PULLMAN &COMLEY LLC
ATTORNEYS

Lee D. Hoffman
90 State House Square
Hartford, CT 06103-3702
p 860 424 4315
f 860 424 4370
lhoffman@pullcom.com
www.pullcom.com

August 8, 2018

VIA ELECTRONIC MAIL AND U.S. MAIL

Melanie Bachman
Executive Director/Staff Attorney
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: Petition No. 1339 – Petition of Wallingford Renewable Energy LLC for a Declaratory Ruling that no Certificate of Environmental Compatibility and Public Need is Required for a 19.99 MW AC Solar Photovoltaic Electric Generating Facility in Wallingford, Connecticut

Dear Ms. Bachman:

I am writing on behalf of my client, Wallingford Renewable Energy ("WRE") in connection with the above-referenced Petition. As you are aware, in the Council's April 3, 2018 Decision and Order, the Council required that WRE submit to the Council a Development and Management ("D&M") Plan in connection with the project. That D&M Plan is to include, among other things, a final Vernal Pool Survey (1.c.) and plans to comply with DEEP Natural Diversity Database Comments dated March 9, 2018 (1.d.).

With this letter, I am enclosing an original and 16 copies of the Vernal Pool Survey and correspondence related to the project's plans to comply with DEEP's NDDB comments dated March 9, 2018. These will also be incorporated into the project's D&M Plan, when that plan is submitted to the Council.

Please accept the original and 15 copies of these responses, and please date-stamp the remaining copy of the responses and return it to me in the enclosed envelope. Should you have any questions concerning this submittal, please contact me at your convenience. I certify that copies of this submittal have been made to all parties on the Petition's service list.

Sincerely,

Lee D. Hoffman

Lee D. Hoffman

ACTIVE/79442.1/LHOFFMAN/7598769v1

Connecticut Department of

ENERGY &
ENVIRONMENTAL
PROTECTION

July 27, 2018

Ms. Lynn Gresock
Tetra Tech, Inc.
2 Lan Drive, Suite 210
Westford, MA 01886
lynn.gresock@tetratech.com

Project: Installation of a Solar Energy Facility "Wallingford Renewable Energy" near 25 Pent Road and Oliver Creek Road, 155 John Road (Cherry St) in Wallingford, Connecticut
NDDB Final Determination No. 201801464 (Formerly NDDB Preliminary Assessment No. 201702360)

Dear Lynn Gresock,

I have re-reviewed Natural Diversity Data Base maps and files regarding the area delineated on the map you provided for the proposed Installation of a Solar Energy Facility "Wallingford Renewable Energy" near 25 Pent Road and Oliver Creek Road, 155 John Road (Cherry St) in Wallingford, Connecticut.

Conservation Measures for State Endangered *Floerkea proserpinacoides* (False Mermaid Weed)
During the evaluation of the floodplain communities associated with the Quinnipiac River in May of 2017 an Oxbow Associates, Inc. botanist documented additional populations of ***Floerkea proserpinacoides*** both within the study area and southward to Toelles Road. The plant observations were documented and submitted to the DEEP-NDDB Program. The plants observed within the study area occurred primarily in the floodplain along the banks of the Quinnipiac River. Some plants were also observed in the utility ROW within the floodplain. Although no solar panel installation activities are proposed in the floodplain (according to the NDDB application material submitted), it is important to be aware that these plants occur along the Quinnipiac River within the property boundaries. I recommend that a conservation plan be developed for the ***Floerkea proserpinacoides*** that are known from the Quinnipiac River banks and floodplain to ensure this plant is fully protected. This is especially important when considering the fencing component of the solar facility. You can submit the conservation plan to our NDDB Program at deep.nddbrequest@ct.gov so we will have it on file as the project moves forward and you seek DEEP permits and registrations for the project. The plan should encompass both avoidance and monitoring of this known population.

Sandplain Habitat Follow-Up Site Surveys for State Listed Plants and Insects

Thank you for providing the two follow-up site survey reports for the sandplain habitat on the MIRA Parcel. Both of these follow-up site investigation reports evaluated the open sand deposit area (.8 acre) which is part of a much larger parcel within which a ground-mounted solar array has been proposed. The two reports you provided included:

1. The SWCA Environmental Consultants Botanical Survey Report written by Steve Johnson dated July 2, 2018 that provided an assessment of plants and habitats on the 0.08 acre area of open sand habitat located near the junction of Pent Road and Oliver Creek Road in Wallingford, Connecticut. The report prepared by Steve Johnson documented a population of State Special Concern low frostweed (*Crocanthemum propinquum*) and in additional correspondence dated July 11, 2018 offered a conservation plan to protect the plant from project impacts.
2. The Site Visit and Survey Report prepared by David L. Wagner and Tanner A. Matson and dated June 10, 2018. This site investigation provided an assessment of invertebrates and sandplain species. This report concluded that the small size does not warrant mitigation efforts for the invertebrate species.

Conservation Measures for State Special Concern *Crocanthemum propinquum* (Low Frostweed) in the sandplain habitat on the MIRA Parcel
Habitat surveys were conducted by SWCA Environmental Consultants biologist Steve Johnson for State Special Concern *Crocanthemum propinquum* (Low Frostweed) in the sand barren habitat and several specimens of

Crocanthemum were observed. In order to protect the State Special Concern *Crocanthemum propinquum* from project impacts a conservation plan was proposed by SWCA Environmental Consultants, Steve Johnson. I concur with the translocation plan protocols and methods for preventing unintended impacts to this plant from the project. The Conservation plan included:

- **Translocation** of the state listed low frostweed to a specific location that provides the same appropriate substrate as well as a balance of sun and shade that is similar to the microhabitat area identified in its existing location. The goal was to identify a location as similar as possible to the original site and within 400 feet. The translocation will occur prior to earth disturbing construction activities associated with the Project in the Subject Area, and will occur within the growing season. The new location for the plants, once identified by the qualified botanist, will be prepared and microclimate adjustments and groundcover will be cleared and maintained. The translocated plants will be prepared as described and replanting according to the plan prepared by SWCA Environmental Consultants, Steve Johnson in the Conservation plan.
- **Management** will follow the translocation with post-planting watering, general inspections and invasive species and groundcover management. These protocols are described in the Conservation Plan. During the inspections photographs and notes will be taken and follow-up measures will be implemented (if needed). A botanist will inspect the translocation site during the growing season at 6 (six) month intervals for one year.
- **Reporting** to the NDDB Program (deep.nddbrequest@ct.gov) the key milestones of the conservation plan including the translocation of the plants and inspection process with photographs and documentation

    1. Following completion of the translocation effort;
    2. Following completion of Project construction (the transition point to the 12-month additional monitoring period); and
    3. Quarterly following the final inspection period.

Sandplain Grassland Habitat and State Listed Insects

I concur with The Site Visit and Survey Report prepared by David L. Wagner and Tanner A. Matson and dated June 10, 2018 that concluded that the small size does not warrant mitigation efforts for the invertebrate species.

Vertebrate State Listed Animals:

State Listed Bats
Thank you for including time of year restrictions in your original NDDB application form to protect tree roosting bat species. Tree cutting should be prohibited between May 1st and August 15th. Establishing wooded buffer adjacent to the wetland area will help maintain potential roosting habitat. Retaining larger diameter trees (12-inch DBH and larger) wherever possible on-site may additionally minimize the potential for negative impacts to bats. Trees with loose, rough bark such as maples, hickories, and oaks are more desirable than other tree species due to the increased cover that the loose bark provides. Large trees with cavities are also utilized by different bat species. Like most eastern bats, the northern long-eared bat roosts in trees during summer. Install a Bat Box if possible. Bat houses installed in the area where trees will be removed will help in the conservation of bats. Dead and dying trees are usually not left standing, so trees suitable for roosting may be in short supply and bat houses or boxes may provide additional roost sites.

State Listed Turtles
Although State Special Concern Wood (*Glyptemys insculpta*) and Box Turtles (*Terrapene carolina carolina*) were not included on the DEEP-NDDB Program Preliminary Assessment letter dated April 7, 2017, the Habitat Assessment Report you provided dated December 18, 2017 and developed by Oxbow Associates, Inc., included habitat descriptions that suggest that these turtles may occur on this project site. The report also indicated that vernal pools were still being explored and Spotted Turtles may be found in that type of habitat.

Conservation strategies to protect these three turtles include:

- Hiring a qualified herpetologist to be on site to ensure these protection guidelines remain in effect and prevent turtles from being run over when moving heavy equipment. This is especially important in the month of June when turtles are selecting nesting sites.

- Exclusionary practices will be required to prevent any turtle access into construction areas. These measures will need to be installed at the limits of disturbance.
- Exclusionary fencing must be at least 20" tall and must be secured to and remain in contact with the ground and be regularly maintained (at least bi-weekly and after major weather events) to secure any gaps or openings at ground level that may let animal pass through. Do not use plastic or netted silt-fence.
- All staging and storage areas, outside of previously paved locations, regardless of the duration of time they will be utilized, must be reviewed to remove individuals and exclude them from re-entry.
- All construction personnel working within the turtle habitat must be apprised of the species description and the possible presence of a listed species, and instructed to relocate turtles found inside work areas or notify the appropriate authorities to relocate individuals.
- Any turtles encountered within the immediate work area shall be carefully moved to an adjacent area outside of the excluded area and fencing should be inspected to identify and remove access point.
- In areas where silt fence is used for exclusion, it shall be removed as soon as the area is stable to allow for reptile and amphibian passage to resume.
- No heavy machinery or vehicles may be parked in any turtle habitat.
- Special precautions must be taken to avoid degradation of wetland habitats including any wet meadows and seasonal pools.
- The contractor and consulting herpetologist must search the work area each morning prior to any work being done.
- When felling trees adjacent to brooks and streams, please cut them to fall away from the waterway and do not drag trees across the waterway or remove stumps from banks.
- Avoid and limit any equipment use within 50 feet of streams and brooks.
- Any confirmed sightings of box, wood or spotted turtles should be reported and documented with the NDDB (nddbrequestdep@ct.gov) on the appropriate special animal form found at (http://www.ct.gov/deep/cwp/view.asp?a=2702&q=323460&depNav_GID=1641)

This determination is good for two years. Please re-submit an NDDB Request for Review if the scope of work changes or if work has not begun on this project by July 27, 2020.

Natural Diversity Data Base information includes all information regarding critical biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection's Natural History Survey and cooperating units of DEEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the Data Base should not be substitutes for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the Data Base as it becomes available.

Please contact me if you have further questions at (860) 424-3592, or dawn.mckay@ct.gov . Thank you for consulting the Natural Diversity Data Base.

Sincerely,

Dawn M. McKay

Dawn M. McKay
Environmental Analyst 3

VERNAL POOL SURVEY REPORT

PROPOSED WALLINGFORD RENEWABLE ENERGY

WALLINGFORD, CONNECTICUT

June 14, 2018

REMA

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ATTACHMENTS

1.0 INTRODUCTION & OVERVIEW

This *Vernal Pool Survey Report* represents documentation on behalf of Wallingford Renewable Energy LLC (WRE) of the effort by Rema Ecological Services, LLC (REMA), in coordination with Oxbow Associates, Inc. (OA), to conduct in-field, breeding season surveys, of *nine* seasonally flooded wetland areas that had been identified in October of 2017 as "potential vernal pool" (PVP) habitats in a REMA *Wetlands Report* submitted in January 2018 as part of a Connecticut Siting Council (CSC) Petition for the Wallingford Renewable Energy project (the Project).

The northern portion of the Project is located on property associated with the capped Town of Wallingford Landfill, and no PVPs were identified within that portion of the Project Site. The southern portion of the Project is located on property owned by the Materials Innovation and Recycling Authority (MIRA Property, or the Study Area); it is within the MIRA Property that surveys had indicated the presence of nine PVPs. Because the first surveys identifying the PVPs were conducted on the cusp of appropriate seasonal conditions, WRE committed to conducting spring surveys in 2018 to confirm the location and extent of vernal pools and assess proximity of Project features to each confirmed vernal pool resource (see Figure A, Attachment A).

The 2018 vernal pool amphibian breeding season differed from the more "typical" one, in that it started late, due to atypical cold weather in March and April, which was also punctuated with a few warmer days, allowing for some initial amphibian movement to breeding pools. For this reason, it was determined to be appropriate to capture a greater than typical level of observations within the Study Area. Experienced field scientists from OA conducted vernal pool surveys on April 11 and April 23, 2018; experienced field scientists from REMA conducted surveys on April 27, April 30, and May 29, 2018. The survey start date, originally planned for mid- to late-March was deferred to mid-April 2018 based on observations of vernal pool activity at several other comparable locations in Connecticut; the anomalously cool spring in southern New England delayed typical vernal pool breeding cycle milestones by approximately three weeks (see Table A, Attachment B). The extended survey period utilized allowed not only for observations of initial egg mass laying by the target amphibians, and initial hatching by wood frog larvae, but also observations throughout the atypical temperature regime, changing hydrology as influenced by weather patterns, and reproductive success.

The survey confirmed that most of the previously identified PVPs were found to be functional vernal pools, and contained obligate vernal pool species including wood frog, spotted salamander (*Ambystoma maculatum*), and fairy shrimp (*Eubranchipus vernalis*), although pool boundaries were slightly adjusted for several (see Figure A, Attachment A). Only one previously identified PVP (PVP 7A on Figure A) was determined not to qualify as a vernal pool. In addition to this confirmatory work, two additional functional vernal pool habitats were also identified during the 2018 surveys (VP 2A and VP 4A on Figure A).

This report describes the survey methods employed; the survey results, including a description of each vernal pool; and a discussion of the relationship of the Project to vernal pool function in order to demonstrate no adverse effect is anticipated, and that the vernal pool habitats will be conserved.

2.0 METHODS

The Study Area was examined, expressly for the purpose of evaluating the location, quality and function of the PVPs previously identified in the 2017 field season. During each of the field survey events (i.e., April 11, April 23, April 27, April 30, and May 29, 2018), each of the nine PVPs were systematically reviewed, for component species (i.e., vertebrates and invertebrates), as well as abiotic characteristics (e.g., pH, temperature, depth, dimensions).

Both REMA and OA had been involved with identification of the PVPs during the 2017 field season. Each PVP location was reviewed using chest waders/hip boots, dipnets, submersible cameras, and a field pH meter. Detailed notes were taken in the field to allow accurate attribution of specific observations to particular pool locations, and a photographic log was compiled.

Egg masses of indicator species amphibians (spotted salamander and wood frog) were enumerated during systematic walking transects of the basins, typically by two observers in parallel. Polarized glasses were used occasionally, but turbidity and pollen film were both low during all of the field dates, with the exception of the May survey, facilitating comprehensive reviews.

During the initial field visit on April 11, 2018 wood frog egg masses were observed to be well developed, but not yet emerging. This indicated that breeding by wood frogs was largely complete and that egg mass counts were representative of the full breeding effort by that species for the 2018 season. Spotted salamander egg masses were variably developed,

partly attributable to depth of deposition and time since deposition. Because additional egg deposition was possible, additional field surveys were scheduled by OA. The later observations on April 23, 2018 indicated that egg masses laid by early arrivals to the pools, particularly wood frogs (*Lithobates sylvaticus*), were mostly destroyed, and/or dislodged by the abnormally low temperatures that followed and the extreme storm event of April 16, 2018. In several pools with "stream" outlets, wood frog egg masses that were laid in "rafts" and not anchored to vegetation (e.g., shrub branches), were washed away and stranded outside of the pools by runoff resulting from the aforementioned unusually large and intense rain storm. For this reason, an extended period of observations was determined necessary to reflect accurate vernal pool characterization, and to monitor reproductive success for the 2018 vernal pool breeding season.

During each survey date, and after a careful count of egg masses first from pool perimeter prior to entering the pool, two researchers methodically conducted dipnet sweeps, working towards each other from opposite sides of the vernal pool habitat. At each pool an attempt was made to dipnet the entire pool, but efforts were concentrated in representative micro-habitat areas, such as the shallow perimeter, areas with greater sun exposure, and areas with woody debris. Benthic litter materials were also investigated, such as deposits of fine particulate organic matter (FPOM), and samples were carefully sorted through in search of invertebrates, bivalves, and other aquatic organisms. Perimeter shallows were typically examined prior to entering the pool to increase the probability of capturing marbled salamander larvae, if present. Similarly, emergent, or erect herbaceous vegetation patches were sampled to reveal the invertebrate species often found occupying the three-dimensional structure of a lentic wetland system.

In addition to direct examination of the nine PVPs, other areas of ponding not previously identified as PVPs were observed and evaluated, or were indicated by anuran calling. The majority of these areas observed were not found to meet any of conventional criteria for vernal pools, and were dismissed as ephemeral, seasonally flooded depressions within the palustrine forest. However, two additional depressions were identified with vernal pool characteristics (VP2A and VP 4A, see Figure A), and observations at these locations continued throughout the remaining field efforts by both OA and REMA.

3.0 SURVEY RESULTS

The nine original PVPs and two additional identified areas were surveyed for the presence or absence of obligate vernal pool indicators (i.e., wood frog, spotted salamanders, fairy

shrimp). As noted above, one of the original PVPs was determined to not be characteristic of vernal pool habitat, while the remaining areas that were surveyed were determined to be vernal pools (see Figure A, Attachment A). A description of each of the eleven surveyed areas, providing characteristics and the basis for the vernal pool determination, is provided below. Table B, in Attachment B, provides a detailed summary of data collected for each of the eleven surveyed areas. Representative annotated photos of each of the surveyed areas are included in Attachment C (Photos 1 to 64).

3.1 Vernal Pool 1

This vernal pool is found embedded with the wooded northern portion of Wetland B1[1] (see Attachment C, Photos 1 through 6). This is a classic, isolated parabolic basin, roughly 430 square feet in size. At maximum flood, the basin is capable of holding approximately 4 feet of water. OA observed a maximum of 42 inches of water on April 11, while REMA documented 32 inches on April 30, 2018. This pool is underlain by about 16 inches of topsoil that is high in organic matter, over glayed medium sand.

OA documented the basin as having a low biotic diversity and showed a moderate breeding effort by wood frog (13 egg masses) and the presence of fairy shrimp and caddis flies. During the April 30 survey, REMA documented only four fully hatched wood frog egg masses, a few wood frog larvae, and an abundance of fairly shrimp. Overall, it is, as expected, a low-diversity pool that may have a high recruitment percentage for wood frogs in suitable years due to the lack of invertebrate and other predators.

3.2 Vernal Pool 2

This is a moderately well defined, shallow vernal pool, also embedded within Wetland B1, bordering to the west and north of a natural gas pipeline utility corridor (see Figure A). It is the deeper portion of a seasonally flooded forested wetland. This inundation is made possible, in part, by a partially clogged and restrictive culvert that carries flows under the gas pipeline access roadway (see Attachment C, Photos 7 through 15).

The vernal pool habitat is approximately 5,530 square feet in size and will pond a maximum of about 16 inches of water (OA, April 11). It is underlain by 14 inches of topsoil that high in organic matter, with the top 4 inches being almost free of a mineral

[1] We have retained the original wetland units identification scheme as found in our January 2018 *Wetlands Report* (Attachment D shows wetland boundaries relative to vernal pool features).

fraction. The pool was found inundated to a maximum of 24 inches by REMA on April 27, likely the result of the large April 16 precipitation event.

Vernal Pool 2 is a moderately well defined, shallow depression bordering on and west of a utility corridor. The limits of this functional system were redefined based on spring flooding and presence of indicator species. The system receives drainage from the east across the utility corridor and discharges toward the Quinnipiac River to the west, but through-flow in the basin was undetectable. On April 11 OA found 55 wood frog egg masses in this vernal pool, in two main clusters and a number of outlying, individual egg masses; no spotted salamander eggs were detected. On April 27, REMA found 16 mostly hatched wood frog egg masses with a moderate abundance of fairly shrimp. However, no wood frog larvae were detected even after thorough dipnetting by two investigators.

Maximum water depth observed by OA on April 11 was 16 inches, while REMA observed up to 24 inches on April 27, likely due to the large rain even that took place on April 16, 2018. This flooded portion of the forested swamp receives overflow from the wetland associated with Vernal Pool 2A (see discussion below), which allows for a moderately long-hydroperiod, conducive to wood frog reproduction, predation notwithstanding.

Limnephilid caddis fly larvae, Sphaeriid clams, and other invertebrates were also observed by both OA and REMA. REMA documented a moderate abundance of predaceous diving beetle larva (Dytiscidae), which may have contributed to the lack of wood frog larvae observed by REMA.

Redfin pickerel (*Esox americanus americanus*) were observed in this basin on April 23 by OA, following a rain event of approximately 3 inches on April 16. This predatory fish was not observed by REMA during the subsequent April and May visits, but may have also contributed to the absence of wood frog larvae.

Even with the presence of predatory invertebrates on tadpoles, such as the predaceous diving beetle larvae, this is a moderately productive system for wood frog.

3.3 Vernal Pool 2A

This vernal pool habitat consists of the westernmost section of Wetland B2, which is an old cut-off meander of the Quinnipiac River. Most of the wetland is emergent, is shallowly inundated during the early portion of the growing season, and is densely dominated by

common reed (*Phragmites australis*). However, the westernmost section is somewhat deeper and is shaded by trees, resembling the preferred habitat for vernal pool amphibians (see Attachment C, Photos 16 through 26).

The apparent vernal pool habitat portion of the overall wetland, approximately 4,270 square feet, may have been utilized as a borrow pit during the construction/overtopping of the adjacent utility corridor. Maximum water depths recorded by OA was 42 inches on April 11, but only 24 inches was recorded by REMA on April 27, 2018.

On April 11, OA observed 3 spotted salamander egg masses and 24 wood frog masses. On April 23, only a single salamander egg mass (opaque morph) was found by OA despite favorable conditions. On April 27, REMA observed the single salamander egg mass, but found no wood frog egg masses. Intense dipnetting (over 100 sweeps) did not net any wood frog larvae.

Invertebrate diversity was moderate during all of the survey dates, with fairy shrimp, Limnephilid caddis fly larvae, amphipods, isopods, predaceous diving beetle larvae, flatworms, and Cladocerans observed. Mosquito larvae were particularly abundant during the REMA surveys.

Vernal Pool 2A is unique within the Study Area, in that it has a relatively narrow ditched outlet, which regulates water depths. The ditch is culverted under the adjacent utility corridor, but narrows to the west (see Figure A). On April 27, REMA noted that the ditch, which had been delineated as a wetland, was restricting flows westerly to Wetland B1 and its embedded Vernal Pool 2 due to a woody debris and leaf jam. It also appeared that this artificial restriction had been somewhat larger in the past, but the intense 3.08-inch storm event on April 16 had likely dislodged part of this "dam" (also see climatological data in Attachment B, Table B). This may in part explain the unaccounted-for wood frog egg masses and the lack of wood frog larvae observed on April 27, 2018. It is probable that the OA-observed wood frog egg masses were washed out during the storm and/or were stranded on higher ground, after the "dam" was partially dislodged, lowering water levels. Additionally, predation of larvae by invertebrates and vertebrates could also be involved.

3.4 Vernal Pool 3

This vernal pool is embedded within Wetland B1, approximately 50 feet to the southwest of Vernal Pool 2, and occurs up against the natural gas pipeline corridor (see Attachment A, Figure A). The pool habitat is approximately 1,300 square feet in size and was observed with water depths of 16-18 inches (see Attachment C, Photos 27 through 31). Its invert is

controlled by outflow to Vernal Pool 4 and the Quinnipiac River. It is underlain by 9 inches of topsoil that is not high in organic matter (i.e., loamy fine sand).

Its indicator species are limited to fairy shrimp and to 17 wood frog egg masses, observed by OA on April 13, 2018. On April 30, REMA observed one fully hatched wood frog egg mass, and netted a few wood frog larvae. This pool's hydroperiod is implicitly limited owing to its limited depth and positive drainage.

3.5 Vernal Pool 4

This vernal pool is embedded within Wetland B1 (see Figure A; Attachment C, Photos 32 through 37). It is the deeper portion of a seasonally flooded forested wetland, which is also in the pathway of the overflow from Wetland B5. However, flow velocities are not very high, so amphibian breeding can be sustained without dislodgement.

The vernal pool habitat is approximately 4,045 square feet in size and was found ponding a maximum of about 36 inches of water by OA on April 11. On April 27, the maximum observed water depth by REMA was 22 inches. It is underlain by 12 inches of topsoil that is high in organic matter, and has very poorly drained soils.

On April 11, OA counted 9 spotted salamander egg masses, along with 13 wood frog egg clusters. Notably, many of the spotted salamander egg masses were inordinately small (+/-3 centimeters), more typical of second depositions by a female. More typical sized egg masses were not observed in the vicinity of the diminutive masses.

On April 27, REMA observed two fully hatched wood frog egg masses, and one spotted salamander egg mass. Dipnetting yield a few wood frog larvae. A few fairy shrimp, as well as other invertebrates including predaceous diving beetles, were observed by REMA.

3.6 Vernal Pool 4A

This vernal pool is loosely connected to Vernal Pool 4, especially during high flow periods, and is an additional vernal pool habitat of approximately 260 square feet documented during the 2018 survey (see Figure A; Attachment C, Photos 38 through 41). Maximum depths recorded by OA and REMA were 36 inches and 20 inches on April 11 and April 27, respectively.

OA initially observed five spotted salamander egg masses, while the REMA recount yielded four. On April 11, OA counted four wood frog egg masses, while on April 27 REMA observed two more for a total of six; four of the egg masses were fully hatched, while two had hatched with the larvae still present within the disintegrating egg mass. This would indicate a late arrival to the pool for breeding. The typical invertebrates were observed but fairy shrimp were absent.

This vernal pool is only active during wetter springs, such as the one experienced during 2018 (see National Weather Service (NWS) Monthly Summaries in Attachment B, Table A). It is likely that this vernal pool habitat is marginally productive during normal precipitation years, particularly for spotted salamanders, which require a longer hydroperiod to successfully reproduce.

3.7 Vernal Pool 5

This vernal pool is located roughly 90 feet southwest of Vernal Pool 4 (see Figure A; Attachment C, Photos 42 through 47). While this pool resembles the classic type, without a surface connection to another water body, it has seen significant disturbance in the past, as evidenced by steep sided banks, debris (i.e., metal, tires, etc.) and the soils.

The vernal pool habitat is approximately 2,920 square feet in size and was found ponding up to 42 inches of water within its eastern section by OA on April 11, 2018. On April 27, REMA observed up to 26 inches of water, averaging 22 inches. This pool is underlain by 12 inches of topsoil that is high in organic matter, and over 22 inches of tight silt loam with organics lenses, over loamy medium sand. It is the silt loam that allows for a perched water table in this pool, with very poorly drained soils.

A three-year-old painted turtle was captured in the pool by OA. With 66 wood frog egg masses, observed by OA on April 11, this breeding habitat appears to be the most

productive for that species within the Study Area. Twelve mostly diminutive spotted salamander egg masses, similar to those found in Vernal Pool 4 were observed by OA. On April 27, REMA observed two fully hatched wood frog egg masses, and netted several wood frog larvae.

3.8 Vernal Pool 6

This vernal pool habitat is embedded within the central section of Wetland B5 (see Figure A; Attachment C, Photos 48 to 51). This portion of the forested swamp has pronounced hummocks and interconnected flooded areas which hold up to 14 inches of water, based on both OA and REMA observations. The vernal pool habitat encompasses an area of roughly 7,075 square feet, with a flooded coverage of about 60 percent. It is underlain by at least 24 inches of muck.

Although the benthic material in this wetland suggests it remains saturated through the year, the standing water is apparently of limited duration. Although seemingly suitable *Sphagnum*/shrub hummocks supporting highbush blueberry and maples were observed in this wetland, numerous explorations for four-toed salamander (*Hemidactylium s. scutatum*) did not yield any egg-tending females by OA during the April investigations. This may be attributable to the fact that since the majority of the system is too shallow, and without flow, four-toed salamander larvae would not find persistent water adjacent to the suitable nest site features.

Twenty-five wood frog egg masses were observed within a limited inundated western portion of the overall wetland. No spotted salamander eggs were encountered despite this system receiving extended examination by five individuals from both OA and REMA. On April 27, REMA did not observe any wood frog egg masses, but dipnetting yielded many wood frog larvae. Isopods, amphipods, and a few other species were observed, but the invertebrate fauna of the wetland was not found to be abundant. During the investigation REMA investigators observed a minimum of three adult spring peepers (*Pseudacris c. crucifer*).

Several snapping turtles (*Chelydra serpentina*) were observed in this wetland by OA, as well as a northern water snake (*Nerodia s. sipedon*), and an unseen, but probable plunging spotted turtle (*Clemmys guttata*) was also encountered. REMA also observed snapping

turtles, which readily predate upon wood frog larvae, and keep wood frog reproduction in this vernal habitat to below moderate levels.

This pool is a cryptic system wherein a portion of a larger wetland has vernal pool functionality while the majority of the system does not due to hydroperiod limitations or other factors.

3.9 Vernal Pool 7

This vernal pool habitat is located at the far southern end of Wetland B3 (see Figure A; Attachment C, Photos 52 to 56). This is a man-made pool, with hydrology that is in great measure dependent on a partially clogged culvert that passes water from Wetland B3 to Wetland B4, located under the access roadway to a portion of the Study Area that had historically included a trailer park (nearby to the southwest).

The vernal pool habitat is roughly 1,533 square feet in size, and is underlain by a few inches of organics over firm very fine sand. On April 11, OA documented a maximum of 18 inches of inundation at this pool, while REMA observed a maximum of 12 inches on May 29, 2018.

The water quality of this pool appears poor based on visual indicators; there is heavy iron-bacteria staining and the water column has a haze we associate with degraded, ruderal areas elsewhere.

Limnephilid caddis fly larvae were found in sparse occurrence there as well as amphipods and Physid snails. No indicator species were observed in this pool by OA during the April visits. However, during the REMA visit on May 29, many wood frog larvae were dipnetted. This would indicate late breeding by this species, during a year of anomalous temperature and rain patterns.

It is noteworthy that large, second-year green frog tadpoles, as well as nearly metamorphosed individuals, were found in the pool by OA on April 23 and by REMA on May 29, 2018. This would indicate that the hydroperiod of at least a portion of this pool is long enough for this species to reproduce here. However, this puts predatory pressure on wood frog larvae, which are readily consumed by the larger second year green frog tadpoles. Therefore, it is not likely that this pool is productive for wood frogs.

3.10 Potential Vernal Pool 7A

This PVP habitat is located at the southern end of Wetland B3 (see Figure A; Attachment C, Photos 57 and 58). This is a seasonally flooded section of Wetland B3, which is maintained by the abandoned paved access to the former trailer park. It is roughly 75 feet northwesterly of Vernal Pool 7.

The PVP habitat is roughly 3,120 square feet in size, and is underlain by roughly two feet or organics (i.e., muck). On April 11, OA observed a maximum depth of 18 inches, while on May 29 the maximum recorded by REMA was 14 inches.

Neither OA, nor REMA investigators found any indicator amphibians at this flooded habitat, and dipnetting only yielded a low abundance of invertebrates, such as isopods and amphipods, and a few Limnephilid caddisflies within the southernmost, emergent margin of this habitat. One nearly metamorphosed green frog was also noted, likely entering this area from Vernal Pool 7, via a narrow connection, during the large storm event of April 16, 2018. This PVP is not considered to be a vernal pool.

3.11 Vernal Pool 8

This vernal pool found at the southwesterly corner of Wetland B5 (see Figures A; Attachment C, Photos 59 through 64). This wetland/pool was, in part, created when the hydrologic connection between Wetland B5 and Wetland B6 was severed to the south by a woods road many years ago. It is a seasonally flooded portion of the wetland, with numerous prominent hummocks with trees and shrubs growing on them.

The vernal pool habitat is approximately 4,620 square feet in size and will pond a maximum of about 36 inches of water (based on observations by OA on April 23). On April 27, REMA observed that maximum depth of inundation had receded to a maximum of 20 inches. This pool habitat is underlain by at least 14 inches of muck, over firm very fine sand.

During extreme high-water spring conditions this pool is confluent with Vernal Pool 6; however, there is a modest difference in character between the two. A partial carcass of a spotted salamander adult was observed in this wetland on April 23 by OA. Moreover, only two egg masses attributable to this species were observed, both during the April 23 survey. Twenty-seven wood frog egg masses were observed by OA, with all but several masses in a consolidated cluster in the northerly part of the pool habitat. On April 30, REMA observed

one spotted salamander and one mostly hatched wood frog egg masses, and a moderate effort of dipnetting yielded many wood frog larvae, particularly within one deeper northern section. A variety of invertebrates were captured, including amphipods, isopods, and caddisflies, but fairy shrimp were absent.

This pool is moderately distinct in its landscape context but of a cryptic nature owing to it being only slightly more persistent than much of its surroundings.

4.0 DISCUSSION

The 2018 field surveys largely confirmed prior predictions based on predominantly out-of-season vernal pool observations in May, October and November of 2017. Within the southeasterly wetland system, PVP 7A (see Figure A) is an artefact of inadequate or failed drainage associated with the former trailer park area, and was not found to support vernal pool obligate amphibians. This, therefore, has been eliminated for consideration as a vernal pool.

Several diminutive areas of ephemeral ponding in or near floodplain forest were also examined and dismissed as potential vernal pools. One additional, vernal pool (VP-2A), with altered hydrology due to a temporarily restricted outlet, was discovered in the course of the field review (see Figure A). Also, Vernal Pool 4A, a small depression closely associated with Vernal Pool 4, appears to be somewhat productive during the wetter breeding seasons.

Less than 45 egg masses attributable to spotted salamander were observed throughout the Study Area. This low 2018 reproductive effort is probably typical for this Study Area. The 2017 season was not an anomalously dry foraging season for this species (2016 was), and although delayed due to the unusually cold late March and early April temperatures, opportunities for migration and mating occurred during suitable time windows for the species in 2018. More probable, the limited hydroperiods that most of the wetlands experience, compounded with a history of degradation and a fragmented forest system in the vicinity, account for an apparent overall low density of this species at a site of this size.

Salamander egg masses were carefully examined and no candidate examples of the *Ambystoma laterale/jeffersonianum* complex were observed. Similarly, no larvae of marbled salamander were observed or dipnetted during the surveys by any of the

investigators (i.e., OA and REMA), suggesting this species is also improbable from the vicinity. The apparent absence of four-toed salamander in superficially suitable breeding habitat near Vernal Pool 6 was initially surprising, but standing water may be of very limited duration in this system despite the deep accumulated muck that indicates persistent soil saturation.

Wood frogs were somewhat more abundant, though some seemingly comparable pools elsewhere in the region support several hundred or more egg masses seasonally, which is more than the aggregate of egg masses observed throughout the Study Area. An explanation for the relatively low breeding efforts by this species is less clear; hydroperiod(s) is probably a factor, but other factors presumably influence the density of animals extant. We should note that, at least for 2018, low night temperatures (i.e., in the 20s) during and after the majority of egg mass laying likely contributed to a lower reproduction rate for both of the obligate amphibians observed, but particularly for wood frog. This was also compounded by the likely egg mass stranding and washouts attributed to the large rain event of April 16, 2018, particularly in regards to Vernal Pool 2A, but also elsewhere, confirmed by the absence or low numbers of wood frog larvae during subsequent site visits.

The field surveys largely confirmed prior presumptions regarding the distribution of vernal pool habitat within the Study Area. They also allowed for refinement of pool boundaries and functional status of the various systems. Only Vernal Pools 1 and 5 are isolated basins, without any throughflow, though both occur within a larger area of terrestrial forested wetland vs. forested upland habitat; that latter condition is more favorable for spotted salamander habitation and may partially explain this species' limited presence within the Study Area.

Having completed breeding season investigation at the 10 vernal pool habitats, we have analyzed the proposed layout and configuration of the solar arrays for the Project, with respect to their placement in relation to the identified vernal pools. Table 1 provides information regarding the presence of Project features relative to the 100-foot Vernal Pool Envelopes (VPEs). For five of the vernal pools, the VPE would be completely avoided by the arrays. The five remaining vernal pool locations VP-1, VP-2A, VP-4A, VP-7, and VP-8) have small areas where Project-related impacts are limited to use of existing roads and limited areas for fencing and clearing (as shown in Attachment D). The former total area of VPE affected by the Project, as presented in the CSC Petition, was 25 percent (including

the 3 percent of PVP-7A, which is no longer considered). With activities within the VPE limited to 23.9 percent, impact to VPE is less than previously presented (see Table 1 below, and Attachment D, Vernal Pool Habitat Impact Maps 1 through 10). Moreover, sufficient connectivity corridors are provided between all of the pools and all of the upland habitats that would be used by the wood frog population.

Table 1: Proposed Activities within VPEs Associated with Wallingford Renewable Energy

VP#	VP Area (acres)	VPE Area (acres)	Existing VPE Disturbed?	Project Disturbance?	Percent of VPE Affected by Project Activities in CSC Petition[2]	Percent of VPE Affected by Project Activities with Confirmed Vernal Pools[3]
1	0.01	0.91	No	Yes – fence and minor clearing	4	4
2	0.13	1.82	Yes – Utility ROWs	No	-	
2A	0.09	1.42	Yes – Utility ROWs	Yes – very small portion of fence and clearing	Not identified	0.4
3	0.03	1.07	Yes – Utility ROWs	No	-	
4	0.09	1.51	Yes – Utility ROW	No	-	
4A	0.01	0.86	No	Yes – segment of fence and clearing	Not identified	6.5
5	0.07	1.43	Yes – past disturbance, current trash	No	-	
6	0.16	1.86	No	No	-	
7	0.04	1.13	Yes – existing access road	Yes – use of existing access road	6	6
8	0.11	1.70	Yes – existing access roads	Yes – use of existing access road; enhanced turnaround; fence and minor clearing	12	11

The "critical terrestrial habitat" (CTH) was also considered to determine the potential for Project impact. Calculations were completed to evaluate the area of proposed Project

[2] Includes clearing as well as other existing and proposed activities.
[3] Includes clearing as well as other existing and proposed activities.

activities located within the zone from 100 feet to 750 feet from the edge of each vernal pool.

As shown in Table 2, seven of the 10 vernal pools achieve the recommended "25% or less" disturbance within the CTH.

PVP-7A (which had reported in the CSC Petition a 38 percent use of the CTH by the Project) is not a vernal pool. For Vernal Pools 2A and 6, the recommendation is nearly achieved at 28 and 26 percent, respectively. For Vernal Pool 7, the 29 percent Project use of the CTH is the same value presented in the CSC Petition.

Table 2: Proposed Activities within CTHs Associated with Wallingford Renewable Energy

VP#	VP Area (acres)	CTH Area (acres)	CTH Area Disturbance (acres)	Percent of CTH Affected by Project Activities in CSC Petition	Percent of CTH Affected by Project Activities with Confirmed Vernal Pools[4]
1	0.01	41.0	4.8	12	12
2	0.13	45.9	8.9	21	19
2A	0.09	44.1	12.5	-	28
3	0.03	41.9	7.7	20	18
4	0.09	44.2	7.6	19	17
4A	0.01	40.7	6.5	-	16
5	0.07	44.6	4.8	12	11
6	0.16	45.9	11.8	28	26
7	0.04	42.2	12.2	29	29
8	0.11	45.4	10.1	24	22

Based upon the proposed encroachment upon the vernal pools' CTH, it is expected that there may be some impacts to the overall wood frog population, and to a lesser extent to spotted salamanders. However, in our professional opinion, sufficient upland wooded habitat, as well as suitable hibernation habitat (embedded within the delineated wetlands)[5] will remain intact and well-connected, both on-site and off-site, and will continue to provide for all of the life cycle requirements of a modest population of wood frogs and spotted salamanders. Furthermore, the diminution of the wood frog population would not

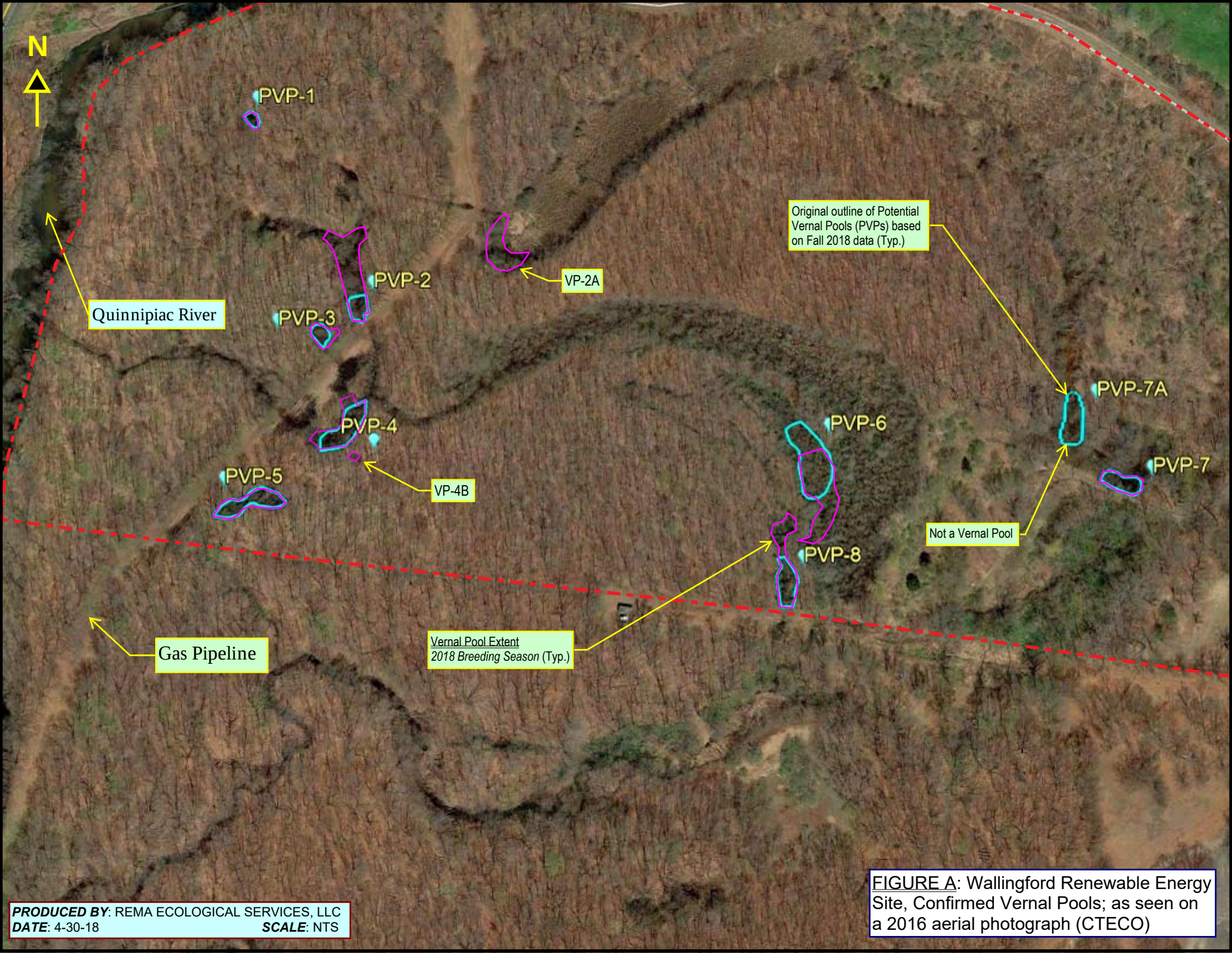
[4] Includes both existing and proposed disturbances to CTHs.
[5] We note that many of the delineated wetland areas included moderately drained to well drained areas, that are alluvial/floodplain "CT-statutory" wetlands. Also several upland islands within Wetland B5, were not excluded in the wetland delineations. Both of these sets of areas are suitable habitat for wood frog hibernation.

be to a level that would alter the "physical" characteristics of the Study Area's population, such as through a significant diminution of nutrient cycling by wood frog tadpoles.

Based on the 2018 breeding season surveys at the Study Area, our study of the past habitat disturbances, and our understanding of the ecology of vernal pools and their obligate amphibians, it is our opinion that the obligate vernal pool amphibian population at the Study Area and the 10 confirmed breeding habitats will be conserved post-development.

Attachment A

Figure A – Confirmed Vernal Pools



PRODUCED BY: REMA ECOLOGICAL SERVICES, LLC
DATE: 4-30-18 ***SCALE***: NTS

FIGURE A: Wallingford Renewable Energy Site, Confirmed Vernal Pools; as seen on a 2016 aerial photograph (CTECO)

Attachment B

Table A: Climatological Data
Table B: Vernal Pool Survey Data

TABLE A: Climatological Data Associated with Wallingford Renewable Energy Project

2018	Temp. (°F)			Dew Point (°F)			Humidity (%)			Sea Level Press. (in)			Wind (mph)			Precip. (in)	Events, Notes
March	high	avg	low	high	avg	low	high	avg	low	high	avg	low	high	avg	high	sum	
1	59	47	35	40	38	33	96	70	48	29.88	29.79	29.6	8	4	-	0.08	Rain
2	43	40	37	38	35	31	93	84	73	29.71	29.41	29.22	24	15	40	1.39	Rain
3	48	42	37	31	28	25	67	59	50	30.08	29.93	29.73	20	15	33	0	
4	42	37	**32**	29	25	22	73	59	49	30.1	30.06	30.02	18	11	30	0	
5	42	37	**32**	28	26	24	78	68	55	30.06	30.02	29.99	15	11	24	0	Snow
6	45	35	**25**	27	24	22	92	67	40	30.08	30.03	29.98	12	3	-	0	
7	36	33	**30**	32	30	24	100	89	67	30	29.77	29.57	20	7	32	0.61	Fog , Snow , Thunderstorm
8	39	36	**30**	30	27	23	82	75	62	29.69	29.66	29.62	12	6	-	0	Snow
9	39	33	**27**	25	21	16	82	61	48	29.8	29.7	29.65	15	5	22	0	
10	37	34	**30**	24	19	17	70	54	43	29.98	29.87	29.8	15	9	26	0	
11	43	32	**21**	22	20	18	88	60	42	30.11	30.04	29.97	12	5	18	0	
12	44	34	**24**	28	24	21	91	67	49	30.1	29.98	29.79	9	3	18	0	
13	37	34	**30**	31	30	25	92	86	70	29.76	29.59	29.54	23	13	37	0.18	Fog , Snow
14	39	34	**30**	27	23	20	75	63	47	29.59	29.5	29.43	16	9	31	0	
15	44	37	**30**	25	21	17	75	57	35	29.57	29.5	29.46	20	11	28	0	
16	39	31	**25**	21	15	11	81	52	37	29.86	29.68	29.56	22	8	40	0	
17	46	36	**25**	15	13	9	60	45	24	29.88	29.77	29.62	15	8	30	0	
18	36	28	**19**	9	1	-6	47	33	20	29.94	29.9	29.83	20	9	32	0	
19	30	-	**30**	9	9	9	40	40	40	29.97	29.97	29.97	5	5	-	0	
20	39	32	**25**	13	10	8	51	36	30	30	29.9	29.83	10	7	-	0	
21	39	34	**30**	30	24	13	92	70	39	29.82	29.71	29.65	17	10	28	0.07	Snow
22	51	42	**32**	30	27	18	92	67	28	29.93	29.73	29.66	17	13	30	0.03	Snow
23	51	40	**30**	23	21	18	75	48	32	30.04	29.97	29.91	13	8	21	0	
24	48	40	**32**	24	20	16	64	45	29	30.15	30.06	30.01	14	8	25	0	
25	45	36	**26**	29	22	17	82	58	37	30.61	30.39	30.17	14	8	21	0	Snow
26	48	36	**23**	24	19	13	88	57	24	30.73	30.68	30.62	12	3	20	0	
27	48	36	**23**	29	19	12	85	53	27	30.67	30.47	30.23	8	2	-	0	Rain
28	55	45	37	38	34	18	89	70	41	30.2	30.05	29.96	9	4	-	0	Rain
29	53	46	39	48	43	36	100	86	64	30.07	29.98	29.83	13	3	18	0	
30	59	52	42	53	47	33	100	88	58	29.98	29.76	29.7	17	6	21	0.09	Fog , Rain
31	55	46	36	32	23	14	70	46	20	30.27	30.16	30	17	8	28	0	
														Total for month		**2.45"**	

NOTE: Data are collected and maintained at the Meriden Markham Municipal Airport, located 4.72 miles northerly of the site at a heading of 7.28 degrees.

TABLE A: Climatological Data Associated with Wallingford Renewable Energy Project *(continued)*

2018	Temp. (°F)			Dew Point (°F)			Humidity (%)			Sea Level Press. (in)			Wind (mph)		Precip. (in)	Events, Notes
April	high	avg	low	high	avg	low	high	avg	low	high	avg	low	high	avg	high	sum	
1	55	46	37	38	29	15	85	55	32	30.1	30	29.94	15	9	29	0.01	Rain
2	42	34	**30**	30	27	16	96	83	44	30.21	30.14	30.1	8	4	-	0.34	Fog , Snow
3	41	32	**26**	37	31	25	100	94	73	30.23	30.11	29.88	10	2	-	0.58	Fog , Rain
4	55	46	37	53	39	16	100	87	30	29.85	29.59	29.39	18	4	37	0.07	Fog , Rain
5	43	34	**26**	18	14	7	71	43	27	30.12	30	29.79	16	12	32	0	
6	50	34	**21**	42	31	17	100	90	69	30.16	29.94	29.69	10	2	-	0.22	Rain , Snow
7	46	40	34	37	24	13	93	57	27	29.94	29.83	29.7	15	7	26	0	
8	45	36	**28**	17	14	10	56	43	28	30.03	29.89	29.8	16	9	29	0	
9	46	34	**23**	27	16	11	75	47	25	30.2	30.15	30.06	13	6	21	0	
10	44	38	**30**	35	32	27	96	82	58	30.19	30.16	30.12	8	2	-	0.13	Rain , Snow
11	51	37	**24**	31	23	16	96	60	26	30.22	30.14	30.05	16	3	22	0	**Oxbow Associates Survey**
12	57	42	**27**	42	32	26	100	78	35	30.12	30.03	29.79	14	3	21	0.02	Fog , Rain
13	72	58	45	46	43	40	86	63	38	29.94	29.87	29.79	9	5	-	0	Rain
14	73	58	42	49	42	30	97	68	43	30.27	30.02	29.85	14	4	17	0	
15	39	36	33	32	29	25	93	75	58	30.42	30.34	30.26	16	10	25	0.34	Rain
16	**57**	**46**	**34**	**54**	**39**	**32**	**100**	**92**	**69**	**30.26**	**29.81**	**29.48**	**18**	**9**	**23**	**3.08**	Rain, Thunderstorm, sevr. damage/flooding
17	48	42	36	39	33	28	83	69	46	29.69	29.59	29.52	16	9	22	0	Rain
18	51	39	**28**	33	28	23	92	61	43	29.79	29.75	29.7	15	5	30	0	
19	44	40	36	37	34	25	96	80	55	29.95	29.75	29.68	14	4	24	0.32	Rain
20	52	42	34	26	24	22	64	51	38	30.33	30.13	29.96	16	11	30	0	
21	60	44	**28**	27	23	17	89	45	20	30.38	30.32	30.23	16	8	28	0	
22	63	48	33	32	20	11	78	37	14	30.4	30.36	30.31	13	5	22	0	
23	64	49	34	33	26	20	82	46	19	30.5	30.45	30.41	14	3	-	0	**Oxbow Associates Survey**
24	64	48	**32**	41	35	30	96	60	29	30.45	30.35	30.22	14	4	22	0	
25	57	54	51	56	52	38	100	93	55	30.21	29.87	29.64	10	3	-	1	Rain
26	66	58	46	55	49	40	100	80	40	29.88	29.67	29.57	16	6	23	0.02	Fog , Rain
27	57	48	43	51	46	41	100	91	66	29.91	29.83	29.74	5	0	-	0	**REMA Survey**
28	66	55	44	51	48	44	100	84	54	29.88	29.8	29.75	15	3	21	0	
29	55	48	42	50	42	32	96	75	53	29.99	29.89	29.82	15	7	28	0.16	Rain
30	50	45	42	37	35	32	76	68	58	30.01	29.96	29.93	15	6	20	0.02	Rain **REMA Survey**
														Total for month		**6.31"**	

TABLE A: Climatological Data Associated with Wallingford Renewable Energy Project *(continued)*

2018	Temp. (°F)			Dew Point (°F)			Humidity (%)			Sea Level Press. (in)			Wind (mph)		Precip. (in)		Events, Notes
May	high	avg	low	high	avg	low	high	avg	low	high	avg	low	high	avg	high	sum	
1	75	58	42	41	37	28	85	51	18	30.07	30.02	29.99	13	4	25	0	Rain
2	89	66	45	46	42	34	86	44	15	30.06	29.99	29.91	18	4	25	0	
3	90	72	55	67	56	46	96	62	32	30	29.94	29.86	21	5	29	0.19	Rain
4	80	70	62	66	62	55	100	79	50	29.94	29.87	29.73	16	5	23	0.01	Rain
5	73	65	57	50	41	35	54	40	26	30.09	30.01	29.8	23	13	36	0	
6	63	58	55	53	50	45	93	74	57	30.09	29.96	29.87	10	5	-	0.02	Rain
7	71	60	50	53	50	43	97	78	41	30.09	30.01	29.91	14	3	20	0	
8	72	63	51	49	46	41	89	54	35	30.29	30.22	30.18	12	5	20	0	
9	75	59	43	52	45	36	100	70	29	30.19	30.15	30.09	15	3	22	0	
10	64	59	55	54	53	52	96	82	67	30.08	29.93	29.8	16	5	24	0.04	Rain
11	70	58	48	53	42	28	100	67	23	30.13	29.94	29.81	14	3	22	0	Fog
12	55	51	48	48	44	36	96	81	51	30.19	30.13	30.06	8	3	-	0.16	Rain
13	54	50	46	49	47	44	96	87	80	30.21	30.15	30.07	10	5	-	0	
14	68	58	50	55	51	47	94	84	63	30.06	29.99	29.9	14	3	-	0	
15	82	68	55	64	60	55	100	90	54	29.99	29.87	29.7	17	6	26	0.21	Fog , Rain , Thunderstorm
16	68	60	55	57	55	51	97	87	61	30.15	30.1	30	9	3	-	0.14	Rain
17	72	64	55	64	59	55	97	88	73	30.09	30.02	29.99	8	1	-	0.27	Rain
18	66	60	52	59	44	28	100	58	38	30.41	30.28	30.09	15	4	20	0	
19	57	52	48	55	48	27	100	88	39	30.4	30.23	30.08	7	4	-	0.54	Rain
20	81	67	54	68	59	53	100	88	56	30.05	29.95	29.88	14	5	24	0.03	Fog , Rain
21	77	64	53	53	49	42	93	61	33	30.19	30.14	30.06	10	4	-	0	
22	66	58	51	56	53	48	97	87	52	30.18	30.09	29.96	9	2	-	0.14	Rain
23	82	68	53	61	55	47	100	78	30	29.99	29.91	29.88	13	4	21	0.08	Rain , Thunderstorm
24	82	69	55	53	45	33	90	48	19	30.11	30.07	30	14	8	18	0	
25	87	68	48	60	53	48	97	64	27	30.08	29.92	29.8	14	3	22	0	
26	90	75	61	68	60	53	93	63	30	29.88	29.8	29.76	10	4	21	0	
27	72	62	52	61	54	49	96	84	68	30.14	30.07	29.9	14	8	23	0.01	Rain
28	68	58	50	55	52	48	96	82	66	30.12	30.06	30	10	6	-	0.01	
29	90	73	57	66	61	54	90	72	42	30.05	29.98	29.93	12	5	-	0	**REMA Survey**
30	80	70	55	64	57	48	100	73	36	30.16	30.11	30.06	14	3	21	0	
31	77	62	50	64	57	48	100	85	60	30.12	30.05	29.93	12	2	17	0.03	Rain
														Total for month		**1.88"**	

NWS Monthly Summaries

	March		April		May	
	Temp	Rain	Temp	Rain	Temp	Rain
BDR	0	-0.07"	-3.6	+ 0.69"	+ 3.5	- 0.39"
BDL	-0.5	-0.97"	-5.4	+ 1.83"	+ 4.9	- 1.87"
Showing departure from climatological normals						

BDR = Bridgeport; BDL = Bradley Airport

Table B: 2018 VERNAL POOL DATA for Wallingford Renewable Energy, Wallingford, CT

SPECIES	*LATIN NAME*	VP-1				VP-2				VP-2A				VP-3			
		OXB[1]		REMA[2]		OXB[1]		REMA[2]		OXB[1]		REMA[2]		OXB[1]		REMA[2]	
		4/11	4/23	4/27	4/30	4/11	4/23	4/27	4/30	4/11	4/23	4/27	4/30	4/11	4/23	4/27	4/30
Spotted Salamander	*Ambystoma maculatum*									3E	1E	1E					
Wood Frog	*Lithobates sylvatica*	3Ad., 13E			4E, U-L	62E		15E		24E				17E			1E, S-L
Spring Peeper	*Pseudacris crucifer*																
Fairy Shrimp	*Eubranchipus vernalis*	x			A	x		C		x		C		x			U
Isopod	Asellidae				x			x		x		x					x
Amphipod	Gammaridae	x			x	x		x		x		x					x
Caddis Fly larvae	Limnephilidae	x				x		x		x		x					
Predaceous Beetle Larva	Dytiscidae							x				x					
Mosquito larvae	Culicidae	x			x	x		x		x		x		x			x
Midge larvae	Chironomidae											x					
Seg. Worm	Tubificidae											x					
Pill Clam	Sphaeriidae					x		x									
Snail	Physidae									x		x					
Flat worm	Phagocata									x							
Spotted turtle	Clemmys guttata																
Other																	
pH		5.6				6.3				6.9				6.0			
Water Temp. (Celcius)		6				8				7				10			
Max./Mean Depth (inches)		***42/18***			***32/26***	***16/12***		***24/18***		***42/24***		***24/20***		***16/9***			***18/16***

NOTES: E = Egg Mass; L = Larvae; S = Sparce, U = Uncommon, C = Common, A = Abundant, Ad. = adult

[1] Dates of Survey by Oxbow Associates = April 11 and 23, 2018

[2] Dates of Survey by REMA Ecological Services = April 27 and 30, and May 29, 2018

Table B: 2018 VERNAL POOL DATA for Wallingford Renewable Energy, Wallingford, CT *(continued)*

SPECIES	*LATIN NAME*	VP-4				VP-4B				VP-5				VP-6			
		OXB[1]		REMA[2]		OXB[1]		REMA[2]		OXB[1]		REMA[2]		OXB[1]		REMA[2]	
		4/11	4/23	4/27	4/30	4/11	4/23	4/27	4/30	4/11	4/23	4/27	4/30	4/11	4/23	4/27	4/30
Spotted Salamander	*Ambystoma maculatum*	**9E**			**1E**	**5E**			**3E**	**12E**							
Wood Frog	*Lithobates sylvatica*	**13E**			**2E, U-L**	**4E**			**6E, S-L**	**66E**			**2WF, C-L**	**25E**			**C-L**
Spring Peeper	*Pseudacris crucifer*																**3Ad.**
Fairy Shrimp	*Eubranchipus vernalis*				**S**												
Isopod	Asellidae				x				x				x	x			x
Amphipod	Gammaridae				x				x				x				x
Caddis Fly larvae	Limnephilidae	x				x				x			x	x			x
Predaceous Beetle Larva	Dytiscidae				x								x				x
Mosquito larvae	Culicidae	x				x			x	x			x	x			x
Midge larvae	Chironomidae																x
Seg. Worm	Tubificidae	x											x	x			x
Pill Clam	Sphaeriidae				x								x				
Snail	Physidae	x			x	x				x			x	x			x
Flat worm	Phagocata																
Spotted turtle	Clemmys guttata													?			
Other														C. serpentina			
pH		6.2				5.9				4.9				5.7			
Water Temp. (Celcius)		9				10				9				11			
Max./Mean Depth (inches)		***36/18***			***22/18***	***36/12***			***20/16***	***42/24***			***26/22***	***12/6***			***15/10***

NOTES:

E = Egg Mass; L = Larvae; S = Sparce, U = Uncommon, C = Common, A = Abundant, Ad. = adult

[1] Dates of Survey by Oxbow Associates = April 11 and 23, 2018

[2] Dates of Survey by REMA Ecological Services = April 27 and 30, and May 29, 2018

Table B: 2018 VERNAL POOL DATA for Wallingford Renewable Energy, Wallingford, CT *(continued)*

SPECIES	*LATIN NAME*	VP-7				VP-7A				VP-8			
		OXB[1]		REMA[2]		OXB[1]		REMA[2]		OXB[1]		REMA[2]	
		4/11	4/23	5/29		4/11	4/23	5/29		4/11	4/23	4/27	4/30
Spotted Salamander	*Ambystoma maculatum*									**2E, 1Ad.**			**1E**
Wood Frog	*Lithobates sylvatica*			**C-L**						**27E**			**1E, C-L**
Spring Peeper	*Pseudacris crucifer*												
Fairy Shrimp	*Eubranchipus vernalis*												
Isopod	Asellidae							x					x
Amphipod	Gammaridae	x		x		x		x		x			x
Caddis Fly larvae	Limnephilidae	x		x		x							x
Predaceous Beetle Larva	Dytiscidae												x
Mosquito larvae	Culicidae									x			x
Midge larvae	Chironomidae												x
Seg. Worm	Tubificidae												x
Pill Clam	Sphaeriidae												
Snail	Physidae	x				x							
Flat worm	Phagocata												
Spotted turtle	Clemmys guttata												
Other		L. clamitans		L. clamitans				L. clamitans					
pH						5.9				5.9			
Water Temp. (Celcius)						10				10			
Max./Mean Depth (inches)		***18/6***		***12/8***		***18/6***		***14/10***		***36/12***			***20/16***

NOTES: E = Egg Mass; L = Larvae; S = Sparce, U = Uncommon, C = Common, A = Abundant, Ad. = adult

[1] Dates of Survey by Oxbow Associates = April 11 and 23, 2018

[2] Dates of Survey by REMA Ecological Services = April 27 and 30, and May 29, 2018

Attachment C

Annotated Photographs: 1 through 64

Vernal Pool Surveys – Wallingford Renewable Energy
Photos taken in April and May 2018, by Oxbow Associates, Inc, and REMA Ecological Services, LLC

Photo 1: VP-1; facing easterly

Photo 2: VP-1 with wood frog egg masses

Photo 3: VP-1; April 30, 2018; facing southeasterly

Photo 4: VP-1; April 30, 2018; facing southeasterly

Photo 5: VP-1 with hatched wood frog egg masses

Photo 6: VP-1; May 29th, 2018; facing northwesterly

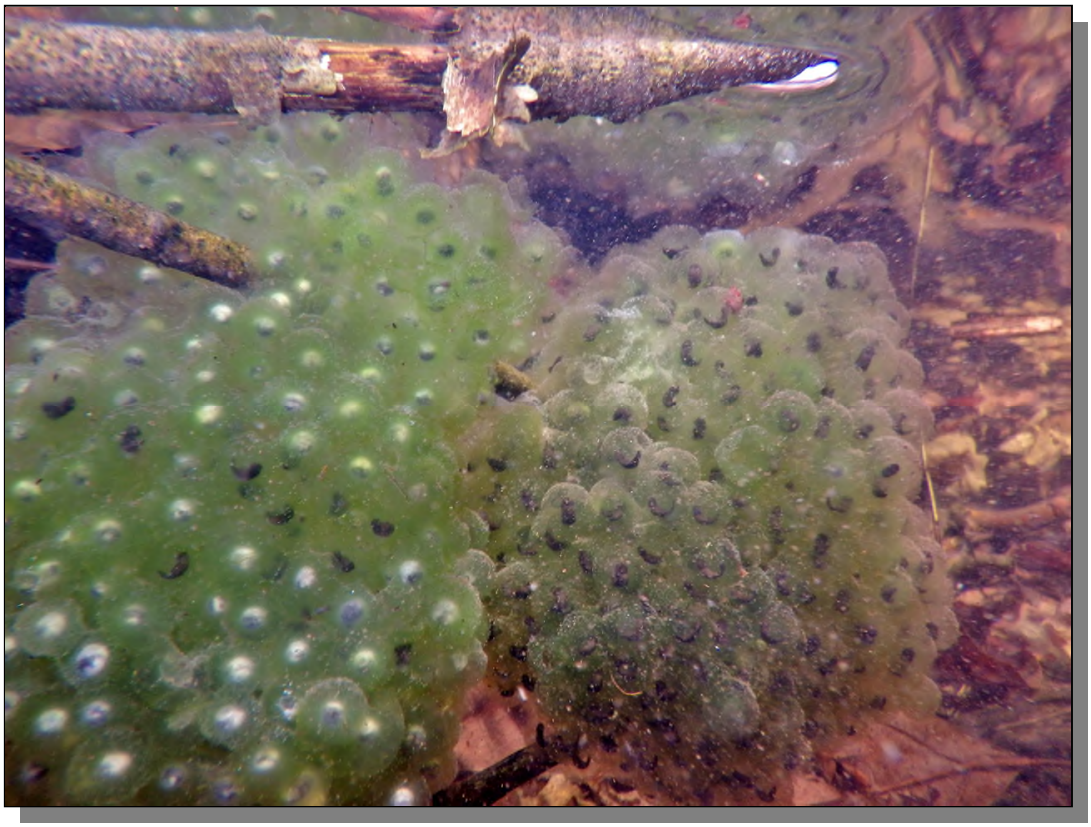


Photo 7: VP-2 with wood frog egg masses as seen under water

Photo 8: VP-2; April 11; facing northwesterly

Photo 9: VP-2, April 27, 2018; facing northwesterly

Photo 10: VP-2 with hatched wood frog egg masses

Photo 11: VP-2, April 30, 2018; facing southerly

Photo 12: VP-2, April 30, 2018; blue flags indicate location of observed wood frog egg masses; facing northerly

Photo 13: VP-2, predaceous diving beetle

Photo 14: VP-2; May 29, 2018; facing northerly

Photo 15: VP-2, wood frog tadpole

Photo 16: VP-2A wood frog egg mass raft

Photo 17: VP-2A juvenile painted turtle

Photo 18: VP-2A; gas line ROW in background ; facing northeasterly

Photo 19: VP-2A; April 27, 2018; facing northeasterly

Photo 20: VP-2A viewed from gas line ROW; note outlet ditch; facing southeasterly

Photo 21: VP-2A outlet ditch with arrow indicating wood debris and leaf jam "dam;" facing northwesterly

Photo 22: VP-2A outlet ditch with culvert under gas line ROW completely inundated due to artificial/temporary "dam" further downstream; facing northwesterly

Photo 23: VP-2A fairy shrimp

Photo 24: VP-2A mosquito larva

Photo 25: VP-2A on May 29, 2018; facing northeasterly

Photo 26: VP-2A; facing easterly

Photo 27: VP-3 on April 11, 2018; facing southeasterly

Photo 28: VP-3 wood frog egg masses

Photo 29: VP-3, April 30, 2018; facing northwesterly

Photo 30: VP-3; facing south easterly

Photo 31: VP-3 on May 29, 2018; facing easterly

Photo 32: VP-4; April 27, 2018; facing northerly

Photo 33: VP-4, April 11, 2018; wood frog egg masses

Photo 34: VP-4; April 30, 2018; facing southwesterly

Photo 35: VP-4; April 30, 2018; facing northerly

Photo 36: VP-4 on May 29, 2018; facing westerly

Photo 37: VP-4; facing northwesterly

Photo 38: VP-4A, April 30, 2018; mostly hatched wood frog egg masses

Photo 39: VP-4A spotted salamander egg mass

Photo 40: VP-4A; April 20, 2018; facing northerly

Photo 41: VP-4A; May 29, 2018; facing northeasterly

Photo 42: VP-5; April 11, 2018; facing westerly

Photo 43: VP-5; facing easterly

Photo 44: VP-5, on April 30, 2018; facing westerly

Photo 45: VP-5; April 30, 2018; blue flag indicates presence of egg mass; facing westerly

Photo 46: VP-5; newly hatched wood frog larvae

Photo 47: VP-5 adult wood frog

Photo 48: VP-6 on April 30, 2018; facing northeasterly

Photo 49: VP-6; facing easterly

Photo 50: VP-6 on May 29, 2018; facing southerly

Photo 51: VP-6; facing southeasterly

Photo 52: VP-7 on April 23, 2018; facing southerly

Photo 53: VP-7 on May 29, 2018; facing northeasterly

Photo 54: VP-7 wood frog tadpole

Photo 55: VP-7 developing green frog

Photo 56: VP-7 green frog tadpole (2nd year)

Photo 57: VP-7A, on April 23, 2018; facing northerly

Photo 58: VP-7A; facing northwesterly

Photo 59: VP-8, on April 11, 2018; facing northerly

Photo 60: VP-8 wood frog egg mass raft; northern section of vernal pool habitat

Vernal Pool Surveys– Wallingford Renewable Energy
Photos taken in April and May 2018, by Oxbow Associates, Inc, and REMA Ecological Services, LLC

Photo 61: VP-8 on April 30, 2018; facing southerly

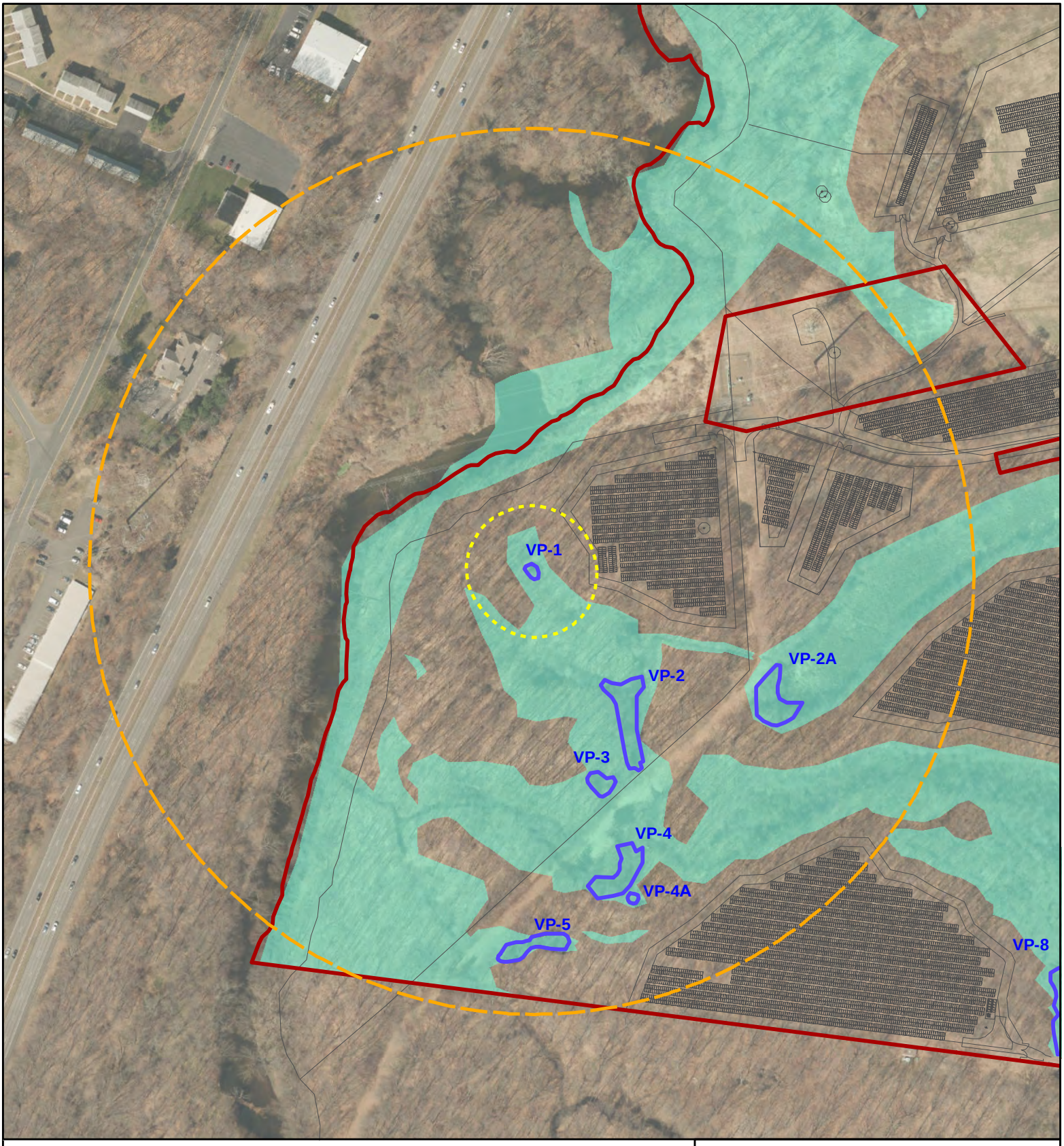
Photo 62: VP-8; facing northerly

Photo 63: VP-8 on May 29, 2018; facing northerly

Photo 64: VP-8 wood frog tadpole

Attachment D

Vernal Pool Habitat Areas Impacts: Map 1 through 10



Project Area
Vernal Pool Habitat
Vernal Pool Envelope (100-foot buffer)
Critical Terrestrial Habitat (750-foot buffer)
Delineated Wetland

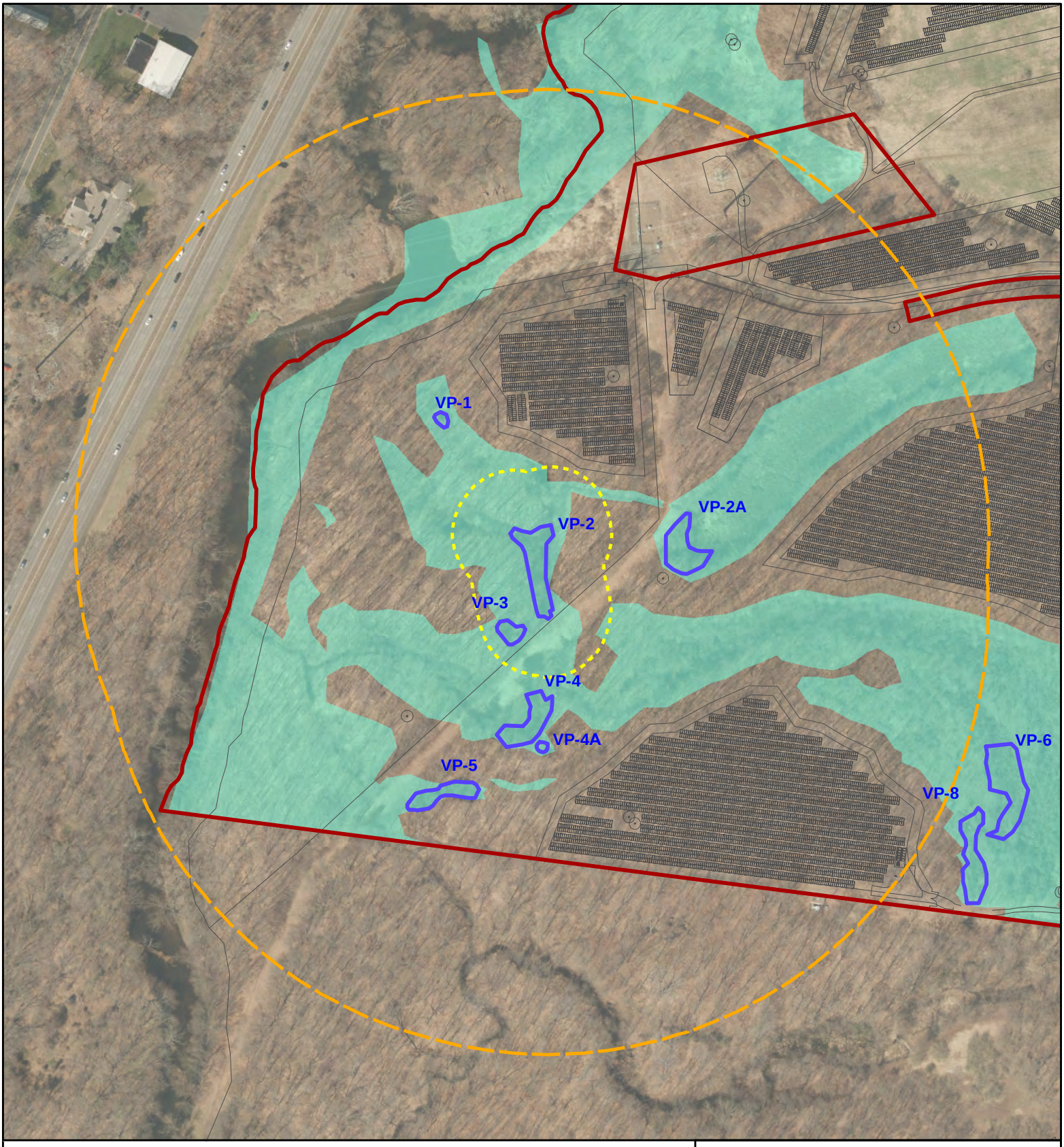
N

0 100 200
Feet

Vernal Pool Habitat Areas
VP-1

Wallingford Renewable Energy Solar Project
Wallingford, CT

R:\PROJECTS\WALLINGFORD_9002\GENERAL\MAPS\Vernal_Pools_mapbook.mxd



Project Area
Vernal Pool Habitat
Vernal Pool Envelope (100-foot buffer)
Critical Terrestrial Habitat (750-foot buffer)
Delineated Wetland

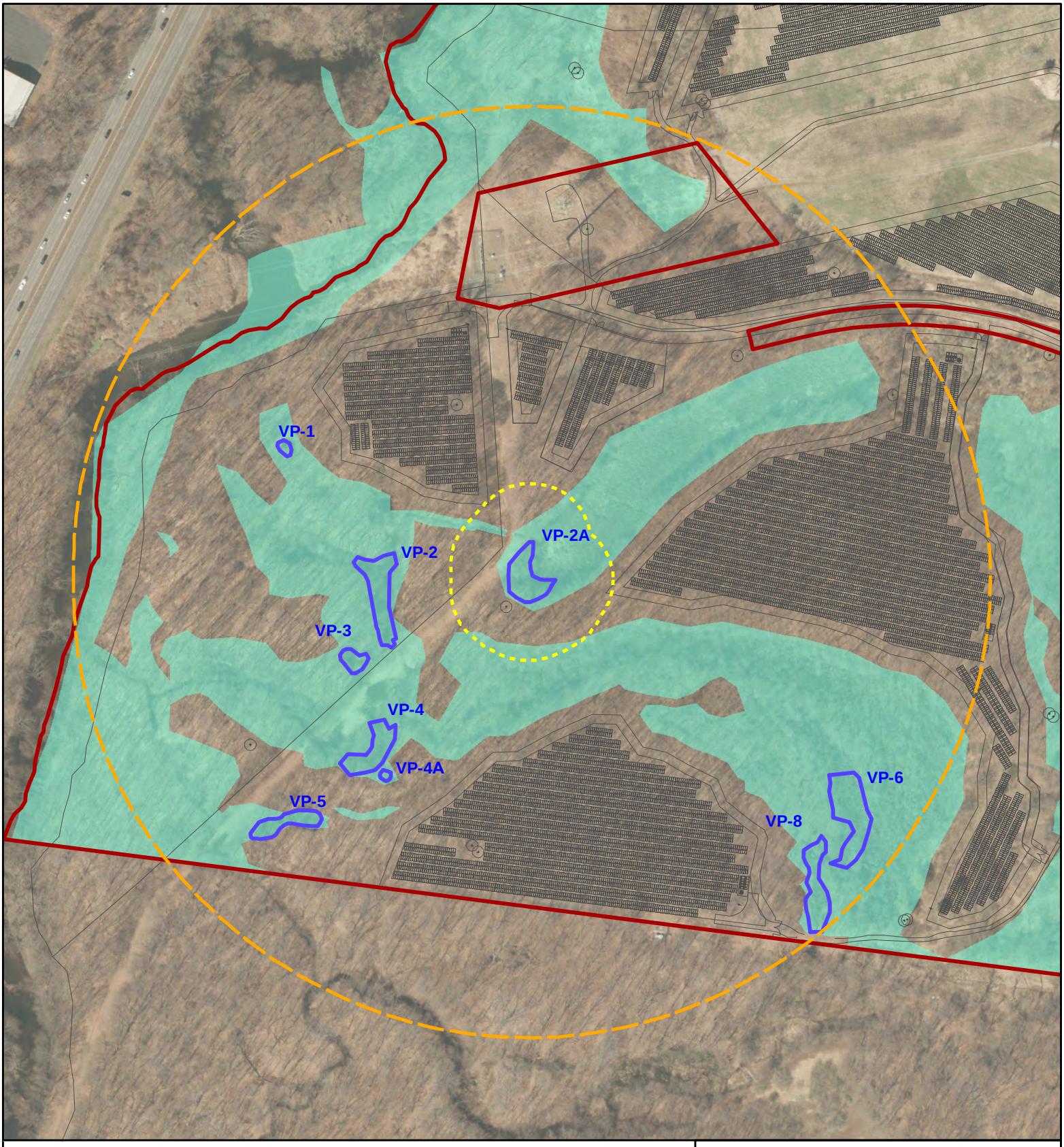
N

0 100 200
Feet

Vernal Pool Habitat Areas
VP-2

Wallingford Renewable Energy Solar Project
Wallingford, CT

R:\PROJECTS\WALLINGFORD_9002\GENERAL\MAPS\Vernal_Pools_mapbook.mxd



Project Area
Vernal Pool Habitat
Vernal Pool Envelope (100-foot buffer)
Critical Terrestrial Habitat (750-foot buffer)
Delineated Wetland

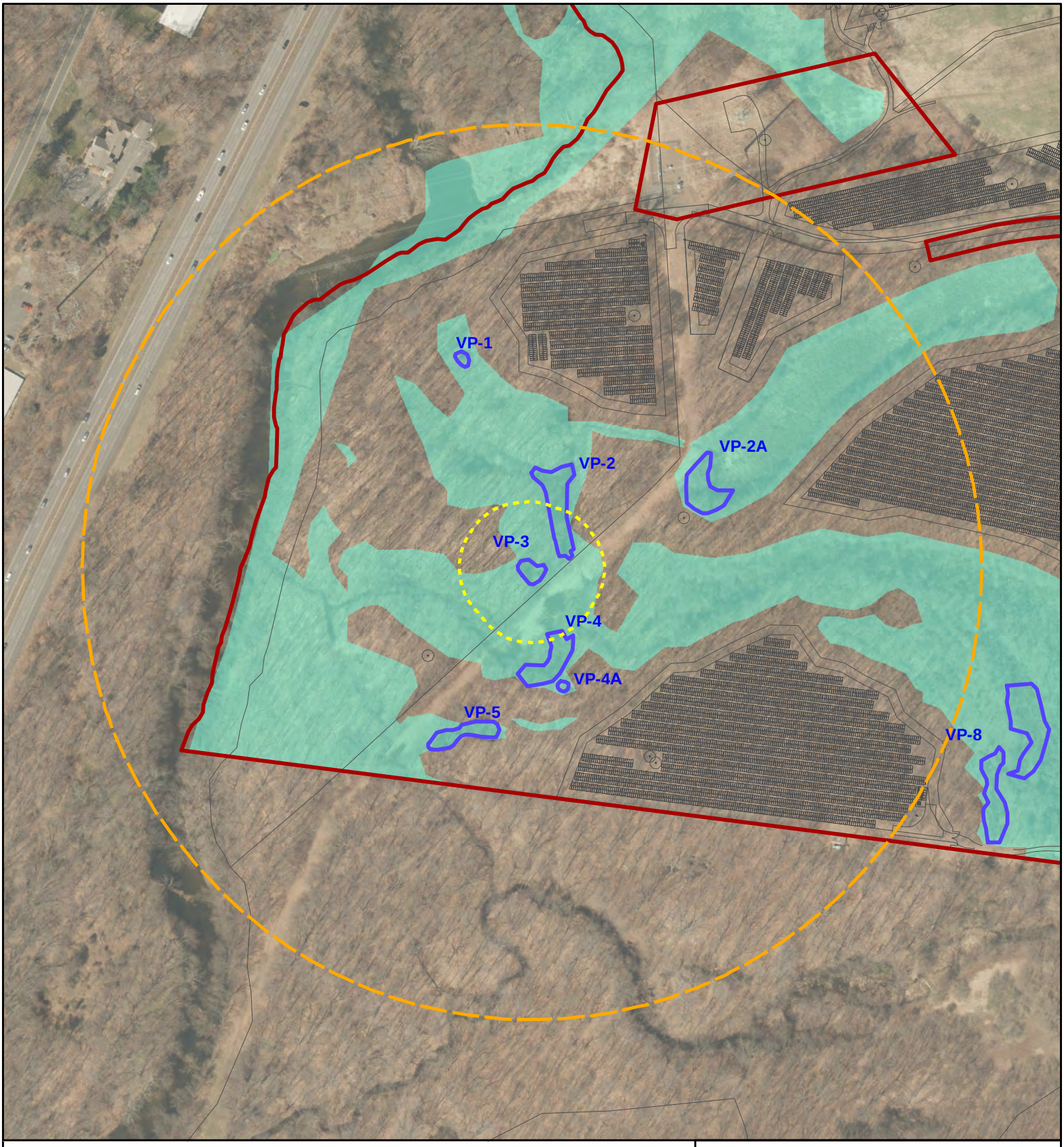
N

0 100 200
Feet

Vernal Pool Habitat Areas
VP-2A

Wallingford Renewable Energy Solar Project
Wallingford, CT

R:\PROJECTS\WALLINGFORD_9002\GENERAL\MAPS\Vernal_Pools_mapbook.mxd



Project Area
Vernal Pool Habitat
Vernal Pool Envelope (100-foot buffer)
Critical Terrestrial Habitat (750-foot buffer)
Delineated Wetland

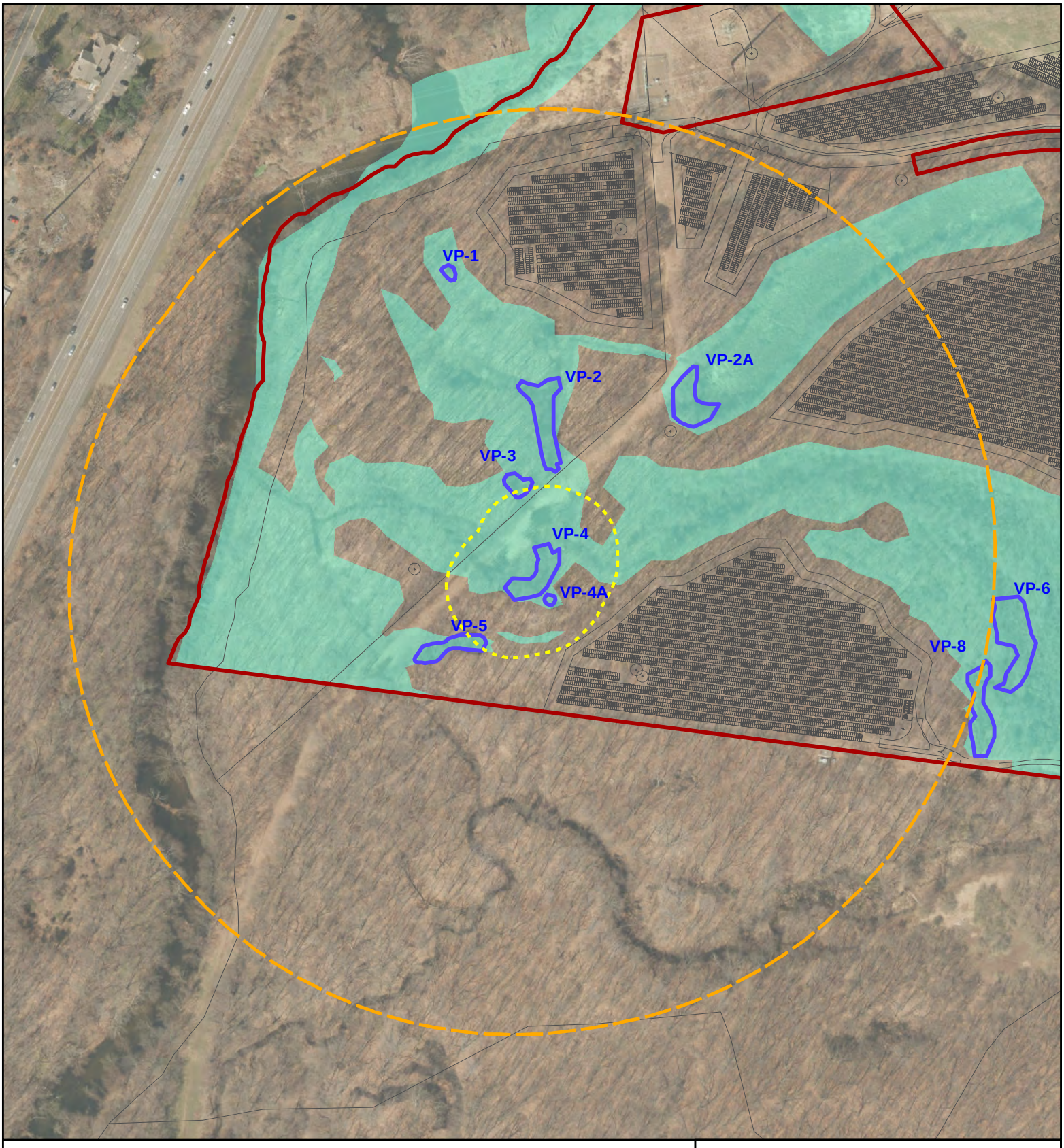
N

0 100 200
Feet

Vernal Pool Habitat Areas
VP-3

Wallingford Renewable Energy Solar Project
Wallingford, CT

R:\PROJECTS\WALLINGFORD_9002\GENERAL\MAPS\Vernal_Pools_mapbook.mxd



Project Area
Vernal Pool Habitat
Vernal Pool Envelope (100-foot buffer)
Critical Terrestrial Habitat (750-foot buffer)
Delineated Wetland

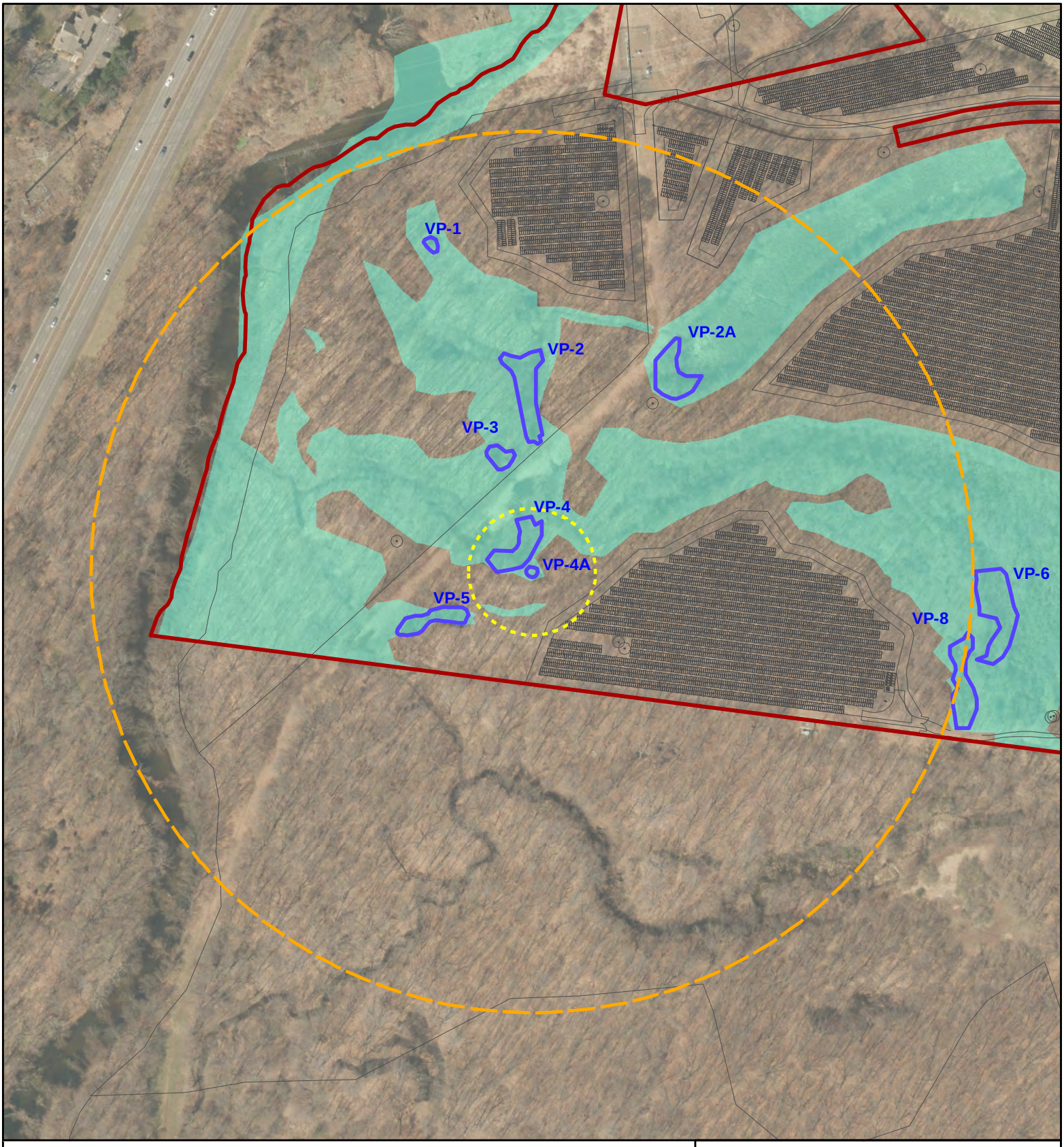
N

0 100 200
Feet

Vernal Pool Habitat Areas
VP-4

Wallingford Renewable Energy Solar Project
Wallingford, CT

R:\PROJECTS\WALLINGFORD_9002\GENERAL\MAPS\Vernal_Pools_mapbook.mxd



Project Area
Vernal Pool Habitat
Vernal Pool Envelope (100-foot buffer)
Critical Terrestrial Habitat (750-foot buffer)
Delineated Wetland

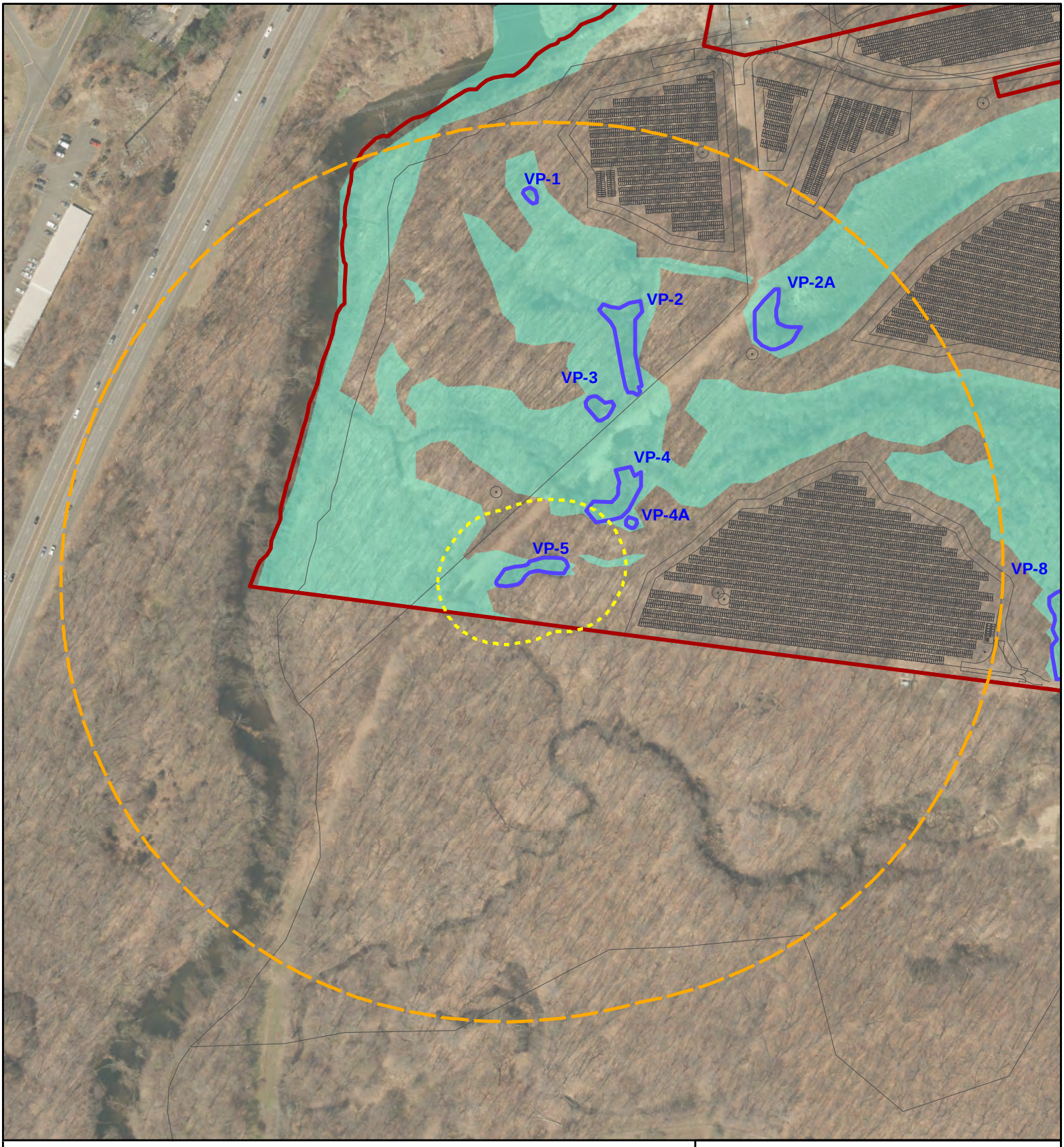
N

0 100 200
Feet

Vernal Pool Habitat Areas
VP-4A

Wallingford Renewable Energy Solar Project
Wallingford, CT

R:\PROJECTS\WALLINGFORD_9002\GENERAL\MAPS\Vernal_Pools_mapbook.mxd



Project Area
Vernal Pool Habitat
Vernal Pool Envelope (100-foot buffer)
Critical Terrestrial Habitat (750-foot buffer)
Delineated Wetland

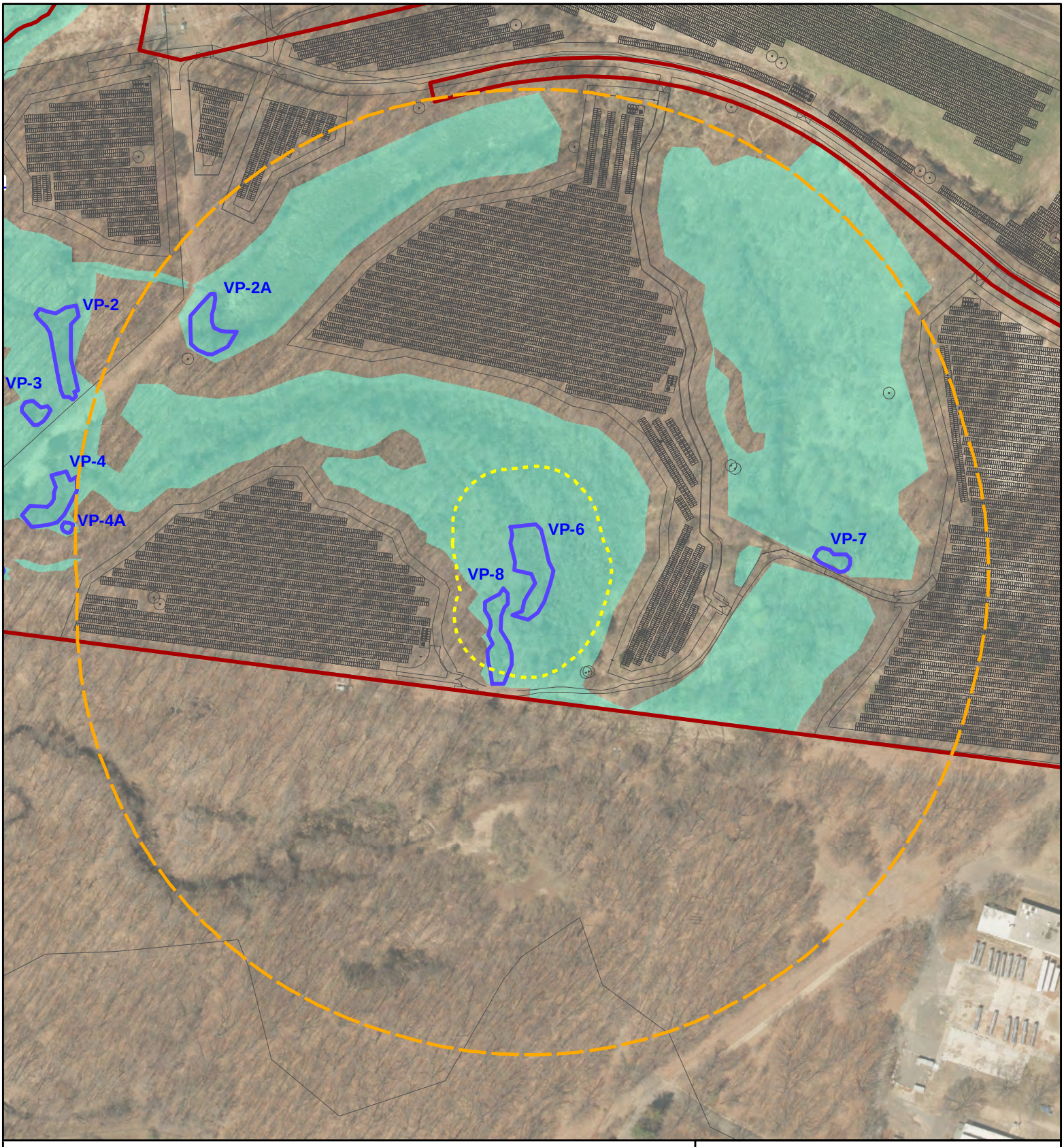
N

0 100 200
Feet

Vernal Pool Habitat Areas
VP-5

Wallingford Renewable Energy Solar Project
Wallingford, CT

R:\PROJECTS\WALLINGFORD_9002\GENERAL\MAPS\Vernal_Pools_mapbook.mxd



Project Area
Vernal Pool Habitat
Vernal Pool Envelope (100-foot buffer)
Critical Terrestrial Habitat (750-foot buffer)
Delineated Wetland

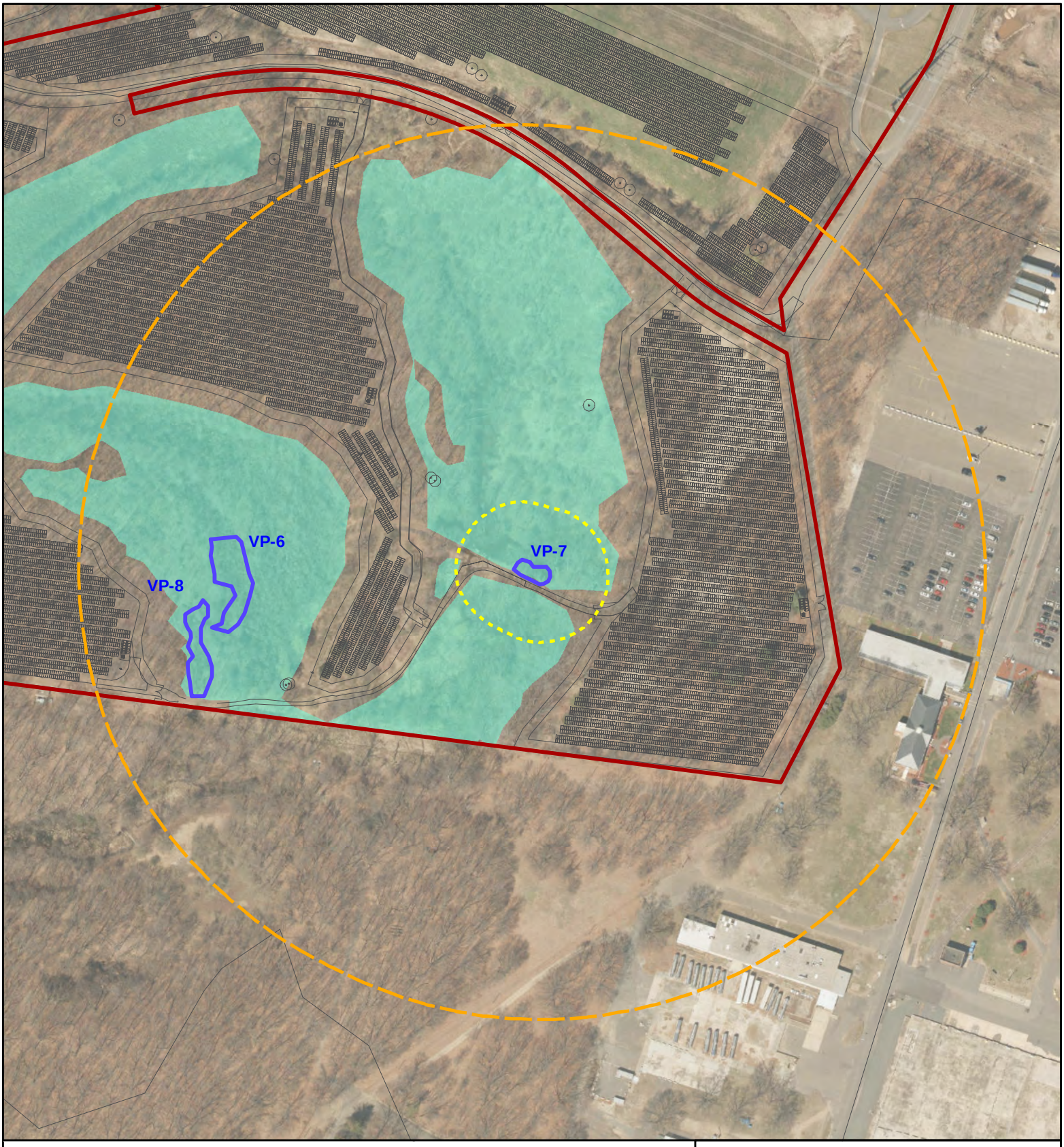
N

0 100 200
Feet

Vernal Pool Habitat Areas
VP-6

Wallingford Renewable Energy Solar Project
Wallingford, CT

R:\PROJECTS\WALLINGFORD_9002\GENERAL\MAPS\Vernal_Pools_mapbook.mxd



Project Area
Vernal Pool Habitat
Vernal Pool Envelope (100-foot buffer)
Critical Terrestrial Habitat (750-foot buffer)
Delineated Wetland

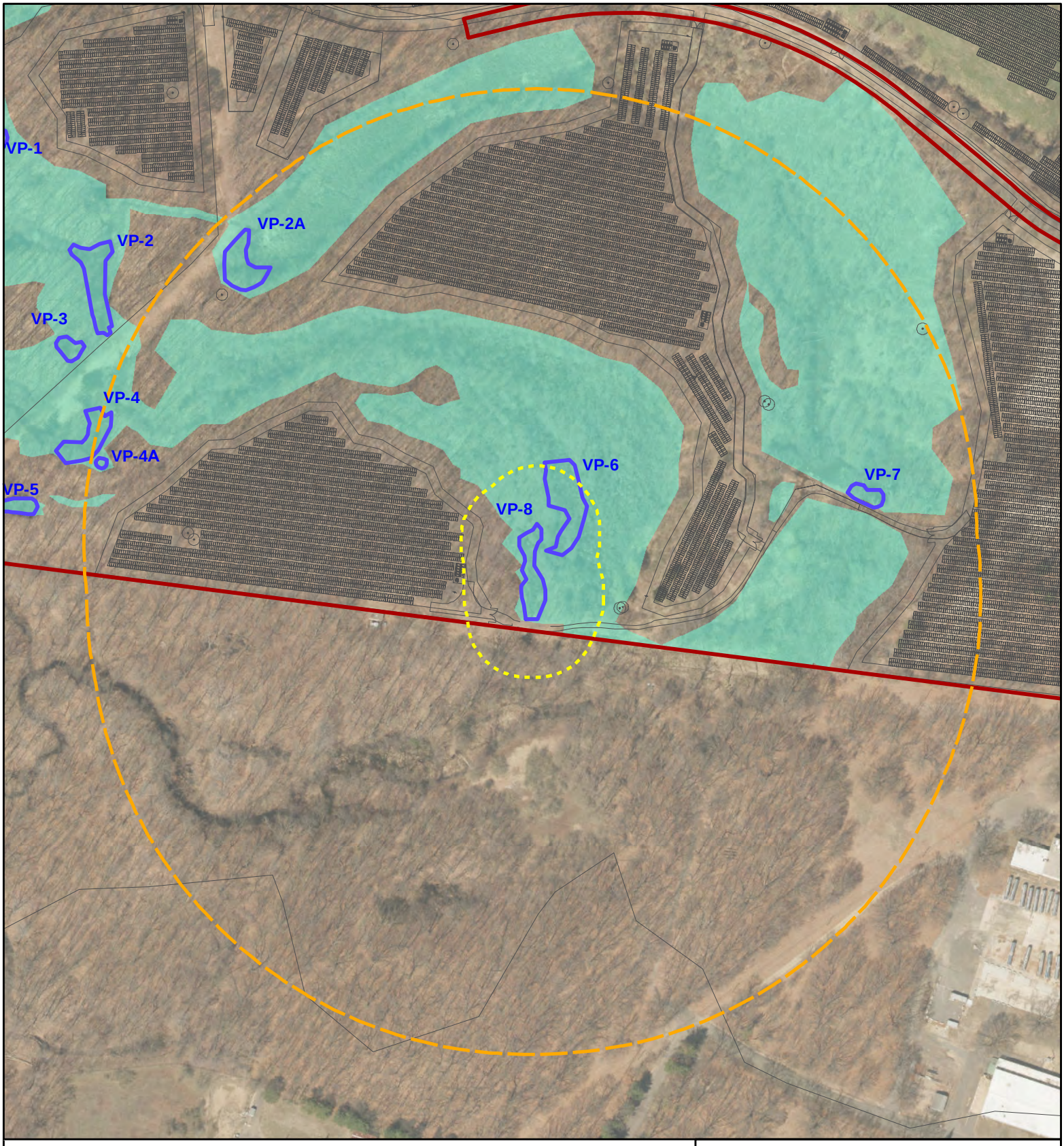
N

0 100 200
Feet

Vernal Pool Habitat Areas
VP-7

Wallingford Renewable Energy Solar Project
Wallingford, CT

R:\PROJECTS\WALLINGFORD_9002\GENERAL\MAPS\Vernal_Pools_mapbook.mxd



Project Area
Vernal Pool Habitat
Vernal Pool Envelope (100-foot buffer)
Critical Terrestrial Habitat (750-foot buffer)
Delineated Wetland

N

0 100 200
Feet

Vernal Pool Habitat Areas
VP-8

Wallingford Renewable Energy Solar Project
Wallingford, CT

R:\PROJECTS\WALLINGFORD_9002\GENERAL\MAPS\Vernal_Pools_mapbook.mxd