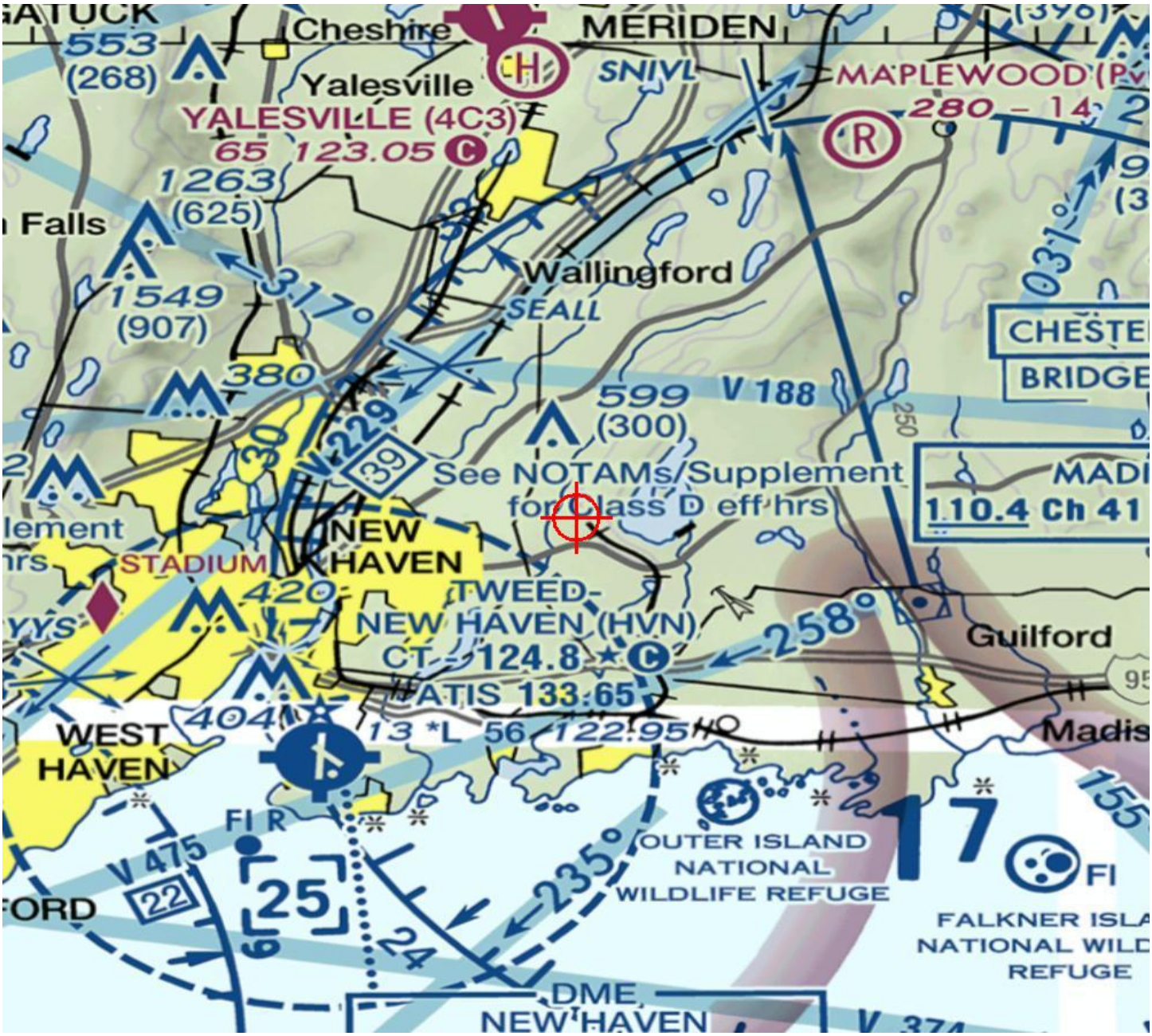
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

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 2020-ANE-6592-OE.

**Signature Control No: 457235264-458104776** ( DNE )
Stephanie Kimmel
Specialist

Attachment(s)
Map(s)

**Sectional Map for ASN 2020-ANE-6592-OE**



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

Aeronautical Study No.
2020-ANE-6593-OE

Issued Date: 12/01/2020

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

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

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

| | |
|---|---|
| Structure: | Solar Panel Point 6 |
| Location: | North Branford, CT |
| Latitude: | 41-20-34.40N NAD 83 |
| Longitude: | 72-48-12.24W |
| Heights: | 80 feet site elevation (SE) |
| | 10 feet above ground level (AGL) |
| | 90 feet above mean sea level (AMSL) |

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

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

This determination expires on 06/01/2022 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.

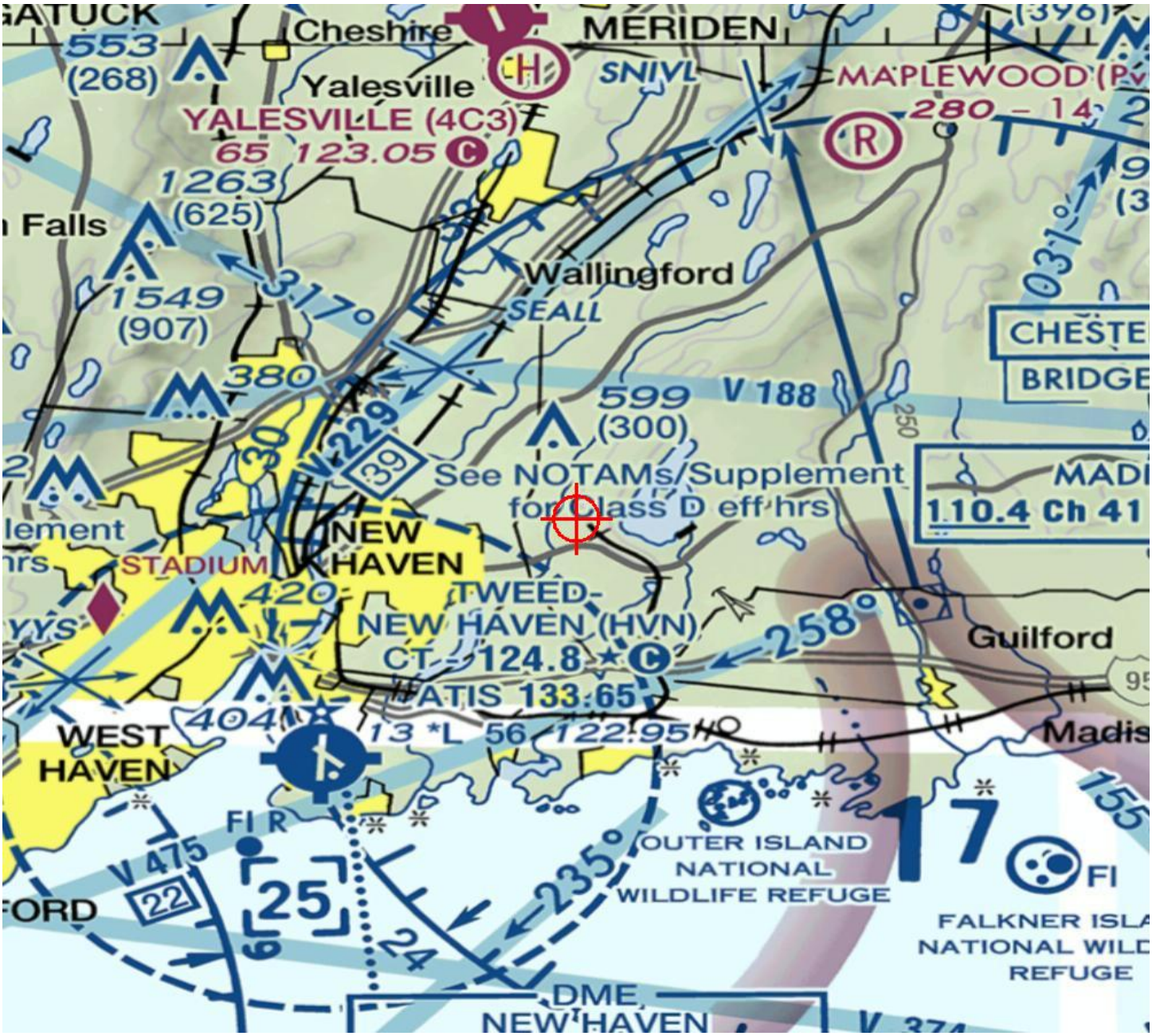
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

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 2020-ANE-6593-OE.

**Signature Control No: 457235265-458104773** ( DNE )
Stephanie Kimmel
Specialist

Attachment(s)
Map(s)

**Sectional Map for ASN 2020-ANE-6593-OE**



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

Aeronautical Study No.
2020-ANE-6594-OE

Issued Date: 12/01/2020

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

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

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

| | |
|---|---|
| Structure: | Solar Panel Point 7 |
| Location: | North Branford, CT |
| Latitude: | 41-20-36.06N NAD 83 |
| Longitude: | 72-48-12.28W |
| Heights: | 79 feet site elevation (SE)<br>10 feet above ground level (AGL)<br>89 feet above mean sea level (AMSL) |

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

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

This determination expires on 06/01/2022 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.

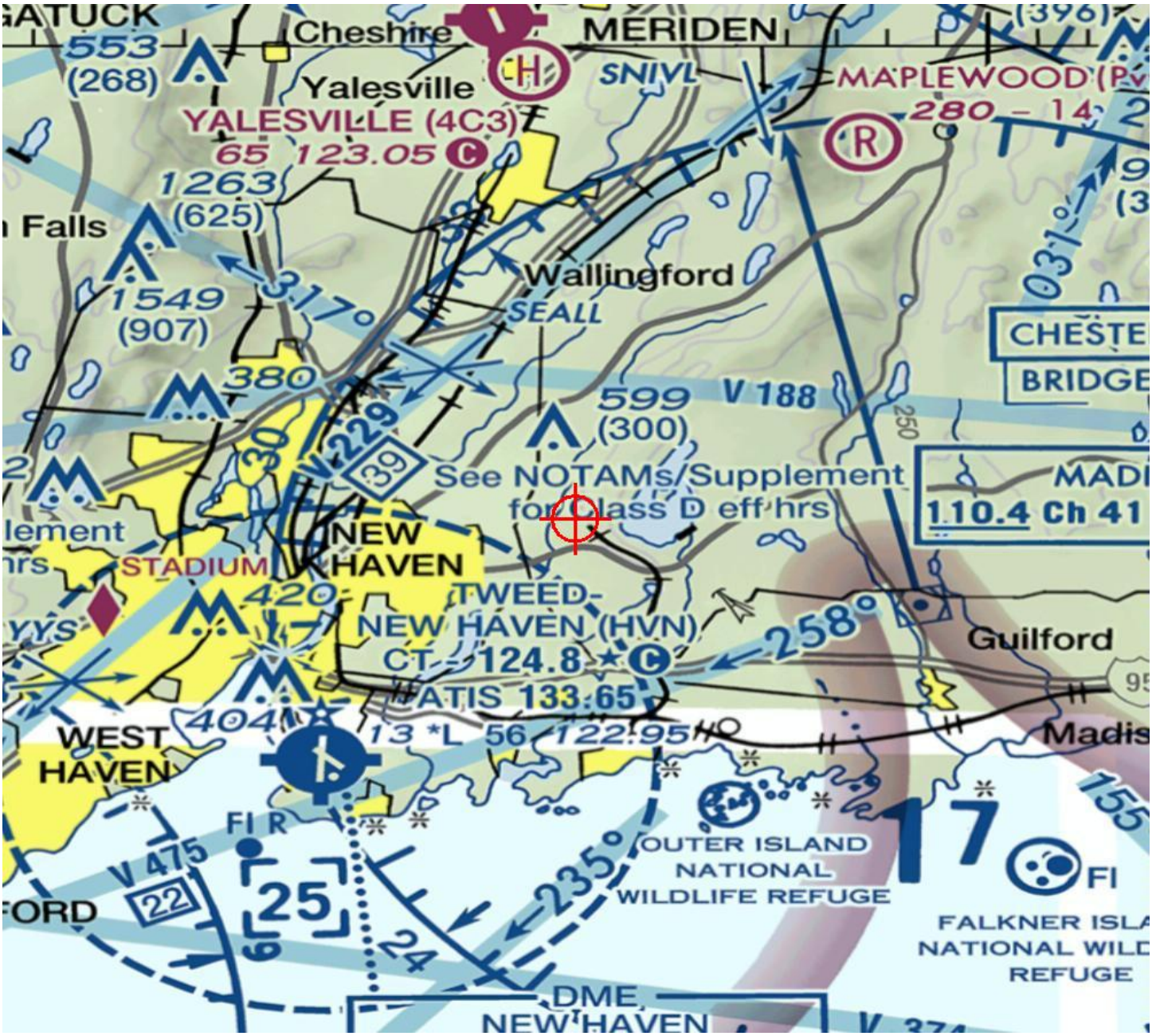
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

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 2020-ANE-6594-OE.

**Signature Control No: 457235266-458104771** ( DNE )
Stephanie Kimmel
Specialist

Attachment(s)
Map(s)

**Sectional Map for ASN 2020-ANE-6594-OE**



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10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2020-ANE-6595-OE

Issued Date: 12/01/2020

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

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

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

| | |
|---|---|
| Structure: | Solar Panel Point 8 |
| Location: | North Branford, CT |
| Latitude: | 41-20-36.06N NAD 83 |
| Longitude: | 72-48-11.09W |
| Heights: | 80 feet site elevation (SE) |
| | 10 feet above ground level (AGL) |
| | 90 feet above mean sea level (AMSL) |

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

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

This determination expires on 06/01/2022 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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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.

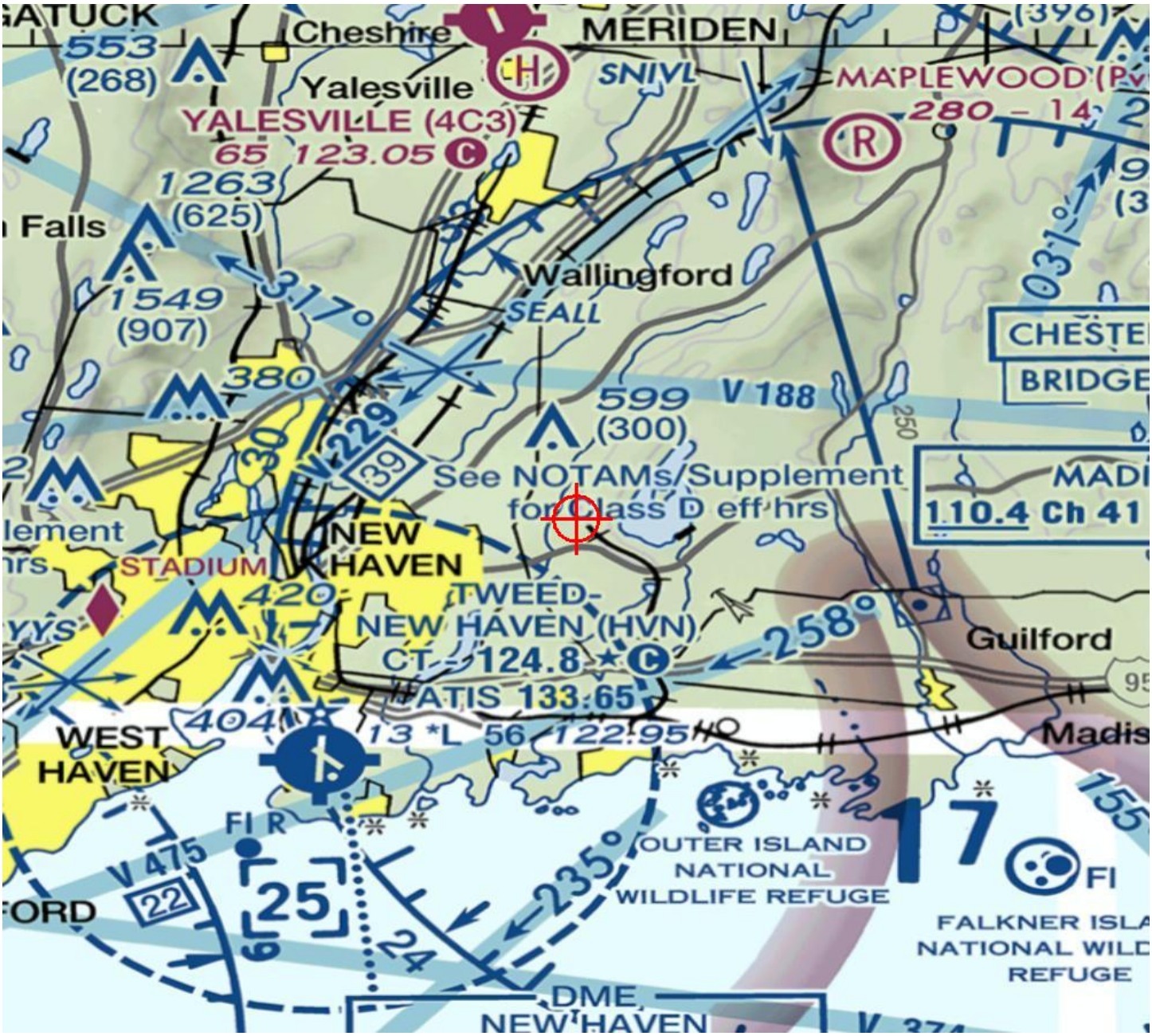
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

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 2020-ANE-6595-OE.

**Signature Control No: 457235267-458104772** ( DNE )
Stephanie Kimmel
Specialist

Attachment(s)
Map(s)

**Sectional Map for ASN 2020-ANE-6595-OE**



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Aeronautical Study No.
2020-ANE-6596-OE

Issued Date: 12/01/2020

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

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

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

| | |
|---|---|
| Structure: | Solar Panel Point 9 |
| Location: | North Branford, CT |
| Latitude: | 41-20-35.30N NAD 83 |
| Longitude: | 72-48-07.62W |
| Heights: | 82 feet site elevation (SE) |
| | 10 feet above ground level (AGL) |
| | 92 feet above mean sea level (AMSL) |

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

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

This determination expires on 06/01/2022 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.
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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 2020-ANE-6596-OE.

**Signature Control No: 457235268-458104775** ( DNE )
Stephanie Kimmel
Specialist

Attachment(s)
Map(s)

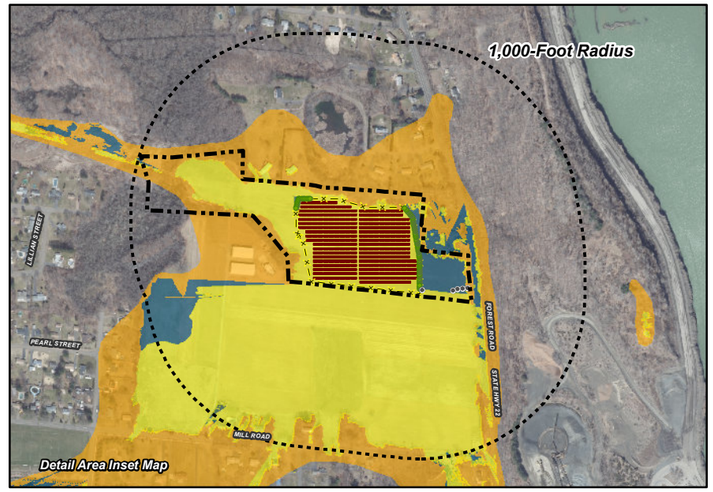
**Sectional Map for ASN 2020-ANE-6596-OE**

# APPENDIX G

PROPOSED CONDITIONS VIEWSHED MAP
AND PHOTO SIMULATIONS

C:\Users\mkopel\Dropbox (APT GIS)\APT GIS Team Folder\Projects\CitrinePower\NorthBranford\mxd\North_Branford_Viewshed_Aerial.mxd


Statewide and Regional Overview Map




Detail Area Inset Map

# Viewshed Analysis Map

Proposed Solar Energy Facility
127 Forest Road
North Branford, Connecticut

Proposed solar panels to be mounted on approximate 10' AGL support structures.
Proposed lanscaping includes evergreen trees with an approximate height of 10' AGL
Forest canopy height and topographic contours are derived from LiDAR data.
Study area encompasses a 1-mile radius and includes 2,303 acres.
Base Map Source: 2019 Aerial Photograph (CTECO)
Map Date: February 2021

## Legend

- Site
- Utility Pole
- Landscape Screening
- Perimeter Fence
- Solar Modules
- Study Area (1-Mile Radius)
- Predicted Year-Round Visibility, Proposed Utility Poles Only (20 Acres)
- Predicted Year-Round Visibility, Proposed Solar Panels and Proposed Utility Poles (61 Acres)
- Areas of Potential Seasonal Visibility, Includes Proposed Solar Panels and/or Proposed Utility Poles (83 Acres)
- Municipal Boundary
- Trail
- Scenic Highway
- DEEP Boat Launches
- Municipal and Private Open Space Property
- State Forest/Park

**Protected Open Space Property**

- Federal
- Land Trust
- Municipal
- Private
- State

### *Data Sources:*

***Physical Geography / Background Data***

A digital surface model (DSM) was created from the State of Connecticut 2016 LiDAR LAS data points. The first return LiDAR LAS values, associated with the highest feature in the landscape (such as a treetop or top of building), were used to capture the natural and built features on the Earth's surface beyond the approximate limits of clearing associated with the proposed solar facility. The "bare-earth" return values were utilized to reflect proposed conditions where vegetative clearing associated with the proposed solar facility would occur.

Municipal Open Space, State Recreation Areas, Trails, County Recreation Areas, and Town Boundary data obtained from CT DEEP.
Scenic Roads: CTDOT State Scenic Highways (2015); Municipal Scenic Roads (compiled by APT)

***Dedicated Open Space & Recreation Areas***

Connecticut Department of Energy and Environmental Protection (DEEP): DEEP Property (May 2007; Federal Open Space (1997); Municipal and Private Open Space (1997); DEEP Boat Launches (1994)

Connecticut Forest & Parks Association, Connecticut Walk Books East & West

***Other***

CTDOT Scenic Strips (based on Department of Transportation data)

***Notes***

***Not all the sources listed above appear on the Viewshed Maps. Only those features within the scale of the graphic are shown.*

***Limitations***

*This map depicts areas where the proposed Facility may potentially be visible to the human eye without the aid of magnification based on a viewer eye-height of 5 feet above the ground and intervening topography, tree canopy and structures. This analysis may not account for all visible locations, as it is based on the combination of computer modeling, incorporating the DSM and 2019 digital aerial photographs only. No in-field verification has been completed. This analysis does not claim to depict the only areas, or all locations, where visibility may occur; it is intended to provide a representation of those areas where the Facility is likely to be seen.*

0.25 0.125 0 0.25 Miles

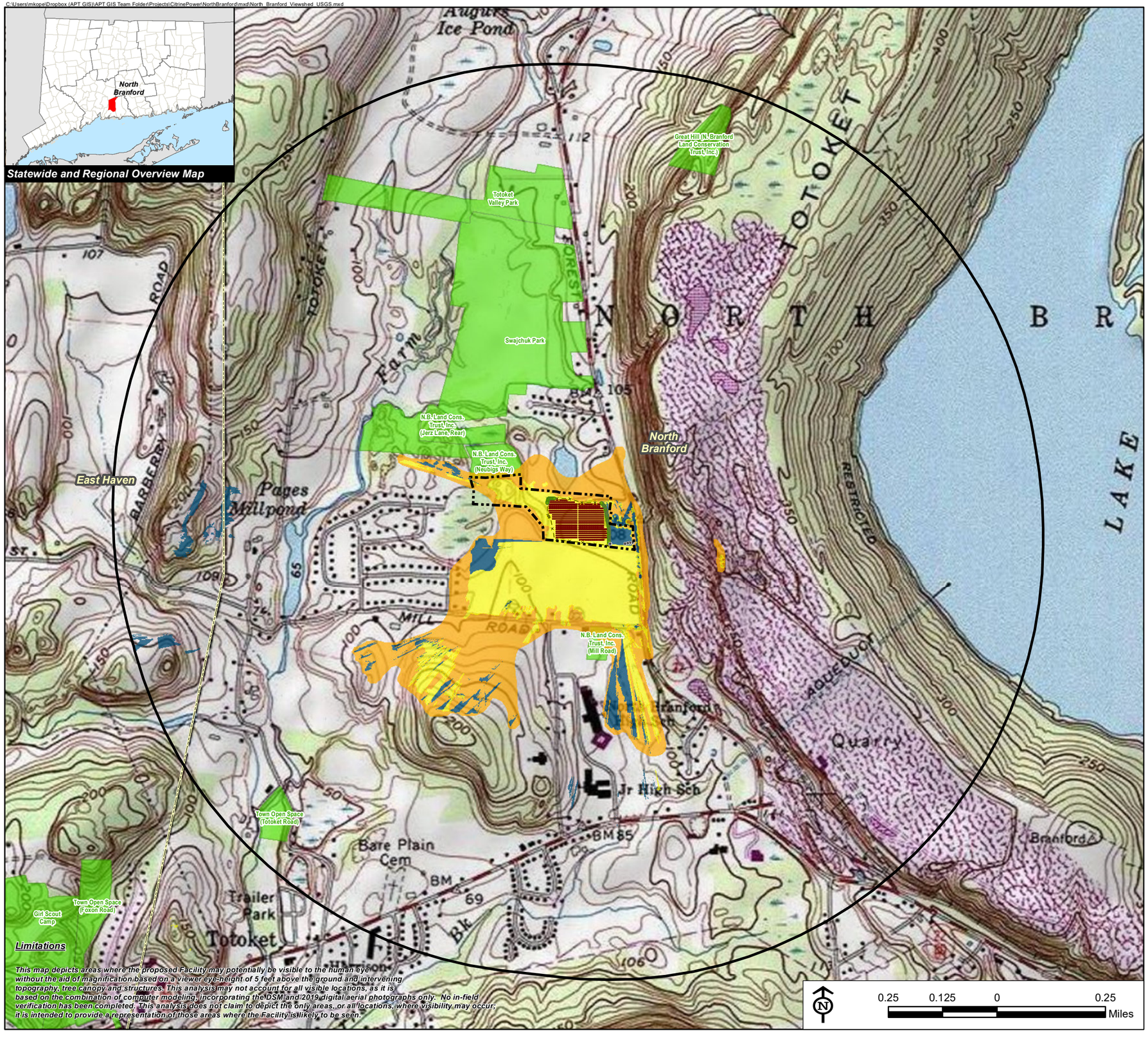
CITRINE

ALL-POINTS TECHNOLOGY CORPORATION

C:\Users\mkopel\Dropbox (APT GIS)\APT GIS Team Folder\Projects\CitrinePower\NorthBranford\mxd\North_Branford_Viewshed_USGS.mxd




Statewide and Regional Overview Map

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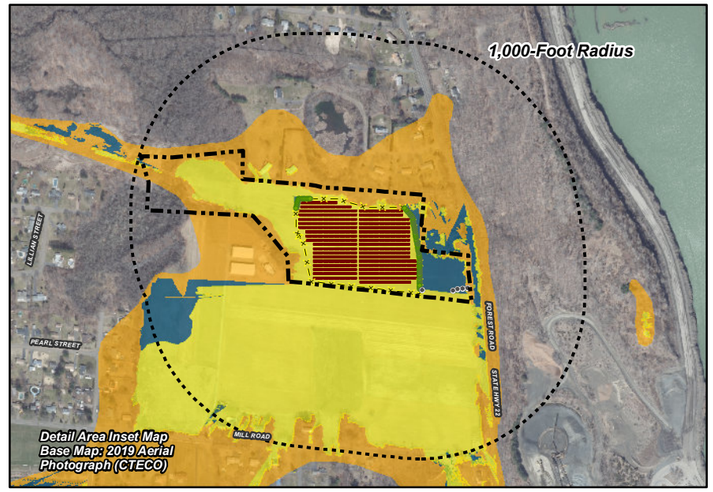
0.25 0.125 0 0.25 Miles




# Viewshed Analysis Map

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127 Forest Road
North Branford, Connecticut

Proposed solar panels to be mounted on approximate 10' AGL support structures.
Proposed lanscaping includes evergreen trees with an approximate height of 10' AGL
Forest canopy height and topographic contours are derived from LiDAR data.
Study area encompasses a 1-mile radius and includes 2,303 acres.
Base Map Source: USGS 7.5 Minute Topographic Quadrangle Map, Branford, CT (1984)
Map Date: February 2021

## Legend

- Site
- Utility Pole
- Landscape Screening
- Perimeter Fence
- Solar Modules
- Study Area (1-Mile Radius)
- Predicted Year-Round Visibility, Proposed Utility Poles Only (20 Acres)
- Predicted Year-Round Visibility, Proposed Solar Panels and Proposed Utility Poles (61 Acres)
- Areas of Potential Seasonal Visibility, Includes Proposed Solar Panels and/or Proposed Utility Poles (83 Acres)
- Municipal Boundary
- Trail
- Scenic Highway
- DEEP Boat Launches
- Municipal and Private Open Space
- State Forest/Park

**Protected Open Space Property**

- Federal
- Land Trust
- Municipal
- Private
- State

***Data Sources:***

***Physical Geography / Background Data***

A digital surface model (DSM) was created from the State of Connecticut 2016 LiDAR LAS data points. The first return LiDAR LAS values, associated with the highest feature in the landscape (such as a treetop or top of building), were used to capture the natural and built features on the Earth's surface beyond the approximate limits of clearing associated with the proposed solar facility. The "bare-earth" return values were utilized to reflect proposed conditions where vegetative clearing associated with the proposed solar facility would occur.

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Connecticut Forest & Parks Association, Connecticut Walk Books East & West

***Other***

CTDOT Scenic Strips (based on Department of Transportation data)

***Notes***

***Not all the sources listed above appear on the Viewshed Maps. Only those features within the scale of the graphic are shown.*

CITRINE

ALL-POINTS TECHNOLOGY CORPORATION

PHOTOGRAPHED ON 1/11/2021

***EXISTING***

| PHOTO | LOCATION | ORIENTATION |
|---|---|---|
| **1** | **MILL ROAD** | **NORTH** |

ALL-POINTS TECHNOLOGY CORPORATION

CITRINE

***PROPOSED***

| PHOTO | LOCATION | ORIENTATION |
|---|---|---|
| **1** | **MILL ROAD** | **NORTH** |

ALL-POINTS TECHNOLOGY CORPORATION

CITRINE

PHOTOGRAPHED ON 1/11/2021

***EXISTING***

| PHOTO | LOCATION | ORIENTATION |
|---|---|---|
| **2** | **FOREST ROAD** | **WEST** |

ALL-POINTS TECHNOLOGY CORPORATION

CITRINE

***PROPOSED***

| PHOTO | LOCATION | ORIENTATION |
|---|---|---|
| **2** | **FOREST ROAD** | **WEST** |

ALL-POINTS TECHNOLOGY CORPORATION

CITRINE

PHOTOGRAPHED ON 1/11/2021

***EXISTING***

| PHOTO | LOCATION | ORIENTATION |
|---|---|---|
| **3** | **FOREST ROAD** | **WEST** |

ALL-POINTS TECHNOLOGY CORPORATION

CITRINE

***PROPOSED***

| PHOTO | LOCATION | ORIENTATION |
|---|---|---|
| **3** | **FOREST ROAD** | **WEST** |

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CITRINE

PHOTOGRAPHED ON 1/11/2021

***EXISTING***

| PHOTO | LOCATION | ORIENTATION |
|---|---|---|
| **4** | **NEUBIG'S WAY** | **SOUTH** |

ALL-POINTS TECHNOLOGY CORPORATION

CITRINE

***PROPOSED***

| PHOTO | LOCATION | ORIENTATION |
|---|---|---|
| **4** | **NEUBIG'S WAY** | **SOUTH** |

ALL-POINTS TECHNOLOGY CORPORATION

CITRINE

TAB

55 Greens Farms Road, 200-78
Westport, CT 06880
203 557 5554
www.citrinepower.com

## CONSTRUCTION HOURS/DAYS and CONSTRUCTION SCHEDULE

March 3, 2021

Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

To Whom It May Concern:

For the construction of the solar array owned by CP NB Solar I, LLC and CP NB Solar II, LLC (collectively the "Petitioner") and its contractors plan to work the following hours during the proposed Construction Schedule attached hereto:

- Monday – Saturday: 7 am to 6 pm
- Sunday – 9 am to 6 pm
- Federal Holidays will be observed

Regards

Cela Sinay Bernie
Managing Partner
Citrine Power LLC
55 Greens Farms Road, Suite 200-78
Westport, CT 06880

CITRINE
55 Greens Farms Road, 200-78
Westport, CT 06880
203 557 5554
www.citrinepower.com

# Construction Schedule

| ***CONSTRUCTION SCHEDULE*** | **EST. DAYS** | ***Mar-21*** | ***Apr-21*** | ***May-21*** | ***Jun-21*** | ***Jul-21*** | ***Aug-21*** | ***Sep-21*** | ***Oct-21*** | ***Nov-21*** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Approvals & Permitting** | ***90 days*** | | | | | | | | | |
| **Major Component Procurement** | ***60 days*** | | | | | | | | | |
| **Construction** | ***90 days*** | | | | | | | | | |
| Site Prep | 15 days | | | | | | | | | |
| Racking and Module Install | 55 days | | | | | | | | | |
| Inverter & AC Install | 45 days | | | | | | | | | |
| Finalize Fence and Landscaping | 10 days | | | | | | | | | |
| **Commissioning and Inspection** | 10 days | | | | | | | | | |
| **Utility Close Out / PTO** | 5 days | | | | | | | | | |
| **Final Completion** | 15 days | | | | | | | | | |
| **TOTAL** | **240 days** | | | | | | | | | |

TAB

CITRINE
55 Greens Farms Road, 200-78
Westport, CT 06880
203 557 5554
www.citrinepower.com

# OPERATIONS & MAINTENANCE PLAN & ANNUAL INSPECTION PROTOCOL

## INTRODUCTION

Citrine Power, LLC, its investors and its affiliates, CP NB Solar I, LLC and CP NB Solar II, LLC (individually and collectively "Citrine") will enter into a third-party Operations and Maintenance Contract, conterminous with the term of the lease, with a reputable solar third-party operations and maintenance contractor ("O&M Contractor"). The O&M Contractor will ensure that any concerns are addressed quickly to minimize any downtime of the proposed PV Facilities. Additionally, Citrine and the O&M Contractor will assign an Operations Project Manager responsible for all operations and maintenance activities required at the Site to ensure that the PV Facilities continue operating as expected.

Prior to commercial operation, our O&M Contractor and the Operations Project Manager for the overall project will conduct detailed training on system emergency procedures for the Town of North Branford's public safety personnel and first responders ("Town").

Our O&M Contractor will maintain staff and a fleet of vehicles supplied with tools and equipment. They also maintain and stock replacement parts in warehouse facilities. Upon project completion, Citrine will present the Town with sets of as-built drawings for each of the completed installations. Although Citrine will be responsible for ongoing operations of the equipment, Citrine will train the O&M Contractor's personnel on the equipment installed at the Site and where it is located. Citrine will also train town's first responder staff (police and fire) n the actions to take in the event of an emergency.

In addition, Citrine enters into extended warranty programs. This provides our customers with long-term, worry-free service and assurance that the PV Facilities will operate continuously. Each PV Facility will be installed with an internet-based data acquisition system (DAS). The DAS will have the capability to send alarms identifying communication and power generation issues.

## SERVICES

During the operation of the PV Facilities, our O&M Contractor shall perform the following services on each PV Facility:

- On Call System Service → Per request
- Annual Full System Electrical Inspection and Maintenance → One time a year
- Vegetation Management & Landscaping → Minimum once per year
- Module Washing → Optional (maximum once per year)

## SCOPE OF WORK

### Daily Monitoring, Annual inspection and Preventative Maintenance

To maintain the PV Facilities at optimal operation, our team and our O&M Contractor and our Operations Project Manager manage the following:

- Daily Monitoring; Responsiveness to Service Alerts and Alarms: For each project, assigned O&M Contractor and Operations Project Manager receive alerts, alarms, and reports from the DAS, notifying the manager of any fault(s) or performance problems. When an alert from the DAS occurs, the Operation Project Manager assesses the cause and severity of the alert – dispatching, as required, service technicians or engineers to access the on-site problem and repair or replace equipment.
- Annual Inspection and Maintenance: The Operations Project Manager is also responsible for scheduling the annual evaluation and preventative maintenance of the PV Facility. We will require our O&M Contractor conduct a full system electrical inspection once a year. This procedure will include the following:
    - Electrical Inspection
        - Perform a visual inspection of PV modules and array wiring, strain relief, mounting system, inverters, switchgear, transformers, combiner boxes, wireways and conduit, data acquisition system, weather sensors, and outdoor lighting.
        - Check pyranometers and reference cells.
        - Record operational data from inverters and meters.
        - IR Thermography may be used as part of the visual inspection process.
    - Inspect External and/or Internal DC Disconnects and Combiner Boxes
        - Ensure all Imp testing is performed on all DC strings, and values are logged.
        - Spot check torque values and tighten loose electrical connections.
    - Inverter and Transformer
        - Clean out all electrical enclosures.
        - Clean inverter air filters.
        - Perform Preventive Maintenance per manufacturer protocol as required to maintain inverter manufacturer's warranty.
    - AC Disconnects
        - The technician will check for proper operation.
    - DAS
        - Verify with Citrine before leaving site that the DAS system is functioning properly.
    - Fencing, Gates, Civil
        - Annual visit will include a visual inspection of any fences, gates, equipment pads, etc.
    - Service Report
        - A report must be filed with Citrine noting results of the annual inspection.

- Vegetation Management & Landscaping: The Site shall be inspected for evidence of erosion and rilling in any slopes. Any such conditions shall be noted in the annual report for re-vegetating and

depending on the severity of erosion and rilling, the area will be repaired as soon as practicable. Growth of trees or other vegetation resulting in shade impact on the arrays should be noted in the annual report. Vegetation growth (saplings, bush, large weeds etc.) within any array fences or inverter enclosures shall be removed.

During PV Facility operation, Citrine will maintain the vegetation within the leased areas, consisting of mowing at least one (1) time(s) per growing season, depending on yearly conditions.

- Module Washing & Snow Removal: Module washing and snow removal are only required if system outputs dictate, *i.e*. pollen build up or excessive amount of snow reduce power output. At a maximum, modules might be washed once per year with clean water and no chemicals or additives will be used.

## CONTACT INFORMATION

Cela Sinay Bernie
Managing Partner
Citrine Power, LLC
55 Greens Farms Road, Westport, CT 06880
203 557 5554 / 917 345 8371

Our final O&M Contractor's information will be provided after the PV Facilities achieve commercial operation.

## EMERGENCY RESPONSE PROCEDURE

### PV Facilities in North Branford CT

1. Ascertain the Nature of the Emergency

    - Police
        - Trespassing
        - Theft
        - Vandalism / Physical Damage
        - Other Crime
    - Fire
        - Injury
        - Fire
        - Smoke
        - Electrical Arcing
        - Hazardous Materials
    - Electrical
        - Damaged Wires

- Damaged Inverters
- Damaged Transfers
- Grid Related Issues

2. Contact appropriate responder below
3. Notify North Branford Police Department and Citrine
4. If required, initiate emergency shutdown with the assistance of Police and Fire Department representatives

## Contact Information

### *Police*

- North Branford Police Department: 260 Forest Road, Northford, CT 06472
- Emergency Contact: 911 // 203 484 2703

### *Fire*

- Contact North Branford Fire Department: 203 484 6016 (909 Foxon Road, North Branford, CT 06471)

### *Electrical*

United Illuminating
800.722.5584
24-Hour Assistance

## Owner's Contact Information

Citrine Power, LLC
55 Greens Farms Road Suite 200-78
Westport, CT 06880
Phone: 203 557 5554
Email: cela@citrinepower.com

## O&M Provider

To be provided when selected

## Emergency Shut Down Procedure

1. Contact North Branford Fire Department: 203 484 6016 (909 Foxon Road, North Branford, CT 06471)
2. Open visible disconnect located in array field next to the solar inverter equipment
3. Turn the DC disconnects located at the inverters to the off position
4. Citrine Power LLC at (203) 557-5554

TAB

CITRINE
55 Greens Farms Road, 200-78
Westport, CT 06880
203 557 5554
www.citrinepower.com

# DECOMMISSIONING PLAN

## EXECUTIVE SUMMARY

Citrine Power LLC and its affiliates, CP NB Hampton Solar I, LLC and CP NB Solar II, LLC (each and collectively the "Petitioner") submit this Decommissioning Plan (the "Plan") to the Connecticut Siting Council ("Council") in conjunction with its Petition for two adjacent ground mounted solar photovoltaic electric generating facilities ("PV Facilities" or the "Sunflower Project"), 1 MW AC and 0.970 MW AC respectively, to be located in the Town of North Branford. This Plan establishes the decommissioning activities for the permanent removal of the solar panels and appurtenant equipment at the end of the PV Facilities' useful life or the permanent cessation of their operation, whichever comes first. The PV Facilities are designed for a useful life of at least twenty-five (25) years. The Plan describes the approach for removal of the PV Facilities and associated equipment and describes anticipated land-restoration activities. This Plan is valid for each and both of the PV Facilities.

Decommissioning and restoration activities will be in accordance with all applicable federal, state, and local laws, as well as local permitting requirements. As with the construction phase, an on-site manager responsible for safety will be present while decommissioning activities take place.

This Plan is based on current procedures and experience. These procedures may be subject to revision over time based on then prevailing industry standards. At the time of decommissioning, various options and procedures will be re-evaluated to ensure that decommissioning is safe and minimizes the potential for impacts to the environment. Decommissioning and site restoration activities will be undertaken with the input of the landowner and will be carried out in accordance with the commitments made in this report or the prevailing industry standards.

## 1. Decommissioning Sequence

In the event of a decommissioning, the following sequence for removal will be used:

- Decommissioning preparation
- Remove solar panel modules and other PV equipment
- Remove structural steel racking
- Remove concrete foundations
- Remove cables and interconnection lines & poles
- Remove above and below ground conduit and cable
- Remove fence
- Remove access road
- Restoration of site
- Monitor

## 2. Decommissioning Preparation

The first step is Site preparation. Site decommissioning, equipment removal, and reclamation of the Site can require between four to eight weeks for PV Facilities of this size (*i.e.,* 1-2 MW AC). Therefore, access roads, fencing, and electrical power will temporarily remain in place for use by the decommissioning and site restoration workers until no longer needed. Demolition debris will be placed in temporary on-site storage areas pending final transportation and disposal/recycling according to the procedures discussed in this Plan. All recyclable materials will be transported to the appropriate nearby recycling facilities as 95 percent or greater of the PV Facilities' components will be recyclable. Any non-recyclable materials will be properly disposed of at a nearby landfill in accordance with State and Federal law.

## 3. Equipment Removal & Recycling

Equipment removal will include all pad-mounted cabinets, internal power systems, solar modules, solar module racking, inverters, transformers, and switchgear/panel boards. The solar panels might be salvageable for reuse or resale on other solar energy projects; the panels are under warranty to generate electricity at 80 percent of their original capacity after twenty (25) years. The panels will be collected, hauled to a storage yard, and assessed for value at the time of decommissioning. Inverters, transformers, and the switchgear may also retain value for reuse on other power generating projects and will be hauled to a storage facility for assessed value, functionality, and potential reuse. If the Petitioner determines that, the solar panels and other PV equipment need to be discarded, all such material will be transported to and recycled at the nearest appropriate facility. Minimal non-recyclable materials are anticipated, of which will be disposed at the nearest qualified disposal facility.

Steel posts that supported the module racking will be removed and any resulting holes, if any, will be backfilled with locally imported soil to match existing site soil conditions. The majority of copper, steel and aluminum will be processed for transportation and delivery to a licensed off-site recycling center if they are deemed to be unsalvageable by the Petitioner.

The concrete foundation designs for PV Facilities consists of one 1 Equipment Pad for each facility, amounting to approximately 20 cubic yards of concrete for a total (2) pads. The foundation can be removed by a jackhammer mounted on either a skid loader or excavator. There is no salvage value to the foundations and slabs. The equipment pads and supports will be broken up and removed. The demolition debris may be cut or dismantled into pieces that can be safely lifted or carried with the on-site decommissioning equipment. Such debris will be completely removed and hauled off site to an approved landfill site or recycling center.

## 4. Cables, Conduit, Interconnection Lines & Poles

The PV Facilities will have cable both above ground and placed in below the ground surface. In all cable locations the trenches are backfilled with on-site earthen materials with topsoil. All conduit and cabling that is removed will be recycled.

The underground interconnection cabling that connects the PV Facilities to The United Illuminating ("UI") local distribution system will remain in place during decommissioning activities to provide electric service on-site during decommissioning. At the time of decommissioning, if the landowner determines that this electric service line will be beneficial for the future use of the site, the line may remain after decommissioning. If the line is not used, the conductors will be removed and transported offsite to the nearest recycling facility. The associated poles owned by the Petitioner, but not owned by UI, will be removed and recycled. Similar on-site earthen materials with topsoil will be used to backfill pole locations after removal. If poles owned by UI located on the landlord's site and access road need to be removed, cable disconnect and pole removal will be coordinated with UI at the expense of the Petitioner.

## 5. Security Fence

The chain link perimeter security fence will remain in place during decommissioning activities for site safety and security purposes. At the time of decommissioning, if the landowner determines that this fence will be beneficial for the future use of the site, the fence may remain after decommissioning. The future use of the site is undetermined at this time. If the fence will not be used, it will be removed and transported to the nearest recycling facility. Holes left behind by the fence support posts will be backfilled with locally imported soil to match existing on-site soils, and hydroseeded with a seed mix to match existing on-site groundcover.

## 6. Access Road

The Facility's on-site access road is will remain in place to accomplish decommissioning at the end of the Facility's life. After decommissioning is complete the might will remain for the landowner's future use. In the event the landlowner does not have use for the gravel access road at decommissioning the gravel will be cleared from the access road.

## 7. Site Restoration Process

After the PV Facilities are completely decommissioned, and all equipment has been removed from the site, additional activities will be performed to restore the site, excepting ordinary wear and tear.

Site restoration activities are anticipated to be limited, because Petitioners do not anticipate altering the

pre-construction conditions during construction. The initial site disturbance during the construction of the PV Facilities is designed to maintain much of the site's original topography and limit mass earth moving. Any modified landform features or physical site alterations as applicable can be left in place as they will continue to function adequately. After the PV Facilities are completely decommissioned, and all equipment has been removed from the site, the areas disturbed by the equipment removal (and ordinary wear and tear) will be reseeded.

Any excavated areas remaining after removal of equipment pads or base material, will be backfilled and compacted with locally imported soil to match existing on-site soils. Areas affected by these modifications would be spread with topsoil where necessary and hydroseeded with a seed mix to match existing on-site groundcover.

If any soils are compacted at levels that would affect successful re-vegetation, they will be de-compacted. The method of de-compaction (i.e. aeration, tilling, etc.) will depend on how compacted the soil has become over the life of the Project.

Any remaining bare earth areas will be hydroseeded with a seed mix to match existing on-site groundcover.

If not managed otherwise, the site would revert to successional forest over time.

## 8. Monitoring Activities

The Site will be monitored by the Petitioner after Site restoration activities are complete to confirm that any earthwork and re-vegetation were performed correctly. The Site will be periodically inspected (at least quarterly) to check for any eroded earthwork or failed vegetation. Any deficiencies will be promptly corrected. This monitoring will continue for a period of one year, or until the site is re-developed for another future purpose, whichever comes first.

TAB

CITRINE
55 Greens Farms Road, 200-78
Westport, CT 06880
203 557 5554
www.citrinepower.com

# Carbon Debt Analysis of Sunflower Project (North Branford) Photovoltaic Systems

Citrine Power LLC and its project affiliates CP NB Solar I, LLC and CP NB Solar II, LLC (collectively the "Petitioner") have performed a carbon debt analysis for the two PV Facilities ("Project") proposed in the Town of North Branford ("Town"). The purpose of this analysis is to determine whether the PV Facilities can have a net improvement in carbon reduction. The Project would not require the removal of any trees. Rather, Petitioner would plant approximately sixty-five new trees in the periphery of certain sections of the fence.

This analysis utilized a United States Environmental Protection Agency ("EPA") conversion factor to identify the amount of carbon sequestered in one year by one acre of average U.S. forest: 0.85 metric tons (MT) CO2 (EPA, 2017). As the PV Facilities together would not require the removal of any trees and would include the planting of sixty-five new trees, there would be no associated "carbon debt".

Each PV Facility is expected to produce approximately 1,743 MWh of energy in its first year of operation for a total of about 3,486 MWh between the two PV Facilities. Using the EPA Greenhouse Gas Equivalencies Calculator, the estimated annual carbon offset of the Project is 2,282 MT CO2. Attachment A provides greenhouse gas equivalencies for this estimated offset, examples of which include:

- 533 passenger vehicles driven for one year;
- 277,539 gallons of gasoline consumed; and
- 284 homes' energy use for one year.

This analysis does not account for energy used as part of material extraction; solar panel manufacturing and production; manufacturing of balance of system components or project installation.

## *References*

*United States Environmental Protection Agency (EPA). (2017). Greenhouse Gases Equivalencies Calculator - Calculations and References. Retrieved 02/28/2021. from https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references*

# Equivalency Results

How are they calculated?

The sum of the greenhouse gas emissions you entered above is of Carbon Dioxide Equivalent. This is equivalent to:

**2,465** Metric Tons

## Greenhouse gas emissions from

**533**

Passenger vehicles driven for one year

*-or-*

**6,116,357**

Miles driven by an average passenger vehicle

## $CO_2$ emissions from

**277,359**

gallons of gasoline consumed

*-or-*

**242,131**

gallons of diesel consumed

*-or-*

**2,715,973**

Pounds of coal burned

*-or-*

**32.6**

**284**

**417**

tanker trucks' worth of gasoline

-or-

homes' energy use for one year

-or-

homes' electricity use for one year

-or-

**13.6**

railcars' worth of coal burned

-or-

**5,707**

barrels of oil consumed

-or-

**100,764**

propane cylinders used for home barbeques

-or-

**0.0006**

coal-fired power plants in one year

-or-

**314,353,159**

number of smartphones charged

## Greenhouse gas emissions avoided by

**838**

Tons of waste recycled instead of landfilled

-or-

**120**

Garbage trucks of waste recycled instead of landfilled

-or-

**104,880**

trash bags of waste recycled instead of landfilled

-or-

**0.532**

Wind turbines running for a year

*-or-*

**93,640**

Incandescent lamps switched to LEDs

## Carbon sequestered by

**40,758**

tree seedlings grown for 10 years

*-or-*

**3,219**

acres of U.S. forests in one year

*-or-*

**16.7**

acres of U.S. forests preserved from conversion to cropland in one year

TAB

# TOWN OF NORTH BRANFORD

TOWN HALL 909 FOXON ROAD, NORTH BRANFORD, CONNECTICUT 06471-1290
TOWN MANAGER (203) 484-6000 FAX (203) 484-6025

February 26, 2021

Melanie Bachman, Esq.
Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

Re: Citrine Power LLC's Petition for Sunflower Solar photovoltaic electric generating facilities in North Branford CT (CP NB Solar I & II – 127 Forest Road)

Dear Attorney Bachman:

We are writing this letter to support Citrine Power LLC's ("Citrine Power") petition for the installation of two solar photovoltaic electric generating facilities, that will be situated on Forest Road in the Town of North Branford. We have been engaged with the Citrine Power team as they have developed these facilities and support their petition application.

Town of North Branford and our schools will be the beneficiaries of the virtual net metering credits from the systems as well as the Page Farm, which is one the of oldest dairy farms in CT and in our Town. Town of North Branford supports renewable energy and we are happy that our Town will host these solar facilities that will, if approved, contribute to the State's robust RPS standards.

Accordingly, we are in support of the solar facilities in general pending Connecticut Siting Council's review and approval.

If you have any questions or concerns please feel free to call me.

Sincerely,

Michael T. Paulhus
Town Manager

TAB

## CERTIFICATION OF SERVICE

I hereby certify that on the 8th day of March, 2021, CP NB Solar I, LLC and CP NB Solar II, LLC provided notice of its Petition For A Declaratory Ruling That A Certificate of Environmental Compatibility And Public Need Is Not Required for the installation of an alternating current and a ground mounted solar photovoltaic electric generating facility proposed to be situated on land located off of Forest Road (CT Route 22) in the Town of North Branford, Connecticut, to the following:

### Abutters

Eric & Maria Anderson
12 Neubigs Way
Northford, CT 06472

Jacob & Jeanetta Beasley
8 Neubigs Way
Northford, CT 06472

Cheryl Dziurgot
150 Forest Road
Northford, CT 06472

North Branford Land Conservation
PO Box 378
North Branford, CT 06471

Dorothy G. Ozols, Trustee
148 Forest Road
North Branford, CT 06472

Tilcon Inc.
PO Box 311228
Newington, CT 06131

Patricia M. Augur Trust
146 Mill Road
Northford, CT 06472

Cheryl Duro
20 Neubigs Way
Northford, CT 06472

Paul & Carol Gangi
4 Neubigs Way
Northford, CT 06472

Town of North Branford
909 Foxon Road
North Branford, CT 06471

Michael Riggione & Penny Surv
24 Neubigs Way
Northford, CT 06472

**Owner**

What TF LLC
218 Foxon Road
East Haven, CT 06513

Respectfully submitted by,

Jesse A. Langer

Jesse A. Langer
(t) 203.786.8317
(f) 203.772.2037
jlanger@uks.com

March 8, 2021

***VIA CERTIFIED MAIL***

Eric & Maria Anderson
12 Neubigs Way
Northford, CT 06472

**RE: Proposed installation of solar electric generating facility to be located off of Forest Road (CT Route 22) in North Branford, Connecticut**

To Whom It May Concern:

I write on behalf of CP NB I, LLC and CP NB II, LLC, wholly owned subsidiaries of Citrine Power, LLC (collectively "Citrine"). Citrine intends to file with the Connecticut Siting Council ("Council") a petition for declaratory ruling ("Petition") that a Certificate of Environmental Compatibility and Public Need is not required.

The Petition addresses the construction, operation and maintenance of a 1.0 megawatt ("MW") alternating current ("AC") and a 0.970 MW AC ground mounted solar photovoltaic electric generating facility, both of which would be located off of Forest Road (CT Route 22) in North Branford, Connecticut ("Project"). The Project would be located west of Forest Road in a residential (R-40) zone. The Project area is undeveloped, privately owned, and totals approximately 19.68 acres. The Project would include the installation of photovoltaic modules, inverters and transformers, electrical lines and a perimeter fence.

As a developer of and investor in renewable power facilities, Citrine seeks out sites that are environmentally responsible and will meet its renewable energy generation objectives. Citrine has identified the Project to further such initiatives.

This letter serves as notice to you as an abutting property owner pursuant to § 16-50j-40 of the Regulations of Connecticut State Agencies. Citrine will file the Petition on or about March 8, 2021, and will request that the Council place the Petition on some future agenda.

You may review the Application at the office of the Council, which is located at Ten Franklin Square, New Britain, Connecticut, 06051, or at the Town Clerk's Office at the Town Hall in the Town of North Branford. If you have any questions or concerns regarding this matter, please contact the undersigned at (203) 786-8317, or the Council at (860) 827-2935.

Very truly yours,

Jesse A. Langer

TAB

## CERTIFICATION OF SERVICE

I hereby certify that on the 8th day of March, 2021, CP NB Solar I, LLC and CP NB Solar II, LLC provided notice of its Petition For A Declaratory Ruling That A Certificate of Environmental Compatibility And Public Need Is Not Required for the installation of an alternating current and a ground mounted solar photovoltaic electric generating facility proposed to be situated on land located off of Forest Road (CT Route 22) in the Town of North Branford, Connecticut, to the following:

### Town of North Branford

Town of North Branford
Bob Viglione, Mayor
Town Council
909 Foxon Road
North Branford, CT 06471

Town of North Branford
Town Manager
Michael T. Paulhus, Town Manager
909 Foxon Road
North Branford, CT 06471

Town of North Branford
Planning & Zoning Commission
Carey Duques, Planning & Zoning
Administrator/Town Planner
909 Foxon Road
North Branford, CT 06471

Town of North Branford
Town Clerk
Lisa A. Valenti, Town Clerk
909 Foxon Road
North Branford, CT 06471

Town of North Branford
Zoning Board of Appeals
Steve Kenning, Chairperson
909 Foxon Road
North Branford, CT 06471

Town of North Branford
Conservation & Inland Wetlands and
Watercourses Agency
Stephen Scavo, Chairperson
909 Foxon Road
North Branford, CT 06471

### State and Regional

The Honorable William Tong
Attorney General, State of Connecticut
Office of the Attorney General
55 Elm Street
Hartford, CT 06106

Connecticut Department of Emergency Services
and Public Protection
Division of Emergency Management
and Homeland Security
*c/o* James C. Rovella, Commissioner
1111 Country Club Road
Middletown, CT 06457

Connecticut Department of Public Health
*c/o* Deidre S. Gifford, MD, MPH
Acting Commissioner
410 Capital Avenue
Hartford, CT 06106

Connecticut Public Utilities Regulatory Authority
*c/o* Marissa Gillett, Chairwoman
Ten Franklin Square
New Britain, CT 06051

Connecticut Council on Environmental Quality
*c/o* Susan D. Merrow, Chair
79 Elm Street
Hartford, CT 06106

Connecticut Department of Economic
and Community Development
*c/o* David Lehman, Commissioner
450 Columbus Boulevard, Suite 5
Hartford, CT 06103

Connecticut Department of Energy
& Environmental Protection
*c/o* Katie Dykes, Commissioner
79 Elm Street
Hartford, CT 06106

Connecticut Department of Agriculture
*c/o* Bryan P. Hurlburt, Commissioner
450 Columbus Boulevard, Suite 701
Hartford, CT 06103

Connecticut Office of Policy and Management
*c/o* Melissa McCaw, Secretary
450 Capitol Avenue
Hartford, CT 06106

Connecticut Department of Transportation
*c/o* Joseph Giulietti, Commissioner
2800 Berlin Turnpike
Newington, CT 06131

Connecticut Department of Economic and
Community Development
State Historic Preservation Office
*c/o* Elizabeth Shapiro, Director
450 Columbus Boulevard, Suite 5
Hartford, CT 06103

South Central Regional
Council of Governments
*c/o* Michael Freda, Chair
127 Washington Avenue
North Haven, CT 06473

Christine Cohen
Connecticut State Senate; 12th District
Legislative Office Building, Room 3200
300 Capitol Avenue
Hartford, CT 06106

Vincent Candelora
Connecticut State Representative; 86th District
Legislative Office Building, Room 4200
300 Capitol Avenue
Hartford, CT 06106

**Federal**

U.S. Department of Transportation
Federal Aviation Administration
*c/o* Steve Dickson, Administrator
800 Independence Avenue, SW
Washington, DC 20591

U.S. Representative Rosa DeLauro
Connecticut 3rd District
101 Water Street, Suite 301
Norwich, CT 06360

U.S. Senator Christopher Murphy
Colt Gateway, Suite 401
120 Huyshope Avenue
Hartford, CT 06106

U.S. Senator Richard Blumenthal
90 State House Square, 10th Floor
Hartford, CT 06103

Federal Communications Commission
*c/o* Jessica Rosenworcel
Acting Chairwoman
45 L Street NE
Washington, DC 20554

Respectfully submitted by,

Jesse A. Langer

MERITAS LAW FIRMS WORLDWIDE

Jesse A. Langer
(t) 203.786.8317
(f) 203.772.2037
jlanger@uks.com

March 8, 2021

***VIA CERTIFIED MAIL***

Town of North Branford
Bob Viglione, Mayor
Town Council
909 Foxon Road
North Branford, CT 06471

**RE: Proposed installation of solar electric generating facility to be located off of Forest Road (CT Route 22) in North Branford, Connecticut**

The Honorable Bob Viglione:

I write on behalf of CP NB Solar I, LLC and CP NB Solar II, LLC, wholly owned subsidiaries of Citrine Power, LLC (collectively "Citrine"). Citrine intends to file with the Connecticut Siting Council ("Council") a petition for declaratory ruling ("Petition") that a Certificate of Environmental Compatibility and Public Need is not required.

The Petition addresses the construction, operation and maintenance of a 1.0 megawatt ("MW") alternating current ("AC") and a 0.970 MW AC ground mounted solar photovoltaic electric generating facility, both of which would be located off of Forest Road (CT Route 22) in North Branford, Connecticut ("Project"). The Project would be located west of Forest Road in a residential (R-40) zone. The Project area is undeveloped, privately owned, and totals approximately 19.68 acres. The Project would include the installation of photovoltaic modules, inverters and transformers, electrical lines and a perimeter fence.

As a developer of and investor in renewable power facilities, Citrine seeks out sites that are environmentally responsible and will meet its renewable energy generation objectives. Citrine has identified the Project to further such initiatives.

This letter serves as notice to you as an "appropriate municipal official and government agenc[y]" as that term is defined under § 16-50j-40 of the Regulations of Connecticut State Agencies. Citrine will file the Petition on or about March 8, 2021 and will request that the Council place the Petition on some future agenda.

Attached please find a copy of the Petition. If you have any questions or concerns regarding this matter, please contact the undersigned at (203) 786-8317, or the Council at (860) 827-2935.

Very truly yours,

Jesse A. Langer

Enclosure

Jesse A. Langer
(t) 203.786.8317
(f) 203.772.2037
jlanger@uks.com

March 8, 2021

***VIA CERTIFIED MAIL***

Town of North Branford
Town Clerk
Lisa A. Valenti, Town Clerk
909 Foxon Road
North Branford, CT 06471

**RE: Proposed installation of solar electric generating facility to be located off of Forest Road (CT Route 22) in North Branford, Connecticut**

Ms. Valenti:

I write on behalf of CP NB Solar I, LLC and CP NB Solar II, LLC, wholly owned subsidiaries of Citrine Power, LLC (collectively "Citrine"). Citrine intends to file with the Connecticut Siting Council ("Council") a petition for declaratory ruling ("Petition") that a Certificate of Environmental Compatibility and Public Need is not required.

The Petition addresses the construction, operation and maintenance of a 1.0 megawatt ("MW") alternating current ("AC") and a 0.970 MW AC ground mounted solar photovoltaic electric generating facility, both of which would be located off of Forest Road (CT Route 22) in North Branford, Connecticut ("Project"). The Project would be located west of Forest Road in a residential (R-40) zone. The Project area is undeveloped, privately owned, and totals approximately 19.68 acres. The Project would include the installation of photovoltaic modules, inverters and transformers, electrical lines and a perimeter fence.

As a developer of and investor in renewable power facilities, Citrine seeks out sites that are environmentally responsible and will meet its renewable energy generation objectives. Citrine has identified the Project to further such initiatives.

This letter serves as notice to you as an "appropriate municipal official and government agenc[y]" as that term is defined under § 16-50j-40 of the Regulations of Connecticut State Agencies. Citrine will file the Petition on or about March 8, 2021 and will request that the Council place the Petition on some future agenda.

Attached please find a copy of the Petition. If you have any questions or concerns regarding this matter, please contact the undersigned at (203) 786-8317, or the Council at (860) 827-2935.

Very truly yours,

Jesse A. Langer

Enclosure

TAB

# STORMWATER MANAGEMENT REPORT

PROPOSED

SUNFLOWER SOLAR PROJECT

127 FOREST ROAD (CT ROUTE 22)
NORTH BRANFORD, CONNECTICUT
NEW HAVEN COUNTY

**Prepared for:**

**CP NB Solar I, LLC & CP NB Solar II, LLC**
**55 Greens Farm Road, Suite 200-78**
**Westport, CT 06880**

**Prepared by:**

**All-Points Technology Corporation, P.C.**
**567 Vauxhall Street Extension, Suite 311**
**Waterford, CT 06385**

**March 2021**

# Table of Contents



# Tables



# Appendices

## Introduction

At the request of CP NB Solar I, LLC and CP NB Solar II, LLC, All-Points Technology Corporation, P.C. ("APT") has undertaken analysis of and design to address stormwater impacts resulting from development of two (2) solar electric generating facilities with outputs of approximately 1.0 megawatts (MW) and 0.97 MW alternating current (AC) herein referred to as Sunflower Solar (the "Project") located at 127 Forest Road (CT Route 22), in North Branford, Connecticut (the "Site").

The purpose of this report is to provide an analysis of the potential stormwater drainage impacts associated with the Project, as well as a description of the design to mitigate such potential stormwater drainage impacts. The design is intended to be in full compliance with the State and Town regulations while taking prevailing site conditions and practical factors into account. In addition, this report will also describe how the proposed Project adheres to the updated Connecticut Department of Energy & Environmental Projection ("CT DEEP") Appendix I, Stormwater Management at Solar Array Construction Projects, Draft 10.1 regulations.

## Existing Site Conditions

The Site is located on one (1) privately-owned irregular shaped parcel that encompasses approximately 19.68 acres on the west side of Forest Road (CT Route 22), south of Neubig's Way and north of Mill Road. The Project will be entirely located within the central portion of an agricultural field.

The Site's existing topography gradually slopes down in an east to west direction, with ground elevations ranging from approximately 106 feet above mean sea level ("AMSL") on its east side to approximately 60 feet AMSL to the west.

## Developed Site Conditions

The Project will be constructed in the eastern portion of the Property, entirely within the central portion of an agricultural field. Access to the Site will be provided via a new 20-foot-wide gravel drive located at the southeastern corner of the Property. The Project includes the installation of 6,656 390W modules and associated fencing, access road, utility and stormwater management features, within 9.96± acres of the Site. Due to the nature of the existing agricultural field, little to no clearing or grubbing is anticipated for the development of the Project.

The proposed solar panels will be installed on a post driven ground mounted racking system, with minimal changes to the existing grades. As a result, the post-development site conditions will mimic the pre-developed site conditions. Any existing ground cover that is disturbed during construction will be reseeded with a low growth seed mix.

**Stormwater Management**

*Analysis Methodology*

The hydrologic analysis was performed using the HydroCAD stormwater modeling system computer program developed by HydroCAD Software Solutions, LLC.

Hydrographs for each watershed were developed using the SCS Synthetic Unit Hydrograph Method with a Type III rainfall distribution. Hydrographs were developed for the NOAA Atlas 14, Volume 10, Version 2 Precipitation 2-, 25-, 50-, and 100-year storm event with rainfall depths of 3.47, 6.48, 7.34, and 8.26 inches respectively.

The existing and proposed drainage areas used in the calculations are illustrated on the Existing and Proposed Drainage Area Maps (EDA-1 & PDA-1). These maps and the corresponding HydroCAD output are attached.

Utilizing Appendix I Draft 10.1, this hydrologic analysis will reflect a reduction of the Hydrologic Soil Group ("HSG") present on-site by a half (1/2) step (e.g. half the difference between the runoff curve number for HSG B versus HSG C). This reduction, as indicated by CT DEEP, is intended to account for the compaction of soils that results from extensive machinery traffic during construction of the array. The Water Quality Volume ("WQV") for the site will be calculated assuming that the gravel surfaces and transformer pads are effectively impervious cover, and as the gravel surfaces are designed to be self-treating, minimal WQV is needed for the proposed Project. As the proposed solar panels are not located in areas of existing slopes exceeding 15%, the solar panel area will not be considered impervious cover for the WQV calculations. Additional Appendix I Draft 10.1 regulations and proposed compliance are presented in a later section with a checklist attached as Appendix E in this report.

*Existing Drainage Patterns*

The proposed Project area drains generally from the east to the west, with the existing property boundary acting as a ridgeline from adjacent properties. A small ridgeline forces a small portion of the flow from the southeastern corner of the Property south.

The Site was modeled at two (2) Analysis Points ("AP-1" and "AP-2"). AP-1 is along the western limits of the Project. AP-2 is located near the southeastern corner of the Property. Peak discharges have been computed at the points of study for the 2-, 25-, 50-, and 100-year storm events.

The Project area soils identified by the United States Department of Agriculture (USDA) Natural Resources Conservation Service consists of map unit symbols 303 and 30A. 303 is classified as "Pits, quarries" and has no HSG rating, but was modeled as an existing rating of "B" soils to match the surrounding areas. 30A is classified as "Branford silt loam, 0 to 3 percent slopes" and has a HSG rating of "B". Specific details for each soil Map Unit Symbol are provided in Appendix A.

The pre-developed discharges at the Analysis Point are tabulated in Table 1.

**Table 1**

| ***Analysis Point*** | **Pre-developed Peak Storm Runoff (Q), cubic feet per second (cfs)** | | | |
|---|---|---|---|---|
| | **2-year** | **25-year** | **50-year** | **100-year** |
| AP-1 | 8.81 | 26.37 | 31.73 | 37.54 |
| AP-2 | 1.94 | 5.22 | 6.20 | 7.25 |

*Proposed Drainage Patterns*

The Project will require little to no clearing and grubbing for the installation of the solar facility. Areas that will be disturbed will be seeded with a low growth seed mix. Hydrologically, the post-developed condition is designed to mimic the pre-developed condition. The change in cover type from and existing row crop condition to a fully stabilized low growth meadow condition with a lower curve number offsets the half-drop (1/2) in HSG within the fenced array limits. Therefore, the post-development runoff is not anticipated to exceed that of the pre-development runoff and no stormwater management best management practices are proposed.

Since the proposed development mimics the existing conditions, the post-development condition was modeled using the same Analysis Points. Peak discharges have been computed at the point of study for the 2-year, 25-year, 50-year, and 100-year storm events. The post-development discharges at each point of study are tabulated in Table 1.

**Table 2**

| ***Analysis Point*** | **Post-developed Peak Storm Runoff (Q), cubic feet per second (cfs)** | | | |
|---|---|---|---|---|
| | **2-year** | **25-year** | **50-year** | **100-year** |
| AP-1 | 4.40 | 17.50 | 21.78 | 26.50 |
| AP-2 | 1.65 | 4.55 | 5.42 | 6.35 |

The reduction in runoff achieved by the post-development discharges in comparison with the pre-development discharges are tabulated in Table 3.

**Table 3**

| ***Analysis Point*** | **Peak Storm Runoff (Q) Comparison Pre- and Post-, cubic feet per second (cfs)** | | | |
|---|---|---|---|---|
| | **2-year** | **25-year** | **50-year** | **100-year** |
| AP-1 | -4.41 | -8.87 | -9.95 | -11.04 |
| AP-2 | -0.29 | -0.67 | -0.78 | -0.90 |

**Appendix I Design Regulations/Compliance**

The following identifies and details the regulations and proposed compliance measures within Appendix I that pertain specifically to civil, stormwater, and erosion control designs. Additionally, a checklist of the same is available in Appendix E.

*(I) Design and construction requirements:*

1. Roadways, gravel surfaces, transformer pads are considered effective impervious cover for the purposes of calculating the WQV. All proposed solar panels in the array are within existing and post-construction slopes that are less than 15% and are not considered impervious for the purposes of calculating the WQV because the following have been met:
    a. Vegetative areas between the rows of solar panels have a width of 13 feet which is greater than the solar panel width of 12.3 feet.
    b. The post-development stormwater runoff will less than that of the pre-development stormwater runoff due to the change of the ground cover from row crops to meadow. No stormwater management controls are needed.
    c. The Project meets (iv) of this requirement as the plan includes specific engineered phased construction plans and detailed erosion control measures.
    d. The panels are spaced and provide a minimum height of 3 feet from the ground to provide growth of native vegetation.
2. Setback and buffer requirements have been met following the below:
    a. See subsection requirements below:
        i. No wetlands or waters are located within 100 feet of the proposed solar facility area. No solar panels are located within the 50-foot setback of any property boundary that is located downgradient of the construction activity.
        ii. No wetlands or waters are located within 100 feet of the proposed solar facility area.
        iii. A 10-foot buffer is maintained between the proposed access road and electrical interconnection path.
    b. No wetland or waters are located within 100 feet of the proposed solar facility area.
    c. The existing wetlands and waters were delineated by Registered Soil Scientist Matthew Gustafson (APT) in October of 2020. The locations delineated resources as well as buffers are present on the development plans.
3. The lowest vertical clearance of the solar panels above the ground is proposed to be 3 feet.

*II. Design requirements for post-construction stormwater management measures.*

1. Post-construction stormwater control measures are designed and will be constructed to provide permanent stabilization and non-erosive conveyance of runoff on the site.
2. The orientation of the panels follows the existing slopes on the site to the extent practicable.
3. The hydrologic analysis has been completed as describe above, with the following details:
    a. The Project evaluates and controls the 2, 25, 50, and 100-year 24-hour rainfall events in accordance with the Stormwater Quality Manual. Maximum sheet flow was kept to 100 feet and shallow concentrated flows are calculated using values for grassed waterways within HydroCAD.
    b. NRCS soil mapping was used for the stormwater/erosion control design.
    c. Even with the modeled half-drop (1/2) in HSG for the facility area, the decrease in curve number associated with the ground cover change from row crops to meadow results in a decrease in post-development runoff in comparison to pre-development runoff. Therefore, no stormwater management measures are needed.
    d. Pre-and post-development drainage area maps are provided in Appendices B and C.
    e. The analysis above demonstrates that the Project will have no net increase in peak flows, erosive velocities or volumes, or adverse impacts to downstream properties.

**Sediment and Erosion Control During Construction**

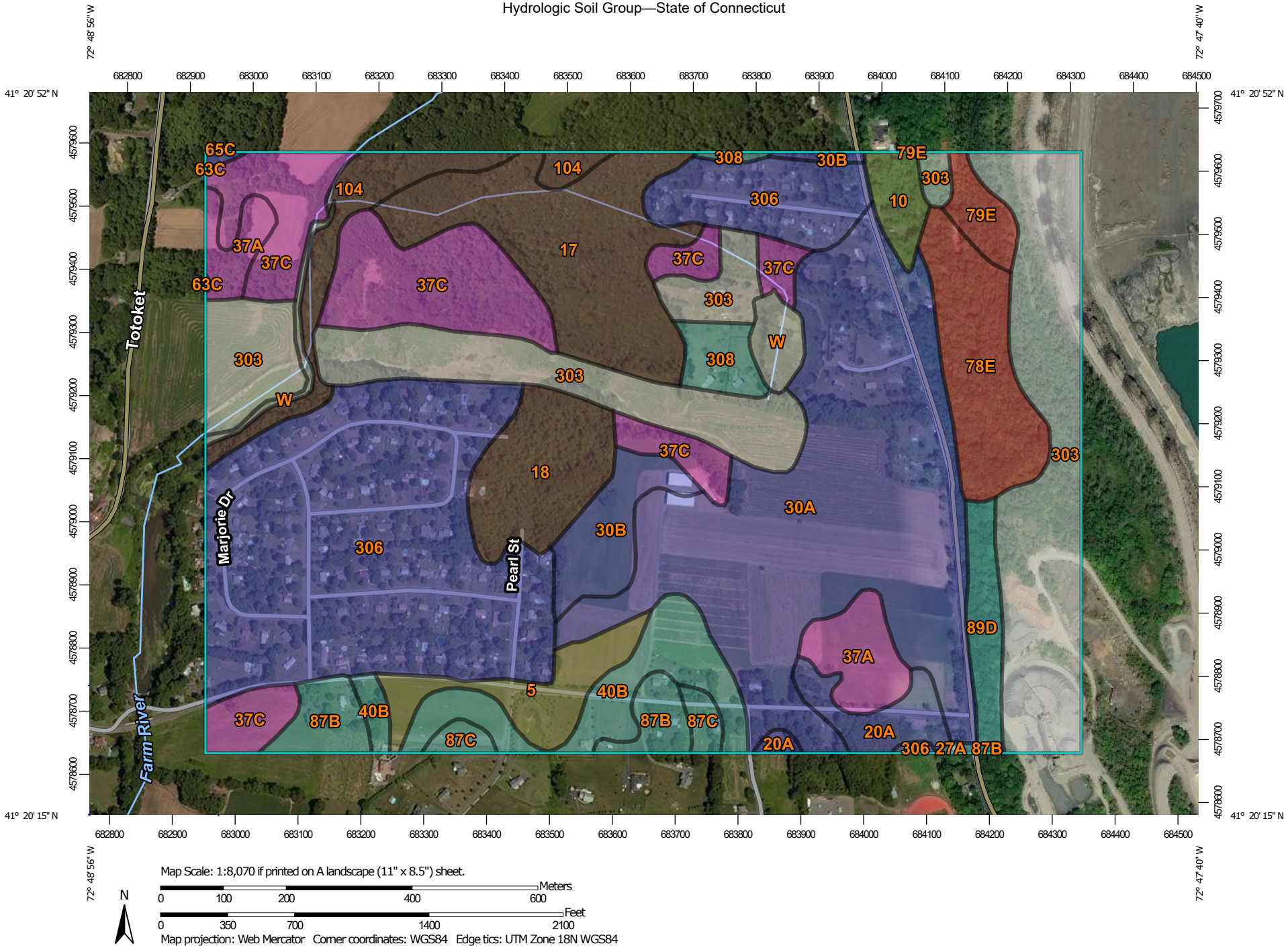
While the Project does not require a stormwater management feature due to the decrease in post-development runoff compared to pre-development runoff, a temporary sediment basin is proposed during phased construction as an erosion control measure. The temporary sediment basin is designed to provide the necessary wet and dry volumes as required by the 2002 CT Soil Erosion Sediment Control Manual. Additionally, the basin and drainage area has been modeled in HydroCAD using conservative measures to mimic construction conditions and a Hydrograph developed using the SCS Synthetic Unit Hydrograph Method with a Type III rainfall distribution for the NOAA Atlas 14, volume 10, Version 2 Precipitation 10-year storm event with a rainfall depth of 5.32 inches. This model shows that the proposed temporary sediment basin (TSB-1) provides 687.3 minutes (11.5 hours) of detention time, which is greater than the requisite minimum 10-hour retention time for the 10-year 24-hour Type III storm event. Additionally, the proposed temporary sediment basin was run through the 100-year storm event to check that it would be able to pass the volume necessary without overtopping.

The modeled areas and supporting HydroCAD calculations are illustrated on the Temporary Erosion Control Area Map (TEC-1). Additional calculations for the temporary sediment basin design are provided in Appendix G.

**Conclusion**

The stormwater management for the proposed site has been designed such that the post-development peak discharges to the waters of the State of Connecticut for the 2-, 25-, 50-, and 100- year storm events are less than the pre-development peak discharges. In addition, the Project adheres to the regulations and guidelines presented by CT DEEP's Appendix I Draft 10.1 as described above. As a result, the proposed solar array will not result in any adverse conditions to the surrounding areas and properties.

# APPENDIX A: NRCS SOIL SURVEY


72° 48' 56" W
72° 47' 40" W
41° 20' 52" N
41° 20' 15" N
682800
682900
683000
683100
683200
683300
683400
683500
683600
683700
683800
683900
684000
684100
684200
684300
684400
684500
4579600
4579500
4579400
4579300
4579200
4579100
4579000
4578900
4578800
4578700
4578600
4579700
65C
63C
104
308
30B
79E
303
306
10
37A
37C
17
63C
W
78E
18
30A
89D
5
40B
87B
20A
27A
Totoket
Marjorie Dr
Pearl St
Farm River
Map Scale: 1:8,070 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 100 200 400 600
Feet
0 350 700 1400 2100
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 Rating Polygons**

A

A/D

B

B/D

C

C/D

D

Not rated or not available

**Soil Rating Lines**

A

A/D

B

B/D

C

C/D

D

Not rated or not available

**Soil Rating Points**

A

A/D

B

B/D

C

C/D

D

Not rated or not available

**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.

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 20, Jun 9, 2020

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

Date(s) aerial images were photographed: Dec 31, 2009—Oct 30, 2017

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.

# Hydrologic Soil Group

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|---|---|---|---|---|
| 5 | Wilbraham silt loam, 0 to 3 percent slopes | C/D | 7.1 | 2.2% |
| 10 | Raynham silt loam | C/D | 3.1 | 0.9% |
| 17 | Timakwa and Natchaug soils, 0 to 2 percent slopes | B/D | 22.8 | 6.9% |
| 18 | Catden and Freetown soils, 0 to 2 percent slopes | B/D | 11.1 | 3.4% |
| 20A | Ellington silt loam, 0 to 5 percent slopes | B | 4.9 | 1.5% |
| 27A | Belgrade silt loam, 0 to 5 percent slopes | C | 0.1 | 0.0% |
| 30A | Branford silt loam, 0 to 3 percent slopes | B | 60.2 | 18.3% |
| 30B | Branford silt loam, 3 to 8 percent slopes | B | 7.1 | 2.2% |
| 37A | Manchester gravelly sandy loam, 0 to 3 percent slopes | A | 8.2 | 2.5% |
| 37C | Manchester gravelly sandy loam, 3 to 15 percent slopes | A | 28.9 | 8.8% |
| 40B | Ludlow silt loam, 3 to 8 percent slopes | C | 11.6 | 3.5% |
| 63C | Cheshire fine sandy loam, 8 to 15 percent slopes | B | 0.1 | 0.0% |
| 65C | Cheshire fine sandy loam, 3 to 15 percent slopes, extremely stony | B | 0.2 | 0.1% |
| 78E | Holyoke-Rock outcrop complex, 15 to 45 percent slopes | D | 12.9 | 3.9% |
| 79E | Rock outcrop-Holyoke complex, 3 to 45 percent slopes | D | 2.9 | 0.9% |
| 87B | Wethersfield loam, 3 to 8 percent slopes | C | 6.3 | 1.9% |
| 87C | Wethersfield loam, 8 to 15 percent slopes | C | 2.4 | 0.7% |
| 89D | Wethersfield loam, 15 to 35 percent slopes, extremely stony | C | 4.8 | 1.5% |

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|---|---|---|---|---|
| 104 | Bash silt loam | B/D | 8.2 | 2.5% |
| 303 | Pits, quarries | | 54.3 | 16.5% |
| 306 | Udorthents-Urban land complex | B | 64.4 | 19.6% |
| 308 | Udorthents, smoothed | C | 3.6 | 1.1% |
| W | Water | | 3.7 | 1.1% |
| **Totals for Area of Interest** | | | **329.1** | **100.0%** |

## Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

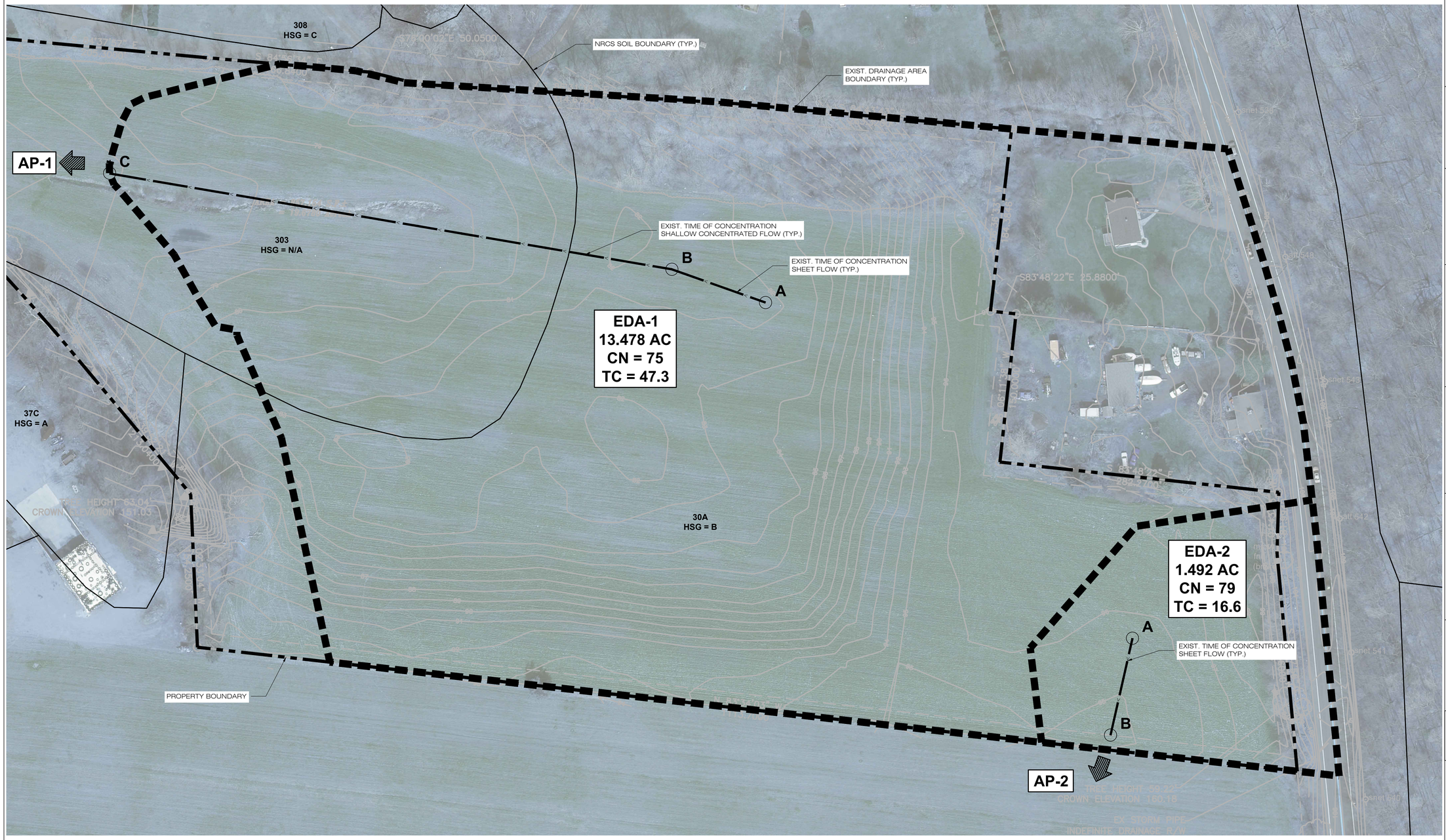
# APPENDIX B: EXISTING DRAINAGE AREA MAP (EDA-1) & HYDROLOGIC COMPUTATION (HYDROCAD)

## EXISTING DRAINAGE AREAS

| | TOTAL AREA (ACRES) | COMPOSITE CN | TC (MINS.) |
|---|---|---|---|
| EDA-1 | 13.478 | 75 | 47.3 |
| EDA-2 | 1.492 | 79 | 16.6 |

## EXISTING CONDITION PEAK FLOWS

| ANALYSIS POINT | 2-YEAR (CFS) | 25-YEAR (CFS) | 50-YEAR (CFS) | 100-YEAR (CFS) |
|---|---|---|---|---|
| AP-1 | 8.81 | 26.37 | 31.73 | 37.54 |
| AP-2 | 1.94 | 5.22 | 6.20 | 7.25 |




1 EDA-1 **EXISTING DRAINAGE AREA MAP**
SCALE : 1" = 50'-0"

50 0 25 50 100
( IN FEET ) 1 inch = 50 ft.


CITRINE
55 GREENS FARMS ROAD
SUITE 200-78
WESTPORT, CT 06880
OFFICE: (203)-557-5554

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


**CSC PERMIT SET**

| NO | DATE | REVISION |
|---|---|---|
| 0 | 02/26/21 | FOR REVIEW: BJP |
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |

**DESIGN PROFESSIONAL OF RECORD**

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

OWNER: WHAT TF LLC
ADDRESS: 218 FOXON ROAD EAST HAVEN, CT 06513

**SUNFLOWER SOLAR**

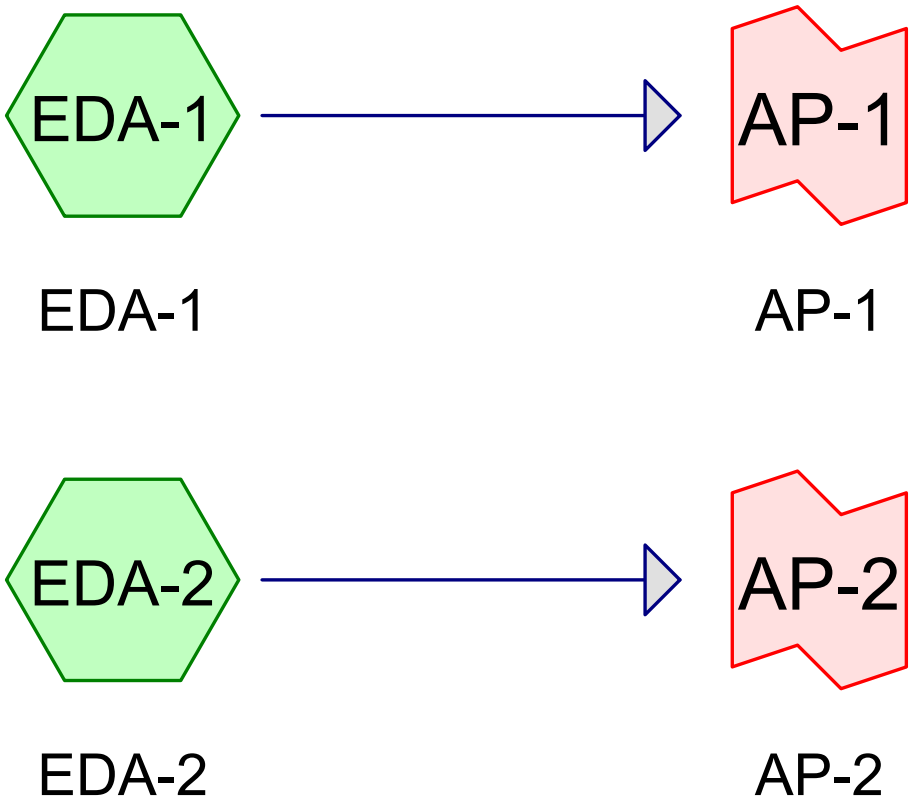
SITE ADDRESS: 127 FOREST ROAD NORTH BRANFORD, CT 06472

APT FILING NUMBER: CT567130

DRAWN BY: JT
DATE: 02/26/21 CHECKED BY: BJP

SHEET TITLE:
**EXISTING DRAINAGE AREA MAP**

SHEET NUMBER:
**EDA-1**




Subcat Reach Pond Link

**Routing Diagram for CT567130_NorthBranford - EX - Rev0**
Prepared by Microsoft, Printed 2/25/2021

## Area Listing (all nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 1.633 | 68 | 1 acre lots, 20% imp, HSG B (EDA-1) |
| 0.273 | 89 | Paved roads w/open ditches, 50% imp, HSG B (EDA-1, EDA-2) |
| 11.587 | 78 | Row crops, straight row, Good, HSG B (EDA-1, EDA-2) |
| 1.477 | 60 | Woods, Fair, HSG B (EDA-1) |
| **14.970** | **75** | **TOTAL AREA** |

## Soil Listing (all nodes)

| Area (acres) | Soil Group | Subcatchment Numbers |
|---|---|---|
| 0.000 | HSG A | |
| 14.970 | HSG B | EDA-1, EDA-2 |
| 0.000 | HSG C | |
| 0.000 | HSG D | |
| 0.000 | Other | |
| **14.970** | | **TOTAL AREA** |

## Ground Covers (all nodes)

| HSG-A (acres) | HSG-B (acres) | HSG-C (acres) | HSG-D (acres) | Other (acres) | Total (acres) | Ground Cover | Subcatchr Numbers |
|---|---|---|---|---|---|---|---|
| 0.000 | 1.633 | 0.000 | 0.000 | 0.000 | 1.633 | 1 acre lots, 20% imp | |
| 0.000 | 0.273 | 0.000 | 0.000 | 0.000 | 0.273 | Paved roads w/open ditches, 50% imp | |
| 0.000 | 11.587 | 0.000 | 0.000 | 0.000 | 11.587 | Row crops, straight row, Good | |
| 0.000 | 1.477 | 0.000 | 0.000 | 0.000 | 1.477 | Woods, Fair | |
| **0.000** | **14.970** | **0.000** | **0.000** | **0.000** | **14.970** | **TOTAL AREA** | |

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment EDA-1: EDA-1** Runoff Area=13.478 ac 2.99% Impervious Runoff Depth=1.28"
Flow Length=674' Tc=47.3 min CN=75 Runoff=8.81 cfs 1.438 af

**Subcatchment EDA-2: EDA-2** Runoff Area=1.492 ac 4.02% Impervious Runoff Depth=1.54"
Flow Length=100' Slope=0.0070 '/' Tc=16.6 min CN=79 Runoff=1.94 cfs 0.192 af

**Link AP-1: AP-1** Inflow=8.81 cfs 1.438 af
Primary=8.81 cfs 1.438 af

**Link AP-2: AP-2** Inflow=1.94 cfs 0.192 af
Primary=1.94 cfs 0.192 af

**Total Runoff Area = 14.970 ac Runoff Volume = 1.630 af Average Runoff Depth = 1.31"**
**96.91% Pervious = 14.507 ac 3.09% Impervious = 0.463 ac**

## Summary for Subcatchment EDA-1: EDA-1

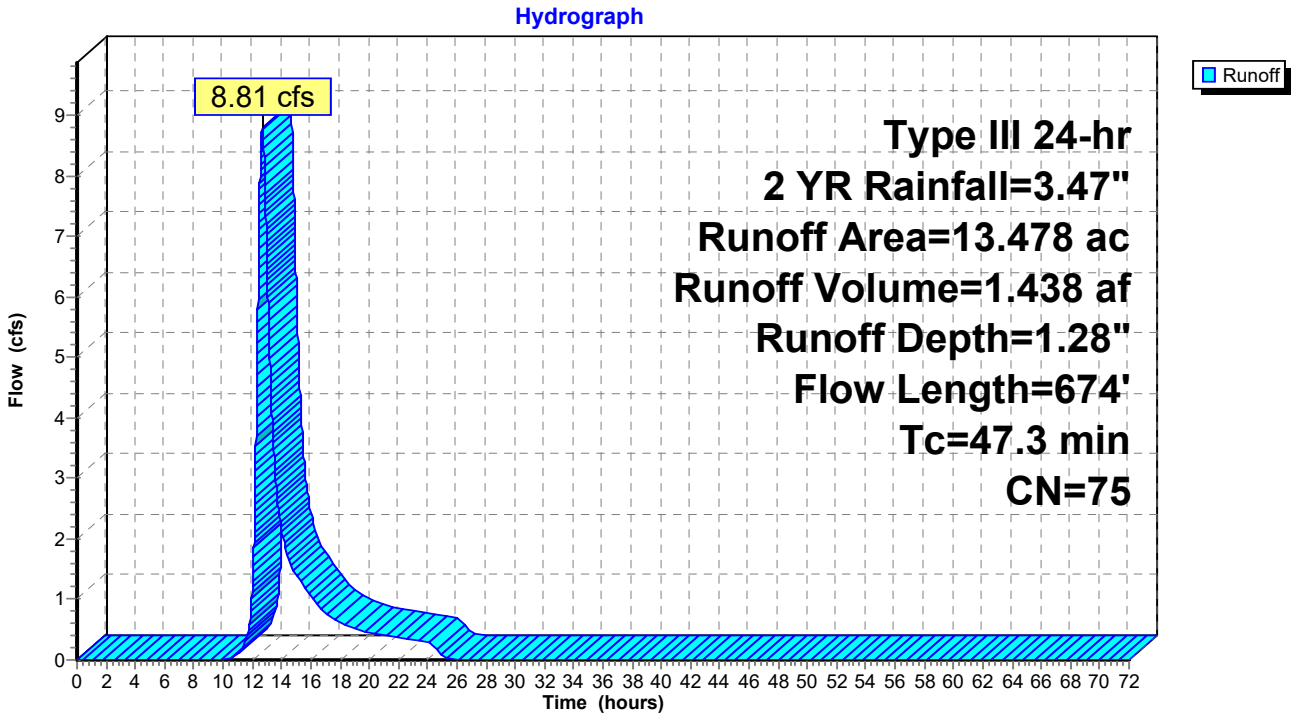
Runoff = 8.81 cfs @ 12.67 hrs, Volume= 1.438 af, Depth= 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.47"

| Area (ac) | CN | Description |
|---|---|---|
| 1.477 | 60 | Woods, Fair, HSG B |
| 10.215 | 78 | Row crops, straight row, Good, HSG B |
| 1.633 | 68 | 1 acre lots, 20% imp, HSG B |
| 0.153 | 89 | Paved roads w/open ditches, 50% imp, HSG B |
| 13.478 | 75 | Weighted Average |
| 13.075 | | 97.01% Pervious Area |
| 0.403 | | 2.99% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 36.1 | 100 | 0.0010 | 0.05 | | **Sheet Flow, A-B** Cultivated: Residue>20% n= 0.170 P2= 3.17" |
| 11.2 | 574 | 0.0090 | 0.85 | | **Shallow Concentrated Flow, B-C** Cultivated Straight Rows Kv= 9.0 fps |
| 47.3 | 674 | Total | | | |

## Subcatchment EDA-1: EDA-1



## Summary for Subcatchment EDA-2: EDA-2

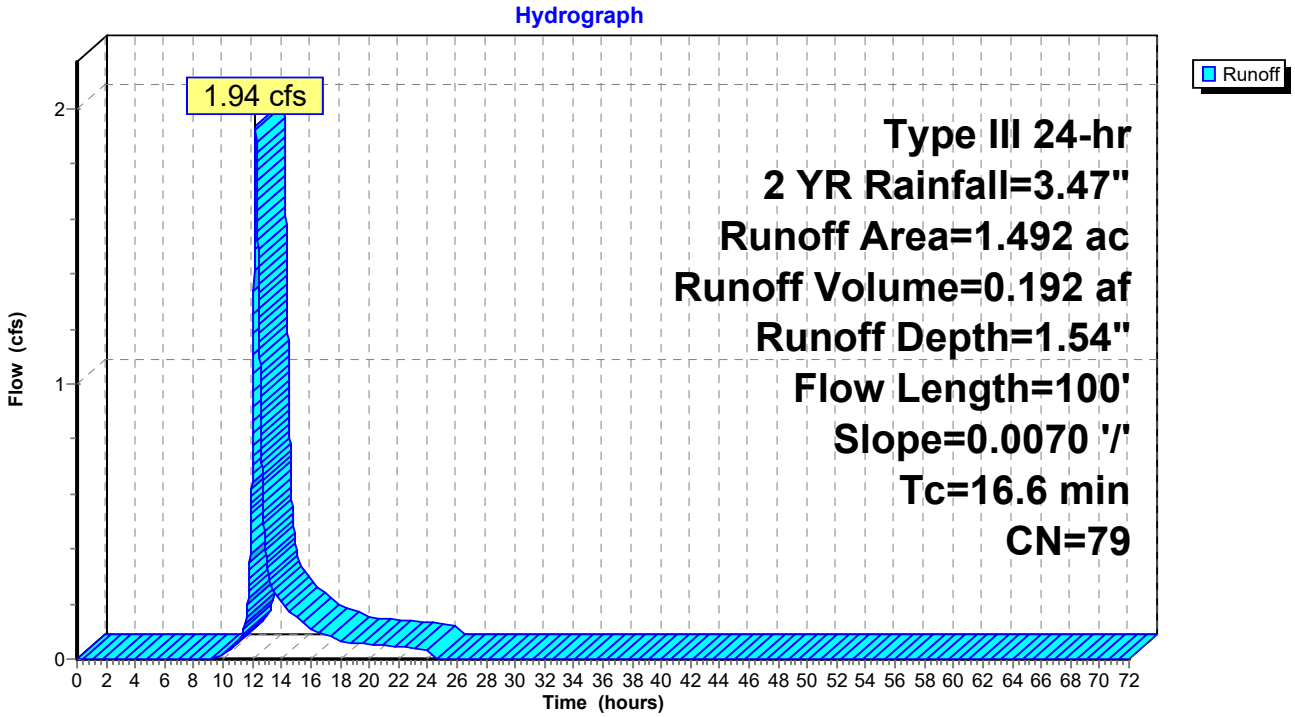
Runoff = 1.94 cfs @ 12.23 hrs, Volume= 0.192 af, Depth= 1.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.47"

| Area (ac) | CN | Description |
|---|---|---|
| 1.372 | 78 | Row crops, straight row, Good, HSG B |
| 0.120 | 89 | Paved roads w/open ditches, 50% imp, HSG B |
| 1.492 | 79 | Weighted Average |
| 1.432 | | 95.98% Pervious Area |
| 0.060 | | 4.02% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 16.6 | 100 | 0.0070 | 0.10 | | **Sheet Flow, A-B** Cultivated: Residue>20% n= 0.170 P2= 3.17" |

## Subcatchment EDA-2: EDA-2

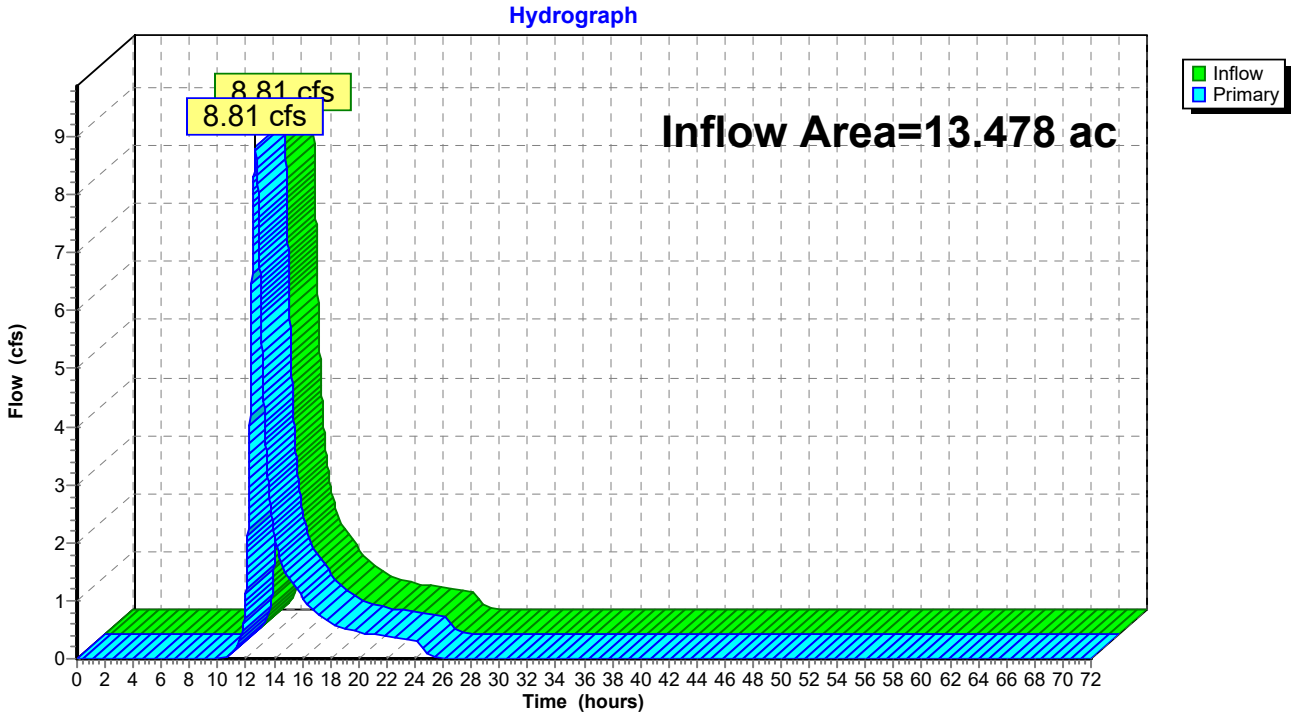


## Summary for Link AP-1: AP-1

Inflow Area = 13.478 ac, 2.99% Impervious, Inflow Depth = 1.28" for 2 YR event
Inflow = 8.81 cfs @ 12.67 hrs, Volume= 1.438 af
Primary = 8.81 cfs @ 12.67 hrs, Volume= 1.438 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

### Link AP-1: AP-1

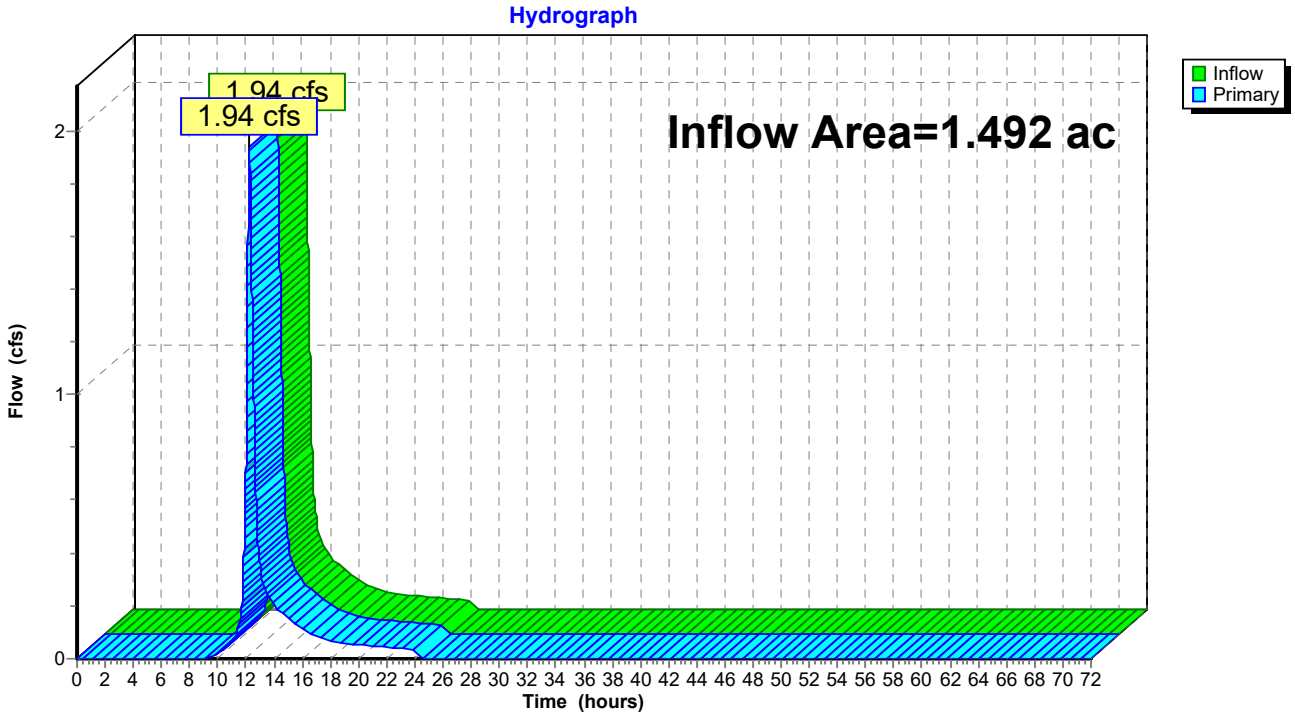


## Summary for Link AP-2: AP-2

Inflow Area = 1.492 ac, 4.02% Impervious, Inflow Depth = 1.54" for 2 YR event
Inflow = 1.94 cfs @ 12.23 hrs, Volume= 0.192 af
Primary = 1.94 cfs @ 12.23 hrs, Volume= 0.192 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

### Link AP-2: AP-2



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment EDA-1: EDA-1** Runoff Area=13.478 ac 2.99% Impervious Runoff Depth=3.69"
Flow Length=674' Tc=47.3 min CN=75 Runoff=26.37 cfs 4.150 af

**Subcatchment EDA-2: EDA-2** Runoff Area=1.492 ac 4.02% Impervious Runoff Depth=4.11"
Flow Length=100' Slope=0.0070 '/' Tc=16.6 min CN=79 Runoff=5.22 cfs 0.511 af

**Link AP-1: AP-1** Inflow=26.37 cfs 4.150 af
Primary=26.37 cfs 4.150 af

**Link AP-2: AP-2** Inflow=5.22 cfs 0.511 af
Primary=5.22 cfs 0.511 af

**Total Runoff Area = 14.970 ac Runoff Volume = 4.661 af Average Runoff Depth = 3.74"**
**96.91% Pervious = 14.507 ac 3.09% Impervious = 0.463 ac**

## Summary for Subcatchment EDA-1: EDA-1

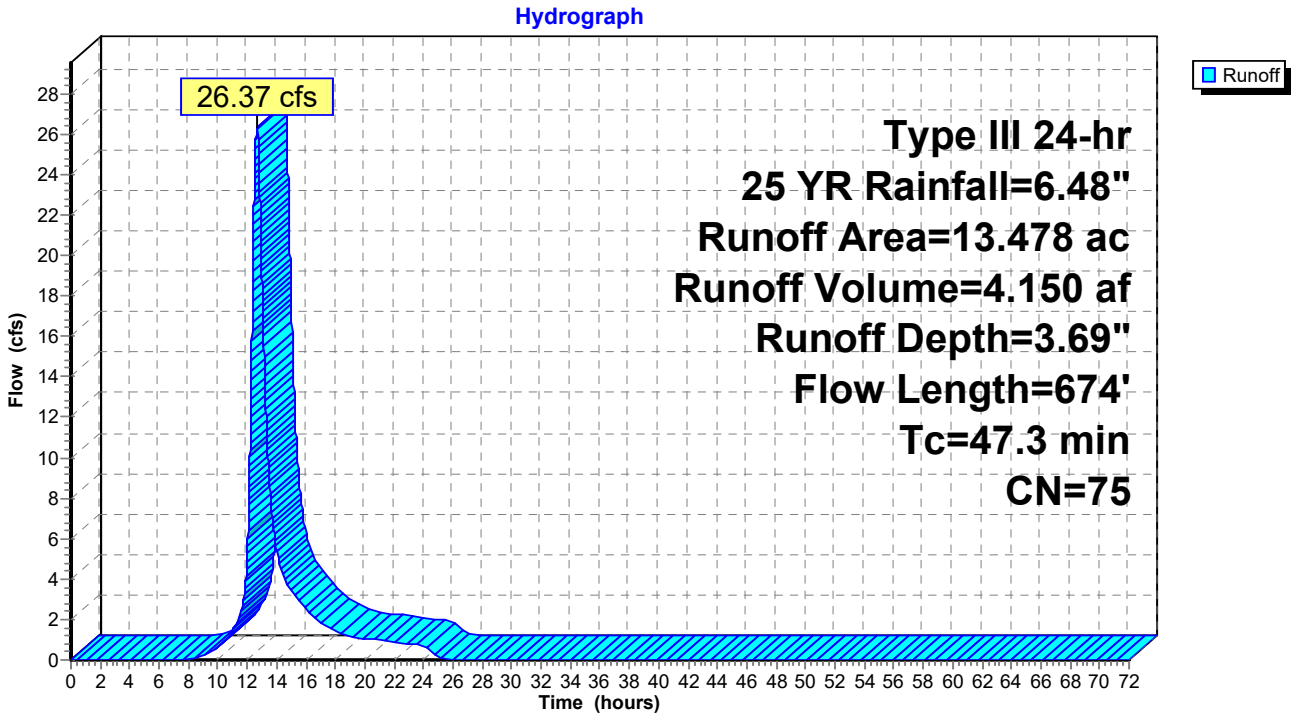
Runoff = 26.37 cfs @ 12.66 hrs, Volume= 4.150 af, Depth= 3.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=6.48"

| Area (ac) | CN | Description |
|---|---|---|
| 1.477 | 60 | Woods, Fair, HSG B |
| 10.215 | 78 | Row crops, straight row, Good, HSG B |
| 1.633 | 68 | 1 acre lots, 20% imp, HSG B |
| 0.153 | 89 | Paved roads w/open ditches, 50% imp, HSG B |
| 13.478 | 75 | Weighted Average |
| 13.075 | | 97.01% Pervious Area |
| 0.403 | | 2.99% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 36.1 | 100 | 0.0010 | 0.05 | | **Sheet Flow, A-B** Cultivated: Residue>20% n= 0.170 P2= 3.17" |
| 11.2 | 574 | 0.0090 | 0.85 | | **Shallow Concentrated Flow, B-C** Cultivated Straight Rows Kv= 9.0 fps |
| 47.3 | 674 | Total | | | |

## Subcatchment EDA-1: EDA-1



## Summary for Subcatchment EDA-2: EDA-2

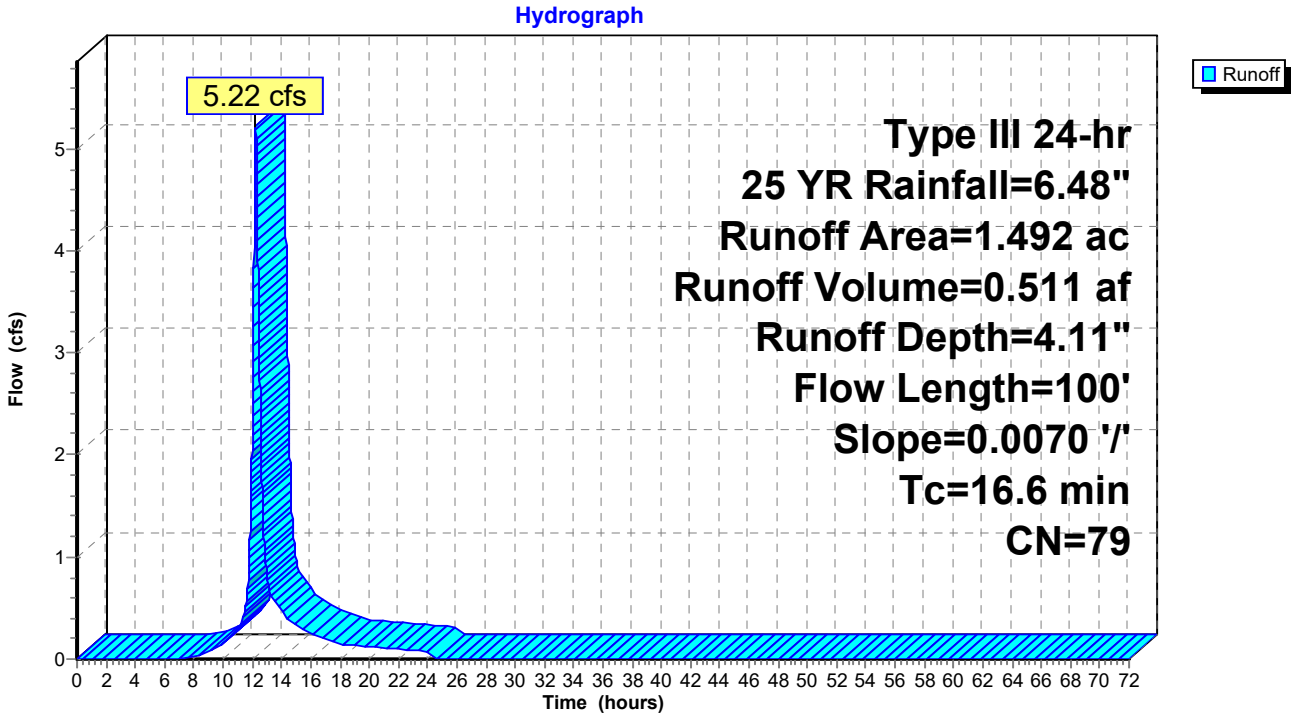
Runoff = 5.22 cfs @ 12.23 hrs, Volume= 0.511 af, Depth= 4.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=6.48"

| Area (ac) | CN | Description |
|---|---|---|
| 1.372 | 78 | Row crops, straight row, Good, HSG B |
| 0.120 | 89 | Paved roads w/open ditches, 50% imp, HSG B |
| 1.492 | 79 | Weighted Average |
| 1.432 | | 95.98% Pervious Area |
| 0.060 | | 4.02% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 16.6 | 100 | 0.0070 | 0.10 | | **Sheet Flow, A-B** Cultivated: Residue>20% n= 0.170 P2= 3.17" |

## Subcatchment EDA-2: EDA-2

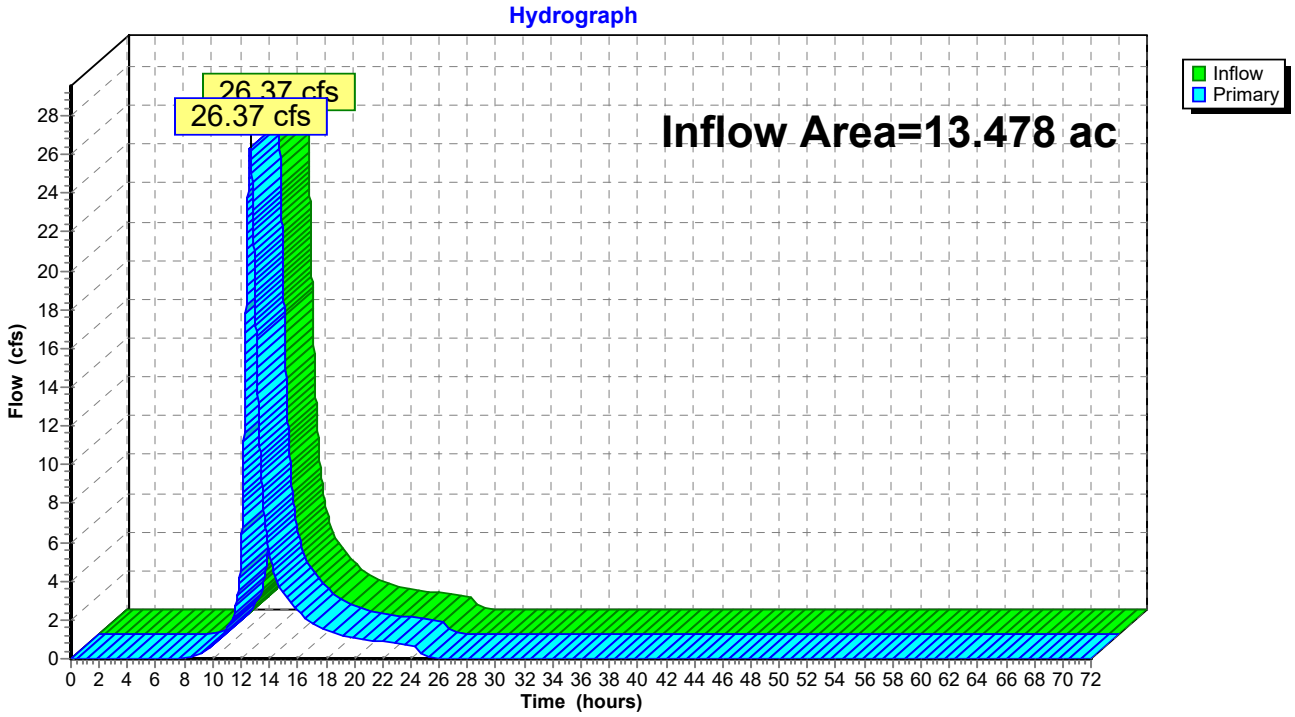


## Summary for Link AP-1: AP-1

Inflow Area = 13.478 ac, 2.99% Impervious, Inflow Depth = 3.69" for 25 YR event
Inflow = 26.37 cfs @ 12.66 hrs, Volume= 4.150 af
Primary = 26.37 cfs @ 12.66 hrs, Volume= 4.150 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

## Link AP-1: AP-1

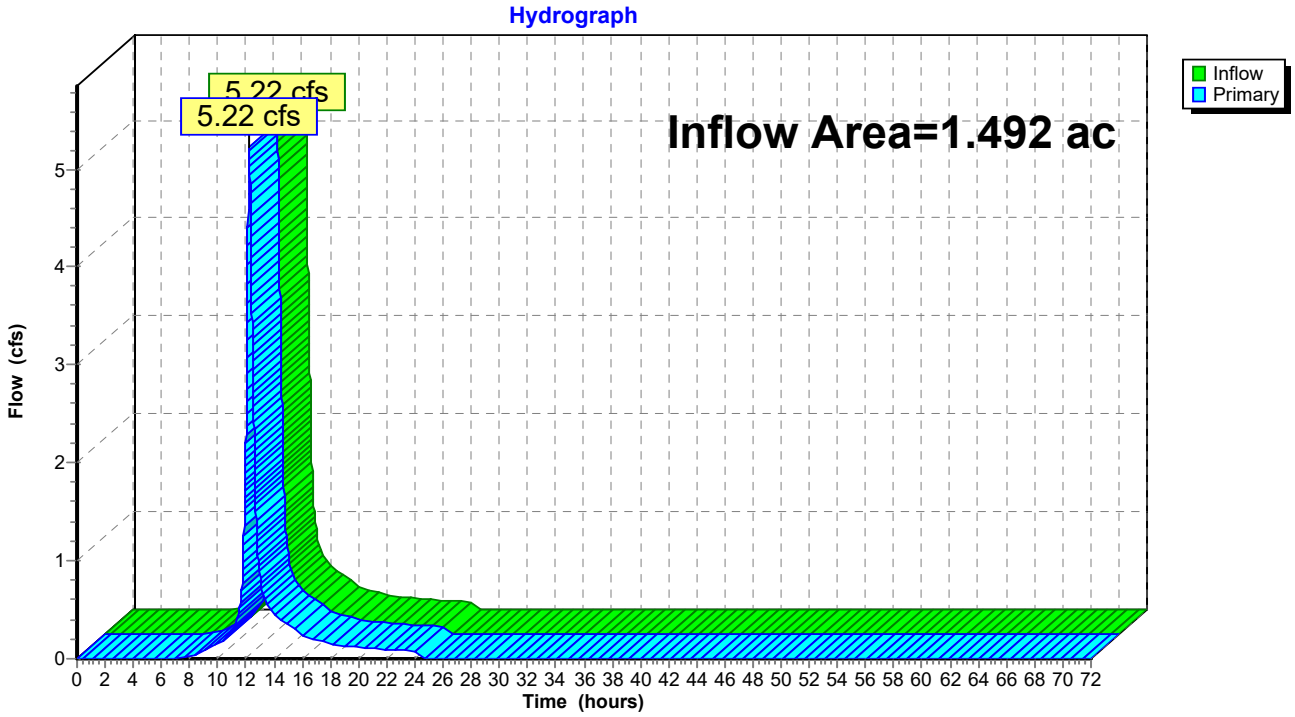


## Summary for Link AP-2: AP-2

Inflow Area = 1.492 ac, 4.02% Impervious, Inflow Depth = 4.11" for 25 YR event
Inflow = 5.22 cfs @ 12.23 hrs, Volume= 0.511 af
Primary = 5.22 cfs @ 12.23 hrs, Volume= 0.511 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

### Link AP-2: AP-2



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment EDA-1: EDA-1** Runoff Area=13.478 ac 2.99% Impervious Runoff Depth=4.45"
Flow Length=674' Tc=47.3 min CN=75 Runoff=31.73 cfs 4.999 af

**Subcatchment EDA-2: EDA-2** Runoff Area=1.492 ac 4.02% Impervious Runoff Depth=4.90"
Flow Length=100' Slope=0.0070 '/' Tc=16.6 min CN=79 Runoff=6.20 cfs 0.609 af

**Link AP-1: AP-1** Inflow=31.73 cfs 4.999 af
Primary=31.73 cfs 4.999 af

**Link AP-2: AP-2** Inflow=6.20 cfs 0.609 af
Primary=6.20 cfs 0.609 af

**Total Runoff Area = 14.970 ac Runoff Volume = 5.607 af Average Runoff Depth = 4.49"**
**96.91% Pervious = 14.507 ac 3.09% Impervious = 0.463 ac**

## Summary for Subcatchment EDA-1: EDA-1

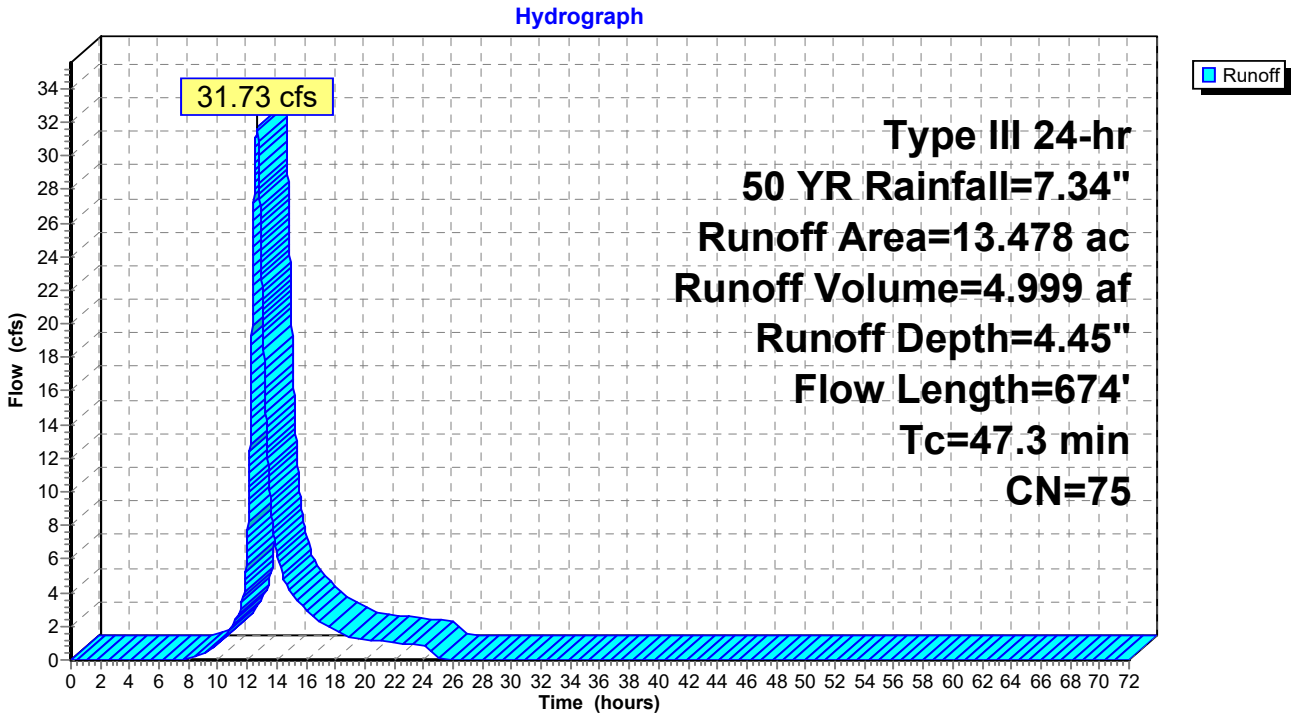
Runoff = 31.73 cfs @ 12.66 hrs, Volume= 4.999 af, Depth= 4.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 50 YR Rainfall=7.34"

| Area (ac) | CN | Description |
|---|---|---|
| 1.477 | 60 | Woods, Fair, HSG B |
| 10.215 | 78 | Row crops, straight row, Good, HSG B |
| 1.633 | 68 | 1 acre lots, 20% imp, HSG B |
| 0.153 | 89 | Paved roads w/open ditches, 50% imp, HSG B |
| 13.478 | 75 | Weighted Average |
| 13.075 | | 97.01% Pervious Area |
| 0.403 | | 2.99% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 36.1 | 100 | 0.0010 | 0.05 | | **Sheet Flow, A-B** Cultivated: Residue>20% n= 0.170 P2= 3.17" |
| 11.2 | 574 | 0.0090 | 0.85 | | **Shallow Concentrated Flow, B-C** Cultivated Straight Rows Kv= 9.0 fps |
| 47.3 | 674 | Total | | | |

## Subcatchment EDA-1: EDA-1



## Summary for Subcatchment EDA-2: EDA-2

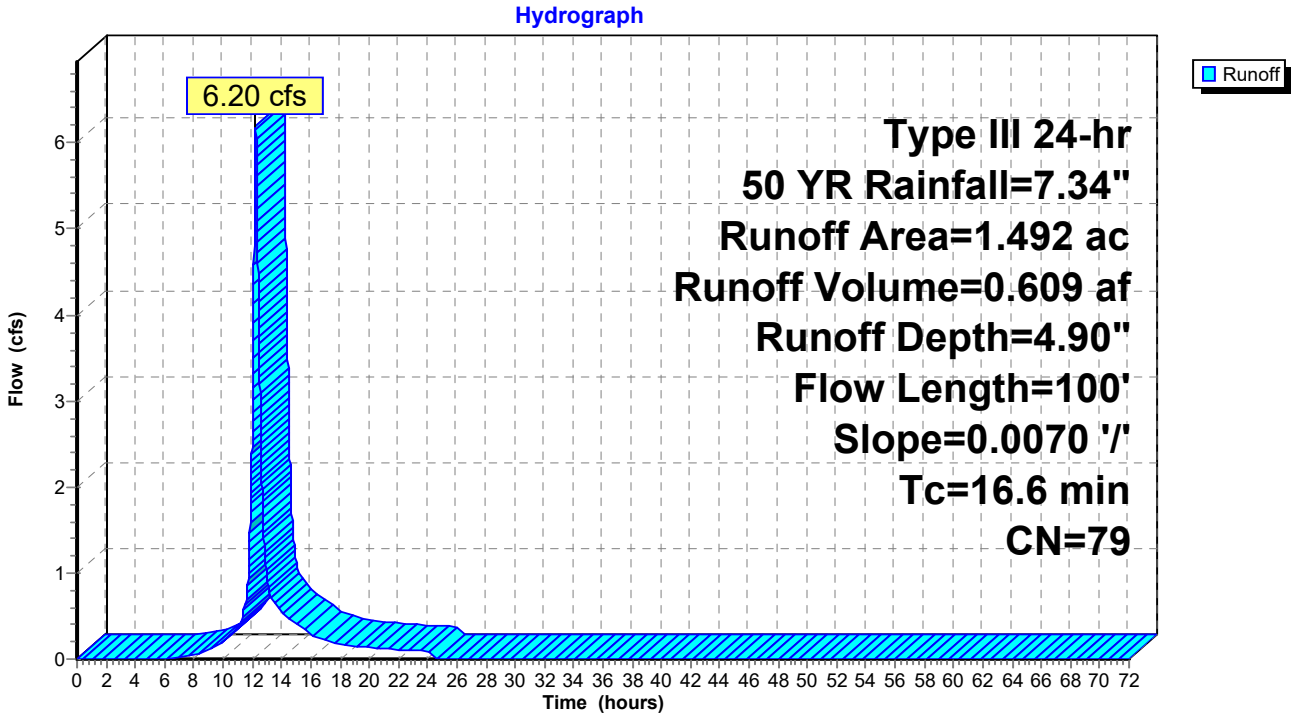
Runoff = 6.20 cfs @ 12.23 hrs, Volume= 0.609 af, Depth= 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 50 YR Rainfall=7.34"

| Area (ac) | CN | Description |
|---|---|---|
| 1.372 | 78 | Row crops, straight row, Good, HSG B |
| 0.120 | 89 | Paved roads w/open ditches, 50% imp, HSG B |
| 1.492 | 79 | Weighted Average |
| 1.432 | | 95.98% Pervious Area |
| 0.060 | | 4.02% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 16.6 | 100 | 0.0070 | 0.10 | | **Sheet Flow, A-B** Cultivated: Residue>20% n= 0.170 P2= 3.17" |

## Subcatchment EDA-2: EDA-2

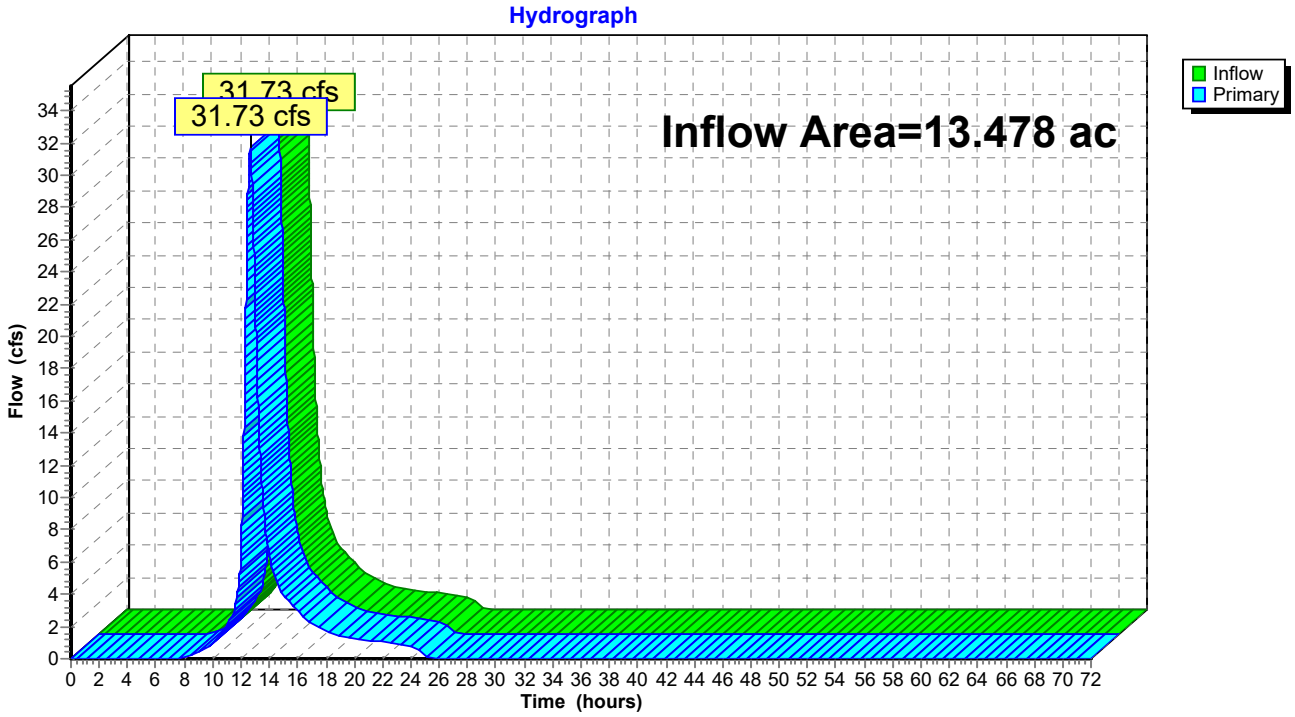


## Summary for Link AP-1: AP-1

Inflow Area = 13.478 ac, 2.99% Impervious, Inflow Depth = 4.45" for 50 YR event
Inflow = 31.73 cfs @ 12.66 hrs, Volume= 4.999 af
Primary = 31.73 cfs @ 12.66 hrs, Volume= 4.999 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

## Link AP-1: AP-1

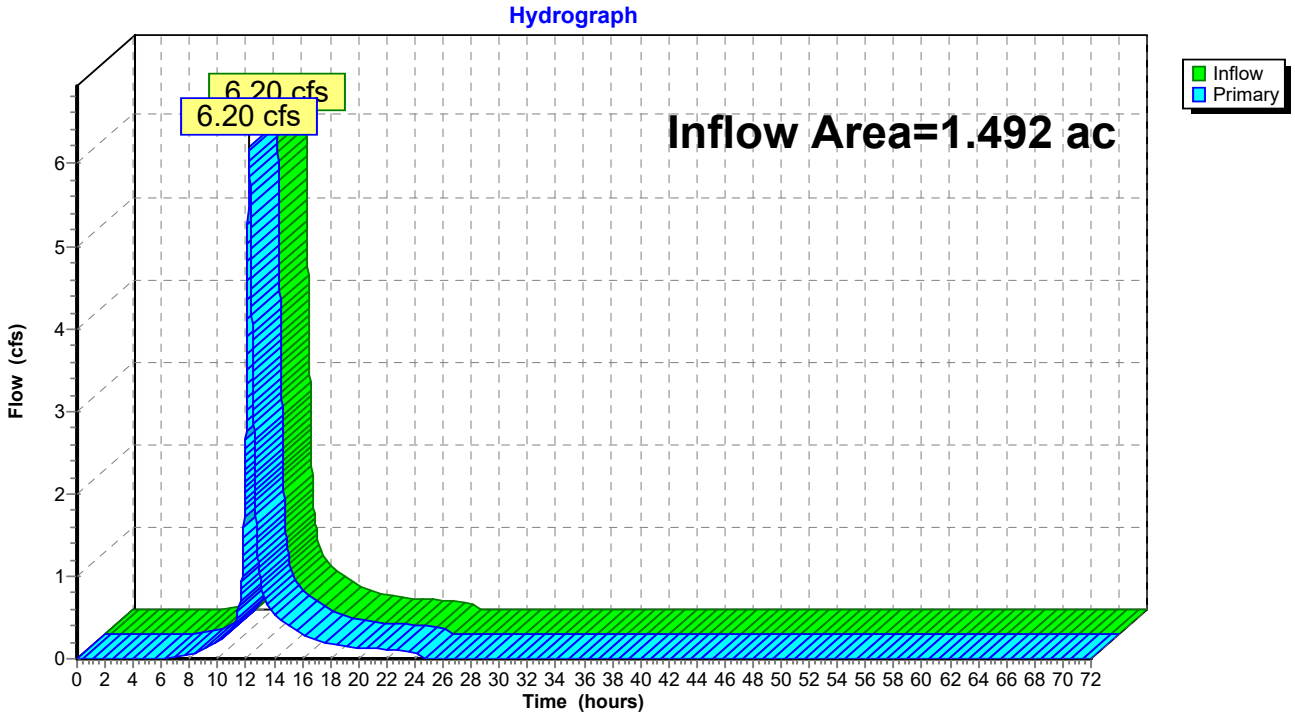


## Summary for Link AP-2: AP-2

Inflow Area = 1.492 ac, 4.02% Impervious, Inflow Depth = 4.90" for 50 YR event
Inflow = 6.20 cfs @ 12.23 hrs, Volume= 0.609 af
Primary = 6.20 cfs @ 12.23 hrs, Volume= 0.609 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

## Link AP-2: AP-2



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment EDA-1: EDA-1** Runoff Area=13.478 ac 2.99% Impervious Runoff Depth=5.28"
Flow Length=674' Tc=47.3 min CN=75 Runoff=37.54 cfs 5.927 af

**Subcatchment EDA-2: EDA-2** Runoff Area=1.492 ac 4.02% Impervious Runoff Depth=5.75"
Flow Length=100' Slope=0.0070 '/' Tc=16.6 min CN=79 Runoff=7.25 cfs 0.715 af

**Link AP-1: AP-1** Inflow=37.54 cfs 5.927 af
Primary=37.54 cfs 5.927 af

**Link AP-2: AP-2** Inflow=7.25 cfs 0.715 af
Primary=7.25 cfs 0.715 af

**Total Runoff Area = 14.970 ac Runoff Volume = 6.642 af Average Runoff Depth = 5.32"**
**96.91% Pervious = 14.507 ac 3.09% Impervious = 0.463 ac**

## Summary for Subcatchment EDA-1: EDA-1

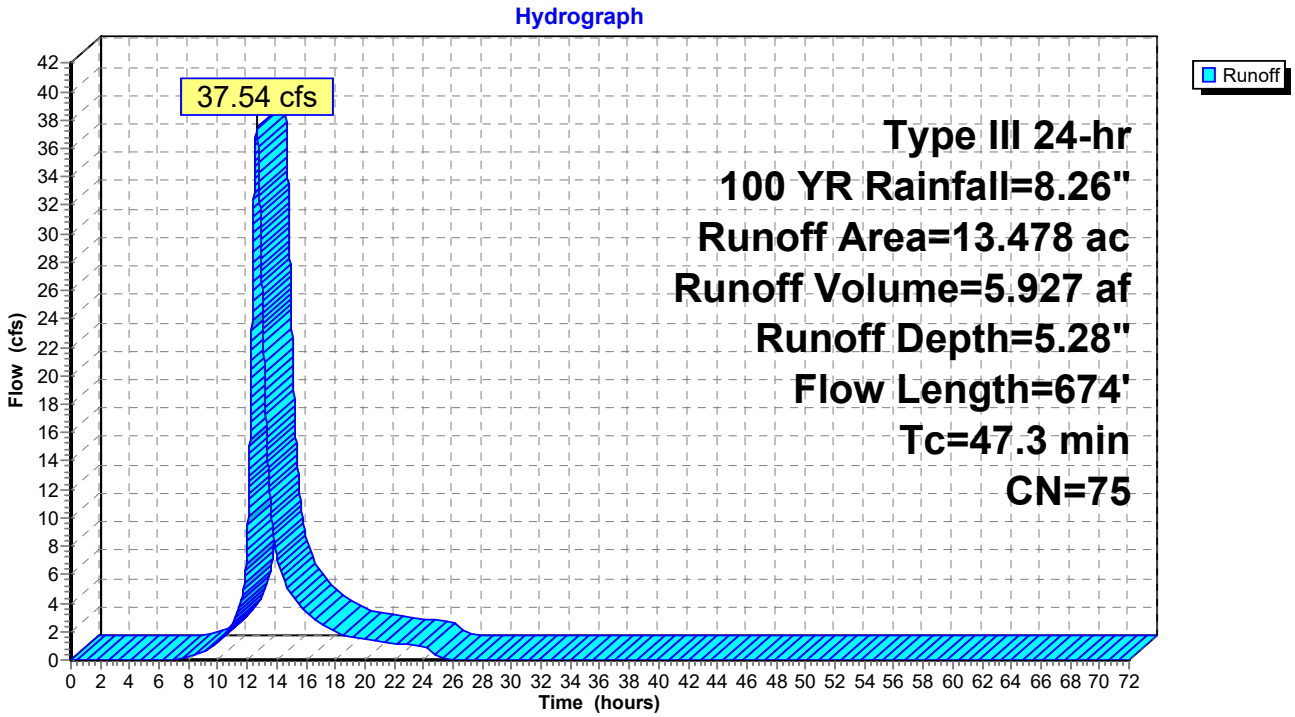
Runoff = 37.54 cfs @ 12.66 hrs, Volume= 5.927 af, Depth= 5.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=8.26"

| Area (ac) | CN | Description |
|---|---|---|
| 1.477 | 60 | Woods, Fair, HSG B |
| 10.215 | 78 | Row crops, straight row, Good, HSG B |
| 1.633 | 68 | 1 acre lots, 20% imp, HSG B |
| 0.153 | 89 | Paved roads w/open ditches, 50% imp, HSG B |
| 13.478 | 75 | Weighted Average |
| 13.075 | | 97.01% Pervious Area |
| 0.403 | | 2.99% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 36.1 | 100 | 0.0010 | 0.05 | | **Sheet Flow, A-B** Cultivated: Residue>20% n= 0.170 P2= 3.17" |
| 11.2 | 574 | 0.0090 | 0.85 | | **Shallow Concentrated Flow, B-C** Cultivated Straight Rows Kv= 9.0 fps |
| 47.3 | 674 | Total | | | |

## Subcatchment EDA-1: EDA-1



## Summary for Subcatchment EDA-2: EDA-2

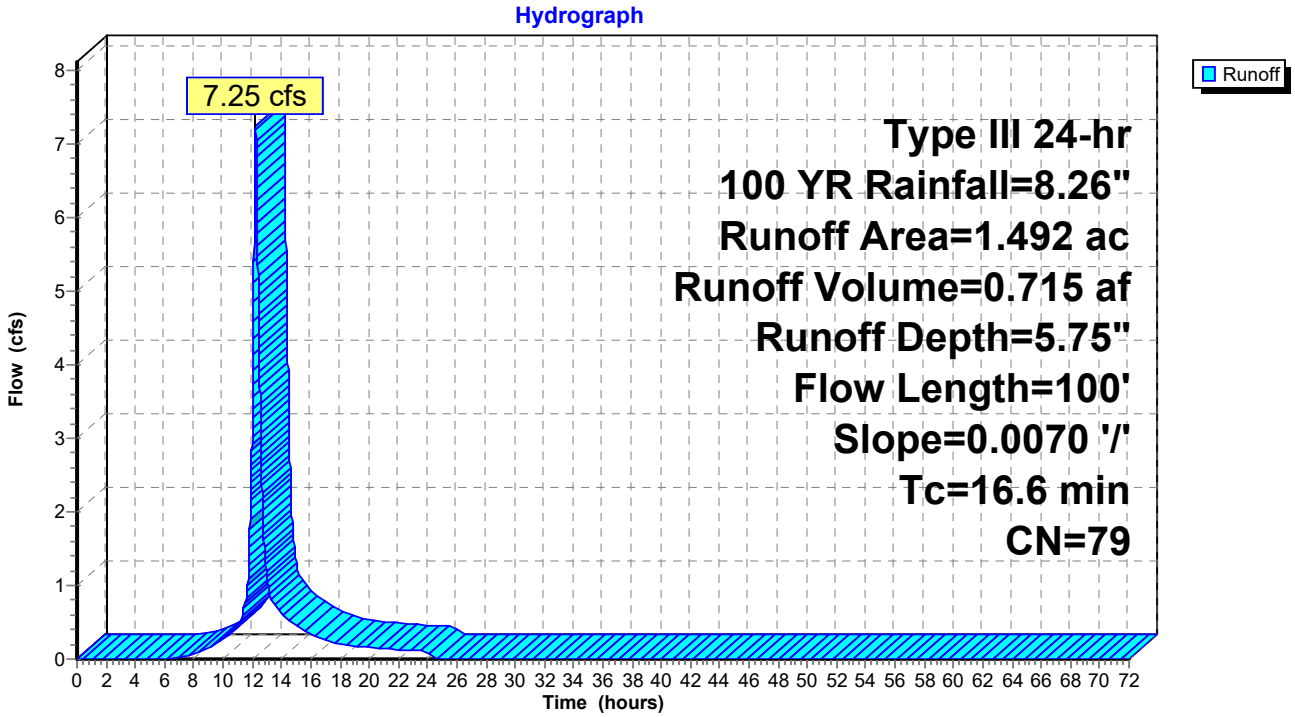
Runoff = 7.25 cfs @ 12.23 hrs, Volume= 0.715 af, Depth= 5.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=8.26"

| Area (ac) | CN | Description |
|---|---|---|
| 1.372 | 78 | Row crops, straight row, Good, HSG B |
| 0.120 | 89 | Paved roads w/open ditches, 50% imp, HSG B |
| 1.492 | 79 | Weighted Average |
| 1.432 | | 95.98% Pervious Area |
| 0.060 | | 4.02% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 16.6 | 100 | 0.0070 | 0.10 | | **Sheet Flow, A-B** Cultivated: Residue>20% n= 0.170 P2= 3.17" |

## Subcatchment EDA-2: EDA-2

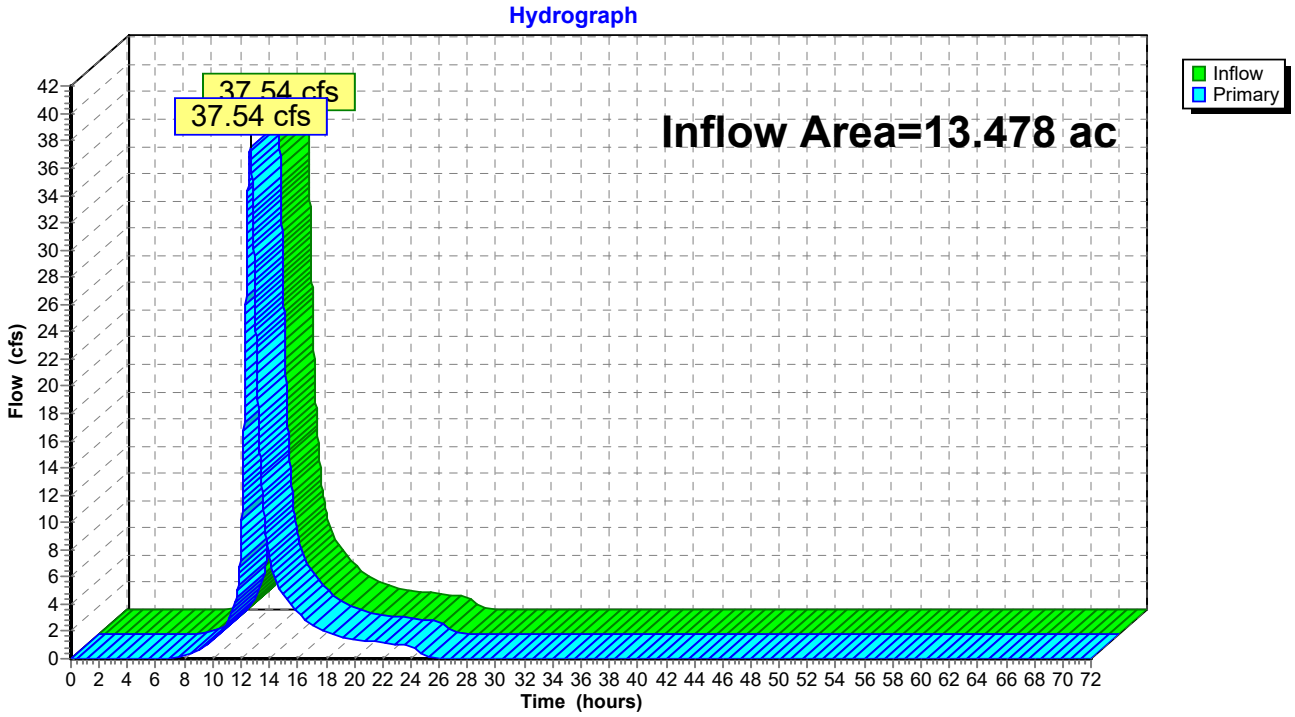


## Summary for Link AP-1: AP-1

Inflow Area = 13.478 ac, 2.99% Impervious, Inflow Depth = 5.28" for 100 YR event
Inflow = 37.54 cfs @ 12.66 hrs, Volume= 5.927 af
Primary = 37.54 cfs @ 12.66 hrs, Volume= 5.927 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

### Link AP-1: AP-1

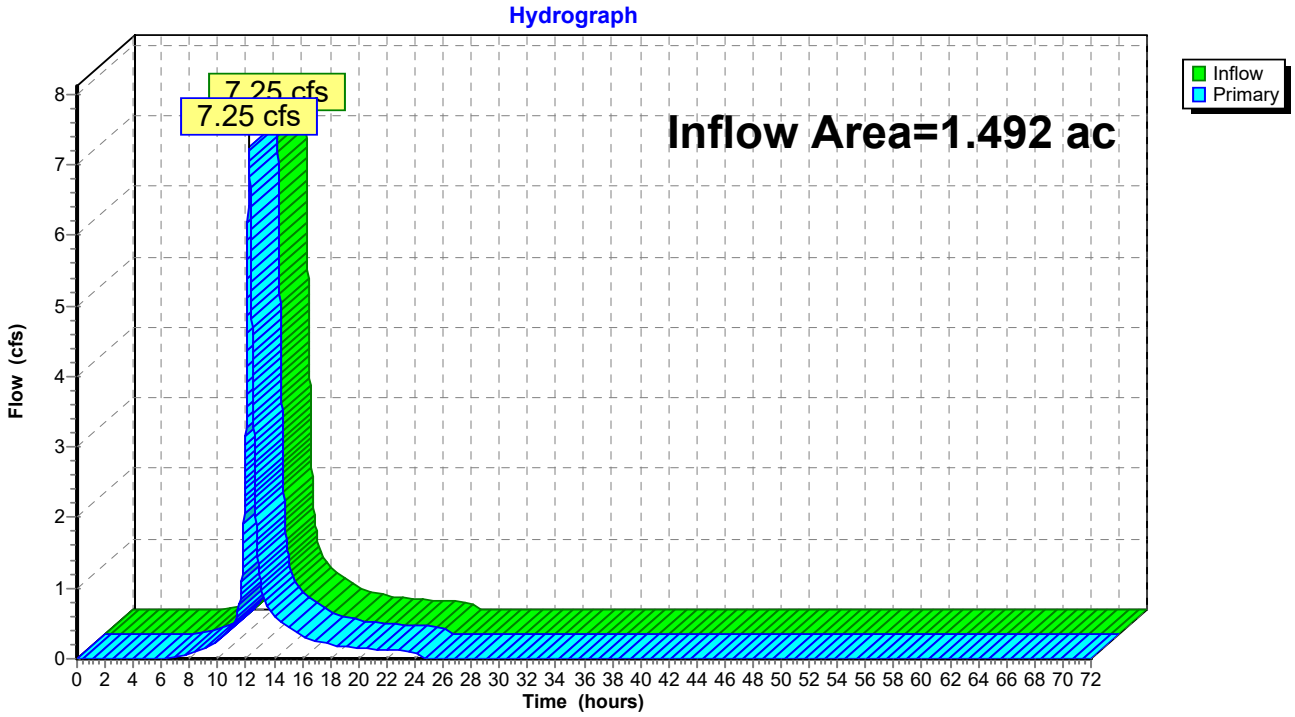


## Summary for Link AP-2: AP-2

Inflow Area = 1.492 ac, 4.02% Impervious, Inflow Depth = 5.75" for 100 YR event
Inflow = 7.25 cfs @ 12.23 hrs, Volume= 0.715 af
Primary = 7.25 cfs @ 12.23 hrs, Volume= 0.715 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

## Link AP-2: AP-2



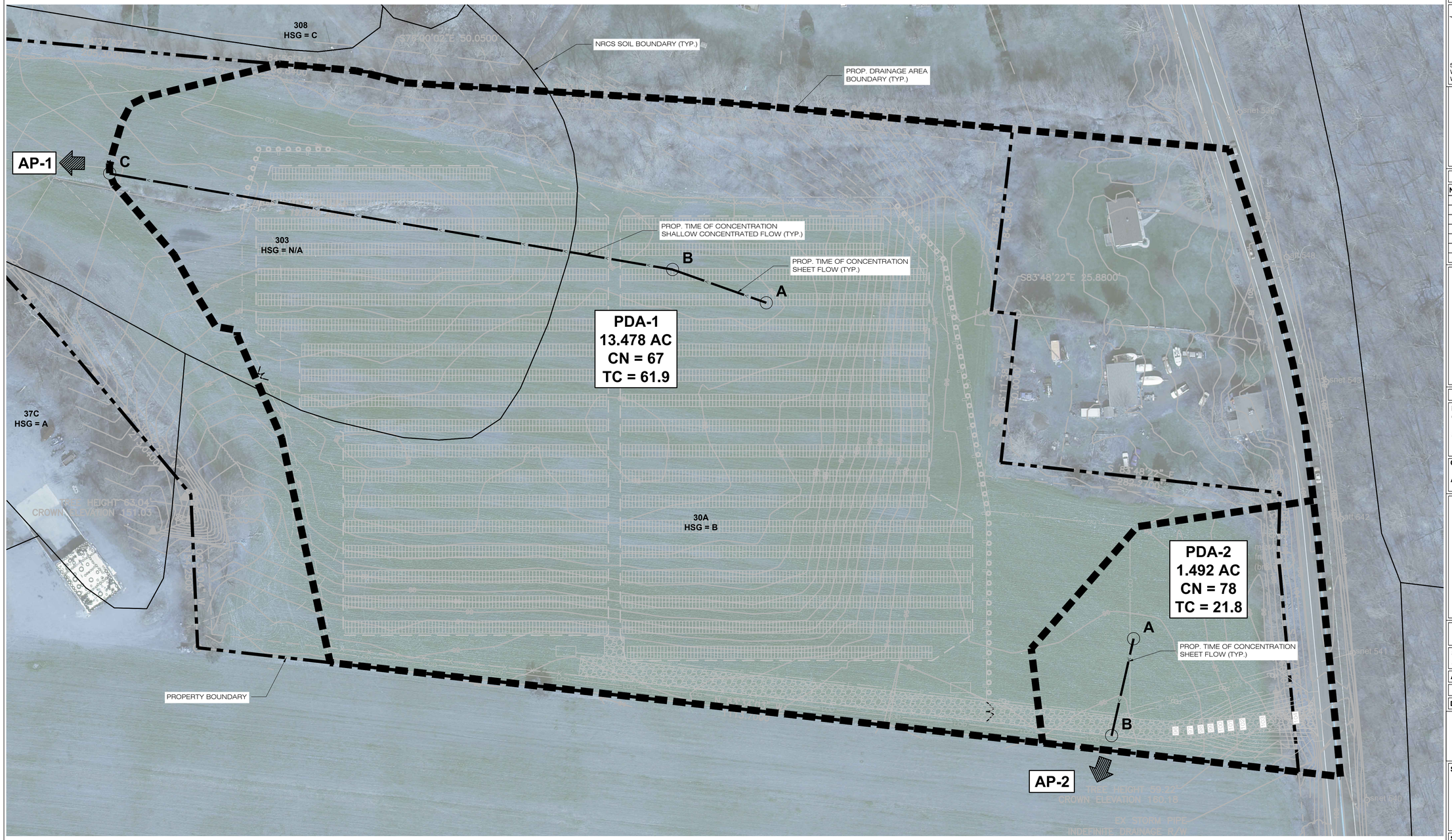
# APPENDIX C: PROPOSED DRAINAGE AREA MAP (PDA-1) & HYDROLOGIC COMPUTATION (HYDROCAD)

## PROPOSED DRAINAGE AREAS

| | TOTAL AREA (ACRES) | COMPOSITE CN | TC (MINS.) |
|---|---|---|---|
| PDA-1 | 13.478 | 67 | 61.9 |
| PDA-2 | 1.492 | 78 | 21.8 |

## PROPOSED CONDITION PEAK FLOWS

| ANALYSIS POINT | 2-YEAR (CFS) | 25-YEAR (CFS) | 50-YEAR (CFS) | 100-YEAR (CFS) |
|---|---|---|---|---|
| AP-1 | 4.40 | 17.50 | 21.78 | 26.50 |
| AP-2 | 1.65 | 4.55 | 5.42 | 6.35 |




1 PDA-1 **PROPOSED DRAINAGE AREA MAP**
SCALE : 1" = 50'-0"

50 0 25 50 100
( IN FEET ) 1 inch = 50 ft.


CITRINE
55 GREENS FARMS ROAD
SUITE 200-78
WESTPORT, CT 06880
OFFICE: (203)-557-5554

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


**CSC PERMIT SET**

| NO | DATE | REVISION |
|---|---|---|
| 0 | 02/26/21 | FOR REVIEW: BJP |
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |

**DESIGN PROFESSIONAL OF RECORD**

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

OWNER: WHAT TF LLC
ADDRESS: 218 FOXON ROAD EAST HAVEN, CT 06513

**SUNFLOWER SOLAR**

SITE ADDRESS: 127 FOREST ROAD NORTH BRANFORD, CT 06472

APT FILING NUMBER: CT567130

DRAWN BY: JT
DATE: 02/26/21 CHECKED BY: BJP

SHEET TITLE:
**PROPOSED DRAINAGE AREA MAP**

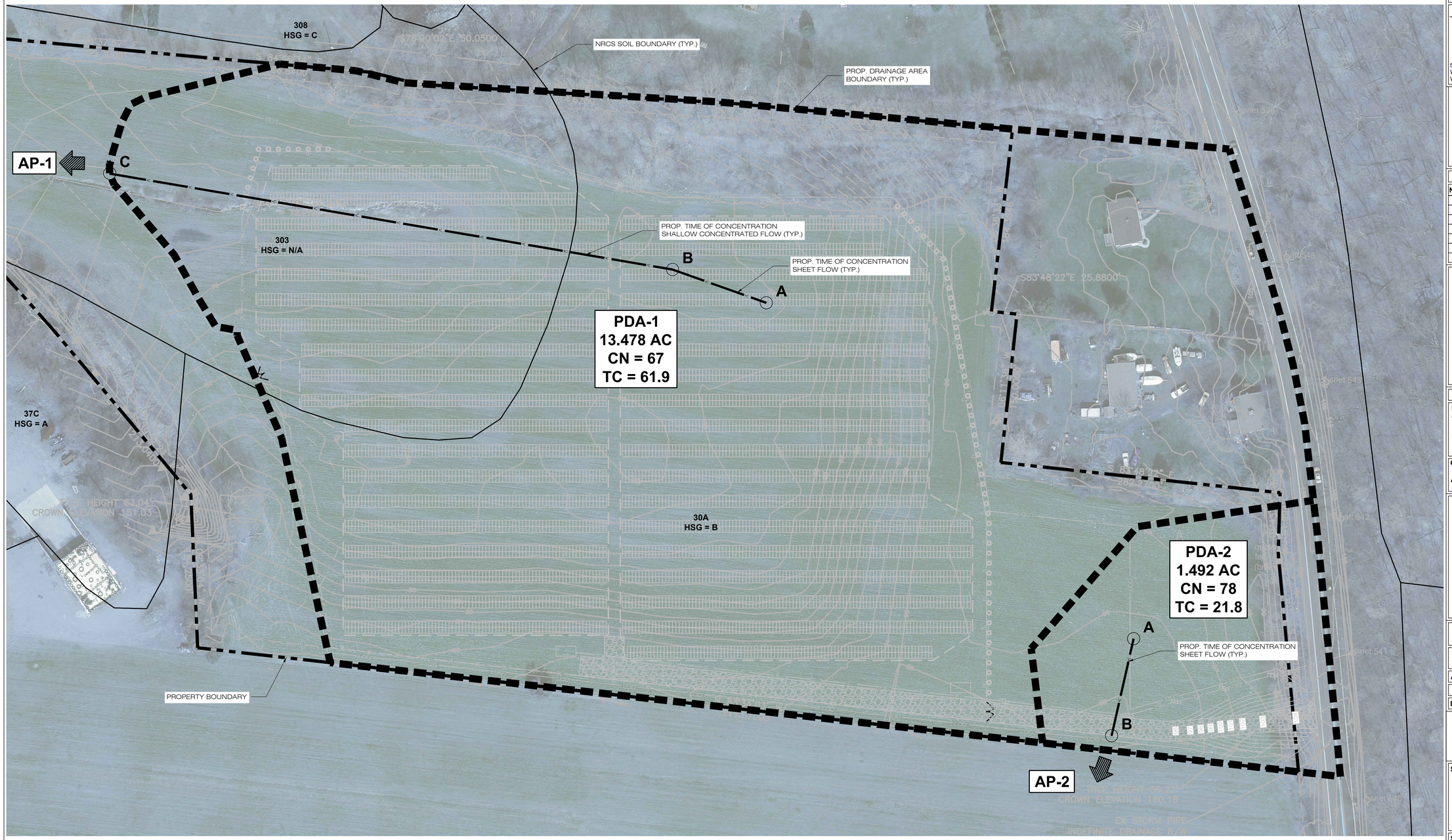
SHEET NUMBER:
**PDA-1**

## PROPOSED DRAINAGE AREAS

| | TOTAL AREA (ACRES) | COMPOSITE CN | TC (MINS.) |
|---|---|---|---|
| PDA-1 | 13.478 | 67 | 61.9 |
| PDA-2 | 1.492 | 78 | 21.8 |

## PROPOSED CONDITION PEAK FLOWS

| ANALYSIS POINT | 2-YEAR (CFS) | 25-YEAR (CFS) | 50-YEAR (CFS) | 100-YEAR (CFS) |
|---|---|---|---|---|
| AP-1 | 4.40 | 17.50 | 21.78 | 26.50 |
| AP-2 | 1.65 | 4.55 | 5.42 | 6.35 |




1 PDA-1 **PROPOSED DRAINAGE AREA MAP**
SCALE : 1" = 50'-0"

50 0 25 50 100
( IN FEET ) 1 inch = 50 ft.


CITRINE
55 GREENS FARMS ROAD
SUITE 200-78
WESTPORT, CT 06880
OFFICE: (203)-557-5554

ALL-POINTS TECHNOLOGY CORPORATION
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WATERFORD, CT 06385 PHONE: (860)-663-1697
WWW.ALLPOINTSTECH.COM FAX: (860)-663-0935


**CSC PERMIT SET**

| NO | DATE | REVISION |
|---|---|---|
| 0 | 02/26/21 | FOR REVIEW: BJP |
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |

**DESIGN PROFESSIONAL OF RECORD**

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

OWNER: WHAT TF LLC
ADDRESS: 218 FOXON ROAD EAST HAVEN, CT 06513

**SUNFLOWER SOLAR**

SITE ADDRESS: 127 FOREST ROAD NORTH BRANFORD, CT 06472

APT FILING NUMBER: CT567130

DRAWN BY: JT
DATE: 02/26/21 CHECKED BY: BJP

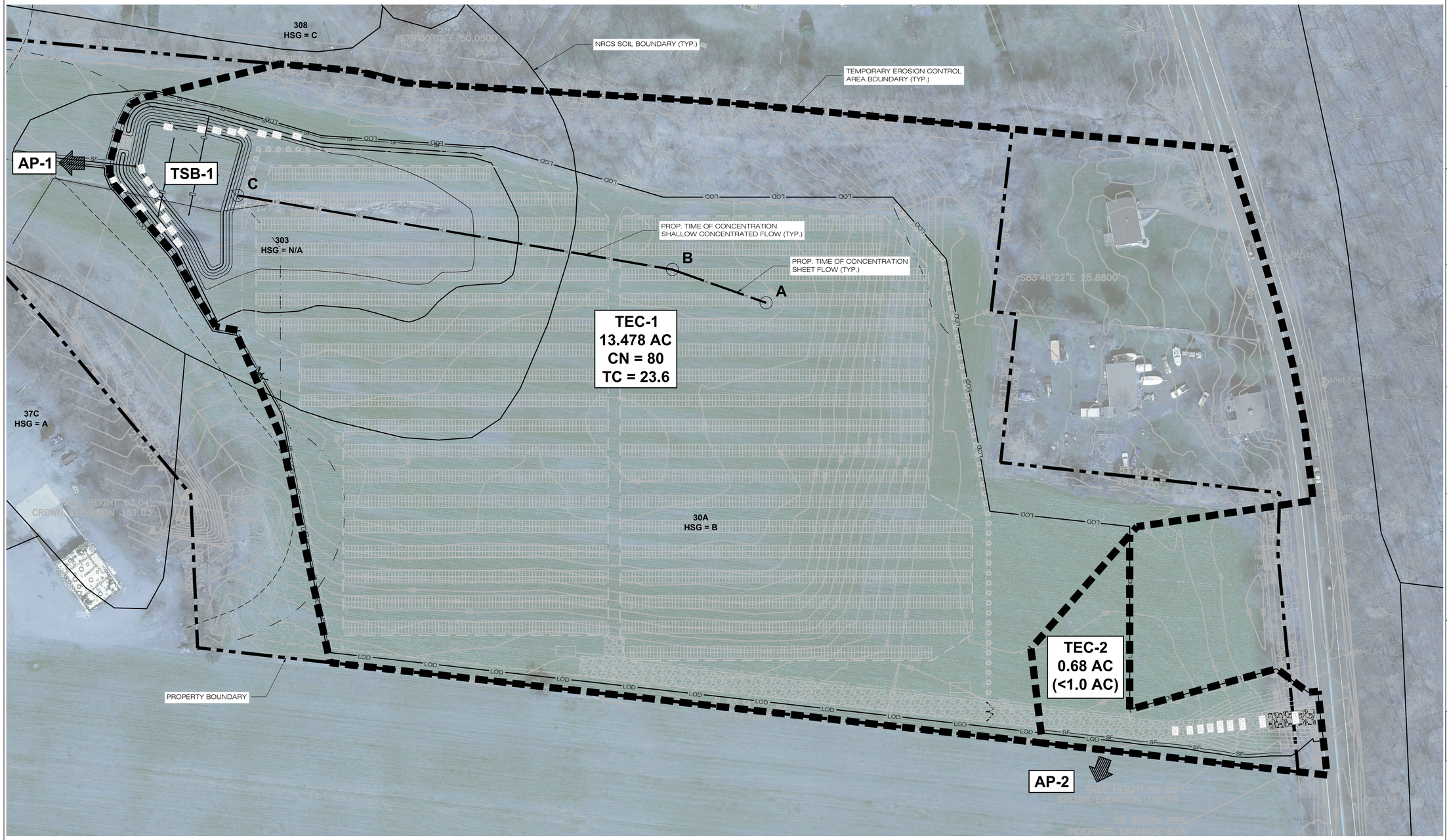
SHEET TITLE:
**PROPOSED DRAINAGE AREA MAP**

SHEET NUMBER:
**PDA-1**

# APPENDIX D: TEMPORARY EROSION CONTROL AREA MAP (TEC-1) & HYDROLOGIC COMPUTATION (HYDROCAD)

## TEMP. EROSION CONTROL AREAS

| | TOTAL AREA (ACRES) | COMPOSITE CN | TC (MINS.) |
|---|---|---|---|
| TEC-1 | 13.478 | 80 | 23.6 |




1 TEC-1 **TEMPORARY EROSION CONTROL AREA MAP**
SCALE : 1" = 50'-0"

50 0 25 50 100
( IN FEET ) 1 inch = 50 ft.


CITRINE
55 GREENS FARMS ROAD
SUITE 200-78
WESTPORT, CT 06880
OFFICE: (203)-557-5554

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


**CSC PERMIT SET**

| NO | DATE | REVISION |
|---|---|---|
| 0 | 02/26/21 | FOR REVIEW: BJP |
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |

**DESIGN PROFESSIONAL OF RECORD**

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

OWNER: WHAT TF LLC

ADDRESS: 218 FOXON ROAD EAST HAVEN, CT 06513

**SUNFLOWER SOLAR**

SITE ADDRESS: 127 FOREST ROAD NORTH BRANFORD, CT 06472

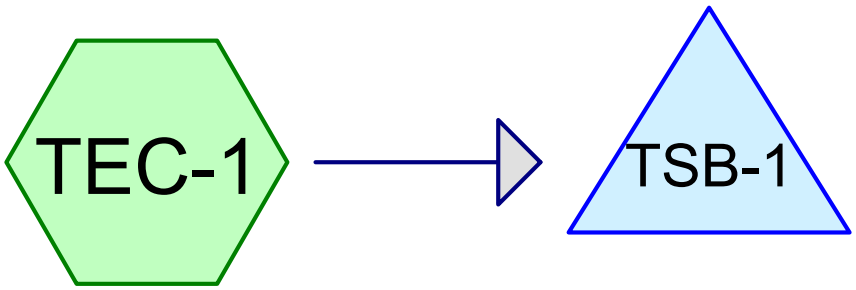
APT FILING NUMBER: CT567130

DRAWN BY: JT

DATE: 02/26/21 CHECKED BY: BJP

SHEET TITLE:
**TEMPORARY EROSION CONTROL AREA MAP**

SHEET NUMBER:
**TEC-1**




TEC-1 TSB-1

Subcat Reach Pond Link

**Routing Diagram for CT567130_NorthBranford - SED - Rev0**
Prepared by Microsoft, Printed 2/25/2021

## Area Listing (all nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 1.633 | 68 | 1 acre lots, 20% imp, HSG B (TEC-1) |
| 0.225 | 96 | Gravel surface, HSG B/C (TEC-1) |
| 8.713 | 86 | Newly graded area, HSG B (TEC-1) |
| 0.153 | 89 | Paved roads w/open ditches, 50% imp, HSG B (TEC-1) |
| 1.293 | 78 | Row crops, straight row, Good, HSG B (TEC-1) |
| 1.461 | 60 | Woods, Fair, HSG B (TEC-1) |
| **13.478** | **80** | **TOTAL AREA** |

## Soil Listing (all nodes)

| Area (acres) | Soil Group | Subcatchment Numbers |
|---|---|---|
| 0.000 | HSG A | |
| 13.478 | HSG B | TEC-1 |
| 0.000 | HSG C | |
| 0.000 | HSG D | |
| 0.000 | Other | |
| **13.478** | | **TOTAL AREA** |

## Ground Covers (all nodes)

| HSG-A (acres) | HSG-B (acres) | HSG-C (acres) | HSG-D (acres) | Other (acres) | Total (acres) | Ground Cover | Subcatchr Numbers |
|---|---|---|---|---|---|---|---|
| 0.000 | 1.633 | 0.000 | 0.000 | 0.000 | 1.633 | 1 acre lots, 20% imp | |
| 0.000 | 0.225 | 0.000 | 0.000 | 0.000 | 0.225 | Gravel surface | |
| 0.000 | 8.713 | 0.000 | 0.000 | 0.000 | 8.713 | Newly graded area | |
| 0.000 | 0.153 | 0.000 | 0.000 | 0.000 | 0.153 | Paved roads w/open ditches, 50% imp | |
| 0.000 | 1.293 | 0.000 | 0.000 | 0.000 | 1.293 | Row crops, straight row, Good | |
| 0.000 | 1.461 | 0.000 | 0.000 | 0.000 | 1.461 | Woods, Fair | |
| **0.000** | **13.478** | **0.000** | **0.000** | **0.000** | **13.478** | **TOTAL AREA** | |

## Pipe Listing (all nodes)

| Line# | Node Number | In-Invert (feet) | Out-Invert (feet) | Length (feet) | Slope (ft/ft) | n | Diam/Width (inches) | Height (inches) | Inside-Fill (inches) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | TSB-1 | 76.00 | 75.50 | 110.0 | 0.0045 | 0.013 | 6.0 | 0.0 | 0.0 |

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment TEC-1: TEC-1** Runoff Area=13.478 ac 2.99% Impervious Runoff Depth=3.17"
Flow Length=543' Tc=21.3 min CN=80 Runoff=32.94 cfs 3.565 af

**Pond TSB-1: TSB-1** Peak Elev=79.34' Storage=81,172 cf Inflow=32.94 cfs 3.565 af
Primary=0.36 cfs 1.225 af Secondary=7.87 cfs 1.670 af Outflow=8.23 cfs 2.894 af

**Total Runoff Area = 13.478 ac Runoff Volume = 3.565 af Average Runoff Depth = 3.17"**
**97.01% Pervious = 13.075 ac 2.99% Impervious = 0.403 ac**

## Summary for Subcatchment TEC-1: TEC-1

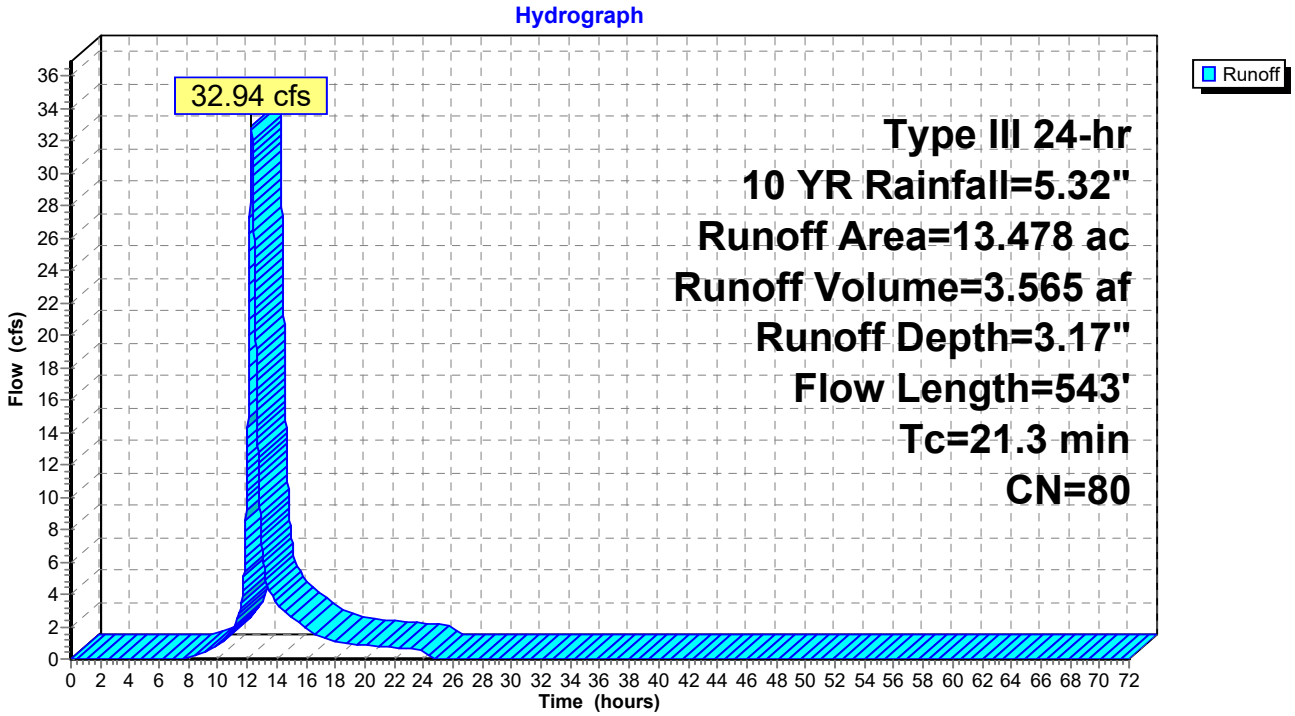
Runoff = 32.94 cfs @ 12.29 hrs, Volume= 3.565 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=5.32"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 1.461 | 60 | Woods, Fair, HSG B |
| | 1.293 | 78 | Row crops, straight row, Good, HSG B |
| | 1.633 | 68 | 1 acre lots, 20% imp, HSG B |
| | 0.153 | 89 | Paved roads w/open ditches, 50% imp, HSG B |
| | 8.713 | 86 | Newly graded area, HSG B |
| * | 0.225 | 96 | Gravel surface, HSG B/C |
| | 13.478 | 80 | Weighted Average |
| | 13.075 | | 97.01% Pervious Area |
| | 0.403 | | 2.99% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 13.5 | 100 | 0.0010 | 0.12 | | **Sheet Flow, A-B** Fallow n= 0.050 P2= 3.17" |
| 7.8 | 443 | 0.0090 | 0.95 | | **Shallow Concentrated Flow, B-C** Nearly Bare & Untilled Kv= 10.0 fps |
| 21.3 | 543 | Total | | | |

## Subcatchment TEC-1: TEC-1



## Summary for Pond TSB-1: TSB-1

Inflow Area = 13.478 ac, 2.99% Impervious, Inflow Depth = 3.17" for 10 YR event
Inflow = 32.94 cfs @ 12.29 hrs, Volume= 3.565 af
Outflow = 8.23 cfs @ 12.90 hrs, Volume= 2.894 af, Atten= 75%, Lag= 37.0 min
Primary = 0.36 cfs @ 12.90 hrs, Volume= 1.225 af
Secondary = 7.87 cfs @ 12.90 hrs, Volume= 1.670 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 79.34' @ 12.90 hrs Surf.Area= 46,805 sf Storage= 81,172 cf

Plug-Flow detention time= 687.3 min calculated for 2.894 af (81% of inflow)
Center-of-Mass det. time= 612.9 min ( 1,446.2 - 833.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 74.00' | 116,279 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

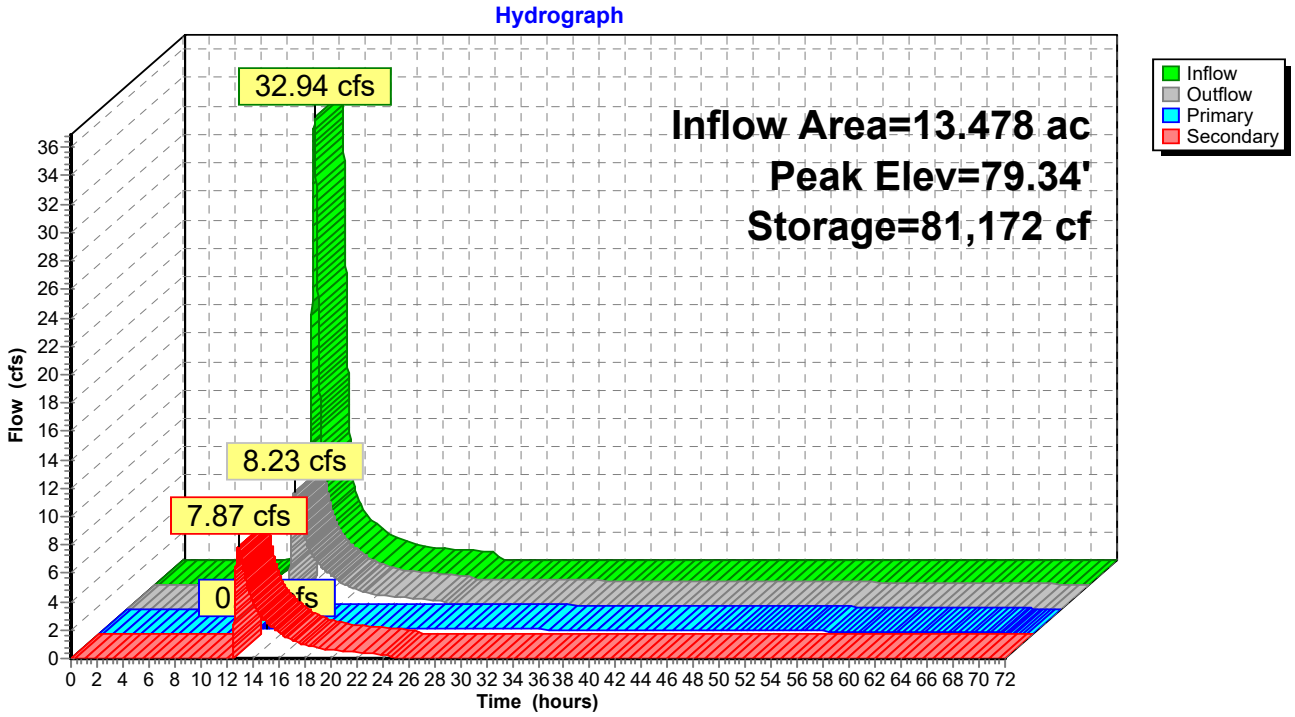
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 74.00 | 7,727 | 390.9 | 0 | 0 | 7,727 |
| 78.00 | 12,870 | 466.3 | 40,759 | 40,759 | 13,149 |
| 79.00 | 41,106 | 894.0 | 25,659 | 66,418 | 59,452 |
| 80.00 | 59,162 | 1,041.9 | 49,861 | 116,279 | 82,257 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 76.00' | **6.0" Round Culvert**<br>L= 110.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 76.00' / 75.50' S= 0.0045 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |
| #2 | Device 1 | 77.00' | **3.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Secondary | 79.00' | **15.0' long x 17.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.36 cfs @ 12.90 hrs HW=79.34' (Free Discharge)
└**1=Culvert** (Passes 0.36 cfs of 0.88 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.36 cfs @ 7.36 fps)

**Secondary OutFlow** Max=7.86 cfs @ 12.90 hrs HW=79.34' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 7.86 cfs @ 1.56 fps)

## Pond TSB-1: TSB-1



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment TEC-1: TEC-1** Runoff Area=13.478 ac 2.99% Impervious Runoff Depth=5.87"
Flow Length=543' Tc=21.3 min CN=80 Runoff=60.20 cfs 6.592 af

**Pond TSB-1: TSB-1** Peak Elev=79.94' Storage=112,627 cf Inflow=60.20 cfs 6.592 af
Primary=0.41 cfs 1.260 af Secondary=35.86 cfs 4.661 af Outflow=36.27 cfs 5.920 af

**Total Runoff Area = 13.478 ac Runoff Volume = 6.592 af Average Runoff Depth = 5.87"**
**97.01% Pervious = 13.075 ac 2.99% Impervious = 0.403 ac**

## Summary for Subcatchment TEC-1: TEC-1

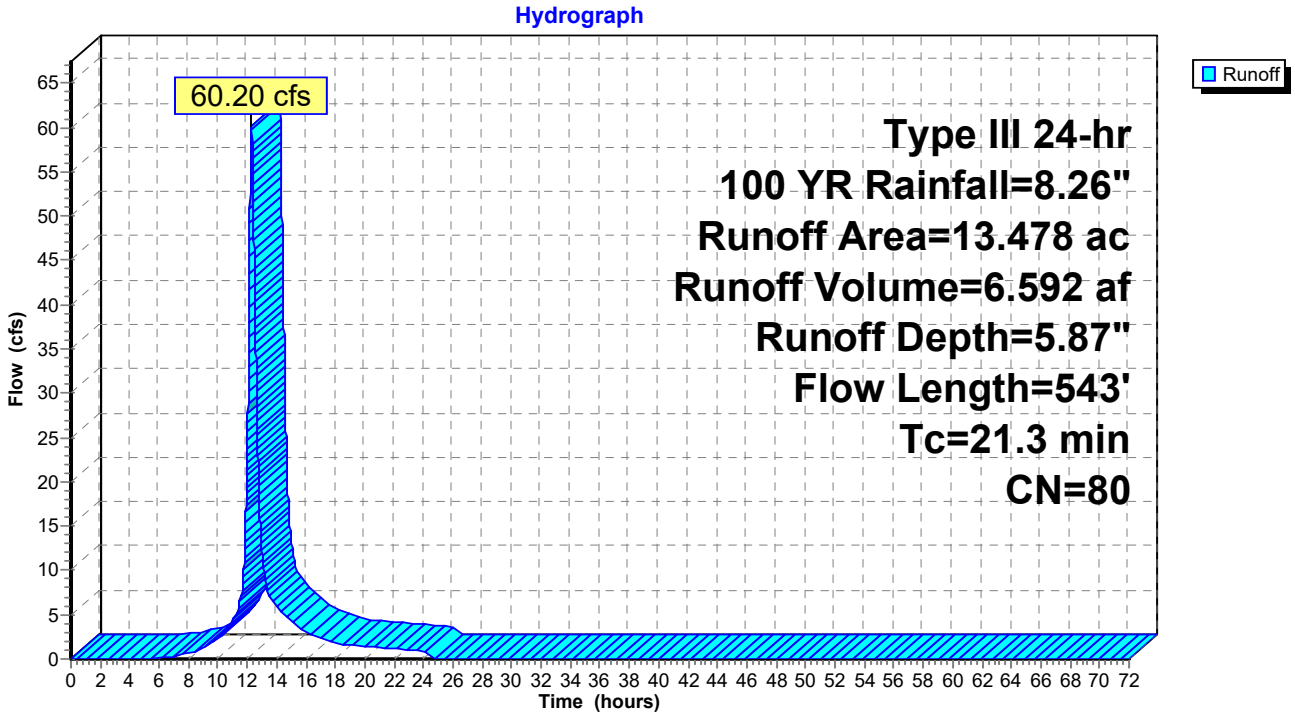
Runoff = 60.20 cfs @ 12.28 hrs, Volume= 6.592 af, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=8.26"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 1.461 | 60 | Woods, Fair, HSG B |
| | 1.293 | 78 | Row crops, straight row, Good, HSG B |
| | 1.633 | 68 | 1 acre lots, 20% imp, HSG B |
| | 0.153 | 89 | Paved roads w/open ditches, 50% imp, HSG B |
| | 8.713 | 86 | Newly graded area, HSG B |
| * | 0.225 | 96 | Gravel surface, HSG B/C |
| | 13.478 | 80 | Weighted Average |
| | 13.075 | | 97.01% Pervious Area |
| | 0.403 | | 2.99% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 13.5 | 100 | 0.0010 | 0.12 | | **Sheet Flow, A-B** Fallow n= 0.050 P2= 3.17" |
| 7.8 | 443 | 0.0090 | 0.95 | | **Shallow Concentrated Flow, B-C** Nearly Bare & Untilled Kv= 10.0 fps |
| 21.3 | 543 | Total | | | |

## Subcatchment TEC-1: TEC-1



## Summary for Pond TSB-1: TSB-1

Inflow Area = 13.478 ac, 2.99% Impervious, Inflow Depth = 5.87" for 100 YR event
Inflow = 60.20 cfs @ 12.28 hrs, Volume= 6.592 af
Outflow = 36.27 cfs @ 12.56 hrs, Volume= 5.920 af, Atten= 40%, Lag= 16.8 min
Primary = 0.41 cfs @ 12.56 hrs, Volume= 1.260 af
Secondary = 35.86 cfs @ 12.56 hrs, Volume= 4.661 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 79.94' @ 12.56 hrs Surf.Area= 57,940 sf Storage= 112,627 cf

Plug-Flow detention time= 375.5 min calculated for 5.920 af (90% of inflow)
Center-of-Mass det. time= 326.7 min ( 1,142.5 - 815.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 74.00' | 116,279 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

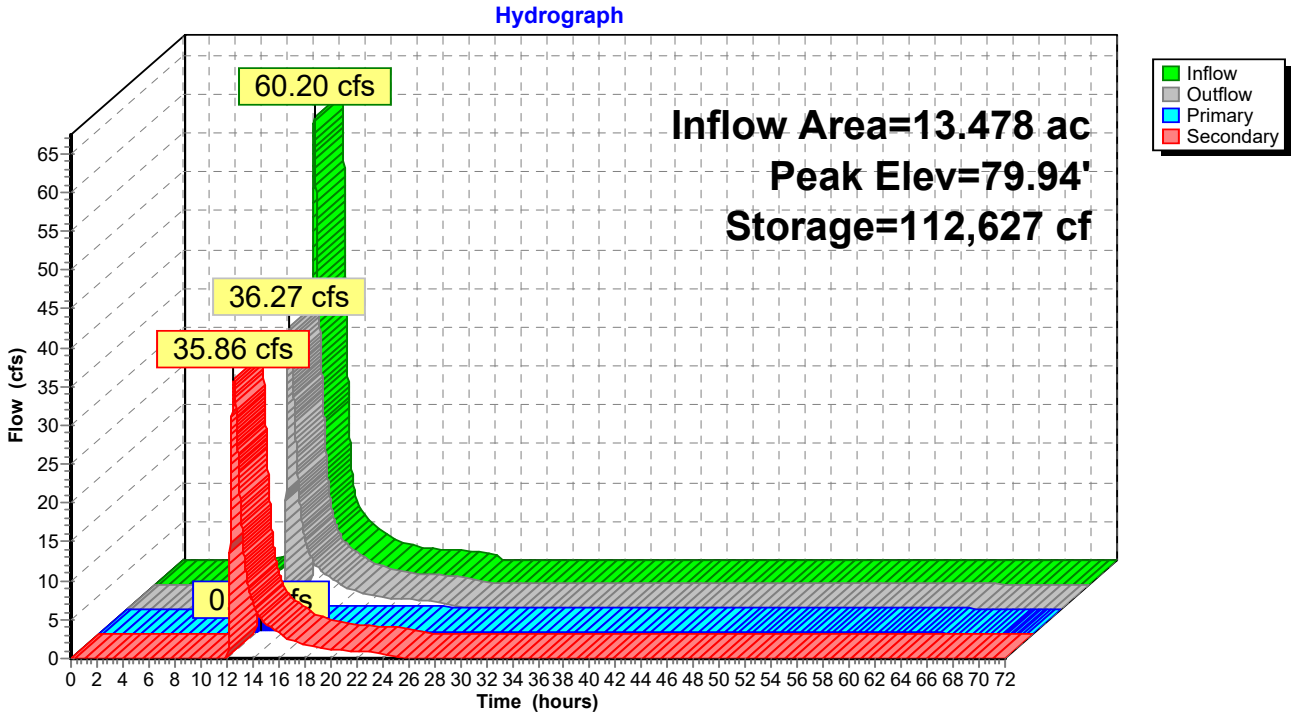
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 74.00 | 7,727 | 390.9 | 0 | 0 | 7,727 |
| 78.00 | 12,870 | 466.3 | 40,759 | 40,759 | 13,149 |
| 79.00 | 41,106 | 894.0 | 25,659 | 66,418 | 59,452 |
| 80.00 | 59,162 | 1,041.9 | 49,861 | 116,279 | 82,257 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 76.00' | **6.0" Round Culvert**<br>L= 110.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 76.00' / 75.50' S= 0.0045 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |
| #2 | Device 1 | 77.00' | **3.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Secondary | 79.00' | **15.0' long x 17.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.41 cfs @ 12.56 hrs HW=79.94' (Free Discharge)
└**1=Culvert** (Passes 0.41 cfs of 0.96 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.41 cfs @ 8.25 fps)

**Secondary OutFlow** Max=35.86 cfs @ 12.56 hrs HW=79.94' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 35.86 cfs @ 2.55 fps)

## Pond TSB-1: TSB-1



# APPENDIX E: CT DEEP APPENDIX I CHECKLIST

**CT DEEP General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities**
**APPENDIX I - Stormwater Management at Solar Array Construction Projects**

**Project Name: Sunflower Solar**
**Site Address: 127 Forest Road, North Branford, CT**

| Section # | **Requirements** *(Italicized Text is Paraphrased)* | **Site and Stormwater Design Review Notes** |
|---|---|---|
| I | Design and construction requirements | |
| 1 | Roadways, gravel surfaces and transformer pads within the solar array are considered effective impervious cover for the purposes of calculating Water Quality Volume (WQV). In addition to these impervious surfaces, all solar panels in the array shall also be considered effective impervious cover for the purposes of calculating Water Quality Volume if the proposed post-construction slopes at a site are equal to or greater than 15% or if the post-construction slopes at a site are less than 15% and the conditions in (a) – (d), inclusive, below have not been met: | met (panels are not considered effective impervious cover), project area existing slopes are less than 15% and conditions (a)-(d) have been met, as explained below |
| a | The vegetated area receiving runoff between rows of solar panels (see Figures 1 and 2, below) is equal to or greater than the average width of the row of solar panels draining to the vegetated area; | met |
| b | Overall site conditions and solar panel configuration within the array are designed and constructed such that stormwater runoff remains as sheet flow across the entire site and flows towards the intended stormwater management controls. | met |
| c | The following conditions are satisfied regarding the design of the post-construction slope of the site: | met |
| i | For 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. | met |
| ii | For slopes greater than 5%, but less than 10%, practices including, but not limited to, level spreaders, terraces or berms as described in Figure 2, below, shall be used to ensure long term sheet flow conditions; and | met, no level spreaders proposed, but flow length across these portions are approx 110 linear feet and then continue along portions of less than 5% slope |
| iii | For sites with slopes greater than or equal to 8%, erosion control blankets or stump grindings or 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, whichever time period is less; and | met, areas of the project area that will be disturbed will be hydroseeded immediately |
| iv | For slopes equal to or greater than 10% and less than 15%, the Plan includes specific engineered stormwater control measures with detailed specifications that are designed to provide permanent stabilization and non-erosive conveyance of runoff to the property line of the site or downgradient from the site. | met, minimal pockets of the project area have slopes exceeding 10% |
| d | The solar panels shall be designed and constructed in such a manner as to allow the growth of native vegetation beneath and between the panels. (Pollinator-friendly vegetation is strongly encouraged). With respect to such vegetation, the Permittee shall not use chemical fertilization, herbicides, or pesticides except as necessary to establish such vegetation. | met |
| 2 | | |
| a | Prior to commencing construction activities, the Permittee shall ensure that the following setback and buffer shall be delineated and maintained on the site: | met |
| i | No solar panel associated with a solar array shall be located within one- hundred (100) feet of any wetland or waters ("the 100-foot setback") that, prior to or after construction, is located downgradient of such construction activity or within fifty (50) feet of any property boundary ("the 50-foot setback") that, prior to or after construction, is located downgradient of such construction activity; and | met, panels are proposed within the 50' property setback that is not downstream of the project area |
| ii | Except as provided in section 2(a)(iii), there shall be an undisturbed buffer of at least fifty (50) feet between any construction activity at a site and any wetland or waters that, prior to or after construction, is located downgradient of such construction activity ("the 50-foot buffer"). Such buffer shall be comprised of existing dense herbaceous vegetative ground cover (e.g. not forested area). If the entirety of such buffer is not comprised of existing dense herbaceous vegetative ground cover, such buffer shall be at least one-hundred (100) feet ("the 100-foot buffer"). | met, project is holding a 100' setback to wetlands or waters located downgradient of the construction activity (existing wetland/waterway buffer not comprised of dense herbaceous vegetative ground cover) |
| iii | There shall be an undisturbed buffer of at least ten (10) feet between any construction activity at a site associated with an access road or the electrical interconnection necessary for the solar array and any wetland or waters that, prior to or after construction, is located downgradient of such construction activity ("10-foot buffer"), except if the access road or electrical interconnection passes between two wetland or waters and the undisturbed buffer cannot be achieved. Any crossing through a wetland or waters for an access road or electrical interconnection is exempt from such buffer requirement. | met |
| b | Notwithstanding section 2(a)(ii), the 50-foot buffer or 100-foot buffer, as applicable, may be reduced, only where necessary, but by no more than fifty percent (50%), only if all of the following have been demonstrated to the satisfaction of the commissioner by approval of a Registration | met, no reduction of either the 50' or 100' buffers proposed |
| i | Stormwater control measures for managing stormwater discharges that will enter or be received by a wetland or waters shall be designed and installed in accordance with the following conditions | not needed |
| I | a minimum sediment load reduction of ninety percent (90%) shall be achieved before such discharges enter or are received by a wetland or waters. The required sediment load reduction shall be calculated based solely on the stormwater controls used; no sediment load reduction from conditions on the site (i.e., from any remaining buffer) shall be considered when calculating the sediment load reduction from such stormwater controls. The sediment load reduction may be calculated using a range of available models that are available to facilitate this calculation, including USDA's RUSLE-series programs and the WEPP erosion model, SEDCAD, SEDIMOT, or other equivalent independent third party model or method acceptable to the commissioner | not needed |
| II | those portions of a solar array from which stormwater discharges enter or will be received by a wetland or waters shall be deemed effective impervious cover for the purposes of calculating Stream Channel Protection in accordance with Section 7.6.1 of the Stormwater Quality Manual, even if those portions of such array are less than one (1) acre; and | not needed |
| III | the buffer into which stormwater discharges shall have a slope of less than or equal to fifteen percent (15%) | not needed |
| c | A soil scientist, as that term is defined in Conn. Gen. Stat. § 22a-38, shall delineate all wetland or waters by field survey. The location of all wetland or waters and all required setbacks and buffers shall be shown on all mapping and prior to the start of construction be clearly marked on the site with flags, stakes, tape, or a similar marking device by a surveyor licensed in Connecticut. | met |
| d | Delineation of the 100-foot setback and any buffer required under this section shall be measured perpendicularly and laterally from the nearest part of the solar array or construction activity, as applicable, to: | met |
| i | in the case of waters, the ordinary high water mark of the water body, defined as the line on the shore established by fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, and/or the presence of litter and debris; | met |
| ii | the nearest edge of the stream or river bank, bluff, or cliff, as applicable; and | met |
| iii | the nearest edge of any wetland, as determined by a soil scientist. | met |
| e | The Plan shall indicate how compliance with this section will be achieved. | met |
| f | Prior to the approval of a registration, the commissioner may determine that the 100 foot-setback or any buffer required under this section is not adequate to protect water quality or natural resources (i.e., a vernal pool, cold-water perennial streams, perennial headwater seeps or similar sensitive wetland or waters, or other sensitive habitat). In such a case, the commissioner may reject or disapprove the registration, or may impose additional terms and conditions in the approval of such registration, including, but not limited to, an additional setback, buffer or other control measure. | *Design Related Concern that Does Not Affect Initial Design and Application* |
| g | Nothing in this section is intended to or shall prevent improvements, as may be directed by the commissioner in the approval of a registration, to enhance the water quality benefits or the natural resource value of any buffer required under this section. | *Design Related Concern that Does Not Affect Initial Design and Application* |

| | | |
|---|---|---|
| h | *Section defines wetland and access road.* | *Not a Design Related Concern* |
| 3 | *The lowest vertical clearance of the solar panels above the ground should not be greater than ten (10) feet.* | met |
| 4 | *Preconstruction Meeting Requirements* | *Not a Design Related Concern* |
| 5 | *Plan Implementation and Routine Inspection Requirements* | *Not a Design Related Concern* |
| 6 | *Copy of Check List from 5 submitted to DEEP* | *Not a Design Related Concern* |
| 7 | *Two Growing Seasons for Notice of Termination* | *Not a Design Related Concern* |
| 8 | *Letter of Credit Requirements* | *Not a Design Related Concern* |
| II | Design requirements for post-construction stormwater management measures. | |
| 1 | Post-construction stormwater control measures shall be designed and constructed to provide permanent stabilization and non-erosive conveyance of runoff on the site, to the property line of the site or downgradient from the site to ensure protection of on and off- site wetland, wetlands, waters or other natural resources. | met |
| 2 | Orientation of panels shall be considered with respect to drainage pattern, flow concentration, drainage area and velocity. | met |
| 3 | The permittee shall conduct a hydrologic analysis that: | |
| a | Evaluates and controls the 2, 25, 50 and 100-year 24-hour rainfall event post- development peak discharge to the corresponding pre-development peak discharge rates in accordance with the Stormwater Quality Manual, with the following exceptions: that sheet flow is maintained for a maximum length of 100 feet; shallow concentrated flow is calculated using velocity factors per NRCS Part 630 National Engineering Handbook Chapter 15 (the use of TR-55 paved or unpaved velocity factors are not acceptable); if swales are used to convey or control stormwater, such swales shall convey and control stormwater from a 100-year, 24-hour rainfall event; | met |
| b | Is based on site specific soil mapping to confirm soil types; and | met |
| c | Is able to determine and confirm the infiltrative capacity of any stormwater management measures. In addition, in areas where grading exceeds a two (2) foot difference between existing and proposed grades, the runoff curve number shall increase by one full HSG (e.g. runoff curve number for soils of HSG B shall be considered HSB C). For the remainder of the entire site, the runoff curve number associated with the Hydrologic Soil Group present on-site shall increase by one half (1/2) the difference between the Hydrologic Soil Group present on-site and the next higher Hydrologic Soil Group (e.g. half the difference between the runoff curve number for HSG B versus HSG C) to account for the compaction of soils that results from extensive machinery traffic over the course of the construction of the array; and | met, project area is modeled with a one half (1/2) drop in HSG |
| d | Is based on slope gradient, surveyed soil type (adjusted per subparagraph (c), above), infiltration rate, length of slope, occurrence of bedrock, and change in drainage patterns. Pre- and post-development drainage area maps shall be provided showing this information; and | met |
| e | For an engineered stormwater management system, demonstrates no net increase in peak flows, erosive velocities or volumes, or adverse impacts to downstream properties in accordance with the general permit and the Stormwater Quality Manual. | met |

# APPENDIX F: NOAA ATLAS 14 PRECIPITATION FREQUENCY TABLE

**NOAA Atlas 14, Volume 10, Version 3**
**Location name: Northford, Connecticut, USA***
**Latitude: 41.3426°, Longitude: -72.8021°**
**Elevation: 100.55 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 | **0.343** (0.273-0.424) | **0.415** (0.330-0.514) | **0.533** (0.422-0.662) | **0.630** (0.496-0.786) | **0.765** (0.581-0.998) | **0.866** (0.643-1.15) | **0.973** (0.699-1.34) | **1.09** (0.740-1.54) | **1.26** (0.822-1.85) | **1.41** (0.891-2.10) |
| 10-min | **0.487** (0.387-0.601) | **0.589** (0.468-0.728) | **0.756** (0.598-0.938) | **0.894** (0.703-1.12) | **1.08** (0.823-1.41) | **1.23** (0.911-1.64) | **1.38** (0.990-1.90) | **1.55** (1.05-2.19) | **1.79** (1.16-2.62) | **1.99** (1.26-2.97) |
| 15-min | **0.572** (0.455-0.707) | **0.692** (0.550-0.856) | **0.889** (0.704-1.10) | **1.05** (0.827-1.31) | **1.28** (0.968-1.66) | **1.44** (1.07-1.92) | **1.62** (1.17-2.24) | **1.82** (1.23-2.57) | **2.11** (1.37-3.08) | **2.35** (1.49-3.50) |
| 30-min | **0.793** (0.631-0.980) | **0.959** (0.762-1.19) | **1.23** (0.973-1.53) | **1.45** (1.14-1.81) | **1.76** (1.34-2.30) | **1.99** (1.48-2.66) | **2.24** (1.61-3.09) | **2.51** (1.70-3.55) | **2.91** (1.89-4.25) | **3.24** (2.05-4.82) |
| 60-min | **1.01** (0.807-1.25) | **1.23** (0.973-1.51) | **1.57** (1.24-1.95) | **1.86** (1.46-2.31) | **2.25** (1.71-2.93) | **2.54** (1.89-3.39) | **2.85** (2.05-3.94) | **3.21** (2.17-4.52) | **3.71** (2.41-5.42) | **4.13** (2.61-6.15) |
| 2-hr | **1.32** (1.06-1.63) | **1.60** (1.28-1.96) | **2.04** (1.63-2.52) | **2.41** (1.91-2.99) | **2.92** (2.23-3.79) | **3.30** (2.47-4.37) | **3.70** (2.68-5.10) | **4.17** (2.84-5.85) | **4.86** (3.17-7.05) | **5.44** (3.45-8.05) |
| 3-hr | **1.54** (1.24-1.88) | **1.85** (1.49-2.26) | **2.37** (1.89-2.90) | **2.79** (2.22-3.44) | **3.38** (2.59-4.37) | **3.82** (2.87-5.04) | **4.28** (3.12-5.89) | **4.83** (3.29-6.75) | **5.65** (3.69-8.16) | **6.33** (4.03-9.33) |
| 6-hr | **1.95** (1.58-2.37) | **2.35** (1.90-2.86) | **3.00** (2.42-3.66) | **3.54** (2.84-4.34) | **4.29** (3.31-5.50) | **4.84** (3.66-6.35) | **5.43** (3.98-7.42) | **6.13** (4.20-8.51) | **7.18** (4.70-10.3) | **8.07** (5.15-11.8) |
| 12-hr | **2.42** (1.98-2.92) | **2.92** (2.38-3.53) | **3.74** (3.04-4.52) | **4.41** (3.56-5.37) | **5.34** (4.16-6.81) | **6.04** (4.59-7.87) | **6.78** (4.99-9.20) | **7.66** (5.27-10.6) | **8.98** (5.91-12.8) | **10.1** (6.47-14.7) |
| 24-hr | **2.85** (2.34-3.41) | **3.47** (2.85-4.15) | **4.48** (3.67-5.39) | **5.32** (4.33-6.43) | **6.48** (5.08-8.22) | **7.34** (5.62-9.53) | **8.26** (6.14-11.2) | **9.39** (6.48-12.9) | **11.1** (7.33-15.7) | **12.6** (8.08-18.2) |
| 2-day | **3.19** (2.64-3.79) | **3.95** (3.27-4.69) | **5.19** (4.28-6.19) | **6.21** (5.09-7.46) | **7.63** (6.03-9.64) | **8.67** (6.70-11.2) | **9.81** (7.36-13.3) | **11.3** (7.79-15.3) | **13.5** (8.93-19.0) | **15.5** (9.97-22.2) |
| 3-day | **3.46** (2.88-4.09) | **4.29** (3.57-5.08) | **5.65** (4.68-6.71) | **6.78** (5.57-8.10) | **8.33** (6.61-10.5) | **9.47** (7.35-12.2) | **10.7** (8.09-14.5) | **12.3** (8.55-16.7) | **14.8** (9.83-20.8) | **17.0** (11.0-24.3) |
| 4-day | **3.71** (3.10-4.37) | **4.59** (3.83-5.42) | **6.03** (5.01-7.14) | **7.22** (5.96-8.60) | **8.87** (7.05-11.1) | **10.1** (7.83-13.0) | **11.4** (8.60-15.3) | **13.1** (9.09-17.6) | **15.7** (10.4-21.9) | **18.0** (11.6-25.6) |
| 7-day | **4.42** (3.71-5.18) | **5.38** (4.52-6.32) | **6.96** (5.82-8.19) | **8.27** (6.86-9.79) | **10.1** (8.04-12.5) | **11.4** (8.89-14.5) | **12.8** (9.70-17.1) | **14.6** (10.2-19.6) | **17.4** (11.6-24.1) | **19.8** (12.8-27.9) |
| 10-day | **5.12** (4.32-5.97) | **6.13** (5.16-7.16) | **7.78** (6.53-9.13) | **9.15** (7.62-10.8) | **11.0** (8.84-13.7) | **12.4** (9.72-15.7) | **14.0** (10.5-18.4) | **15.8** (11.0-21.1) | **18.5** (12.4-25.6) | **20.9** (13.5-29.4) |
| 20-day | **7.27** (6.18-8.43) | **8.36** (7.10-9.70) | **10.1** (8.57-11.8) | **11.6** (9.75-13.6) | **13.7** (11.0-16.7) | **15.2** (11.9-18.9) | **16.8** (12.6-21.7) | **18.6** (13.1-24.6) | **21.2** (14.2-29.0) | **23.3** (15.1-32.5) |
| 30-day | **9.07** (7.75-10.5) | **10.2** (8.70-11.8) | **12.1** (10.2-14.0) | **13.6** (11.5-15.9) | **15.7** (12.7-19.0) | **17.3** (13.6-21.4) | **19.0** (14.2-24.2) | **20.7** (14.7-27.3) | **23.1** (15.6-31.5) | **25.0** (16.3-34.8) |
| 45-day | **11.3** (9.71-13.0) | **12.5** (10.7-14.4) | **14.4** (12.3-16.6) | **16.0** (13.6-18.6) | **18.2** (14.7-21.9) | **19.9** (15.6-24.4) | **21.6** (16.2-27.2) | **23.3** (16.5-30.4) | **25.4** (17.2-34.4) | **27.0** (17.6-37.4) |
| 60-day | **13.2** (11.4-15.1) | **14.4** (12.4-16.5) | **16.4** (14.0-18.9) | **18.0** (15.3-20.9) | **20.3** (16.4-24.2) | **22.0** (17.3-26.8) | **23.7** (17.8-29.7) | **25.3** (18.1-33.0) | **27.3** (18.5-36.9) | **28.7** (18.7-39.6) |

[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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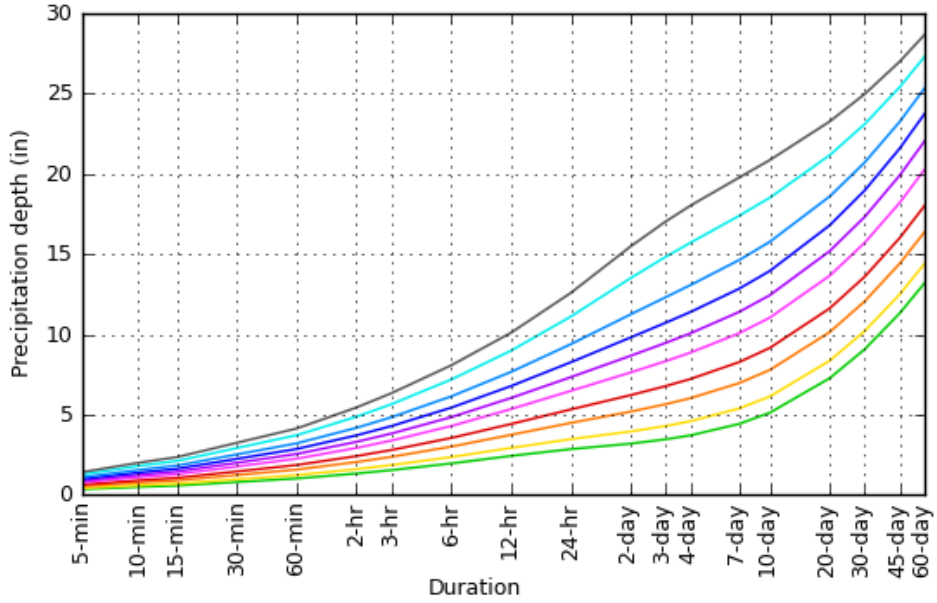
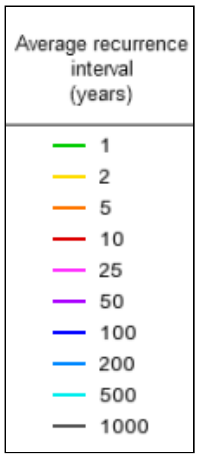
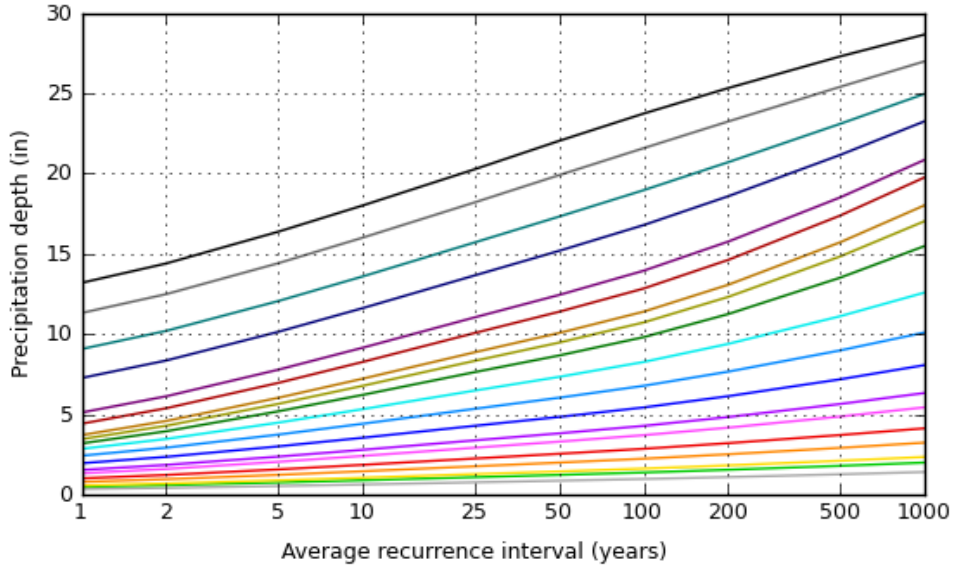
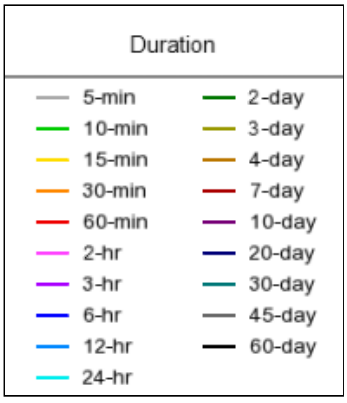
## PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 41.3426°, Longitude: -72.8021°

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Created (GMT): Wed Jan 27 02:36:08 2021

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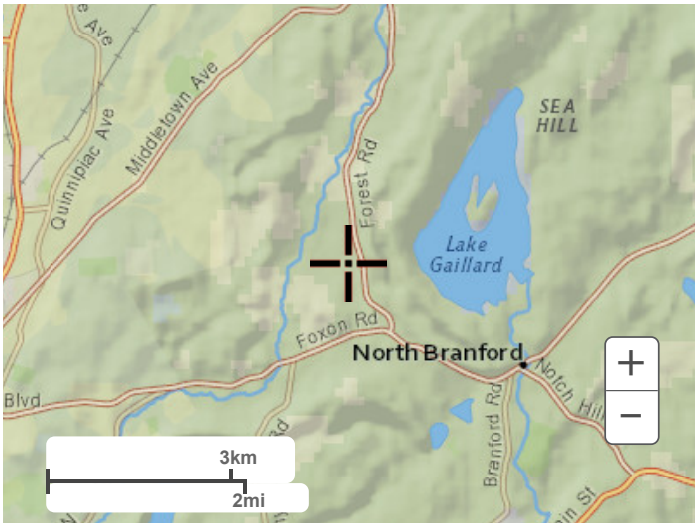
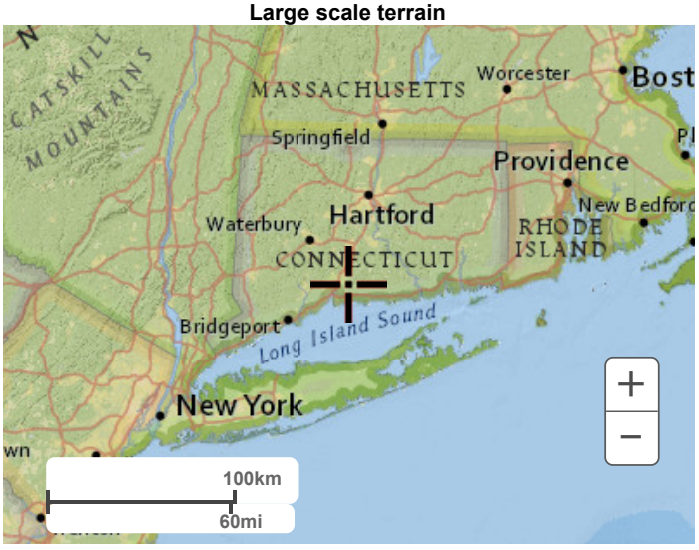
## Maps & aerials

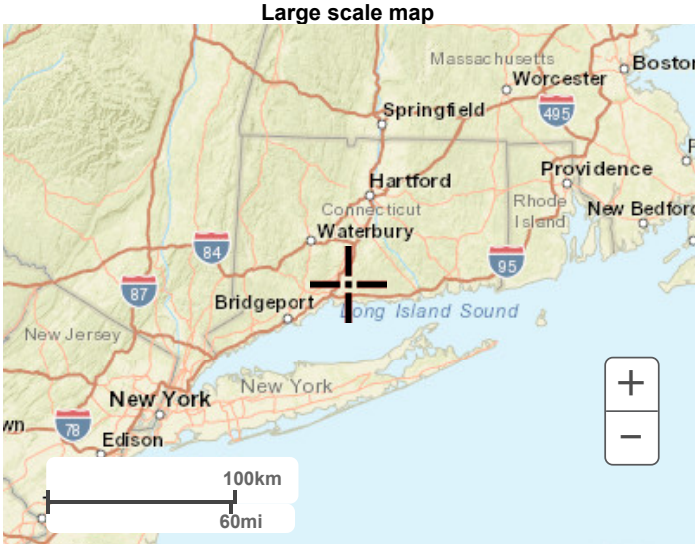
**Small scale terrain**



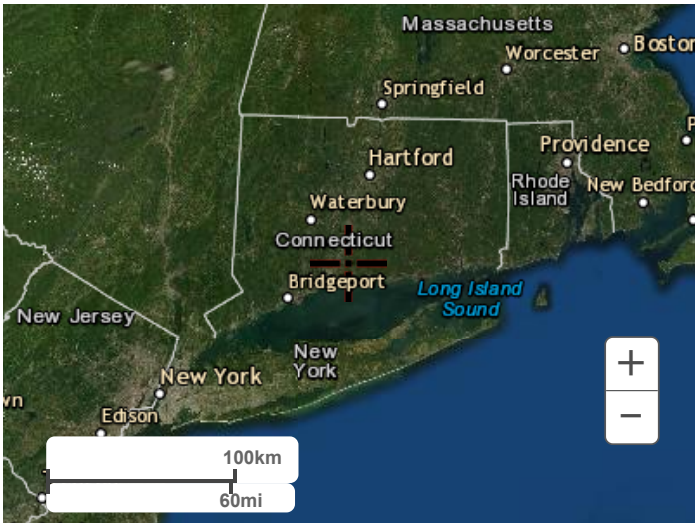

**Large scale terrain**




**Large scale map**




**Large scale aerial**

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

# APPENDIX G: ADDITIONAL CALCULATIONS

SEDIMENT BASIN SIZING
FOR
SUNFLOWER SOLAR
127 FOREST ROAD, NORTH BRANFORD, CT

| | TSB-1 |
|---|---|
| Total Area (ac) | 13.48 |
| Disturbed Area (ac)(DA*) | 8.94 |
| Remaining Existing Drainage Area (ac)(DA^) | 4.54 |
| A* (Disturbed Area)(ton/ac/yr) | 50 |
| A^ (Existing Drainage Area)(ton/ac/yr) | 10 |
| DR | 80% |
| TE | 0.8 |
| γ (silt loam) (lbs/cf) | 75 |
| | |
| Sediment Volume Calcs: | |
| Req. Volume Dry (acre-ft/yr) | 0.19 |
| Req. Volume Dry (cf) | 8,402 |
| Req. Volume Wet (Dry x 2) (cf) | 16,803 |
| Total Req. Sediment Volume (Dry + Wet) (cf) | 25,205 |
| 10YR Storm Residence Time Required (hr) | 10 |
| | |
| Volumes Provided: | |
| Total Provided Sediment Volume (Dry + Wet) (cf) | 28,600 |
| 10YR Storm Residence Time Provided (hr) | 11.50 |

## Stage-Area-Storage for Pond TSB-1: TSB-1

| Elevation (feet) | Surface (sq-ft) | Storage (cubic-feet) |
|---|---|---|
| 74.00 | 7,727 | 0 |
| 74.10 | 7,840 | 778 |
| 74.20 | 7,953 | 1,568 |
| 74.30 | 8,067 | 2,369 |
| 74.40 | 8,183 | 3,181 |
| 74.50 | 8,299 | 4,006 |
| 74.60 | 8,415 | 4,841 |
| 74.70 | 8,533 | 5,689 |
| 74.80 | 8,651 | 6,548 |
| 74.90 | 8,770 | 7,419 |
| 75.00 | 8,890 | 8,302 |
| 75.10 | 9,011 | 9,197 |
| 75.20 | 9,133 | 10,104 |
| 75.30 | 9,255 | 11,024 |
| 75.40 | 9,379 | 11,955 |
| 75.50 | 9,503 | 12,899 |
| 75.60 | 9,628 | 13,856 |
| 75.70 | 9,753 | 14,825 |
| 75.80 | 9,880 | 15,807 |
| 75.90 | 10,007 | 16,801 |
| 76.00 | 10,135 | 17,808 |
| 76.10 | 10,264 | 18,828 |
| 76.20 | 10,394 | 19,861 |
| 76.30 | 10,525 | 20,907 |
| 76.40 | 10,656 | 21,966 |
| 76.50 | 10,788 | 23,038 |
| 76.60 | 10,922 | 24,124 |
| 76.70 | 11,055 | 25,222 |
| 76.80 | 11,190 | 26,335 |
| 76.90 | 11,326 | 27,461 |
| 77.00 | 11,462 | 28,600 ← RISER TOP ELEV. @ 77.00' |
| 77.10 | 11,599 | 29,753 |
| 77.20 | 11,737 | 30,920 |
| 77.30 | 11,876 | 32,100 |
| 77.40 | 12,015 | 33,295 |
| 77.50 | 12,156 | 34,503 |
| 77.60 | 12,297 | 35,726 |
| 77.70 | 12,439 | 36,963 |
| 77.80 | 12,582 | 38,214 |
| 77.90 | 12,726 | 39,479 |
| 78.00 | 12,870 | 40,759 |
| 78.10 | 14,976 | 42,150 |
| 78.20 | 17,241 | 43,760 |
| 78.30 | 19,666 | 45,604 |
| 78.40 | 22,251 | 47,698 |
| 78.50 | 24,994 | 50,059 |
| 78.60 | 27,898 | 52,702 |
| 78.70 | 30,961 | 55,644 |
| 78.80 | 34,183 | 58,900 |
| 78.90 | 37,565 | 62,486 |
| 79.00 | 41,106 | 66,418 ← OVERFLOW WEIR ELEV. @ 79.00' |
| 79.10 | 42,764 | 70,611 |
| 79.20 | 44,455 | 74,972 |
| 79.30 | 46,179 | 79,503 |
| 79.40 | 47,935 | 84,209 |
| 79.50 | 49,724 | 89,091 |
| 79.60 | 51,546 | 94,155 |
| 79.70 | 53,401 | 99,402 |
| 79.80 | 55,289 | 104,836 |
| 79.90 | 57,209 | 110,461 |
| 80.00 | **59,162** | **116,279** |

PIPE SIZING CALCULATIONS
FOR
SUNFLOWER SOLAR
127 FOREST ROAD, NORTH BRANFORD, CT

| PIPE | PIPE DIAMETER (IN) | LENGTH (FT) | INV. IN (FT) | INV. OUT (FT) | SLOPE (FT/FT) | N VALUE | MAX VELOCITY (FT/SEC) |
|---|---|---|---|---|---|---|---|
| TSB-1 | 6 | 110 | 76.00 | 75.50 | 0.0045 | 0.0130 | 1.91 |

| APRON SIZING | | | MIN. LENGTH (FT) | | | MIN. W2 (FT) | |
|---|---|---|---|---|---|---|---|
| PIPE | Sp (FT) | Q (CFS FOR 25YR STORM) | TYPE A | TYPE B | MIN. W1 (FT) | TYPE A | TYPE B |
| TSB-1 | 0.50 | 0.38 | 5.24 | 6.71 | 1.50 | 5.17 | 4.18 |

# APPENDIX H: GEOTECHNICAL REPORT

GeoInsight®
Environmental Strategy & Engineering

November 25, 2020 GeoInsight Project 11120-000

Cela Sinay-Bernie
CP NB Solar I, LLC
CP NB Solar II, LLC
55 Greens Farms Road, Suite 200-78
Westport, Connecticut 06880

Re: Geotechnical Data Report
North Branford Ground Mount
127 Forest Road
North Branford, Connecticut

## 1.0 INTRODUCTION

GeoInsight, Inc. (GeoInsight) prepared this geotechnical data report for Citrine Power (Citrine) to present the results of a limited geotechnical investigation for the above-referenced project. Our services were performed in general accordance with a written scope of services dated October 26, 2020 and approval by Citrine. This report is subject to the Limitations included herein.

## 2.0 PROJECT INFORMATION

The project generally consists of development of a new ground-mount solar array on an approximately 6-acre portion of land at 127 Forest Road in North Branford, Connecticut (the Site; Figure 1). Our current understanding of the proposed project is based upon review of a Concept Plan 2 dated June 24, 2020.

The proposed 6-acre array area is currently an undeveloped agricultural property. Ground surface in the proposed array area currently consists of an open agricultural field. We understand that the proposed new array is to be constructed at the existing grades.

## 3.0 SUBSURFACE EXPLORATION PROGRAM

Subsurface explorations at the Site were conducted on October 27, 2020 and consisted of a total of ten test pits identified as TP-1 through TP-10. The test pits were excavated by Butler Construction using a CAT 308E2 CR mini excavator to depths ranging from approximately 5.5 to 12.5 feet below ground surface (bgs).

Test pit locations were selected based upon the Concept Plan 2 referenced herein, with the intent of the test pits being spatially distributed throughout the proposed solar array area. The test pits were established in the field using a handheld global positioning system (GPS) unit. Ground surface

elevations recorded on the test pit logs are based upon data obtained from the CTECO Connecticut Elevation Viewer (https://cteco.uconn.edu/viewers/ctelevation/). The approximate locations of the test pits are shown on Figure 2.

Soil samples collected from the test pits were field screened for presence of volatile organic compounds (VOCs) using a MiniRae 3000 photo-ionization detector (PID) calibrated to a 100 parts per million (ppm) isobutylene standard. Field screening results indicated VOCs at less than 1 ppm to a maximum of 2.1 ppm. Field screening results are reported on the test pit logs.

GeoInsight oversaw the subsurface explorations, collected soil samples, field screened select soil samples, measured apparent groundwater levels, and prepared test pit logs. Soil samples were placed in sealed containers and returned with the field logs to GeoInsight's office for further evaluation and testing. Soil samples were classified in general accordance with visual and manual procedures (ASTM D 2488) and described using modified Burmister Soil Classification System descriptors. The final test pit logs are included in Attachment A. Stratification lines shown on the test pit logs represent approximate boundaries between soil types encountered. The actual transitions will likely be more gradual and may vary over short distances.

## 4.0 SUBSURFACE CONDITIONS

General

The soil profile and conditions outlined below highlight the major subsurface stratifications at the Site. The individual test pit logs should be consulted for detailed descriptions of the subsurface conditions encountered at the test pit locations. When reviewing the test pit records and the subsurface profile, it should be understood that soil conditions might vary away from the test pit locations. Variations in subsurface conditions are possible laterally and with depth that are not identified on the test pit logs or otherwise in this report.

Overburden Soils

Subsurface conditions at the Site generally consisted of a surficial tilled layer (agriculturally tilled) with miscellaneous debris underlain by a reworked native sand layer (fill; at two locations) and a native stratified drift deposit.

The surficial tilled layer was observed to depths ranging from approximately 1 to 2 feet bgs, and was generally described as a dark brown to brown, heterogeneous mixture of fine to medium sand and silt, with little gravel, trace amounts of clay, trace amounts of cobbles, trace amounts of miscellaneous debris (asphalt, brick, woody material and concrete), and trace amounts of roots. Miscellaneous debris was specifically encountered at five test pit locations.

A layer of reworked native soil/fill was encountered at two test pit locations (TP-4 and TP-10) to depths ranging from approximately 5 to 7 feet bgs. The reworked native soil/fill was generally described as brown, fine to medium sand, with some to little amounts of gravel and silt, and trace amounts of cobbles.

A native stratified drift deposit was encountered at each of the test pits, to the termination depths of the explorations. The native stratified drift deposit was generally described as reddish-brown, light brown or orange, fine to medium sand, with some to trace amounts of gravel, trace amounts of silt, and occasional cobbles. The native deposit also included layers of very fine to fine sand and fine to coarse sand, and trace amounts of clay were observed at TP-10.

Refusal Surfaces

Continuous refusal surfaces (i.e. bedrock) were not encountered in the test pits, which were excavated to depths ranging from approximately 5.5 to 12.5 feet bgs.

Groundwater

Groundwater was encountered at each of the test pits at depths ranging from approximately 5 to 12 feet bgs, which corresponds to approximately elevation (El.) 83 feet to El. 72.5 feet. Groundwater elevation was observed to be highest in the southeast corner of the Site (TP-10; El. 83 feet) and lowest in the northern to northwestern portion of the Site (TP-1 through TP-3; El. 74.5 feet to El. 72.5 feet).

Groundwater levels were recorded shortly after completion of the test pits and therefore may not be representative of static groundwater levels. Groundwater may be shallower or deeper during seasonal periods different than those at the time of the explorations, and generally will fluctuate due to season, temperature, precipitation, nearby underground utilities, and construction activity in the area. Water levels during and following construction may vary from the groundwater measurements reported herein.

## 4.0 LABORATORY TESTING

GeoInsight selected representative soil samples from the test pits for laboratory geotechnical and soil corrosivity testing. The samples were collected from locations that were intended to provide laboratory test data spatially distributed throughout the Site. The geotechnical laboratory testing was performed by GeoInsight or by Phoenix Environmental Laboratories, Inc. of Manchester, Connecticut. The laboratory test reports are included in Attachment B. The geotechnical and soil corrosivity laboratory tests are presented in the following sections.

Geotechnical Laboratory Testing

Geotechnical laboratory testing consisting of the following:

- Grain Size Analysis (ASTM D6913); and
- Moisture Content (ASTM D2216).

The geotechnical laboratory testing included a total of 3 grain size analysis tests and 21 moisture content tests.

Soil Corrosivity Laboratory Testing
Soil corrosivity testing consisted of the following:

- Soil Resistivity (ASTM G57);
- pH (ASTM D4972);
- Water-Soluble Sulfate (AASHTO T290); and
- Water-Soluble Chloride (AASTHO T291).

Laboratory soil corrosivity testing was performed on three representative soil samples collected from the test pits.

## 5.0 GENERAL COMMENTS AND LIMITATIONS

GeoInsight provided the data contained within this report based upon limited subsurface explorations performed, as documented in the report text and attached materials. The data provided in this report pertain to the specific areas explored. GeoInsight believes the subsurface explorations described herein were performed in a manner consistent with the services that would have been provided by other geotechnical professionals under similar circumstances. However, given the variable nature of native soil deposits and rock formations, we cannot represent that the subsurface conditions identified in the test pit logs and described in this report are exact, nor can we guarantee that our interpolation between or extrapolation from subsurface exploration locations is completely representative of actual conditions.

This report has been prepared for specific application to the Site located at 127 Forest Road in North Branford, Connecticut. No other warranty, expressed, or implied, is made. In addition, this report was prepared exclusively for CP NB Solar I, LLC and CP NB Solar II, LLC and the associated project team. The use of this report by other parties without written consent from GeoInsight is hereby prohibited.

We appreciate the opportunity to have been of service to you on this project. If you have questions concerning this report, or if we may be of further assistance, please contact us at (860) 894-1022.

Sincerely,
GEOINSIGHT, INC.

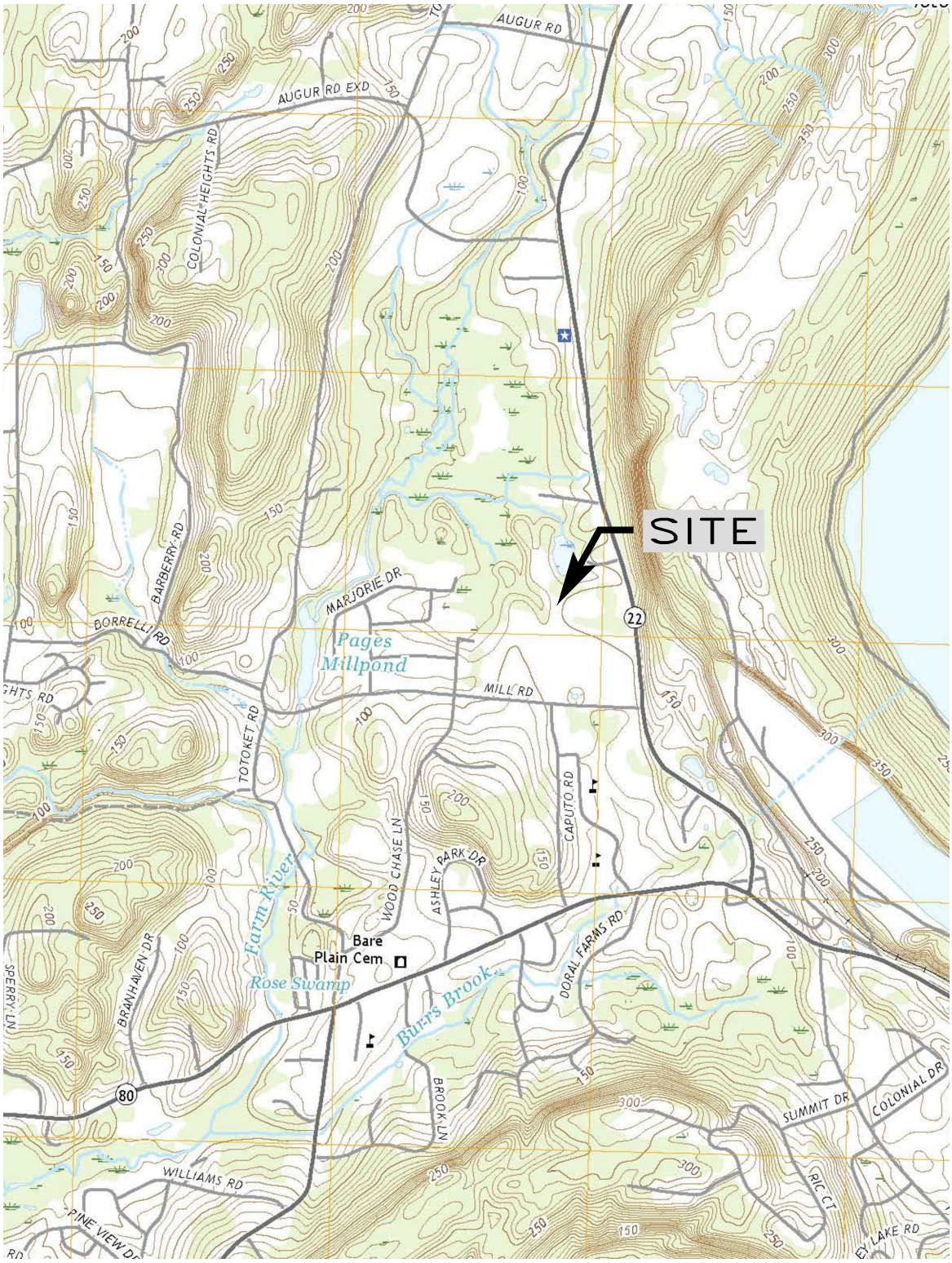
Brian T. Nereson, P.E.
Geotechnical Engineer/Associate

Jeff W. King, P.G., L.E.P.
Senior Hydrogeologist/Regional Manager

Attachments

T:\11120 - Citrine Power, 127 Forest Rd., Northford, CT\Reports And Tables\Reports\Geotechnical\11120 Citrine N Branford CT Geotechnical Data Report.Doc

# FIGURES




## SOURCE:

USGS BRANFORD, CONNECTICUT
TOPOGRAPHIC QUADRANGLE DATED 2018.

CONTOUR INTERVAL: 10 FEET

0 2000 4000

APPROX. SCALE IN FEET

| | | | |
|---|---|---|---|
| CLIENT: CP NB SOLAR I, LLC AND CP NB SOLAR II, LLC | | | |
| PROJECT: 127 FOREST ROAD NORTH BRANFORD, CT | | | |
| TITLE: SITE LOCUS | | | |
| DESIGNED: DES | DRAWN: BTN | CHECKED: JWK | APPROVED: JWK |
| SCALE: 1" = 2000' | DATE: 11/25/20 | FILE NO.: 11120D001 | PROJECT NO.: 11120 |
| | | | FIGURE NO.: 1 |

GeoInsight
Practical in Nature

PLOT DATE: 11-25-20
FILE: T:\11120 - Citrine Power, 127 Forest Rd., Northford, CT\11120D001.dwg


PROPERTY BOUNDARY

TEST PIT LOCATIONS

STUDY AREA BOUNDARY

Site boundaries and features are approximate and should not be used for design.

0 25 50 100 150 200 Feet

**SOURCE:** CTDEEP GIS DATA

N

| | | | | |
|---|---|---|---|---|
| **TITLE:** SITE PLAN WITH TEST PIT LOCATIONS | | | | |
| **PROJECT:** 127 FOREST ROAD NORTH BRANFORD, CONNECTICUT | | | | |
| **CLIENT:** CP NB SOLAR I, LLC AND CP NB SOLAR II, LLC | | | | |
| **DESIGNED:** AHF | **DRAWN:** AHF | **CHECKED:** JWK | **APPROVED:** JWK | GeoInsight *Practical in Nature* |
| **SCALE:** 1"= 80' | **DATE:** 10/27/20 | **FILE NO.:** 11120-M01 | **PROJECT NO.:** 11120-000 | **FIGURE NO.:** 2 |

Date: 11/2/2020
Document Path: H:\ArcMap\11120 - Citrine Power\11120M001 - Site Plan with Test Pits.mxd

**ATTACHMENT A**

# TEST PIT LOG

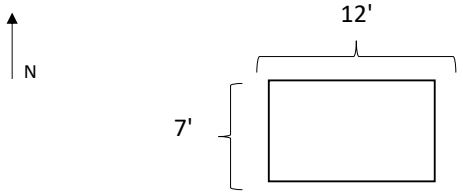
GeoInsight
Environmental Strategy & Engineering

| | |
|---|---|
| **Client:** CP NB Solar I, LLC and CP NB Solar II, LLC | **Test Pit Identification:** TP-1 |
| **Project:** North Branford Ground Mount | **Sheet:** 1 of 1 |
| **Location:** 127 Forest Road, North Branford, Connecticut | **Project No.** 11120 |
| **Equipment:** CAT 308E2 CR | **Date:** 10/27/2020 |
| **Reach:** 14 feet | **Chkd. By:** BTN |
| **GeoInsight Rep.:** AHF | **Weather:** Cloudy, 55 |
| **Contractor:** Butler Construction | **Ground Surface Elev.:** ~ 78 ft[see note 1] |

| GROUNDWATER OBSERVATIONS | FIELD TESTING PERFORMED |
|---|---|
| **Depth (ft. bgs):** 5 | |
| **Stabilization (hours):** After excavation | |
| **Est. SHWT (feet bgs):** Not recorded | |
| **Description:** NA | |

| DEPTH (ft) | SAMPLE INFORMATION # | Depth (ft) | Screening (ppm) | STRATUM DESCRIPTION | SAMPLE DESCRIPTION | NOTE |
|---|---|---|---|---|---|---|
| 0 | | 0-1 | 1.6 | TILLED LAYER (FILL) | 0 - 1: Dark brown, fine to medium SAND and SILT, little Gravel, trace Asphalt, Brick, and Cobble fragments (<1 cm). | |
| 1 | | | | | | |
| | | 1-2.5 | 1.6 | NATIVE GRAVELLY SAND (STRATIFIED DRIFT DEPOSIT) | 1 - 2.5: Reddish brown, fine to medium SAND, some Gravel, little Cobble, trace Silt, damp to moist. | |
| 2 | | | | | | |
| | | 2.5-5.5 | 1.8 | | 2.5 - 5.5: Reddish brown, fine to medium SAND, trace Gravel and Silt, moist to wet. | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | End of excavation - 5.5 feet. Refusal not encountered. | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |
| 13 | | | | | | |
| 14 | | | | | | |
| 15 | | | | | | |

**TEST PIT ORIENTATION (sketch)**




**TEST PIT DETAILS (feet)**

**Length:** 12'

**Width:** 7'

**Depth:** 5.5'

**NOTES**

1. Ground surface elevation based upon data obtained from the CTECO Connecticut Elevation Viewer (https://cteco.uconn.edu/viewers/ctelevation/).

# TEST PIT LOG

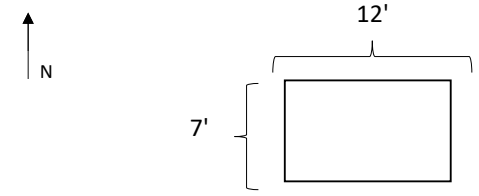
GeoInsight
Environmental Strategy & Engineering

| | |
|---|---|
| **Client:** CP NB Solar I, LLC and CP NB Solar II, LLC | **Test Pit Identification:** TP-2 |
| **Project:** North Branford Ground Mount | **Sheet:** 1 of 1 |
| **Location:** 127 Forest Road, North Branford, Connecticut | **Project No.** 11120 |
| **Equipment:** CAT 308E2 CR | **Date:** 10/27/2020 |
| **Reach:** 14 feet | **Chkd. By:** BTN |
| **GeoInsight Rep.:** AHF | **Weather:** Cloudy, 55 |
| **Contractor:** Butler Construction | **Ground Surface Elev.:** ~ 80 ft[see note 1] |

| GROUNDWATER OBSERVATIONS | FIELD TESTING PERFORMED |
|---|---|
| **Depth (ft. bgs):** 5.5 | |
| **Stabilization (hours):** After excavation | |
| **Est. SHWT (feet bgs):** Not recorded | |
| **Description:** NA | |

| DEPTH (ft) | SAMPLE INFORMATION # | Depth (ft) | Screening (ppm) | STRATUM DESCRIPTION | SAMPLE DESCRIPTION | NOTE |
|---|---|---|---|---|---|---|
| 0 | | 0-1.5 | 1.9 | TILLED LAYER (FILL) | 0 - 1.5: Dark brown, fine to medium SAND, some Silt, little Gravel, trace Cobble and Roots. | |
| 1 | | | | | | |
| 2 | | 1.5-6 | 1.9 | NATIVE SAND (STRATIFIED DRIFT DEPOSIT) | 1.5 - 6: Reddish brown, fine to medium SAND, trace Gravel and Silt, moist to wet. | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | End of excavation - 6 feet. Refusal not encountered. | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |
| 13 | | | | | | |
| 14 | | | | | | |
| 15 | | | | | | |

**TEST PIT ORIENTATION (sketch)**




**TEST PIT DETAILS (feet)**

**Length:** 12'

**Width:** 7'

**Depth:** 6'

**NOTES**

1. Ground surface elevation based upon data obtained from the CTECO Connecticut Elevation Viewer (https://cteco.uconn.edu/viewers/ctelevation/).

# TEST PIT LOG

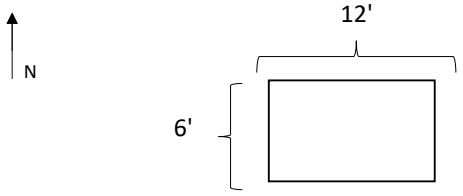
GeoInsight
Environmental Strategy & Engineering

| | |
|---|---|
| **Client:** CP NB Solar I, LLC and CP NB Solar II, LLC | **Test Pit Identification:** TP-3 |
| **Project:** North Branford Ground Mount | **Sheet:** 1 of 1 |
| **Location:** 127 Forest Road, North Branford, Connecticut | **Project No.** 11120 |
| **Equipment:** CAT 308E2 CR | **Date:** 10/27/2020 |
| **Reach:** 14 feet | **Chkd. By:** BTN |
| **GeoInsight Rep.:** AHF | **Weather:** Cloudy, 55 |
| **Contractor:** Butler Construction | **Ground Surface Elev.:** ~ 82 ft[see note 1] |

| GROUNDWATER OBSERVATIONS | FIELD TESTING PERFORMED |
|---|---|
| **Depth (ft. bgs):** 9.5 | |
| **Stabilization (hours):** After excavation | |
| **Est. SHWT (feet bgs):** Not recorded | |
| **Description:** NA | |

| DEPTH (ft) | SAMPLE INFORMATION # | Depth (ft) | Screening (ppm) | STRATUM DESCRIPTION | SAMPLE DESCRIPTION | NOTE |
|---|---|---|---|---|---|---|
| 0 | | 0-2 | 2.1 | TILLED LAYER (FILL) | 0 - 2: Brown, fine to medium SAND, some Silt, little Gravel, trace Brick, Clay, and Concrete fragments (<0.5 cm), damp. | |
| 1 | | | | | | |
| | | | | | | |
| 2 | | 2-4 | 1.9 | NATIVE GRAVELLY SAND (STRATIFIED DRIFT DEPOSIT) | 2 - 4: Reddish brown, fine to medium SAND, some Cobble and Gravel, trace Silt, damp. | |
| 3 | | | | | | |
| | | | | | | |
| 4 | | 4-5 | 1.6 | | 4 - 5: Light brown, very fine to medium SAND, some Gravel, trace Cobble and Silt, damp. | |
| 5 | | 5-7 | 1.6 | | 5 - 7: Reddish brown, fine to medium SAND, some Cobble and Gravel, trace Silt, damp to moist. | |
| 6 | | | | | | |
| | | | | | | |
| 7 | | 7-10 | 1.6 | | 7 - 10: Light brown, fine to medium SAND, little Gravel, trace Cobble and Silt, moist to wet. | |
| 8 | | | | | | |
| | | | | | | |
| 9 | | | | | | |
| | | | | | | |
| 10 | | | | | End of excavation - 10 feet. Refusal not encountered. | |
| 11 | | | | | | |
| | | | | | | |
| 12 | | | | | | |
| | | | | | | |
| 13 | | | | | | |
| | | | | | | |
| 14 | | | | | | |
| | | | | | | |
| 15 | | | | | | |

**TEST PIT ORIENTATION (sketch)**




**TEST PIT DETAILS (feet)**

**Length:** 12'

**Width:** 6'

**Depth:** 10'

**NOTES**

1. Ground surface elevation based upon data obtained from the CTECO Connecticut Elevation Viewer (https://cteco.uconn.edu/viewers/ctelevation/).

# TEST PIT LOG

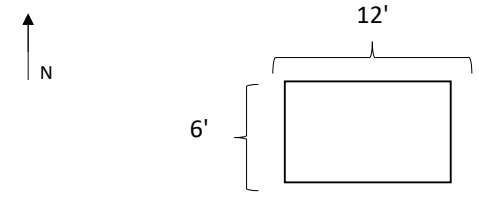
GeoInsight
Environmental Strategy & Engineering

| | |
|---|---|
| **Client:** CP NB Solar I, LLC and CP NB Solar II, LLC | **Test Pit Identification:** TP-4 |
| **Project:** North Branford Ground Mount | **Sheet:** 1 of 1 |
| **Location:** 127 Forest Road, North Branford, Connecticut | **Project No.** 11120 |
| **Equipment:** CAT 308E2 CR | **Date:** 10/27/2020 |
| **Reach:** 14 feet | **Chkd. By:** BTN |
| **GeoInsight Rep.:** AHF | **Weather:** Cloudy, 55 |
| **Contractor:** Butler Construction | **Ground Surface Elev.:** ~ 86 ft[see note 1] |

| GROUNDWATER OBSERVATIONS | FIELD TESTING PERFORMED |
|---|---|
| **Depth (ft. bgs):** 10 | |
| **Stabilization (hours):** After excavation | |
| **Est. SHWT (feet bgs):** Not recorded | |
| **Description:** NA | |

| DEPTH (ft) | SAMPLE INFORMATION # | Depth (ft) | Screening (ppm) | STRATUM DESCRIPTION | SAMPLE DESCRIPTION | NOTE |
|---|---|---|---|---|---|---|
| 0 | | 0-0.5 | | TOPSOIL | 6 inches Organic TOPSOIL. | |
| 1 | | 0.5-5 | 2 | REWORKED NATIVE/FILL | 0.5 - 5: Brown, fine to medium SAND, some Gravel and Silt, little Cobble, damp. | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | 5-6 | 1.6 | NATIVE GRAVELLY SAND (STRATIFIED DRIFT DEPOSIT) | 5 - 6: Light brown, fine to medium SAND, little Gravel, trace Silt, damp. | |
| 6 | | 6-10.5 | 1.6 | | 6 - 10.5: Reddish brown, fine to medium SAND, some Cobble and Gravel, trace Silt, moist to wet. | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | End of excavation - 10.5 feet. Refusal not encountered. | |
| 12 | | | | | | |
| 13 | | | | | | |
| 14 | | | | | | |
| 15 | | | | | | |

**TEST PIT ORIENTATION (sketch)**




**TEST PIT DETAILS (feet)**

**Length:** 12'

**Width:** 6'

**Depth:** 10.5'

**NOTES**

1. Ground surface elevation based upon data obtained from the CTECO Connecticut Elevation Viewer (https://cteco.uconn.edu/viewers/ctelevation/).

# TEST PIT LOG

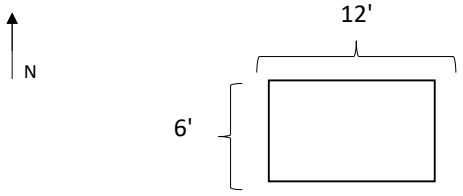
GeoInsight
Environmental Strategy & Engineering

| | |
|---|---|
| **Client:** CP NB Solar I, LLC and CP NB Solar II, LLC | **Test Pit Identification:** TP-5 |
| **Project:** North Branford Ground Mount | **Sheet:** 1 of 1 |
| **Location:** 127 Forest Road, North Branford, Connecticut | **Project No.** 11120 |
| **Equipment:** CAT 308E2 CR | **Date:** 10/27/2020 |
| **Reach:** 14 feet | **Chkd. By:** BTN |
| **GeoInsight Rep.:** AHF | **Weather:** Cloudy, 55 |
| **Contractor:** Butler Construction | **Ground Surface Elev.:** ~ 82 ft[see note 1] |

| GROUNDWATER OBSERVATIONS | FIELD TESTING PERFORMED |
|---|---|
| **Depth (ft. bgs):** 7.5 | |
| **Stabilization (hours):** After excavation | |
| **Est. SHWT (feet bgs):** Not recorded | |
| **Description:** NA | |

| DEPTH (ft) | SAMPLE INFORMATION # | Depth (ft) | Screening (ppm) | STRATUM DESCRIPTION | SAMPLE DESCRIPTION | NOTE |
|---|---|---|---|---|---|---|
| 0 | | 0-1.5 | <1 | TILLED LAYER (FILL) | 0 - 1.5: Brown, fine to medium SAND, some Gravel and Silt, little Cobble, trace Brick and Concrete fragments (<2 cm), damp. | |
| 1 | | | | | | |
| 2 | | 1.5-4 | <1 | NATIVE GRAVELLY SAND (STRATIFIED DRIFT DEPOSIT) | 1.5 - 4: Orange to brown, fine to coarse SAND, some Gravel, trace Cobble and Silt, damp. | |
| 3 | | | | | | |
| 4 | | 4-8 | <1 | | 4 - 8: Orange to brown, fine to medium SAND, trace Gravel and Silt, moist to wet. | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | End of excavation - 8 feet. Refusal not encountered. | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |
| 13 | | | | | | |
| 14 | | | | | | |
| 15 | | | | | | |

**TEST PIT ORIENTATION (sketch)**




**TEST PIT DETAILS (feet)**

**Length:** 12'

**Width:** 6'

**Depth:** 8'

**NOTES**

1. Ground surface elevation based upon data obtained from the CTECO Connecticut Elevation Viewer (https://cteco.uconn.edu/viewers/ctelevation/).

# TEST PIT LOG

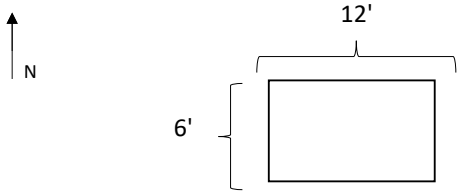
GeoInsight
Environmental Strategy & Engineering

| | |
|---|---|
| **Client:** CP NB Solar I, LLC and CP NB Solar II, LLC | **Test Pit Identification:** TP-6 |
| **Project:** North Branford Ground Mount | **Sheet:** 1 of 1 |
| **Location:** 127 Forest Road, North Branford, Connecticut | **Project No.** 11120 |
| **Equipment:** CAT 308E2 CR | **Date:** 10/27/2020 |
| **Reach:** 14 feet | **Chkd. By:** BTN |
| **GeoInsight Rep.:** AHF | **Weather:** Cloudy, 55 |
| **Contractor:** Butler Construction | **Ground Surface Elev.:** ~ 83 ft[see note 1] |

| GROUNDWATER OBSERVATIONS | FIELD TESTING PERFORMED |
|---|---|
| **Depth (ft. bgs):** 8 | |
| **Stabilization (hours):** After excavation | |
| **Est. SHWT (feet bgs):** Not recorded | |
| **Description:** NA | |

| DEPTH (ft) | SAMPLE INFORMATION # | Depth (ft) | Screening (ppm) | STRATUM DESCRIPTION | SAMPLE DESCRIPTION | NOTE |
|---|---|---|---|---|---|---|
| 0 | | 0-0.5 | | TOPSOIL | 6 inches Organic TOPSOIL. | |
| 1 | | 0.5-2 | 1.0 | TILLED LAYER (FILL) | 0.5 - 2: Brown, fine to medium SAND, some Silt, little Gravel, trace Brick fragments, Cobble, Roots, and Woody debris, damp. | |
| 2 | | 2-8.5 | <1 | NATIVE GRAVELLY SAND (STRATIFIED DRIFT DEPOSIT) | 2 - 8.5: Reddish brown, fine to coarse SAND, little Gravel, trace Cobble and Silt, moist to wet. | |
| 8 | | | | | End of excavation - 8.5 feet. Refusal not encountered. | |

**TEST PIT ORIENTATION (sketch)**




**TEST PIT DETAILS (feet)**

**Length:** 12'

**Width:** 6'

**Depth:** 8.5'

**NOTES**

1. Ground surface elevation based upon data obtained from the CTECO Connecticut Elevation Viewer (https://cteco.uconn.edu/viewers/ctelevation/).

# TEST PIT LOG

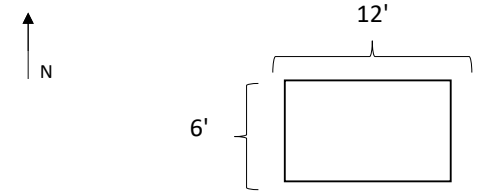
GeoInsight
Environmental Strategy & Engineering

| | |
|---|---|
| **Client:** CP NB Solar I, LLC and CP NB Solar II, LLC | **Test Pit Identification:** TP-7 |
| **Project:** North Branford Ground Mount | **Sheet:** 1 of 1 |
| **Location:** 127 Forest Road, North Branford, Connecticut | **Project No.** 11120 |
| **Equipment:** CAT 308E2 CR | **Date:** 10/27/2020 |
| **Reach:** 14 feet | **Chkd. By:** BTN |
| **GeoInsight Rep.:** AHF | **Weather:** Cloudy, 55 |
| **Contractor:** Butler Construction | **Ground Surface Elev.:** ~ 86 ft[see note 1] |

| GROUNDWATER OBSERVATIONS | FIELD TESTING PERFORMED |
|---|---|
| **Depth (ft. bgs):** 12 | |
| **Stabilization (hours):** After excavation | |
| **Est. SHWT (feet bgs):** Not recorded | |
| **Description:** NA | |

| DEPTH (ft) | SAMPLE INFORMATION # | Depth (ft) | Screening (ppm) | STRATUM DESCRIPTION | SAMPLE DESCRIPTION | NOTE |
|---|---|---|---|---|---|---|
| 0 | | 0-2 | 2 | TILLED LAYER (FILL) | 0 - 2: Brown, fine to medium SAND, some Silt, little Gravel, trace Cobble and Roots, damp. | |
| 1 | | | | | | |
| 2 | | 2-5 | 1.6 | NATIVE GRAVELLY SAND (STRATIFIED DRIFT DEPOSIT) | 2 - 5: Reddish brown, fine to medium SAND, some Gravel, trace Cobble and Silt, damp. | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | 5-6 | 1.6 | | 5 - 6: Light brown, very fine to fine SAND, trace Gravel and Silt, damp. | |
| 6 | | 6-10 | 1.6 | | 6 - 10: Reddish brown, fine to coarse SAND, little Gravel, trace Silt, damp to moist. | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | 10-12.5 | 1.6 | | 10 - 12.5: Reddish brown, very fine to medium SAND, little Silt, trace Gravel, wet. | |
| 11 | | | | | | |
| 12 | | | | | | |
| 13 | | | | | End of excavation - 12.5 feet. Refusal not encountered. | |
| 14 | | | | | | |
| 15 | | | | | | |

**TEST PIT ORIENTATION (sketch)**




**TEST PIT DETAILS (feet)**

**Length:** 12'

**Width:** 6'

**Depth:** 12.5'

**NOTES**

1. Ground surface elevation based upon data obtained from the CTECO Connecticut Elevation Viewer (https://cteco.uconn.edu/viewers/ctelevation/).

# TEST PIT LOG

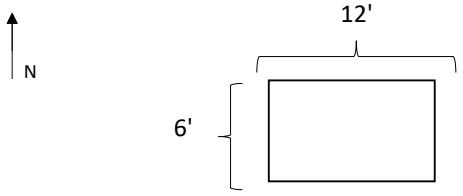
GeoInsight
Environmental Strategy & Engineering

| | |
|---|---|
| **Client:** CP NB Solar I, LLC and CP NB Solar II, LLC | **Test Pit Identification:** TP-8 |
| **Project:** North Branford Ground Mount | **Sheet:** 1 of 1 |
| **Location:** 127 Forest Road, North Branford, Connecticut | **Project No.** 11120 |
| **Equipment:** CAT 308E2 CR | **Date:** 10/27/2020 |
| **Reach:** 14 feet | **Chkd. By:** BTN |
| **GeoInsight Rep.:** AHF | **Weather:** Cloudy, 55 |
| **Contractor:** Butler Construction | **Ground Surface Elev.:** ~ 85 ft[see note 1] |

| GROUNDWATER OBSERVATIONS | FIELD TESTING PERFORMED |
|---|---|
| **Depth (ft. bgs):** 8 | |
| **Stabilization (hours):** After excavation | |
| **Est. SHWT (feet bgs):** Not recorded | |
| **Description:** NA | |

| DEPTH (ft) | SAMPLE INFORMATION # | Depth (ft) | Screening (ppm) | STRATUM DESCRIPTION | SAMPLE DESCRIPTION | NOTE |
|---|---|---|---|---|---|---|
| 0 | | 0-2 | <1 | TILLED LAYER (FILL) | 0 - 2: Brown, fine to medium SAND, some Silt, little Cobble and Gravel, damp. | |
| 1 | | | | | | |
| 2 | | 2-8.5 | <1 | NATIVE SAND (STRATIFIED DRIFT DEPOSIT) | 2 - 8.5: Orange to brown, very fine to medium SAND, trace Gravel and Silt, damp to wet. | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | End of excavation - 8.5 feet. Refusal not encountered. | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |
| 13 | | | | | | |
| 14 | | | | | | |
| 15 | | | | | | |

**TEST PIT ORIENTATION (sketch)**




**TEST PIT DETAILS (feet)**

**Length:** 12'

**Width:** 6'

**Depth:** 8.5'

**NOTES**

1. Ground surface elevation based upon data obtained from the CTECO Connecticut Elevation Viewer (https://cteco.uconn.edu/viewers/ctelevation/).

# TEST PIT LOG

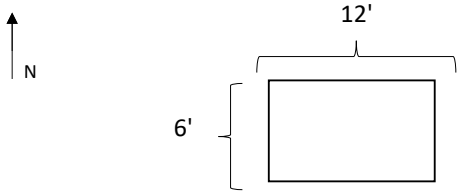
GeoInsight
Environmental Strategy & Engineering

| | |
|---|---|
| **Client:** CP NB Solar I, LLC and CP NB Solar II, LLC | **Test Pit Identification:** TP-9 |
| **Project:** North Branford Ground Mount | **Sheet:** 1 of 1 |
| **Location:** 127 Forest Road, North Branford, Connecticut | **Project No.** 11120 |
| **Equipment:** CAT 308E2 CR | **Date:** 10/27/2020 |
| **Reach:** 14 feet | **Chkd. By:** BTN |
| **GeoInsight Rep.:** AHF | **Weather:** Cloudy, 55 |
| **Contractor:** Butler Construction | **Ground Surface Elev.:** ~ 85 ft[see note 1] |

| GROUNDWATER OBSERVATIONS | FIELD TESTING PERFORMED |
|---|---|
| **Depth (ft. bgs):** 7 | |
| **Stabilization (hours):** After excavation | |
| **Est. SHWT (feet bgs):** Not recorded | |
| **Description:** NA | |

| DEPTH (ft) | SAMPLE INFORMATION # | Depth (ft) | Screening (ppm) | STRATUM DESCRIPTION | SAMPLE DESCRIPTION | NOTE |
|---|---|---|---|---|---|---|
| 0 | | 0-1 | <1 | TILLED LAYER (FILL) | 0 - 1: Brown, fine to medium SAND, some Silt, little Cobble and Gravel, trace Concrete fragment, damp. | |
| 1 | | | | | | |
| | | 1-7.5 | <1 | NATIVE SAND (STRATIFIED DRIFT DEPOSIT) | 1 - 7.5: Light brown, very fine to medium SAND, trace Gravel and Silt, damp to wet. | |
| 2 | | | | | | |
| | | | | | | |
| 3 | | | | | | |
| | | | | | | |
| 4 | | | | | | |
| | | | | | | |
| 5 | | | | | | |
| | | | | | | |
| 6 | | | | | | |
| | | | | | | |
| 7 | | | | | | |
| | | | | | | |
| 8 | | | | | | |
| | | | | | | |
| 9 | | | | | End of excavation - 7.5 feet. Refusal not encountered. | |
| | | | | | | |
| 10 | | | | | | |
| | | | | | | |
| 11 | | | | | | |
| | | | | | | |
| 12 | | | | | | |
| | | | | | | |
| 13 | | | | | | |
| | | | | | | |
| 14 | | | | | | |
| | | | | | | |
| 15 | | | | | | |

**TEST PIT ORIENTATION (sketch)**




**TEST PIT DETAILS (feet)**

**Length:** 12'

**Width:** 6'

**Depth:** 7.5'

**NOTES**

1. Ground surface elevation based upon data obtained from the CTECO Connecticut Elevation Viewer (https://cteco.uconn.edu/viewers/ctelevation/).

# TEST PIT LOG

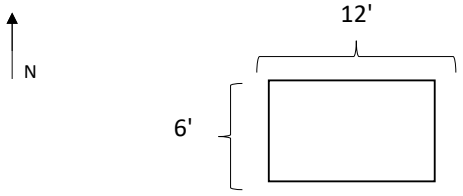
GeoInsight
Environmental Strategy & Engineering

| | |
|---|---|
| **Client:** CP NB Solar I, LLC and CP NB Solar II, LLC | **Test Pit Identification:** TP-10 |
| **Project:** North Branford Ground Mount | **Sheet:** 1 of 1 |
| **Location:** 127 Forest Road, North Branford, Connecticut | **Project No.** 11120 |
| **Equipment:** CAT 308E2 CR | **Date:** 10/27/2020 |
| **Reach:** 14 feet | **Chkd. By:** BTN |
| **GeoInsight Rep.:** AHF | **Weather:** Cloudy, 55 |
| **Contractor:** Butler Construction | **Ground Surface Elev.:** ~ 95 ft[see note 1] |

| GROUNDWATER OBSERVATIONS | FIELD TESTING PERFORMED |
|---|---|
| **Depth (ft. bgs):** 12 | |
| **Stabilization (hours):** After excavation | |
| **Est. SHWT (feet bgs):** Not recorded | |
| **Description:** NA | |

| DEPTH (ft) | SAMPLE INFORMATION # | Depth (ft) | Screening (ppm) | STRATUM DESCRIPTION | SAMPLE DESCRIPTION | NOTE |
|---|---|---|---|---|---|---|
| 0 | | 0-2 | <1 | TILLED LAYER (FILL) | 0 - 2: Brown, fine to medium SAND, some Silt, little Gravel, trace Cobble, damp. | |
| 1 | | | | | | |
| 2 | | 2-7 | <1 | REWORKED NATIVE/FILL | 2 - 7: Brown, fine to medium SAND, little Gravel and Silt, trace Cobble, damp. | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | 7-12.5 | <1 | NATIVE SILTY SAND (STRATIFIED DRIFT DEPOSIT) | 7 - 12.5: Light brown, very fine to fine SAND, little Silt, trace Clay and Gravel, damp to wet. | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |
| 13 | | | | | End of excavation - 12.5 feet. Refusal not encountered. | |
| 14 | | | | | | |
| 15 | | | | | | |

**TEST PIT ORIENTATION (sketch)**




**TEST PIT DETAILS (feet)**

**Length:** 12'

**Width:** 6'

**Depth:** 12.5'

**NOTES**

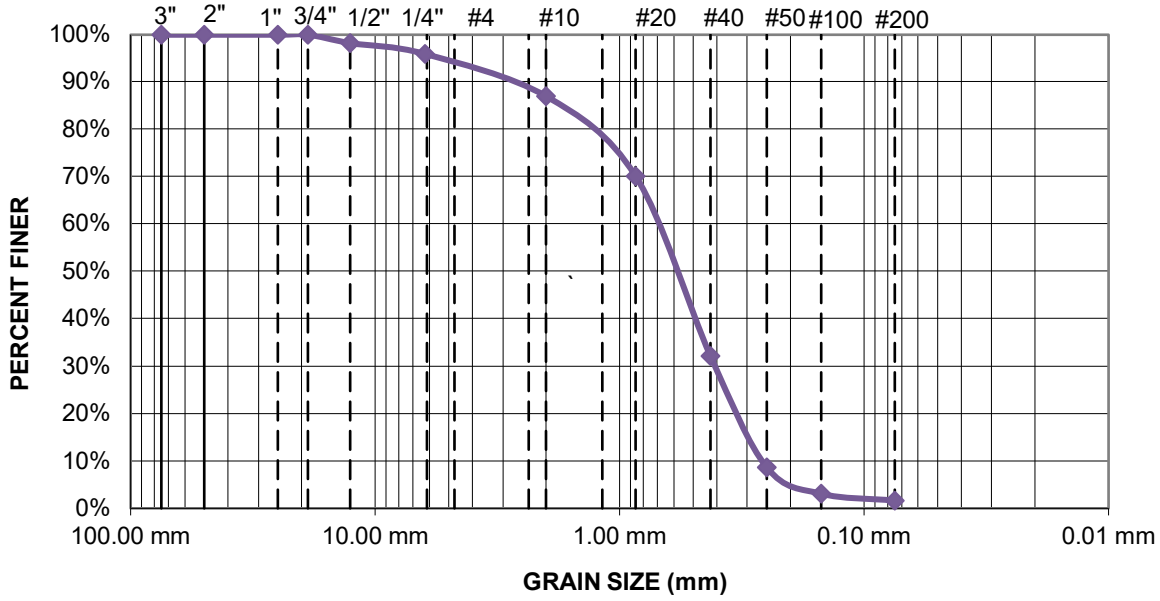
1. Ground surface elevation based upon data obtained from the CTECO Connecticut Elevation Viewer (https://cteco.uconn.edu/viewers/ctelevation/).

**ATTACHMENT B**

GeoInsight®
Environmental Strategy & Engineering
*Practical in Nature*

186 Granite Street, 3rd Flr, Suite A
Manchester, New Hampshire 03101
Tel: (603) 314-0820
Fax: (603) 314-0821
info@geoinc.com
www.geoinsightinc.com

# Particle Size Distribution Report




| % > 3" | %Gravel | | | %Sand | | | %Fines |
|---|---|---|---|---|---|---|---|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| Retained | 0.0% | 0.0% | 4.1% | 9.0% | 54.8% | 30.6% | 1.6% |

| SIEVE SIZE | PERCENT FINER | SPEC. PERCENT | Pass? (X=NO) |
|---|---|---|---|
| 3 " | 100.0% | * | |
| 2 " | 100.0% | | |
| 1 " | 100.0% | | |
| 3/4 " | 100.0% | | |
| 1/2 " | 98.2% | | |
| 1/4 " | 95.9% | | |
| # 4 | 95.9% | | |
| # 8 | | | |
| # 10 | 87.0% | | |
| # 16 | | | |
| # 20 | 70.1% | | |
| # 40 | 32.2% | | |
| # 60 | 8.7% | | |
| # 100 | 3.1% | | |
| # 200 | 1.6% | | |

*no specification provided

**Material Description**

Brown, fine to medium SAND, trace fine Gravel and Silt.

**Atterberg Limits**

PL = LL = PI =

**Partcle Sizes**

$D_{85}$ = $D_{60}$ = $D_{50}$ =
$D_{30}$ = $D_{15}$ = $D_{10}$ =
$C_u$ = $C_c$ =

**Classification**

UCS = AASHTO =

**Remarks**

TP

**Project Name:** 127 Forest Rd, North Branford, CT **Project No.:** 11120

**Sample No.:** L001 **Source of Sample:** TP-1 **Date:** 11/5/20

**Location:** Test Pit TP-1 **Elev./Depth:** 4-5 ft

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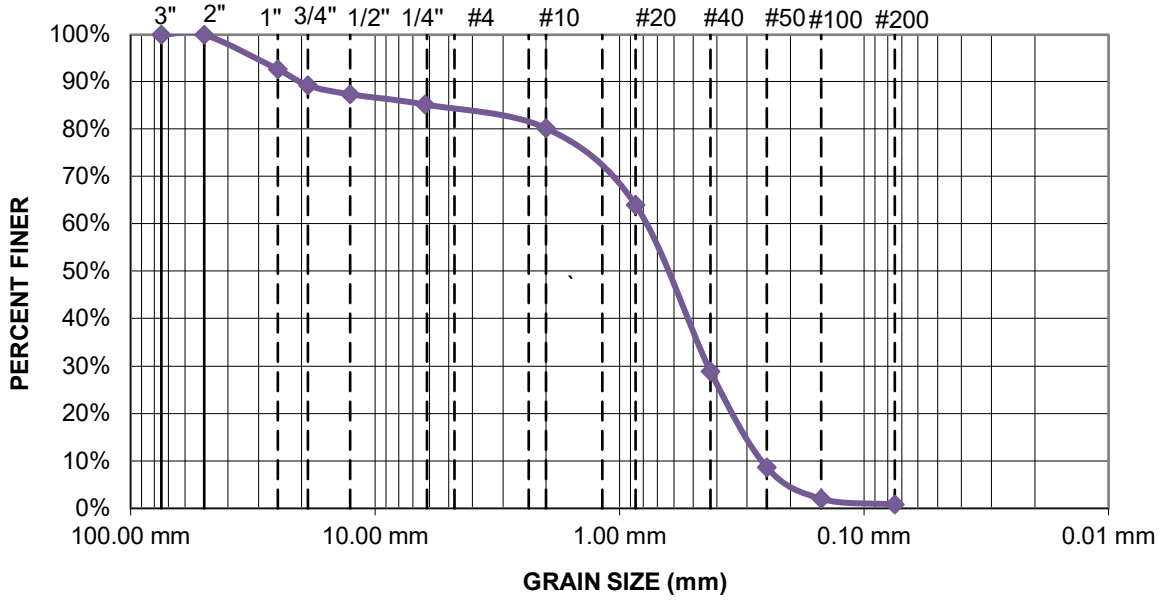
info@geoinc.com
www.geoinsightinc.com

# Particle Size Distribution Report




| % > 3" | %Gravel | | | %Sand | | | %Fines |
|---|---|---|---|---|---|---|---|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| Retained | 0.0% | 10.8% | 4.0% | 5.0% | 51.3% | 28.1% | 0.8% |

| SIEVE SIZE | PERCENT FINER | SPEC. PERCENT | Pass? (X=NO) |
|---|---|---|---|
| 3 " | 100.0% | * | |
| 2 " | 100.0% | | |
| 1 " | 92.6% | | |
| 3/4 " | 89.2% | | |
| 1/2 " | 87.4% | | |
| 1/4 " | 85.2% | | |
| # 4 | 85.2% | | |
| # 8 | | | |
| # 10 | 80.2% | | |
| # 16 | | | |
| # 20 | 64.1% | | |
| # 40 | 28.9% | | |
| # 60 | 8.7% | | |
| # 100 | 2.0% | | |
| # 200 | 0.8% | | |

*no specification provided

**Material Description**

Brown, fine to medium SAND, little Gravel, trace Silt.

**Atterberg Limits**

PL = LL = PI =

**Partcle Sizes**

$D_{85}$ = $D_{60}$ = $D_{50}$ =
$D_{30}$ = $D_{15}$ = $D_{10}$ =
$C_u$ = $C_c$ =

**Classification**

UCS = AASHTO =

**Remarks**

**Project Name:** 127 Forest Rd, North Branford, CT **Project No.:** 11120

**Sample No.:** L002 **Source of Sample:** TP-6 **Date:** 11/5/20

**Location:** Test Pit TP-6 **Elev./Depth:** 2-4 ft

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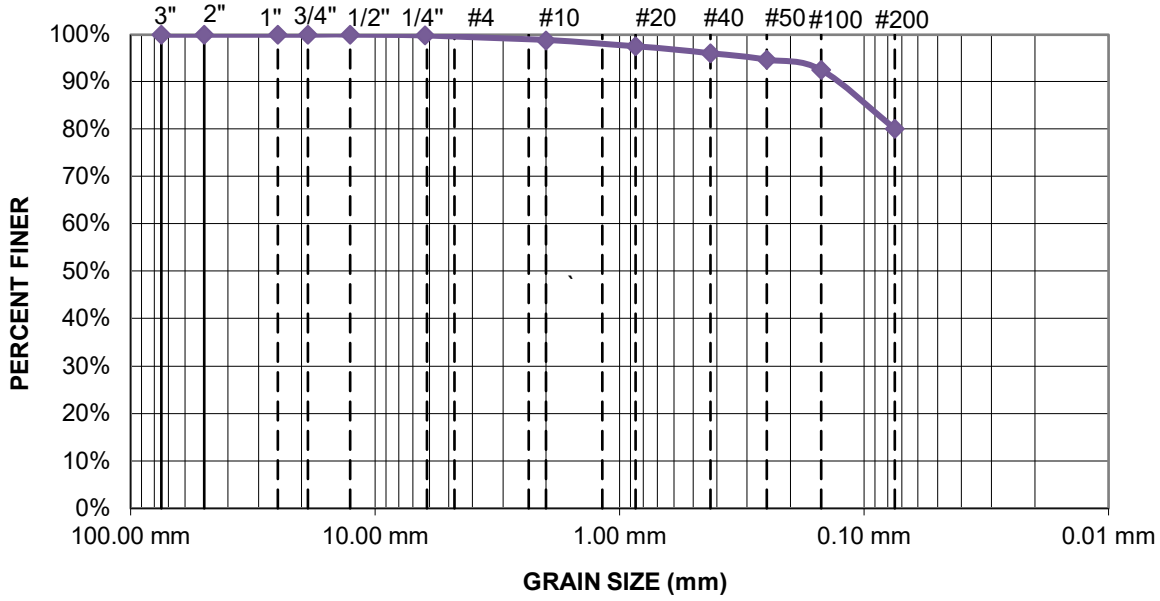
Fax: (603) 314-0821
info@geoinc.com
www.geoinsightinc.com

# Particle Size Distribution Report




| % > 3" | %Gravel | | | %Sand | | | %Fines |
|---|---|---|---|---|---|---|---|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| Retained | 0.0% | 0.0% | 0.2% | 1.0% | 2.7% | 15.9% | 80.1% |

| SIEVE SIZE | PERCENT FINER | SPEC. PERCENT | Pass? (X=NO) |
|---|---|---|---|
| 3 " | 100.0% | * | |
| 2 " | 100.0% | | |
| 1 " | 100.0% | | |
| 3/4 " | 100.0% | | |
| 1/2 " | 100.0% | | |
| 1/4 " | 99.8% | | |
| # 4 | 99.8% | | |
| # 8 | | | |
| # 10 | 98.8% | | |
| # 16 | | | |
| # 20 | 97.5% | | |
| # 40 | 96.1% | | |
| # 60 | 94.7% | | |
| # 100 | 92.5% | | |
| # 200 | 80.1% | | |

*no specification provided

**Material Description**

Brown, SILT, little fine Sand, trace Gravel.

**Atterberg Limits**

PL = LL = PI =

**Partcle Sizes**

$D_{85}$ = $D_{60}$ = $D_{50}$ =
$D_{30}$ = $D_{15}$ = $D_{10}$ =
$C_u$ = $C_c$ =

**Classification**

UCS = AASHTO =

**Remarks**

**Project Name:** 127 Forest Rd, North Branford, CT **Project No.:** 11120

**Sample No.:** L002 **Source of Sample:** TP-10 **Date:** 11/5/20

**Location:** Test Pit TP-10 **Elev./Depth:** 10-12 ft

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## Natural Moisture Content Laboratory Report

## ASTM D2216

| Sample Location | Sample Depth (feet bgs) | Moisture Content (%) |
|---|---|---|
| TP-2 | 0-2 | 9.5 |
| TP-2 | 2-4 | 12.8 |
| TP-2 | 4-6 | 17.0 |

| Sample Location | Sample Depth (feet bgs) | Moisture Content (%) |
|---|---|---|
| TP-7 | 2-4 | 4.9 |
| TP-7 | 4-6 | 5.0 |
| TP-7 | 6-8 | 5.6 |
| TP-7 | 8-10 | 4.8 |
| TP-7 | 10-12 | 12.7 |

| | | |
|---|---|---|
| TP-4 | 0-2 | 13.3 |
| TP-4 | 2-4 | 9.9 |
| TP-4 | 4-6 | 10.3 |
| TP-4 | 6-8 | 7.6 |
| TP-4 | 8-10 | 9.2 |

| | | |
|---|---|---|
| TP-8 | 0-2 | 5.5 |
| TP-8 | 2-4 | 5.1 |
| TP-8 | 4-6 | 19.6 |
| TP-8 | 6-8 | 17.4 |

| | | |
|---|---|---|
| TP-5 | 0-2 | 5.7 |
| TP-5 | 2-4 | 4.8 |
| TP-5 | 4-6 | 5.4 |
| TP-5 | 6-8 | 15.1 |

**Project:** North Branford Ground Mount Array

**Project Location:** 127 Forest Road, North Branford, CT

**GeoInsight Project No:** 11120-000

**Test Date:** 11/5/20

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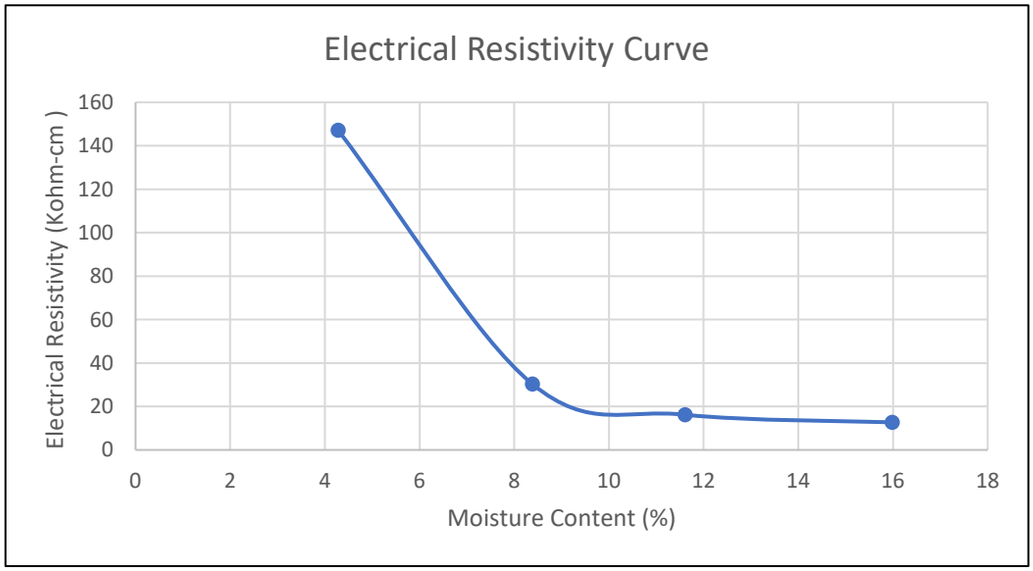
# ELECTRICAL RESISTIVITY LABORATORY TEST REPORT
# ASTM G187 SOIL BOX METHOD

**Project Name:** 127 Forest Rd, North Branford, CT
**GeoInsight Project No.:** 11120

**Sample Location:** On-Site Material
**Sample Depth:** TP-1 (2-4')




**Test Data**

| Resistivity (Kohm-cm) | Moisture Content (%) |
|---|---|
| 147.1 | 4.3 |
| 30.36 | 8.4 |
| 16.21 | 11.6 |
| 12.72 | 16.0 |

**Run By:** ATS
**Date:** 11/4/2020
**Approved By:** BTN

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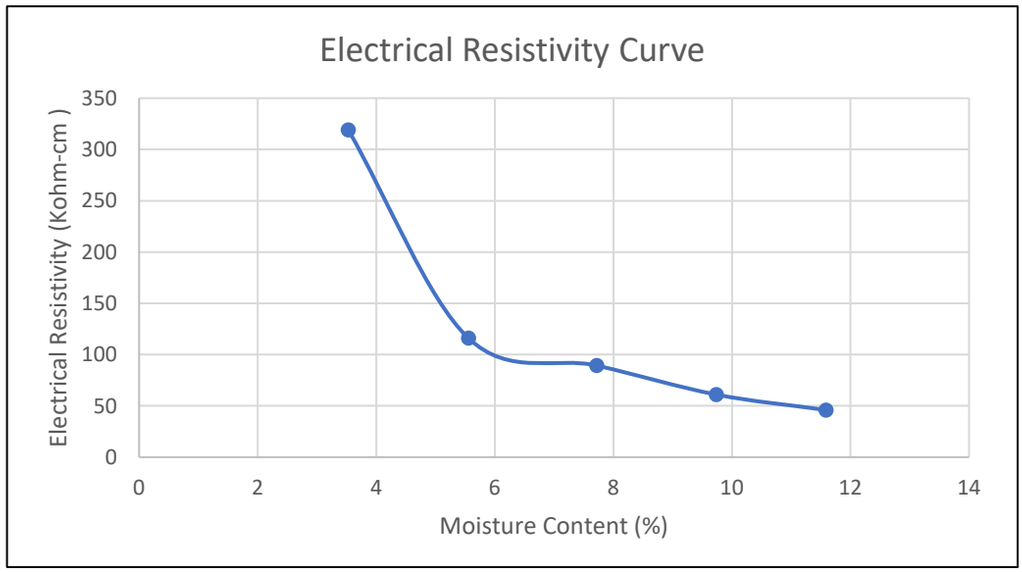
**ELECTRICAL RESISTIVITY LABORATORY TEST REPORT**
**ASTM G187 SOIL BOX METHOD**

**Project Name:** 127 Forest Rd, North Branford, CT
**GeoInsight Project No.:** 11120

**Sample Location:** On-Site Material
**Sample Depth:** TP-6 (2-4')




**Test Data**

| Resistivity (Kohm-cm) | Moisture Content (%) |
|---|---|
| 319 | 3.5 |
| 116 | 5.6 |
| 89.30 | 7.7 |
| 61.03 | 9.7 |
| 45.99 | 11.6 |

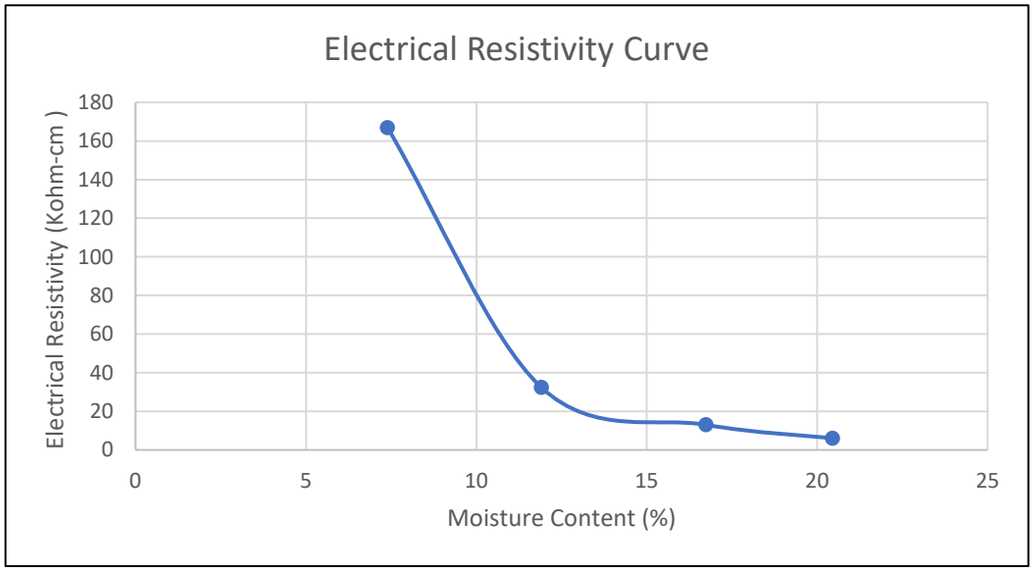
**Run By:** ATS
**Date:** 11/4/2020
**Approved By:** BTN

GeoInsight
Environmental Strategy & Engineering
*Practical in Nature*

**ELECTRICAL RESISTIVITY LABORATORY TEST REPORT**
**ASTM G187 SOIL BOX METHOD**

**Project Name:** 127 Forest Rd, North Branford, CT
**GeoInsight Project No.:** 11120

**Sample Location:** On-Site Material
**Sample Depth:** TP-10 (2-4')




**Test Data**

| Resistivity (Kohm-cm) | Moisture Content (%) |
|---|---|
| 167.0 | 7.4 |
| 32.4 | 11.9 |
| 13.03 | 16.7 |
| 6.10 | 20.5 |

**Run By:** ATS
**Date:** 11/4/2020
**Approved By:** BTN

PHOENIX
Environmental Laboratories, Inc.

**Friday, November 06, 2020**

**Attn: Mr. Jeff King**
**GeoInsight, Inc.**
**200 Court St 2nd Fl**
**Middletown, CT 06457**

**Project ID:** **11120 CITRINE POWER**
**SDG ID:** **GCH04605**
**Sample ID#s: CH04605 - CH04607**

**This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.**

**This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.**

**All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.**

**A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.**

**If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.**

**Sincerely yours,**

**Phyllis Shiller**
**Laboratory Director**

**NELAC - #NY11301**
**CT Lab Registration #PH-0618**
**MA Lab Registration #M-CT007**
**ME Lab Registration #CT-007**
**NH Lab Registration #213693-A,B**
**NJ Lab Registration #CT-003**
**NY Lab Registration #11301**
**PA Lab Registration #68-03530**
**RI Lab Registration #63**
**UT Lab Registration #CT00007**
**VT Lab Registration #VT11301**

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

# Sample Id Cross Reference

November 06, 2020

SDG I.D.: GCH04605

Project ID: 11120 CITRINE POWER

| Client Id | Lab Id | Matrix |
|---|---|---|
| TP-1 (2-4`) | CH04605 | SOIL |
| TP-6 (2-4`) | CH04606 | SOIL |
| TP-10 (2-4`) | CH04607 | SOIL |

Environmental Laboratories, Inc.
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Tel. (860) 645-1102 Fax (860) 645-0823

# Analysis Report

November 06, 2020

FOR: Attn: Mr. Jeff King
GeoInsight, Inc.
200 Court St 2nd Fl
Middletown, CT 06457

| Sample Information | | Custody Information | | Date | Time |
|---|---|---|---|---|---|
| Matrix: | SOIL | Collected by: | | 10/27/20 | 8:05 |
| Location Code: | GEOINSGHT | Received by: | LB | 10/27/20 | 17:00 |
| Rush Request: | Standard | Analyzed by: | see "By" below | | |
| P.O.#: | | | | | |

## Laboratory Data

SDG ID: GCH04605
Phoenix ID: CH04605

Project ID: 11120 CITRINE POWER
Client ID: TP-1 (2-4`)

| Parameter | Result | RL/ PQL | Units | Dilution | Date/Time | By | Reference |
|---|---|---|---|---|---|---|---|
| Percent Solid | 91 | | % | | 10/28/20 | CAJ | SW846-%Solid |
| Chloride | < 33 | 33 | mg/kg | 10 | 10/28/20 | BS/GD | SW9056A |
| Corrosivity | Negative | | Pos/Neg | 1 | 10/27/20 | AP | SW846-Corr |
| pH at 25C - Soil | 7.14 | 1.00 | pH Units | 1 | 10/27/20 23:30 | AP | SW846 9045D |
| Sulfate | < 33 | 33 | mg/kg | 10 | 10/28/20 | BS/GD | SW9056A |

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

**Comments:**

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

Corrosivity is based solely on the pH analysis performed above.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

**Phyllis Shiller, Laboratory Director**
**November 06, 2020**
**Reviewed and Released by: Rashmi Makol, Project Manager**

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

# Analysis Report

November 06, 2020

FOR: Attn: Mr. Jeff King
GeoInsight, Inc.
200 Court St 2nd Fl
Middletown, CT 06457

| Sample Information | | Custody Information | | Date | Time |
|---|---|---|---|---|---|
| Matrix: | SOIL | Collected by: | | 10/27/20 | 11:30 |
| Location Code: | GEOINSGHT | Received by: | LB | 10/27/20 | 17:00 |
| Rush Request: | Standard | Analyzed by: | see "By" below | | |
| P.O.#: | | | | | |

## Laboratory Data

SDG ID: GCH04605
Phoenix ID: CH04606

Project ID: 11120 CITRINE POWER
Client ID: TP-6 (2-4`)

| Parameter | Result | RL/ PQL | Units | Dilution | Date/Time | By | Reference |
|---|---|---|---|---|---|---|---|
| Percent Solid | 96 | | % | | 10/28/20 | CAJ | SW846-%Solid |
| Chloride | < 31 | 31 | mg/kg | 10 | 10/28/20 | BS/GD | SW9056A |
| Corrosivity | Negative | | Pos/Neg | 1 | 10/27/20 | AP | SW846-Corr |
| pH at 25C - Soil | 7.39 | 1.00 | pH Units | 1 | 10/27/20 23:30 | AP | SW846 9045D |
| Sulfate | < 31 | 31 | mg/kg | 10 | 10/28/20 | BS/GD | SW9056A |

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

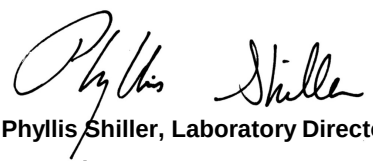
**Comments:**

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

Corrosivity is based solely on the pH analysis performed above.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



**Phyllis Shiller, Laboratory Director**
**November 06, 2020**
**Reviewed and Released by: Rashmi Makol, Project Manager**

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

# Analysis Report

November 06, 2020

FOR: Attn: Mr. Jeff King
GeoInsight, Inc.
200 Court St 2nd Fl
Middletown, CT 06457

| Sample Information | | Custody Information | | Date | Time |
|---|---|---|---|---|---|
| Matrix: | SOIL | Collected by: | | 10/27/20 | 12:45 |
| Location Code: | GEOINSGHT | Received by: | LB | 10/27/20 | 17:00 |
| Rush Request: | Standard | Analyzed by: | see "By" below | | |
| P.O.#: | | | | | |

## Laboratory Data

SDG ID: GCH04605
Phoenix ID: CH04607

Project ID: 11120 CITRINE POWER
Client ID: TP-10 (2-4`)

| Parameter | Result | RL/ PQL | Units | Dilution | Date/Time | By | Reference |
|---|---|---|---|---|---|---|---|
| Percent Solid | 88 | | % | | 10/28/20 | CAJ | SW846-%Solid |
| Chloride | < 34 | 34 | mg/kg | 10 | 10/28/20 | BS/GD | SW9056A |
| Corrosivity | Negative | | Pos/Neg | 1 | 10/27/20 | AP | SW846-Corr |
| pH at 25C - Soil | 6.82 | 1.00 | pH Units | 1 | 10/27/20 23:30 | AP | SW846 9045D |
| Sulfate | < 34 | 34 | mg/kg | 10 | 10/28/20 | BS/GD | SW9056A |

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

**Comments:**

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

Corrosivity is based solely on the pH analysis performed above.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

**Phyllis Shiller, Laboratory Director**
**November 06, 2020**
**Reviewed and Released by: Rashmi Makol, Project Manager**

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

# QA/QC Report

November 06, 2020

## QA/QC Data

SDG I.D.: GCH04605

| Parameter | Blank | Blk RL | Sample Result | Dup Result | Dup RPD | LCS % | LCSD % | LCS RPD | MS % | MSD % | MS RPD | % Rec Limits | % RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| QA/QC Batch 551141 (PH), QC Sample No: CH04384 (CH04605, CH04606, CH04607) | | | | | | | | | | | | | |
| pH at 25C - Soil | | | 7.26 | 7.23 | 0.40 | 101 | | | | | | 85 - 115 | 20 |
| QA/QC Batch 551305 (mg/L), QC Sample No: CH03051 (CH04605, CH04606, CH04607) | | | | | | | | | | | | | |
| Chloride | BRL | 3.0 | 76.2 | 71.1 | 6.90 | 94.5 | | | 96.7 | | | 90 - 110 | 20 |
| Sulfate | BRL | 3.0 | 39.6 | 36.9 | 7.10 | 95.1 | | | 95.7 | | | 90 - 110 | 20 |

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference

Phyllis Shiller, Laboratory Director
November 06, 2020

Friday, November 06, 2020

Criteria: CT: GAM

State: CT

# Sample Criteria Exceedances Report

## GCH04605 - GEOINSGHT

| SampNo | Acode | Phoenix Analyte | Criteria | Result | RL | Criteria | RL Criteria | Analysis Units |
|---|---|---|---|---|---|---|---|---|

*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

# REASONABLE CONFIDENCE PROTOCOL
# LABORATORY ANALYSIS QA/QC CERTIFICATION FORM

***Laboratory Name:*** Phoenix Environmental Labs, Inc. ***Client:*** GeoInsight, Inc.

***Project Location:*** 11120 CITRINE POWER ***Project Number:***

***Laboratory Sample ID(s):*** CH04605-CH04607 ***Sampling Date(s):*** 10/27/2020

***List RCP Methods Used (e.g., 8260, 8270, et cetera)*** None

| | | |
|---|---|---|
| **1** | **For each analytical method referenced in this laboratory report package, were all specified QA/QC performance criteria followed, including the requirement to explain any criteria falling outside of acceptable guidelines, as specified in the CT DEP method-specific Reasonable Confidence Protocol documents?** | ☑ Yes ☐ No |
| **1A** | **Were the method specified preservation and holding time requirements met?** | ☑ Yes ☐ No |
| **1B** | ***VPH and EPH methods only:*** **Was the VPH or EPH method conducted without significant modifications (see section 11.3 of respective RCP methods)** | ☐ Yes ☐ No ☑ NA |
| **2** | **Were all samples received by the laboratory in a condition consistent with that described on the associated Chain-of-Custody document(s)?** | ☑ Yes ☐ No |
| **3** | **Were samples received at an appropriate temperature (< 6 Degrees C)?** | ☐ Yes ☑ No ☐ NA |
| **4** | **Were all QA/QC performance criteria specified in the CTDEP Reasonable Confidence Protocol documents achieved?** | ☑ Yes ☐ No |
| **5** | **a) Were reporting limits specified or referenced on the chain-of-custody?**<br>**b) Were these reporting limits met?** | ☑ Yes ☐ No<br>☑ Yes ☐ No |
| **6** | **For each analytical method referenced in this laboratory report package, were results reported for all constituents identified in the method-specific analyte lists presented in the Reasonable Confidence Protocol documents?** | ☐ Yes ☑ No |
| **7** | **Are project-specific matrix spikes and laboratory duplicates included in the data set?** | ☐ Yes ☑ No |

**Notes: For all questions to which the response was "No" (with the exception of question #7), additional information must be provided in an attached narrative. If the answer to question #1, #1A or 1B is "No", the data package does not meet the requirements for "Reasonable Confidence". This form may not be altered and all questions must be answered.**

**I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete.**

**Authorized Signature:** Rashmi Makol **Position:** Project Manager

**Printed Name:** Rashmi Makol **Date:** Friday, November 06, 2020

**Name of Laboratory** Phoenix Environmental Labs, Inc.

**This certification form is to be used for RCP methods only.**

**Environmental Laboratories, Inc.**
**587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045**
**Tel. (860) 645-1102 Fax (860) 645-0823**

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

# RCP Certification Report

November 06, 2020

SDG I.D.: GCH04605

## *SDG Comments*

No RCP analyses are included with this report. The RCP narrative is provided at the request of the client.

Temperature above 6C:
The samples were received in a cooler with ice packs. The samples were delivered to the Laboratory within a short period of time after sample collection. Therefore no significant bias is suspected.

## *IC*

Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents achieved? Yes.

**Instrument:**

**IC 10/26/20-3** Brian Sheriden, Greg Danielewski, Chemist 10/26/20

CH04605 , CH04606 , CH04607

The initial calibration met all criteria including a standard run at the reporting level.
All method verification standards and blanks met criteria.

**QC (Batch Specific):**

**Batch 551305 (CH03051)**

CH04605, CH04606, CH04607

All LCS recoveries were within 90 - 110 with the following exceptions: None.

## *Temperature Narration*

The samples were received at 10.3C with cooling initiated.
(Note acceptance criteria for relevant matrices is above freezing up to 6°C)

Cooler: Yes [X] No [ ]
Coolant: IPK [ ] ICE [X] No [ ]

# CHAIN OF CUSTODY RECORD

Temp 10.3 Pg of

**PHOENIX**
*Environmental Laboratories, Inc.*

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Email: info@phoenixlabs.com Fax (860) 645-0823
**Client Services (860) 645-8726**

**Data Delivery/Contact Options:**
[ ] Fax:
[ ] Phone:
[X] Email: jking@geoinc.com

Customer: GeoInsight
Address: 200 Court St 2nd Floor
Middletown, CT 06457

Project: 11120 - Citrine Power
Report to: Jeff King
Invoice to: NHO
QUOTE #

Project P.O:

***This section MUST be completed with Bottle Quantities.***

**Client Sample - Information - Identification**

Sampler's Signature: Adam Fi Date: 10/27/20

**Matrix Code:**
**DW**=Drinking Water **GW**=Ground Water **SW**=Surface Water **WW**=Waste Water
**RW**=Raw Water **SE**=Sediment **SL**=Sludge **S**=Soil **SD**=Solid **W**=Wipe **OIL**=Oil
**B**=Bulk **L**=Liquid **X** = _____(Other)

Analysis Request

| PHOENIX USE ONLY SAMPLE # | Customer Sample Identification | Sample Matrix | Date Sampled | Time Sampled | pH | Water Soluble Sulfate | Water Soluble Chloride | | | | | | | GL Amber 8 oz. w/H3PO4 | Soil VOA Vials [ ] methanol [ ] H2O | GL Soil container ( 8 ) oz | GL Soil container ( ) oz | 40 ml VOA Vial [ ] As is [ ] HCl | GL Amber 1000ml [ ] As is [ ] H2SO4 | PL As is [ ] 250ml [ ] 500ml [ ] 1000ml | PL H2SO4 [ ] 250ml [ ] 500ml | PL HNO3 250ml | PL NaOH 250ml | Bacteria Bottle w/thio | Bacteria Bottle as is |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 04605 | TP-1 (2-4') | S | 10/27/20 | 0805 | X | X | X | | | | | | | | | X | | | | | | | | | |
| 04606 | TP-6 (2-4') | 1 | 1 | 1130 | 1 | 1 | 1 | | | | | | | | | X | | | | | | | | | |
| 04607 | TP-10 (2-4') | 1 | 1 | 1245 | 1 | 1 | 1 | | | | | | | | | X | | | | | | | | | |

| Relinquished by: | Accepted by: | Date: | Time: |
|---|---|---|---|
| Adam Fi | | 10/27 | 1700 |

**Comments, Special Requirements or Regulations:**

**Turnaround Time:**
[ ] 1 Day*
[ ] 2 Days*
[ ] 3 Days*
[X] Standard
[ ] Other
*** SURCHARGE APPLIES**

**RI**
[ ] (Residential) Direct Exposure
[ ] (Comm/Industrial) Direct Exposure
[ ] GA Leachability
[ ] GB Leachability
[ ] GA-GW Objectives
[ ] GB-GW Objectives

**CT**
[X] RCP Cert
[ ] GW Protection
[ ] SW Protection
[X] GA Mobility
[ ] GB Mobility
[ ] Residential DEC
[ ] I/C DEC
[ ] Other

**MA**
[ ] MCP Certification
[ ] GW-1 [ ] MWRA eSMART
[ ] GW-2
[ ] GW-3
[ ] S-1 GW-1 [ ] S-1 GW-2 [ ] S-1 GW-3
[ ] S-2 GW-1 [ ] S-2 GW-2 [ ] S-2 GW-3
[ ] S-3 GW-1 [ ] S-3 GW-2 [ ] S-3 GW-3
[ ] SW Protection

**State where samples were collected:** CT

**Data Format**
[X] Excel
[X] PDF
[ ] GIS/Key
[ ] EQuIS
[ ] Other

**Data Package**
[ ] Tier II Checklist
[ ] Full Data Package*
[X] Phoenix Std Report
[ ] Other

*** SURCHARGE APPLIES**