

EXPANDED ENVIRONMENTAL NOTIFICATION FORM

ADM TMUD Wareham PV+ES Projects EEA No. 13940

ADM Tihonet Mixed Use Development Wareham, Carver and Plymouth, Massachusetts



Applicant:

Borrego Solar Systems, Inc.
55 Technology Dr., #102
Lowell, MA 01851

Prepared by:

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In conjunction with:

Borrego Solar Systems, Inc.
55 Technology Dr., #102
Lowell, MA 01851

***Submitted in Compliance with the
Massachusetts Environmental Policy Act***

March 15, 2021



March 15, 2021

Secretary Kathleen A. Theoharides
Executive Office of Energy and Environmental Affairs (EEA)
Attn: MEPA Office
100 Cambridge Street, Suite 900
Boston, MA 02114

Via: Email to MEPA@mass.gov

Reference: Expanded Environmental Notification Form
ADM TMUD Wareham PV+ES Projects
EEA No. 13940 – ADM Tihonet Mixed Use Development
Wareham, Massachusetts
B+T Project No. 1833.113

Dear Secretary Theoharides:

On behalf of the Project Proponent, Borrego Solar Systems, Inc. (BSSI or the Proponent), and in accordance with the Certificate of the Secretary of Environmental Affairs Establishing a Special Review Procedure dated January 29, 2007 (the SRP Certificate) for the ADM Tihonet Mixed Use Development (TMUD or the Project), Beals and Thomas, Inc. (B+T) respectfully submits the enclosed Expanded Environmental Notification Form (EENF) for the 27 Charge Pond Road PV+ES Project, the 140 Tihonet Road PV+ES Project, and the 150 Tihonet Road PV+ES Project in Wareham, Massachusetts.

As noted in the SRP Certificate, the overall ADM TMUD Project consists of the phased development of a mixed-use village community on approximately 5,666.91± acres (the Parcel, acreage updated since SRP to reflect areas sold to the Commonwealth or private entities) in the towns of Wareham, Carver and Plymouth. The proposed Project has and will continue to incorporate the principles of smart-growth, open space preservation, low-impact development, traditional village design, pedestrian orientation, Transfer of Development Rights, and the preservation of environmental resources.

Currently proposed are three individual large-scale ground-mounted photovoltaic installations, as described on the following page:

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Southborough, MA 01772
Regional Office: Plymouth, MA

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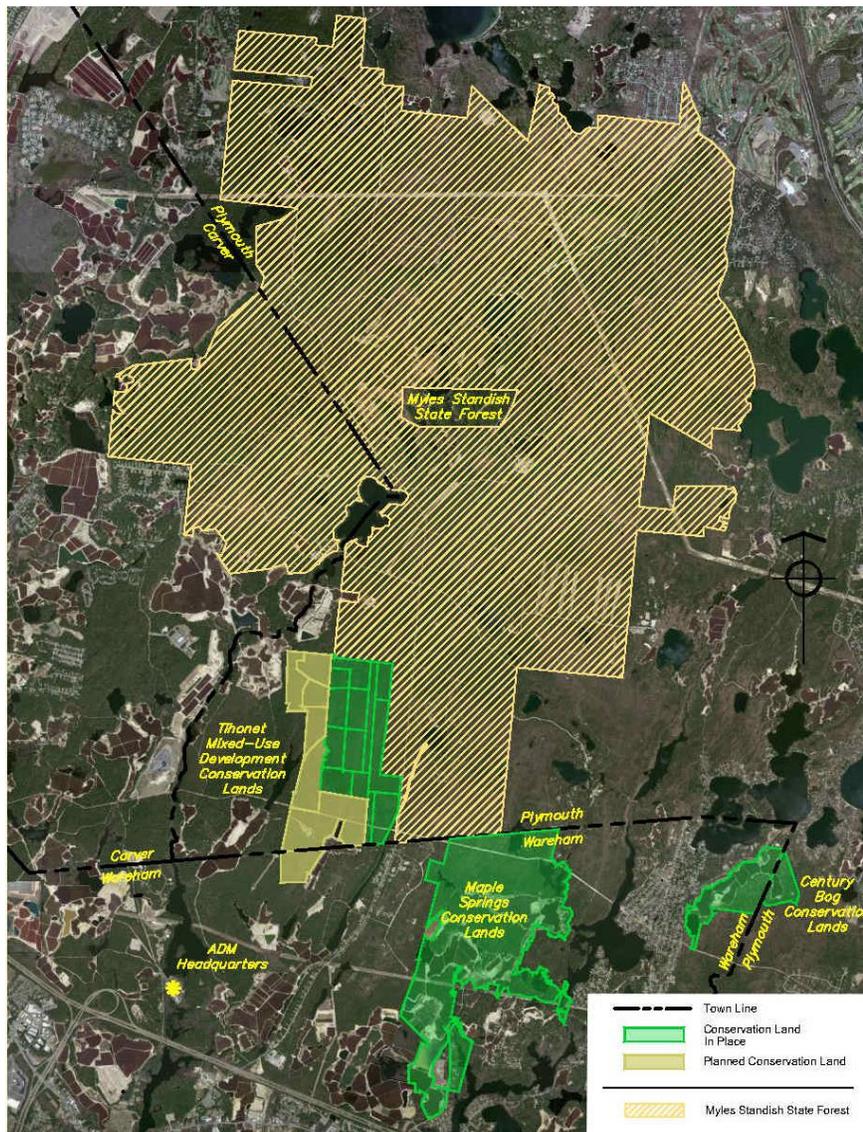
- The 27 Charge Pond Road PV+ES Project consists of an approximately ± 5 megawatt (MW) AC/ ± 11.6 MW DC solar array and energy storage system including Site access and interconnection to the electrical grid. This project is proposed within a ± 42.1 -acre area on a portion of a larger ± 130 acre overall parcel of land located to the east of Parker Mills Pond and south of Route 25. This project exceeds the ENF threshold relating to land alteration (301 CMR 11.03(1)(b)1) for direct alteration of 25 or more acres of land; however, no Agency Action is required. As a result, this project would not ordinarily be subject to MEPA were it not required by the SRP Certificate.
- The 140 Tihonet Road PV+ES Project consists of an approximately ± 5 MW AC/ ± 19.3 MW DC solar array and energy storage system including Site access and interconnection to the electrical grid. This project is proposed within a ± 66.2 -acre area on a portion of a larger area of land located to the southwest of the previously-approved 160 Tihonet Road Wareham PV+ES (aka Tihonet East Solar) Project, immediately south of an existing electrical easement, and east of Tihonet Pond and Tihonet Road. This project exceeds the ENF threshold relating to land alteration (301 CMR 11.03(1)(b)1) for direct alteration of 25 or more acres of land and the EIR threshold for direct alteration of 50 or more acres (301 CMR 11.03(1)(a)1); however, no Agency Action is required. As a result, this project would not ordinarily be subject to MEPA were it not required by the SRP Certificate.
- The 150 Tihonet Road PV+ES Project consists of an approximately ± 5 MW AC/ ± 15.5 MW DC solar array and energy storage system including Site access and interconnection to the electrical grid. This project is proposed within a ± 49.2 -acre area immediately north across the existing electrical easement from the 140 Tihonet Road PV+ES Project described in the above bullet. This project exceeds the ENF threshold relating to land alteration (301 CMR 11.03(1)(b)1) for direct alteration of 25 or more acres of land. The Project requires a Conservation and Management Permit from the Massachusetts Department of Fisheries and Wildlife for work within unmapped but acknowledged pine barrens habitat. Impacts to this habitat will be mitigated in coordination with Natural Heritage & Endangered Species Program through the conservation of forested areas located proximate to Myles Standish State Forest and other conservation lands established by the landowner, as well as habitat funding.

Further mitigation is proposed for each project and is described in Section 2.5.

These three individual solar Projects represent the tenth, eleventh, and twelfth Projects being undertaken by ADM as part of Phase C of the TMUD, and will continue to advance the Commonwealth's commendable goals to foster renewable energy and achieve Net Zero emissions by 2050.

In support of the EENF, a greenhouse gas emissions analysis is included in Section 2.3.12 herein. This analysis demonstrates that there is a considerable net benefit of the renewable energy produced by the proposed Projects when compared to the carbon sequestration of the forests at the sites of the proposed solar Projects.

To date, the landowner has also transferred 436.84 acres of former TMUD land adjacent to Myles Standish State Forest to the Commonwealth of Massachusetts for conservation purposes. An additional 409± acres of conservation lands adjacent to the state forest are also presently earmarked for conservation in association with the TMUD. These acres at the TMUD are in addition to other significant proactive conservation lands placed at Maple Springs and Century Bog, and not associated with development projects. To date, due to the landowner's cooperative relationship with Massachusetts Department of Fish and Game, over 1,700 acres of conservation lands have been placed in Wareham and Plymouth.



In accordance with the SRP, enclosed please find the following information in addition to the EENF for the three solar Projects:

- Master Plan Update, specifically, information relating to:
 - A summary of the 140 Tihonet Road PV+ES Project, the 150 Tihonet Road PV+ES Project, and the 27 Charge Pond Road PV+ES Project and the previously contemplated residential uses these replace.
 - Discussion of consistency with the Conceptual Plan as most recently presented to MEPA.
- Cumulative Impact Assessment, including information demonstrating that these phases will not preclude options to avoid, minimize and mitigate environmental impacts associated with future project phases.
- Information pertaining to public outreach undertaken to date.

Based on the information herein, which demonstrates that the Projects avoid, minimize, and mitigate Damage to the Environment, the Proponent respectfully requests that the 27 Charge Pond Road and 150 Tihonet Road PV+ES Projects described herein be allowed to proceed without further MEPA review. As outlined above, the 27 Charge Pond Road PV+ES project would not be subject to MEPA jurisdiction were it not for the SRP Certificate, and the landowner and Proponent have an established mitigation process and have coordinated with NHESP regarding the 150 Tihonet Road PV+ES project such that further MEPA review will not provide meaningful information. Further, to facilitate MEPA's review, information relating to greenhouse gas considerations for the Projects has also been included herein, such that further MEPA review would be unlikely to yield additional project information. Development of these Projects will not preclude options to avoid, minimize or mitigate environmental impacts associated with future phases of the ADM TMUD.

Furthermore, the Proponent respectfully requests a waiver of a mandatory EIR for the 140 Tihonet Road PV+ES Project. Although this Project exceeds the mandatory EIR threshold for land alteration, there are no associated Agency Actions required for the project. As outlined above, this project would not be subject to MEPA jurisdiction were it not for the SRP Certificate. Furthermore, ground-mounted solar is a less intensive land use than the large-scale residential developments previously reviewed by MEPA in the TMUD. Finally, greenhouse gas considerations are addressed herein, such that requiring an EIR would not yield meaningful additional information to facilitate MEPA or agency reviews.

Secretary Kathleen A. Theoharides
Executive Office of Energy and Environmental Affairs
March 15, 2021
Page 5

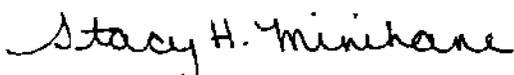
The elimination of the single-family homes in favor of the proposed solar uses reduces Phase C wastewater generation and commensurate nutrient loading from sewage disposal systems, as well as other environmental impacts associated with traffic, roadways and other impervious areas for example. Please refer to Table 3-2 for comprehensive updated impact estimates for the Phase C portion of the Project. Because the environmental impacts associated with the Projects are fully detailed herein, mitigation is described, and since the Projects will not result in the level of environmental impacts (wastewater, traffic, impervious area, etc.) typically associated with Projects that alter greater than 50 acres of land, an EIR will not serve to further environmental considerations.

Should MEPA require an EIR for the 140 Tihonet Road PV+ES Project, the Proponent respectfully requests that it be scoped for a Single Environmental Impact Report (SEIR) pursuant to 301 CMR 11.08(8)(d)(l).

Should you have any questions regarding this matter or require additional information, please do not hesitate to contact us at (508) 366-0560. We thank you for your consideration.

Very truly yours,

BEALS AND THOMAS, INC.



Stacy H. Minihane, PWS
Senior Associate



Mary Kate Schneeweis
Senior Environmental Planning Specialist

Enclosures

cc: Borrego Solar Systems, Inc. (via email)
A.D. Makepeace Company, James Kane (via email and 1 copy via U.S. Mail)
Circulation List (as noted in Section 6.0)

MKS/shm/cmv/1833113EF001

TABLE OF CONTENTS

1.0 ENVIRONMENTAL NOTIFICATION FORM..... 1-1

2.0 PROJECT NARRATIVE 2-1

2.1 INTRODUCTION AND BACKGROUND 2-1

2.2 MEPA REVIEW THRESHOLDS 2-2

2.3 EXISTING AND PROPOSED CONDITIONS 2-2

2.3.1 *Introduction*..... 2-2

2.3.1.1 Phase C10 – 27 Charge Pond Road PV+ES Project..... 2-2

2.3.1.2 Phase C11 – 140 Tihonet Road PV+ES Project 2-3

2.3.1.3 Phase C12 – 150 Tihonet Road PV+ES Project 2-4

2.3.2 *Wetlands and Water Resources* 2-4

2.3.2.1 Phase C10 – 27 Charge Pond Road PV+ES Project..... 2-5

2.3.2.2 Phase C11 – 140 Tihonet Road PV+ES Project 2-6

2.3.2.3 Phase C12 – 150 Tihonet Road PV+ES Project 2-6

2.3.3 *Rare Species and Wildlife Habitat*..... 2-6

2.3.4 *Topography, Geology, and Soils* 2-7

2.3.4.1 27 Phase C10 – Charge Pond Road PV+ES Project..... 2-7

2.3.4.2 Phase C11 – 140 Tihonet Road PV+ES Project 2-7

2.3.4.3 Phase C12 – 150 Tihonet Road PV+ES Project 2-8

2.3.5 *Zoning and Land Use*..... 2-8

2.3.5.1 27 Phase C10 – Charge Pond Road PV+ES Project..... 2-8

2.3.5.2 Phase C11 – 140 Tihonet Road PV+ES Project 2-9

2.3.5.3 Phase C12 – 150 Tihonet Road PV+ES Project 2-9

2.3.6 *Cultural Resources* 2-9

2.3.6.1 27 Phase C10 – Charge Pond Road PV+ES Project..... 2-9

2.3.6.2 Phase C11 – 140 Tihonet Road PV+ES Project 2-10

2.3.6.3 Phase C12 – 150 Tihonet Road PV+ES Project 2-10

2.3.7 *Recreation and Open Space* 2-10

2.3.8 *Stormwater Management and Hydrology* 2-10

2.3.9 *Transportation*..... 2-10

2.3.10 *Water Supply* 2-11

2.3.11 *Wastewater*..... 2-11

2.3.12 *Air Quality – GHG Analysis*..... 2-11

2.4 ALTERNATIVES ANALYSIS 2-13

2.4.1 *Construction Alternatives/Alternative Site Configurations* 2-13

2.4.2 *Alternative Site Locations*..... 2-14

2.4.3 *Alternative Site Uses*..... 2-14

2.4.4 *Preferred Alternative* 2-15

2.5 MITIGATION..... 2-15

2.6 PERMITS/APPROVALS REQUIRED 2-16

3.0 CONCEPTUAL PLAN..... 3-1

3.1 PHASE C CONCEPTUAL PLAN 3-1

3.1.1 *Introduction*..... 3-1

3.1.2 *Summary*..... 3-2

3.1.3 *MEPA Review Thresholds*..... 3-6

3.1.4 *Permits and Approvals Summary*..... 3-6

3.1.5 *Environmental Impacts* 3-6

3.2 CONSISTENCY WITH CONCEPTUAL PLAN 3-9

4.0 CUMULATIVE IMPACT ASSESSMENT4-1
5.0 PUBLIC OUTREACH.....5-1
6.0 CIRCULATION LIST.....6-1
7.0 MHC DOCUMENTATION7-1
8.0 GREENHOUSE GAS DOCUMENTATION8-1
9.0 FIGURES.....9-1

FIGURES

- 1: PHASE C10 27 CHARGE POND ROAD PV+ES PROJECT USGS MAP
- 2: PHASE C10 27 CHARGE POND ROAD PV+ES PROJECT AERIAL MAP
- 3A – 3E: PHASE C10 27 CHARGE POND ROAD PV+ES PROJECT SITE PLANS
- 4: PHASE C11 140 TIHONET ROAD PV+ES PROJECT USGS MAP
- 5: PHASE C11 140 TIHONET ROAD PV+ES PROJECT AERIAL MAP
- 6A - 6E: PHASE C11 140 TIHONET ROAD PV+ES PROJECT SITE PLANS
- 7: PHASE C12 150 TIHONET ROAD PV+ES PROJECT USGS MAP
- 8: PHASE C12 150 TIHONET ROAD PV+ES PROJECT AERIAL MAP
- 9A - 9E: PHASE C12 150 TIHONET ROAD PV+ES PROJECT SITE PLANS
- 10: USGS REVISED PHASE LOCATION INDEX
- 11: UPDATED CONTEXT MAP
- 12: PHASE C CONCEPTUAL PLAN (POTENTIAL USES)
- 13: NHESP MAP

Section 1.0
Environmental Notification Form

Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
Massachusetts Environmental Policy Act (MEPA) Office

Environmental Notification Form

For Office Use Only

EEA#: _____

MEPA Analyst: _____

The information requested on this form must be completed in order to submit a document electronically for review under the Massachusetts Environmental Policy Act, 301 CMR 11.00.

Project Name: ADM TMUD Wareham PV+ES Projects

C10: 27 Charge Pond Road PV+ES

C11: 140 Tihonet Road PV+ES

C12: 150 Tihonet Road PV+ES

Street Address: 27 Charge Pond Road (aka 67 Tihonet Road), 140 Tihonet Road (aka 0 and 169 Tihonet Road), and 150 Tihonet Road (aka 0 and 169 Tihonet Road)

Municipality: Wareham

Watershed: Buzzards Bay

Universal Transverse Mercator

Coordinates:

357266.3 easting, 4626065.0 northing

358048.8 easting, 4627877.3 northing

357962.6 easting, 4628422.0 northing

Latitude: 41° 46' 25.0" N, 41° 47' 24.2" N, and 41° 47' 41.8" N

Longitude: 70° 43' 2.5" W, 70° 42' 30.2" W, and 70° 42' 34.4" W

Estimated commencement date: 03/2022

Estimated completion date: 12/2023

Project Type: Renewable Energy (Solar)

Status of project design: C10: 100 %complete, C11: 100 %complete, C12: 90 %complete

Proponent: Borrego Solar Systems, Inc.

Street Address: 55 Technology Drive, #102

Municipality: Lowell

State: MA

Zip Code: 01851

Name of Contact Person: Stacy H. Minihane

Firm/Agency: Beals and Thomas, Inc.

Street Address: 32 Court Street

Municipality: Plymouth

State: MA

Zip Code: 02360

Phone: (508) 366-0560

Fax:

E-mail: sminihane@bealsandthomas.com

Does this project meet or exceed a mandatory EIR threshold (see 301 CMR 11.03)?

Yes No

Only the 140 Tihonet PV+ES Project exceeds the EIR land alteration threshold at 301 CMR 11.03(1)(a). However, the Project does not require any Agency Actions, and will not result in the level of environmental impacts (wastewater, traffic, impervious area, etc.) typically associated with projects that alter greater than 50 acres of land. Environmental impacts and mitigation are fully detailed herein.

If this is an Expanded Environmental Notification Form (ENF) (see 301 CMR 11.05(7)) or a Notice of Project Change (NPC), are you requesting:

a Single EIR? (see 301 CMR 11.06(8))

Yes (if EIR is required) No

a Special Review Procedure? (see 301 CMR 11.09)

Yes No

a Waiver of mandatory EIR? (see 301 CMR 11.11)

Yes (EIR not mandatory given no Agency Action) No

a Phase I Waiver? (see 301 CMR 11.11)

Yes No

(Note: Greenhouse Gas Emissions analysis must be included in the Expanded ENF.)

Which MEPA review threshold(s) does the project meet or exceed (see 301 CMR 11.03)?

Direct alteration of 25 or more acres of land (301 CMR 11.03(1)(b)1) – 27 Charge Pond Road PV+ES Project and 150 Tihonet Road PV+ES Project
Direct alteration of 50 or more acres of land (301 CMR 11.03(1)(a)1) – 140 Tihonet Road PV+ES Project

Which State Agency Permits will the project require?

Conservation and Management Permit, Massachusetts Division of Fisheries and Wildlife - 150 Tihonet Road PV+ES Project only

Identify any financial assistance or land transfer from an Agency of the Commonwealth, including the Agency name and the amount of funding or land area in acres: **None**

Summary of Project Size & Environmental Impacts	Existing	Change	Total
LAND			
Total site acreage	C10: ±42.1 ac ¹ C11: ±66.2 ac C12: ±49.2 ac		
New acres of land altered		C10: ±40.1 ac C11: ±65.3 ac C12: ±49.2 ac	
Acres of impervious area	0	C10: 0.07 ac C11: 0.16 ac C12: 0.15 ac	C10: 0.07 ac C11: 0.16 ac C12: 0.15 ac
Square feet of new bordering vegetated wetlands alteration		C10: ±6,500 sf ²	
Square feet of new other wetland alteration		0	
Acres of new non-water dependent use of tidelands or waterways		0	
STRUCTURES			
Gross square footage	0	0	0
Number of housing units	0	0	0
Maximum height (feet)	0	0	0
TRANSPORTATION			
Vehicle trips per day	0	50 ³ per project during construction	50 per project during construction
Parking spaces	0	0	0

¹ Excludes area of wetland restoration

² The proposed work within BVW consists of trash and debris removal as required by the Wareham Conservation Commission. This work received an Order of Conditions, which was not appealed; accordingly, no Permit is required, and the threshold at 301 CMR 11.03(3)(b)1(d) is not exceeded

³ This is a conservative estimate of temporary trips associated with site preparation and construction of each solar project. This activity is anticipated to occur for approximately ten weeks (dependent upon weather and truck availability). Once the site preparation is complete it is anticipated that construction trips will be reduced to approximately 20 per day. Once the construction activity is completed, normal operation and maintenance of the solar facility involves minimal traffic.

WASTEWATER			
Water Use (Gallons per day)	0	0	0
Water withdrawal (GPD)	0	0	0
Wastewater generation/treatment (GPD)	0	0	0
Length of water mains (miles)	0	0	0
Length of sewer mains (miles)	0	0	0
Has this project been filed with MEPA before? <input checked="" type="checkbox"/> Yes (EEA # <u>13940 – ADM Tihonet Mixed Use Development</u>) <input type="checkbox"/> No			
Has any project on this site been filed with MEPA before? <input type="checkbox"/> Yes (EEA # _____) <input checked="" type="checkbox"/> No			

GENERAL PROJECT INFORMATION – all proponents must fill out this section

PROJECT DESCRIPTION:

This EENF is filed to address three individual projects (collectively, the Projects): the 27 Charge Pond Road PV+ES Project (Phase C10), the 140 Tihonet Road PV+ES Project (Phase C11), and the 150 Tihonet Road PV+ES Project (Phase C12).

Each consists of a ground-mounted solar energy facility, including solar modules, transformers, inverters, internal access drives, and security fencing. Upon completion of construction, the disturbed areas will be stabilized with herbaceous groundcover.

Describe the existing conditions and land uses on the project site:

In addition to the summaries below, please refer to the enclosed narrative in Section 2.3 for additional information.

27 Charge Pond Road PV+ES Project

The Site lies east of Parker Mills Pond with access via Charge Pond Road, an existing public way. The Site is generally forested and undeveloped, although a previously cleared/disturbed area is located in the northeastern portion of the Site.

140 Tihonet Road PV+ES Project

The Site is located south of an existing electric utility, and east of Tihonet Pond and Tihonet Road. The Site is accessed via Tihonet Road, an existing sand track agricultural road. The Site is generally forested and undeveloped with the exception of existing unimproved agricultural access roads.

150 Tihonet Road PV+ES Project

The Site is located north of an existing electric utility easement, and east of Tihonet Pond and Tihonet Road. The Site is accessed via Tihonet Road, an existing sand track agricultural road. The Site is generally forested and undeveloped.

Describe the proposed project and its programmatic and physical elements:

In addition to the summaries below, please refer to the enclosed narrative in Section 2.3 for additional information.

27 Charge Pond Road PV+ES Project

The Project consists of an approximately ± 5 -megawatt (MW) AC/ ± 11.6 MW DC ground mounted solar array and energy storage system, resulting in a total of ± 40.1 acres of clearing within a ± 42.1 -acre Site. Permanent impacts are limited to land clearing and grading, while temporary impacts consist of traffic associated with construction. The number of trees to be removed has been minimized with consideration of the proposed use, which requires access to maximum sunlight over as long a period of time per day as possible. Traffic trips will be essentially limited to the construction period. Following construction, traffic to the Site will be limited to the infrequent trips required for normal operation and maintenance of the solar facility.

140 Tihonet Road PV+ES Project

The Project consists of an approximately ± 5 MW AC/ ± 19.3 MW DC ground-mounted solar array and energy storage system, resulting in a total of ± 65.3 acres of clearing within a ± 66.2 -acre Site. Permanent impacts are limited to land clearing and grading, while temporary impacts consist of traffic associated with construction. The number of trees to be removed has been minimized with consideration of the proposed use, which requires access to maximum sunlight over as long a period of time per day as possible. Traffic trips will be essentially limited to the construction period. Following construction, traffic to the Site will be limited to the infrequent trips required for normal operation and maintenance of the solar facility.

150 Tihonet Road PV+ES Project

The Project consists of an approximately ± 5 MW AC/ ± 15.5 MW DC ground-mounted solar array and energy storage system, resulting in a total of ± 49.2 acres of clearing. Permanent impacts are limited to land clearing and grading, while temporary impacts consist of traffic associated with construction. The number of trees to be removed has been minimized with consideration of the proposed use, which requires access to maximum sunlight over as long a period of time per day as possible. Traffic trips will be essentially limited to the construction period. Following construction, traffic to the Site will be limited to the infrequent trips required for normal operation and maintenance of the solar facility.

Describe the on-site project alternatives (and alternative off-site locations, if applicable), considered by the proponent, including at least one feasible alternative that is allowed under current zoning, and the reasons(s) that they were not selected as the preferred alternative:

In addition to the summaries below, please refer to the enclosed narrative in Section 2.4 for additional information.

Construction Alternatives/Alternative Site Configurations

Construction alternatives for the Projects include the no-build alternative, which is not consistent with the Proponent's goals. Furthermore, the projects are also consistent with the Commonwealth's renewable energy goals and 2050 Net Zero emissions target.

Additional construction alternatives evaluated for the Projects include alternate solar panel footing options, consisting of either individual posts with concrete footings, or a "tray" (i.e. concrete ballast) extending the length of each row. Posts with concrete footings may allow for a shallower foundation, but would also require significantly larger surface area disturbance. Concrete ballast trays do not penetrate the ground, but a significant surface area is required to deploy the necessary amount of concrete. In addition to the direct impacts resulting from the placement of the concrete footings or ballast, additional impacts would potentially be necessary for construction of stormwater management facilities to offset the increase in impervious area. Accordingly, the proposed piles are the least impactful footing alternative. Construction alternatives for the projects include the no-build alternative, which is not consistent with the Proponent's goals. Furthermore, the Projects are also consistent with the Commonwealth's renewable energy goals.

Increasing or decreasing the megawatts of the facilities would generally result in commensurate increases or decreases in the associated impacts. The size of all three Projects has already been reduced in response to feedback from the Town of Wareham during the local permitting processes (27 Charge Pond Road PV+ES by 3.9 acres, 140 Tihonet Road PV+ES by 11.2 acres, and 150 Tihonet Road PV+ES by 17.8 acres). Decreasing the size further would not meet the energy goals of the Projects.

Alternative Site Locations

Alternative locations for the three Projects within the overall ADM Tihonet Mixed-Use Parcel were generally not considered as the current Sites offer several benefits:

- Availability of interconnection at these locations
- Avoidance of wetland resource areas
- Contiguous areas of land sufficient in size to accommodate the facilities
- Outside of mapped state-listed species habitat, and outside acknowledged habitat for various pine barren species for the 27 Charge Pond Road PV+ES Project and the 140 Tihonet Road PV+ES Project
- Distance and screening from residential properties
- Regardless of the solar project, a portion of the 140 Tihonet Road PV+ES Site may be cleared for agricultural purposes (sand mining) prior to installation of the solar modules, transformers, and inverters.

Alternative Site Uses

Other potential uses for the Sites include construction of cranberry bogs, agricultural reservoirs, or single-family homes; however the residential uses previously included in Phase C are hereby eliminated from the Master Plan. Therefore, overall environmental impacts are decreased with these Projects. Given the landowner's Phase C2 cranberry bog project, additional cranberry bogs are not necessary at this time, and these locations are not appropriately sited for agricultural reservoirs in relation to the landowner's on-going cranberry bog operations. The construction of residential development would require significant infrastructure investments, and would also result in greater potential impacts than the proposed renewable energy Projects. Specifically, the impacts from road development (land clearing and creation of impervious surfaces) in addition to the impacts of residential uses (land clearing, traffic generation, sewage disposal systems, and nitrogen loading) and an increase in required municipal services would generate substantially more environmental impacts than the proposed solar Projects. Given the current market, the costs to construct and mitigate a residential development are not warranted considering the appropriateness of the Sites to house solar developments.

The 27 Charge Pond Road and 150 Tihonet Road PV+ES Projects have completed local Wareham Planning Board and Conservation Commission permitting. The 140 Tihonet Road PV+ES Project is currently undergoing local permitting with the Town of Wareham. The landowner and Proponent are coordinating with NHESP regarding a Conservation and Management Permit for the 150 Tihonet Road PV+ES Project.

NOTE: The purpose of the alternatives analysis is to consider what effect changing the parameters and/or siting of a project, or components thereof, will have on the environment, keeping in mind that the objective of the MEPA review process is to avoid or minimize damage to the environment to the greatest extent feasible. Examples of alternative projects include alternative site locations, alternative site uses, and alternative site configurations.

Summarize the mitigation measures proposed to offset the impacts of the preferred alternative:
In addition to the summaries below, please refer to the enclosed narrative in Section 2.5 for additional information.

Impacts to sensitive environmental receptors (wetlands and associated buffer zones, vernal pools) will not occur in association with the 27 Charge Pond Road PV+ES Project, the 140 Tihonet Road PV+ES Project, or the 150 Tihonet Road PV+ES Project. Although portions of the 150 Tihonet Road PV+ES Project lie within identified but unmapped pine barrens habitat, the Proponent is coordinating with NHESP and will undertake appropriate mitigation in the form of conservation lands and habitat funding.

The Projects will not result in the development impacts typically associated with other types of development (residential, commercial, industrial, etc.). Specifically, the Projects will not generate water or sewer demands, increases in traffic, or greenhouse gas (GHG) emissions. In fact, the Projects will offset the amount of GHG that would be generated when compared to the use of fossil fuels to generate electricity. Furthermore, the amount of impervious area has been minimized to only that necessary by designing new gravel access roads, reusing and improving existing access roads where feasible, and limiting impervious area to the concrete pads for the required inverters and battery storage equipment. The remainder of the Projects will be pervious and vegetated with low-growing herbaceous species.

Therefore, mitigation for the Projects consists of minimizing land disturbance to that necessary to accommodate the arrays, installation of stormwater management systems to mitigate the Projects in accordance with state and local requirements, and maintenance of significant wooded buffers from the roadway and nearest residences in order to mitigate potential visual impacts. Construction methods will also mitigate potential impacts, including the use of appropriate erosion and sedimentation controls (stabilized site entrance, construction-period sedimentation basins and swales, compost mulch tubes, silt fence, etc.) and hydraulically advancing the pile bases into the ground to reduce the excavation and exposure of soil associated with normal construction practices.

Beyond the renewable energy benefits, the Proponent has committed to providing the estimated economic benefit that results from the tree clearing for the Projects to the Town of Wareham for its use in undertaking its preferred mitigation project(s). Significant decommissioning bond amounts have been established for the projects as further described in Section 2.5. The Proponent and the Town have also reached PILOT tax agreements for each Project as further described in Section 2.5.

The Projects have also been designed in accordance with Town of Wareham Fire Department safety requirements with regard to emergency vehicle access, signage, etc.

For the 27 Charge Pond Road PV+ES Project, at the request of the Wareham Conservation Commission, the Proponent has committed to restoring an area of historic fill/debris/dumping area within a portion of the BVW and buffer zone. The proposed restoration is intended to remove anthropogenic fill and debris within the buffer zone and wetland, such that original grades are generally restored and the debris is no longer present.

Finally, for the 150 Tihonet Road PV+ES Project impacts to unmapped pine barrens habitat will be mitigated in coordination with NHESP through the conservation of forested areas located proximate to Myles Standish State Forest and other conservation lands established by the landowner, as well as habitat funding.

If the project is proposed to be constructed in phases, please describe each phase:

Construction phasing is not proposed for the Projects. Construction sequencing of the Projects is anticipated to occur as follows: installation of erosion controls, tree clearing, construction of temporary sedimentation basins (as applicable), site grading, stormwater control construction, electrical trenching, panel installation, fencing installation, final site stabilization.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN:

Is the project within or adjacent to an Area of Critical Environmental Concern?

Yes (Specify _____) **No**

if yes, does the ACEC have an approved Resource Management Plan? Yes No;

If yes, describe how the project complies with this plan.

Will there be stormwater runoff or discharge to the designated ACEC? Yes No;

If yes, describe and assess the potential impacts of such stormwater runoff/discharge to the designated ACEC.

RARE SPECIES:

Does the project site include Estimated and/or Priority Habitat of State-Listed Rare Species? (see http://www.mass.gov/dfwele/dfw/nhosp/regulatory_review/priority_habitat/priority_habitat_home.htm)

Yes (Specify: **The three solar Projects are not located within state-listed mapped species habitat. However, a portion of the 150 Tihonet Road PV+ES Project Site is located within acknowledged habitat for various pine barren species.**) **No**

HISTORICAL /ARCHAEOLOGICAL RESOURCES:

Does the project site include any structure, site or district listed in the State Register of Historic Place or the inventory of Historic and Archaeological Assets of the Commonwealth?

Yes (Specify _____) **No**

If yes, does the project involve any demolition or destruction of any listed or inventoried historic or archaeological resources? Yes (Specify _____) No

WATER RESOURCES:

Is there an Outstanding Resource Water (ORW) on or within a half-mile radius of the project site?

Yes **No**;

if yes, identify the ORW and its location. _____

(NOTE: Outstanding Resource Waters include Class A public water supplies, their tributaries, and bordering wetlands; active and inactive reservoirs approved by MassDEP; certain waters within Areas of Critical Environmental Concern, and certified vernal pools. Outstanding resource waters are listed in the Surface Water Quality Standards, 314 CMR 4.00.)

Are there any impaired water bodies on or within a half-mile radius of the project site? **Yes** **No**;
if yes, identify the water body and pollutant(s) causing the impairment:

Parker Mills Pond: Non-Native Aquatic Plants, Total Phosphorous
Tihonet Pond: Dissolved Oxygen

Is the project within a medium or high stress basin, as established by the Massachusetts Water Resources Commission? Yes **No**

STORMWATER MANAGEMENT:

Generally describe the project's stormwater impacts and measures that the project will take to comply with the standards found in MassDEP's Stormwater Management Regulations:

Comprehensive Stormwater Management Reports including calculations were submitted during the local permitting process for each Project. All Projects will result in a change in vegetative cover type under proposed conditions. To mitigate changes in peak rates and volumes of stormwater runoff, open stormwater management systems consisting of infiltration basins and swales have been designed to collect and infiltrate overland stormwater runoff from the Projects. The proposed stormwater management systems have been designed in compliance with the MassDEP Stormwater Handbook.

MASSACHUSETTS CONTINGENCY PLAN:

Has the project site been, or is it currently being, regulated under M.G.L.c.21E or the Massachusetts Contingency Plan? Yes **No**; if yes, please describe the current status of the site (including Release Tracking Number (RTN), cleanup phase, and Response

Action Outcome classification): _____

Is there an Activity and Use Limitation (AUL) on any portion of the project site? Yes **No**;
if yes, describe which portion of the site and how the project will be consistent with the AUL:

_____.

Are you aware of any Reportable Conditions at the property that have not yet been assigned an RTN? Yes **No**; if yes, please describe: _____

SOLID AND HAZARDOUS WASTE:

If the project will generate solid waste during demolition or construction, describe alternatives considered for re-use, recycling, and disposal of, e.g., asphalt, brick, concrete, gypsum, metal, wood:

Not applicable

(NOTE: Asphalt pavement, brick, concrete and metal are banned from disposal at Massachusetts landfills and waste combustion facilities and wood is banned from disposal at Massachusetts landfills. See 310 CMR 19.017 for the complete list of banned materials.)

Will your project disturb asbestos containing materials? ___ Yes **X** No;

if yes, please consult state asbestos requirements at <http://mass.gov/MassDEP/air/asbhom01.htm>

Describe anti-idling and other measures to limit emissions from construction equipment:

Efforts will be advanced during the selection of contractors to participate in the Diesel Retrofit Program and use ultra-low sulfur diesel (ULSD) fuel during construction. The Proponent acknowledges the “Diesel Engine Retrofits in the Construction Industry: A How to Guide” published by the MassDEP in January 2008 and the associated program. The intention is to incorporate to the extent practicable the Diesel Retrofit Program for construction vehicles through the use of oxidation catalysts of diesel particulate filters, and to meet Tier 3 or Tier 4 emissions standards for non-road construction equipment if possible.

The Proponent commits to compliance with the Massachusetts Idling Regulation (310 CMR 7.11). The regulation prohibits motor vehicles from idling their engines more than five minutes unless the idling is necessary to service the vehicle or to operate engine assisted power equipment or other associated power.

DESIGNATED WILD AND SCENIC RIVER:

Is this project site located wholly or partially within a defined river corridor of a federally designated Wild and Scenic River or a state designated Scenic River? ___ Yes **X** No;

if yes, specify name of river and designation:

If yes, does the project have the potential to impact any of the “outstandingly remarkable” resources of a federally Wild and Scenic River or the stated purpose of a state designated Scenic River?

___ Yes ___ No; if yes, specify name of river and designation: _____;

if yes, will the project will result in any impacts to any of the designated “outstandingly remarkable” resources of the Wild and Scenic River or the stated purposes of a Scenic River.

___ Yes ___ No;

if yes, describe the potential impacts to one or more of the “outstandingly remarkable” resources or stated purposes and mitigation measures proposed.

ATTACHMENTS:

1. List of all attachments to this document. **Please refer to the Table of Contents.**
2. U.S.G.S. map (good quality color copy, 8-½ x 11 inches or larger, at a scale of 1:24,000) indicating the project location and boundaries. **Please refer to Figures 1, 4, and 7.**
3. Plan, at an appropriate scale, of existing conditions on the project site and its immediate environs, showing all known structures, roadways and parking lots, railroad rights-of-way, wetlands and water bodies, wooded areas, farmland, steep slopes, public open spaces, and major utilities. **Please refer to Figures 2-3, 5-6, and 8-9.**
4. Plan, at an appropriate scale, depicting environmental constraints on or adjacent to the project site such as Priority and/or Estimated Habitat of state-listed rare species, Areas of Critical Environmental Concern, Chapter 91 jurisdictional areas, Article 97 lands, wetland resource area delineations, water supply protection areas, and historic resources and/or districts. **Please refer to Figures 4, 6, and 9.**
5. Plan, at an appropriate scale, of proposed conditions upon completion of project (if construction of the project is proposed to be phased, there should be a site plan showing conditions upon the completion of each phase). **Please refer to Figures 4, 6, and 9.**
6. List of all agencies and persons to whom the proponent circulated the ENF, in accordance with 301 CMR 11.16(2). **Please refer to Section 6.**
7. List of municipal and federal permits and reviews required by the project, as applicable. **Please refer to Section 2.6 of the enclosed narrative.**

LAND SECTION – all proponents must fill out this section

I. Thresholds / Permits

- A. Does the project meet or exceed any review thresholds related to **land** (see 301 CMR 11.03(1) **X** Yes ___ No; if yes, specify each threshold:

Direct alteration of 25 or more acres of land (301 CMR 11.03(1)(b)1) – 27 Charge Pond Road PV+ES Project and 150 Tihonet Road PV+ES Project
Direct alteration of 50 or more acres of land (301 CMR 11.03(1)(a)1) – 140 Tihonet Road PV+ES Project

II. Impacts and Permits

- A. Describe, in acres, the current and proposed character of the project site, as follows:

27 Charge Pond Road PV+ES Project

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Footprint of buildings	<u>0</u>	<u>0</u>	<u>0</u>
Internal roadways	<u>0</u>	<u>0</u>	<u>0</u>
Parking and other paved areas	<u>0</u>	<u>0</u>	<u>0</u>
Other altered areas	<u>1.8±</u>	<u>40.3±</u>	<u>42.1±</u>
Undeveloped areas	<u>40.3±</u>	<u>-40.3±</u>	<u>0</u>
Total: Project Site Acreage	<u>42.1±</u>	<u>42.1±</u>	<u>42.1±</u>

140 Tihonet Road PV+ES Project

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Footprint of buildings	<u>0</u>	<u>0</u>	<u>0</u>
Internal roadways	<u>0</u>	<u>0</u>	<u>0</u>
Parking and other paved areas	<u>0</u>	<u>0</u>	<u>0</u>
Other altered areas	<u>0.9±</u>	<u>65.3±</u>	<u>66.2±</u>
Undeveloped areas	<u>65.3±</u>	<u>-65.3±</u>	<u>0</u>
Total: Project Site Acreage	<u>66.2±</u>	<u>66.2±</u>	<u>66.2±</u>

150 Tihonet Road PV+ES Project

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Footprint of buildings	<u>0</u>	<u>0</u>	<u>0</u>
Internal roadways	<u>0</u>	<u>0</u>	<u>0</u>
Parking and other paved areas	<u>0</u>	<u>0</u>	<u>0</u>
Other altered areas	<u>0</u>	<u>49.2±</u>	<u>49.2±</u>
Undeveloped areas	<u>49.2±</u>	<u>-49.2±</u>	<u>0</u>
Total: Project Site Acreage	<u>49.2±</u>	<u>49.2±</u>	<u>49.2±</u>

- B. Has any part of the project site been in active agricultural use in the last five years? ___ Yes **X** No; if yes, how many acres of land in agricultural use (with prime state or locally important agricultural soils) will be converted to nonagricultural use?
- C. Is any part of the project site currently or proposed to be in active forestry use? ___ Yes **X** No; if yes, please describe current and proposed forestry activities and indicate whether any part of the site is the subject of a forest management plan approved by the Department of Conservation and Recreation:
- D. Does any part of the project involve conversion of land held for natural resources purposes in accordance with Article 97 of the Amendments to the Constitution of the Commonwealth to any purpose not in accordance with Article 97? ___ Yes **X** No; if yes, describe:

- E. Is any part of the project site currently subject to a conservation restriction, preservation restriction, agricultural preservation restriction or watershed preservation restriction? ___ Yes **X** No; if yes, does the project involve the release or modification of such restriction? ___ Yes ___ No; if yes, describe:
- F. Does the project require approval of a new urban redevelopment project or a fundamental change in an existing urban redevelopment project under M.G.L.c.121A? ___ Yes **X** No; if yes, describe:
- G. Does the project require approval of a new urban renewal plan or a major modification of an existing urban renewal plan under M.G.L.c.121B? ___ Yes **X** No; if yes, describe:

III. Consistency

- A. Identify the current municipal comprehensive land use plan

Title: **Wareham Master Plan** Date: **2020**

- B. Describe the project's consistency with that plan with regard to:

- 1) economic development

One of the mission statements for the Master Plan states, “Wareham needs more traditional economic development in well-planned locations that complement the town’s character.” The Project will be a tax revenue-generating development for the Town, and will maintain the Town’s existing character by siting the Projects away from public ways and completing the layouts in a manner to avoid visual impacts. Specifically, development of renewable energy projects such as these generate large and constant streams of revenues with minimal to no related costs to the Town. The Projects will result in rollback taxes to the Town as the Sites are removed from Chapter 61A. The Proponent and the Town have also reached PILOT tax agreements that address future, real, and personal property taxes for each Project.

Furthermore, the Master Plan’s Natural and Cultural Resources Goal 1 is to, “Coordinate and strategically implement several ongoing efforts to increase climate resilience in Wareham.” While the Project will not contribute directly to climate resilience specifically in Wareham, it will advance the Commonwealth’s renewable energy initiatives, which broadly address the issues surrounding climate change.

- 2) adequacy of infrastructure

The Master Plan Services and Facilities Goal 2 is to “Support the economic development and fiscal policies that are required to fund the local services and facilities desired by Wareham’s residents.” The proposed Projects aid in accomplishing Strategy 1 of this goal by, “Aggressively pursu[ing] economic development necessary to fund local services and facilities.” The proposed solar use will require minimal local services to operate, while also providing an environmental benefit through the generation of renewable energy. Additionally, as previously described, the proceeds that will be obtained from the tree clearing will be donated to the Town for its use.

- 3) open space impacts

The proposed Projects are generally consistent with the Master Plan Open Space Goal 3: “Protect and promote Wareham’s agriculture,” in that the proposed solar Projects have been designed to avoid impacts to adjacent agricultural uses where they occur.

- 4) compatibility with adjacent land uses
Strategy 4 of the Master Plan's Land Use Goal 3: "Implement the Future Land Use Map" reads, "Minimize visual and environmental impacts of solar farms by utilizing the town's solar bylaw." The Projects have been submitted to the Wareham Planning Board for review under the Town's solar bylaw, and comply with the regulations therein. Furthermore, the Projects will not be generally visible from public ways and will not visually impact neighborhoods due to their distance from residences and generally low height profile, as well as layout revisions undertaken to reduce the possibility of visibility across the ponds.

- C. Identify the current Regional Policy Plan of the applicable Regional Planning Agency (RPA)
RPA: **Southeastern Regional Planning and Economic Development District (SRPEDD)**

Title: **Southeastern Massachusetts Vision 2020** Date: **1999**

- D. Describe the project's consistency with that plan with regard to:

- 1) economic development
Vision 2020 was prepared as "an initiative to address uncontrolled sprawl and improve management of the rapid changes in this region..." The proposed Projects are consistent with this goal as they replace potential residential projects that may otherwise be allowed pursuant to zoning within this area.
- 2) adequacy of infrastructure
Regarding regional infrastructure, Vision 2020 states, "The expansion of new sewer and water utilities can influence development patterns by unintentionally encouraging growth. This potential growth needs to be considered before new water and sewer extensions are implemented..." The proposed Projects are consistent with this goal as they replace potential residential projects and do not include expanding water and/or sewer into this area.
- 3) open space impacts
Two open space goals of Vision 2020 are to preserve and protect local water supplies and to encourage economically productive farming and farmland preservation. The proposed Projects, while not directly consistent with these goals, protect local water supplies through responsible stormwater management, provide sources of clean, renewable energy, and are designed so as not to impact local productive agricultural areas.

RARE SPECIES SECTION

I. Thresholds / Permits

- A. Will the project meet or exceed any review thresholds related to **rare species or habitat** (see 301 CMR 11.03(2))? ___ Yes **X** No; if yes, specify, in quantitative terms:

(NOTE: If you are uncertain, it is recommended that you consult with the Natural Heritage and Endangered Species Program (NHESP) prior to submitting the ENF.)

- B. Does the project require any state permits related to **rare species or habitat**? **X** Yes ___ No

Conservation and Management Permit, Massachusetts Division of Fisheries and Wildlife - 150 Tihonet Road PV+ES Project

- C. Does the project site fall within mapped rare species habitat (Priority or Estimated Habitat?) in the current Massachusetts Natural Heritage Atlas (attach relevant page)? ___ Yes **X** No.

The Projects are not located within state-listed species habitat. See Section II. B. below.

If you answered "No" to all questions A, B and C, proceed to the **Wetlands, Waterways, and Tidelands Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Rare Species section below.

II. Impacts and Permits

- A. Does the project site fall within Priority or Estimated Habitat in the current Massachusetts Natural Heritage Atlas (attach relevant page)? ___ Yes **X** No. If yes,

1. Have you consulted with the Division of Fisheries and Wildlife Natural Heritage and Endangered Species Program (NHESP)? ___ Yes ___ No; if yes, have you received a determination as to whether the project will result in the "take" of a rare species? ___ Yes ___ No; if yes, attach the letter of determination to this submission.
2. Will the project "take" an endangered, threatened, and/or species of special concern in accordance with M.G.L. c.131A (see also 321 CMR 10.04)? ___ Yes ___ No; if yes, provide a summary of proposed measures to minimize and mitigate rare species impacts
3. Which rare species are known to occur within the Priority or Estimated Habitat?
4. Has the site been surveyed for rare species in accordance with the Massachusetts Endangered Species Act? ___ Yes ___ No
5. If your project is within Estimated Habitat, have you filed a Notice of Intent or received an Order of Conditions for this project? ___ Yes ___ No; if yes, did you send a copy of the Notice of Intent to the Natural Heritage and Endangered Species Program, in accordance with the Wetlands Protection Act regulations? ___ Yes ___ No

- B. Will the project "take" an endangered, threatened, and/or species of special concern in accordance with M.G.L. c.131A (see also 321 CMR 10.04)? **X** Yes ___ No; if yes, provide a summary of proposed measures to minimize and mitigate impacts to significant habitat:

As previously noted, there is no mapped habitat within the Project Sites. That said, the landowner has voluntarily agreed to consider certain portions of its land holdings as pine barrens habitat in conjunction with input from NHESP. The 150 Tihonet Road PV+ES Project lies within such an area. As such, land proximate to previously designated conservation areas and Myles Standish State Forest will be permanently preserved as mitigation for impacts to habitats. Habitat funding will also be provided. This results in an extension of valuable habitat area contiguous to the state forest at no cost to the Commonwealth.

WETLANDS, WATERWAYS, AND TIDELANDS SECTION

I. Thresholds / Permits

- A. Will the project meet or exceed any review thresholds related to **wetlands, waterways, and tidelands** (see 301 CMR 11.03(3))? ___ Yes **X** No; if yes, specify, in quantitative terms:
- B. Does the project require any state permits (or a local Order of Conditions) related to **wetlands, waterways, or tidelands**? **X** Yes ___ No; if yes, specify which permit:

Order of Conditions, Wareham Conservation Commission/Superseding Order of Conditions, MassDEP (on appeal only)

C. If you answered "No" to both questions A and B, proceed to the **Water Supply Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Wetlands, Waterways, and Tidelands Section below.

II. Wetlands Impacts and Permits

- A. Does the project require a new or amended Order of Conditions under the Wetlands Protection Act (M.G.L. c.131A)? **X** Yes ___ No; if yes, has a Notice of Intent been filed? **X** Yes ___ No; if yes, list the date and MassDEP file number:

27 Charge Pond Road PV+ES Project: June 2, 2020, File No. 076-2612
140 Tihonet Road PV+ES Project: June 2, 2020, File No. 076-2611
150 Tihonet Road PV+ES Project: June 8, 2020, File No. 076-2613

If yes, has a local Order of Conditions been issued? **X** Yes, for **27 Charge Pond Road and 150 Tihonet Road only** ___ No; Was the Order of Conditions appealed? ___ Yes **X** No. Will the project require a Variance from the Wetlands regulations? ___ Yes **X** No.

- B. Describe any proposed permanent or temporary impacts to wetland resource areas located on the project site:

The majorities of the 27 Charge Pond Road PV+ES Project, the 140 Tihonet Road PV+ES Project, and the 150 Tihonet Road PV+ES Project have been sited outside jurisdictional areas, although work is proposed within the 100-foot buffer zone associated with Bank, bordering vegetated wetlands (BVW) and locally regulated isolated vegetated wetlands (IVW). The proposed arrays are nearly entirely located outside of the 100-foot buffer zone. Appurtenant structures, excepting the fence but including inverters and battery storage, are located outside of the 100-foot buffer zone. Stormwater facilities lie within the buffer zone in some areas. Areas of dumping within a portion of the BVW at the 27 Charge Pond Road PV+ES Project Site will be restored, as described in Section 2.5 of the enclosed narrative.

- C. Estimate the extent and type of impact that the project will have on wetland resources, and indicate whether the impacts are temporary or permanent:

<u>Coastal Wetlands</u>	<u>Area (square feet) or Length (linear feet)</u>	<u>Temporary or Permanent Impact?</u>
Land Under the Ocean	_____	_____
Designated Port Areas	_____	_____
Coastal Beaches	_____	_____
Coastal Dunes	_____	_____
Barrier Beaches	_____	_____
Coastal Banks	_____	_____
Rocky Intertidal Shores	_____	_____

Salt Marshes	_____	_____
Land Under Salt Ponds	_____	_____
Land Containing Shellfish	_____	_____
Fish Runs	_____	_____
Land Subject to Coastal Storm Flowage	_____	_____
 <u>Inland Wetlands</u>		
Bank (If)	_____	_____
Bordering Vegetated Wetlands	6,500 sf ⁴	Temporary
Isolated Vegetated Wetlands	_____	_____
Land under Water	_____	_____
Isolated Land Subject to Flooding	_____	_____
Bordering Land Subject to Flooding	_____	_____
Riverfront Area	_____	_____

D. Is any part of the project:

1. proposed as a **limited project**? ___ Yes **X No**; if yes, what is the area (in sf)? _____
2. the construction or alteration of a **dam**? ___ Yes **X No**; if yes, describe:
3. fill or structure in a **velocity zone** or **regulatory floodway**? ___ Yes **X No**
4. dredging or disposal of dredged material? ___ Yes **X No**; if yes, describe the volume of dredged material and the proposed disposal site:
5. a discharge to an **Outstanding Resource Water (ORW)** or an **Area of Critical Environmental Concern (ACEC)**? ___ Yes **X No**
6. subject to a wetlands restriction order? ___ Yes **X No** ; if yes, identify the area (in sf):
7. located in buffer zones? **X Yes** ___ No; if yes, how much (in sf)

27 Charge Pond Road PV+ES Project: 145,000± sf
140 Tihonet Road PV+ES Project: 21,000± sf
150 Tihonet Road PV+ES Project: 97,000± sf

E. Will the project:

1. be subject to a local wetlands ordinance or bylaw? **X Yes** ___ No
2. alter any federally-protected wetlands not regulated under state law? ___ Yes **X No**; if yes, what is the area (sf)?

III. Waterways and Tidelands Impacts and Permits

- A. Does the project site contain waterways or tidelands (including filled former tidelands) that are subject to the Waterways Act, M.G.L.c.91? ___ Yes **X No**; if yes, is there a current Chapter 91 License or Permit affecting the project site? ___ Yes ___ No; if yes, list the date and license or permit number and provide a copy of the historic map used to determine extent of filled tidelands:

- B. Does the project require a new or modified license or permit under M.G.L.c.91? ___ Yes **X No**; if yes, how many acres of the project site subject to M.G.L.c.91 will be for non-water-dependent use? Current ___ Change ___ Total ___
 If yes, how many square feet of solid fill or pile-supported structures (in sf)?

- C. For non-water-dependent use projects, indicate the following: **N/A**
 Area of filled tidelands on the site: _____
 Area of filled tidelands covered by buildings: _____
 For portions of site on filled tidelands, list ground floor uses and area of each use:

⁴The proposed work within BVW consists of trash and debris removal as required by the Wareham Conservation Commission. This work received an Order of Conditions, which was not appealed; accordingly, no Permit is required, and the threshold at 301 CMR 11.03(3)(b)1(d)

Does the project include new non-water-dependent uses located over flowed tidelands?

Yes ___ No ___

Height of building on filled tidelands _____

Also show the following on a site plan: Mean High Water, Mean Low Water, Water-dependent Use Zone, location of uses within buildings on tidelands, and interior and exterior areas and facilities dedicated for public use, and historic high and historic low water marks.

- D. Is the project located on landlocked tidelands? ___ Yes **X No**; if yes, describe the project's impact on the public's right to access, use and enjoy jurisdictional tidelands and describe measures the project will implement to avoid, minimize or mitigate any adverse impact:
- E. Is the project located in an area where low groundwater levels have been identified by a municipality or by a state or federal agency as a threat to building foundations? ___ Yes **X No**; if yes, describe the project's impact on groundwater levels and describe measures the project will implement to avoid, minimize or mitigate any adverse impact:
- F. Is the project non-water-dependent and located on landlocked tidelands or waterways or tidelands subject to the Waterways Act and subject to a mandatory EIR? ___ Yes **X No**; (NOTE: If yes, then the project will be subject to Public Benefit Review and Determination.)
- G. Does the project include dredging? ___ Yes **X No**; if yes, answer the following questions:
What type of dredging? Improvement ___ Maintenance ___ Both ___
What is the proposed dredge volume, in cubic yards (cys) _____
What is the proposed dredge footprint ___ length (ft) ___ width (ft) ___ depth (ft);
Will dredging impact the following resource areas?
Intertidal Yes ___ No ___; if yes, ___ sq ft
Outstanding Resource Waters Yes ___ No ___; if yes, ___ sq ft
Other resource area (i.e. shellfish beds, eel grass beds) Yes ___ No ___; if yes ___ sq ft
If yes to any of the above, have you evaluated appropriate and practicable steps to: 1) avoidance; 2) if avoidance is not possible, minimization; 3) if either avoidance or minimize is not possible, mitigation?
If no to any of the above, what information or documentation was used to support this determination?
Provide a comprehensive analysis of practicable alternatives for improvement dredging in accordance with 314 CMR 9.07(1)(b). Physical and chemical data of the sediment shall be included in the comprehensive analysis.
Sediment Characterization
Existing gradation analysis results? ___ Yes ___ No; if yes, provide results.
Existing chemical results for parameters listed in 314 CMR 9.07(2)(b)6? ___ Yes ___ No; if yes, provide results.
Do you have sufficient information to evaluate feasibility of the following management options for dredged sediment? If yes, check the appropriate option.
Beach Nourishment ___
Unconfined Ocean Disposal ___
Confined Disposal:
 Confined Aquatic Disposal (CAD) ___
 Confined Disposal Facility (CDF) ___
Landfill Reuse in accordance with COMM-97-001 ___
Shoreline Placement ___
Upland Material Reuse ___
In-State landfill disposal ___
Out-of-state landfill disposal ___
(NOTE: This information is required for a 401 Water Quality Certification.)

IV. Consistency:

- A. Does the project have effects on the coastal resources or uses, and/or is the project located within the Coastal Zone? **Yes** ___ No; if yes, describe these effects and the projects consistency with the policies of the Office of Coastal Zone Management:

The 27 Charge Pond Road PV+ES Project is located at the landward extent of the coastal zone as mapped by MassGIS. Due to the Project's location in the upland, the proposed solar energy facility is not anticipated to be inconsistent with CZM's policies relative to Coastal Hazards, Energy, Growth Management, Habitat, Ocean Resources, Ports and Harbors, Protected Areas, Public Access, or Water Quality.

- B. Is the project located within an area subject to a Municipal Harbor Plan? ___ Yes **No**; if yes, identify the Municipal Harbor Plan and describe the project's consistency with that plan:

WATER SUPPLY SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **water supply** (see 301 CMR 11.03(4))? ___ Yes X No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **water supply**? ___ Yes X No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Wastewater Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Water Supply Section below.

II. Impacts and Permits

A. Describe, in gallons per day (gpd), the volume and source of water use for existing and proposed activities at the project site:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Municipal or regional water supply	_____	_____	_____
Withdrawal from groundwater	_____	_____	_____
Withdrawal from surface water	_____	_____	_____
Interbasin transfer	_____	_____	_____

(NOTE: Interbasin Transfer approval will be required if the basin and community where the proposed water supply source is located is different from the basin and community where the wastewater from the source will be discharged.)

B. If the source is a municipal or regional supply, has the municipality or region indicated that there is adequate capacity in the system to accommodate the project? ___ Yes ___ No

C. If the project involves a new or expanded withdrawal from a groundwater or surface water source, has a pumping test been conducted? ___ Yes ___ No; if yes, attach a map of the drilling sites and a summary of the alternatives considered and the results. _____

D. What is the currently permitted withdrawal at the proposed water supply source (in gallons per day)? _____ Will the project require an increase in that withdrawal? ___ Yes ___ No; if yes, then how much of an increase (gpd)? _____

E. Does the project site currently contain a water supply well, a drinking water treatment facility, water main, or other water supply facility, or will the project involve construction of a new facility? ___ Yes ___ No. If yes, describe existing and proposed water supply facilities at the project site:

	<u>Permitted Flow</u>	<u>Existing Avg Daily Flow</u>	<u>Project Flow</u>	<u>Total</u>
Capacity of water supply well(s) (gpd)	_____	_____	_____	
Capacity of water treatment plant (gpd)	_____	_____	_____	

F. If the project involves a new interbasin transfer of water, which basins are involved, what is the direction of the transfer, and is the interbasin transfer existing or proposed?

G. Does the project involve:

1. new water service by the Massachusetts Water Resources Authority or other agency of the Commonwealth to a municipality or water district? ___ Yes ___ No
2. a Watershed Protection Act variance? ___ Yes ___ No; if yes, how many acres of

alteration?

3. a non-bridged stream crossing 1,000 or less feet upstream of a public surface drinking water supply for purpose of forest harvesting activities? ___ Yes ___ No

III. Consistency

Describe the project's consistency with water conservation plans or other plans to enhance water resources, quality, facilities and services:

WASTEWATER SECTION

I. Thresholds / Permits

- A. Will the project meet or exceed any review thresholds related to **wastewater** (see 301 CMR 11.03(5))? ___ Yes **X** No; if yes, specify, in quantitative terms:
- B. Does the project require any state permits related to wastewater? ___ Yes **X** No; if yes, specify which permit:
- C. If you answered "No" to both questions A and B, proceed to the Transportation -- Traffic Generation Section. If you answered "Yes" to either question A or question B, fill out the remainder of the Wastewater Section below.

II. Impacts and Permits

- A. Describe the volume (in gallons per day) and type of disposal of wastewater generation for existing and proposed activities at the project site (calculate according to 310 CMR 15.00 for septic systems or 314 CMR 7.00 for sewer systems):

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Discharge of sanitary wastewater	_____	_____	_____
Discharge of industrial wastewater	_____	_____	_____
TOTAL	_____	_____	_____

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Discharge to groundwater	_____	_____	_____
Discharge to outstanding resource water	_____	_____	_____
Discharge to surface water	_____	_____	_____
Discharge to municipal or regional wastewater facility	_____	_____	_____
TOTAL	_____	_____	_____

- B. Is the existing collection system at or near its capacity? ___ Yes ___ No; if yes, then describe the measures to be undertaken to accommodate the project's wastewater flows:
- C. Is the existing wastewater disposal facility at or near its permitted capacity? ___ Yes ___ No; if yes, then describe the measures to be undertaken to accommodate the project's wastewater flows:
- D. Does the project site currently contain a wastewater treatment facility, sewer main, or other wastewater disposal facility, or will the project involve construction of a new facility? ___ Yes ___ No; if yes, describe as follows:

	<u>Permitted</u>	<u>Existing Avg Daily Flow</u>	<u>Project Flow</u>	<u>Total</u>
Wastewater treatment plant capacity (in gallons per day)	_____	_____	_____	_____

- E. If the project requires an interbasin transfer of wastewater, which basins are involved, what is the direction of the transfer, and is the interbasin transfer existing or new?

(NOTE: Interbasin Transfer approval may be needed if the basin and community where wastewater will be discharged is different from the basin and community where the source of water supply is located.)

F. Does the project involve new sewer service by the Massachusetts Water Resources Authority (MWRA) or other Agency of the Commonwealth to a municipality or sewer district? ___ Yes ___ No

G. Is there an existing facility, or is a new facility proposed at the project site for the storage, treatment, processing, combustion or disposal of sewage sludge, sludge ash, grit, screenings, wastewater reuse (gray water) or other sewage residual materials? ___ Yes ___ No; if yes, what is the capacity (tons per day):

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Storage	_____	_____	_____
Treatment	_____	_____	_____
Processing	_____	_____	_____
Combustion	_____	_____	_____
Disposal	_____	_____	_____

H. Describe the water conservation measures to be undertaken by the project, and other wastewater mitigation, such as infiltration and inflow removal.

III. Consistency

A. Describe measures that the proponent will take to comply with applicable state, regional, and local plans and policies related to wastewater management:

B. If the project requires a sewer extension permit, is that extension included in a comprehensive wastewater management plan? ___ Yes ___ No; if yes, indicate the EEA number for the plan and whether the project site is within a sewer service area recommended or approved in that plan:

TRANSPORTATION SECTION (TRAFFIC GENERATION)

I. Thresholds / Permit

A. Will the project meet or exceed any review thresholds related to **traffic generation** (see 301 CMR 11.03(6))? ___ Yes **X** No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **state-controlled roadways**? ___ Yes **X** No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Roadways and Other Transportation Facilities Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Traffic Generation Section below.

II. Traffic Impacts and Permits

A. Describe existing and proposed vehicular traffic generated by activities at the project site:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Number of parking spaces	_____	_____	_____
Number of vehicle trips per day	_____	_____	_____
ITE Land Use Code(s):	_____	_____	_____

B. What is the estimated average daily traffic on roadways serving the site?

	<u>Roadway</u>	<u>Existing</u>	<u>Change</u>	<u>Total</u>
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____

C. If applicable, describe proposed mitigation measures on state-controlled roadways that the project proponent will implement:

D. How will the project implement and/or promote the use of transit, pedestrian and bicycle facilities and services to provide access to and from the project site?

C. Is there a Transportation Management Association (TMA) that provides transportation demand management (TDM) services in the area of the project site? ___ Yes ___ No; if yes, describe if and how will the project will participate in the TMA:

D. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation facilities? ___ Yes ___ No; if yes, generally describe:

E. If the project will penetrate approach airspace of a nearby airport, has the proponent filed a Massachusetts Aeronautics Commission Airspace Review Form (780 CMR 111.7) and a Notice of Proposed Construction or Alteration with the Federal Aviation Administration (FAA) (CFR Title 14 Part 77.13, forms 7460-1 and 7460-2)?

III. Consistency

Describe measures that the proponent will take to comply with municipal, regional, state, and federal plans and policies related to traffic, transit, pedestrian and bicycle transportation facilities and services:

TRANSPORTATION SECTION (ROADWAYS AND OTHER TRANSPORTATION FACILITIES)

I. Thresholds

A. Will the project meet or exceed any review thresholds related to **roadways or other transportation facilities** (see 301 CMR 11.03(6))? ___ Yes **X** No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **roadways or other transportation facilities**? ___ Yes **X** No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Energy Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Roadways Section below.

II. Transportation Facility Impacts

A. Describe existing and proposed transportation facilities in the immediate vicinity of the project site:

B. Will the project involve any

- 1. Alteration of bank or terrain (in linear feet)? _____
- 2. Cutting of living public shade trees (number)? _____
- 3. Elimination of stone wall (in linear feet)? _____

III. Consistency -- Describe the project's consistency with other federal, state, regional, and local plans and policies related to traffic, transit, pedestrian and bicycle transportation facilities and services, including consistency with the applicable regional transportation plan and the Transportation Improvements Plan (TIP), the State Bicycle Plan, and the State Pedestrian Plan:

ENERGY SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **energy** (see 301 CMR 11.03(7))? ___ Yes **X** No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **energy**? ___ Yes **X** No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Air Quality Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Energy Section below.

II. Impacts and Permits

A. Describe existing and proposed energy generation and transmission facilities at the project site:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Capacity of electric generating facility (megawatts)	_____	_____	_____
Length of fuel line (in miles)	_____	_____	_____
Length of transmission lines (in miles)	_____	_____	_____
Capacity of transmission lines (in kilovolts)	_____	_____	_____

B. If the project involves construction or expansion of an electric generating facility, what are:
1. the facility's current and proposed fuel source(s)?
2. the facility's current and proposed cooling source(s)?

C. If the project involves construction of an electrical transmission line, will it be located on a new, unused, or abandoned right of way? ___Yes ___No; if yes, please describe:

D. Describe the project's other impacts on energy facilities and services:

III. Consistency

Describe the project's consistency with state, municipal, regional, and federal plans and policies for enhancing energy facilities and services:

AIR QUALITY SECTION

I. Thresholds

A. Will the project meet or exceed any review thresholds related to **air quality** (see 301 CMR 11.03(8))? ___ Yes **X** No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **air quality**? ___ Yes **X** No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Solid and Hazardous Waste Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Air Quality Section below.

II. Impacts and Permits

A. Does the project involve construction or modification of a major stationary source (see 310 CMR 7.00, Appendix A)? ___ Yes ___ No; if yes, describe existing and proposed emissions (in tons per day) of:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Particulate matter	_____	_____	_____
Carbon monoxide	_____	_____	_____
Sulfur dioxide	_____	_____	_____
Volatile organic compounds	_____	_____	_____
Oxides of nitrogen	_____	_____	_____
Lead	_____	_____	_____
Any hazardous air pollutant	_____	_____	_____
Carbon dioxide	_____	_____	_____

B. Describe the project's other impacts on air resources and air quality, including noise impacts:

III. Consistency

A. Describe the project's consistency with the State Implementation Plan:

B. Describe measures that the proponent will take to comply with other federal, state, regional, and local plans and policies related to air resources and air quality:

SOLID AND HAZARDOUS WASTE SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **solid or hazardous waste** (see 301 CMR 11.03(9))? ___ Yes X No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **solid and hazardous waste**? ___ Yes X No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Historical and Archaeological Resources Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Solid and Hazardous Waste Section below.

II. Impacts and Permits

A. Is there any current or proposed facility at the project site for the storage, treatment, processing, combustion or disposal of solid waste? ___ Yes ___ No; if yes, what is the volume (in tons per day) of the capacity:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Storage	_____	_____	_____
Treatment, processing	_____	_____	_____
Combustion	_____	_____	_____
Disposal	_____	_____	_____

B. Is there any current or proposed facility at the project site for the storage, recycling, treatment or disposal of hazardous waste? ___ Yes ___ No; if yes, what is the volume (in tons or gallons per day) of the capacity:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Storage	_____	_____	_____
Recycling	_____	_____	_____
Treatment	_____	_____	_____
Disposal	_____	_____	_____

C. If the project will generate solid waste (for example, during demolition or construction), describe alternatives considered for re-use, recycling, and disposal:

D. If the project involves demolition, do any buildings to be demolished contain asbestos? ___ Yes ___ No

E. Describe the project's other solid and hazardous waste impacts (including indirect impacts):

III. Consistency

Describe measures that the proponent will take to comply with the State Solid Waste Master

Plan:

HISTORICAL AND ARCHAEOLOGICAL RESOURCES SECTION

I. Thresholds / Impacts

A. Have you consulted with the Massachusetts Historical Commission? **Yes** ___ No; if yes, attach correspondence. For project sites involving lands under water, have you consulted with the Massachusetts Board of Underwater Archaeological Resources? ___ Yes ___ No; if yes, attach correspondence

B. Is any part of the project site a historic structure, or a structure within a historic district, in either case listed in the State Register of Historic Places or the Inventory of Historic and Archaeological Assets of the Commonwealth? ___ Yes **No**; if yes, does the project involve the demolition of all or any exterior part of such historic structure? ___ Yes ___ No; if yes, please describe:

C. Is any part of the project site an archaeological site listed in the State Register of Historic Places or the Inventory of Historic and Archaeological Assets of the Commonwealth? ___ Yes **No**; if yes, does the project involve the destruction of all or any part of such archaeological site? ___ Yes ___ No; if yes, please describe:

Intensive (locational) archaeological surveys were undertaken at the three Sites. At the 27 Charge Pond Road PV+ES Project Site and the 150 Tihonet Road PV+ES Project Site, no pre- or post-contact cultural material was recovered during the subsurface investigations.

At the 140 Tihonet Road PV+ES Project Site, two pieces of pre-contact cultural material were recovered from isolated test pits during the subsurface investigations. Supplemental testing around each test pit did not recover additional cultural material. The recovered pre-contact cultural materials document a Native American presence in the general area. However, the isolated nature of the finds and the absence of any evidence of subsurface features limit the information potential of these materials which has been exhausted by the intensive survey.

D. If you answered "No" to all parts of both questions A, B and C, proceed to the **Attachments and Certifications** Sections. If you answered "Yes" to any part of either question A or question B, fill out the remainder of the Historical and Archaeological Resources Section below.

II. Impacts

Describe and assess the project's impacts, direct and indirect, on listed or inventoried historical and archaeological resources:

Upon completion of the subsurface investigations described above, the Projects are not anticipated to impact any potentially significant archaeological resources and no further archaeological investigations were recommended.

III. Consistency

Describe measures that the proponent will take to comply with federal, state, regional, and local plans and policies related to preserving historical and archaeological resources:

Coordination with MHC has been undertaken. Please refer to Section 6.0 for documentation.

CERTIFICATIONS:

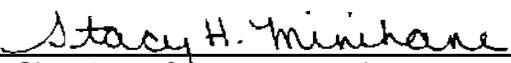
1. The Public Notice of Environmental Review has been/will be published in the following newspapers in accordance with 301 CMR 11.15(1):

Wareham Week	3/18/21
Carver Reporter	3/19/21
Old Colony Memorial	3/17/21
New Bedford Standard Times	3/18/21

(Name) _____ (Date) _____

2. This form has been circulated to Agencies and Persons in accordance with 301 CMR 11.16(2).

Signatures:

3/15/21		3/15/21	
Date	Signature of Responsible Officer or Proponent	Date	Signature of person preparing ENF (if different from above)

<u>Zachary Farkes</u>	<u>Stacy H. Minihane</u>
Name (print or type)	Name (print or type)

<u>Borrego Solar Systems, Inc.</u>	<u>Beals and Thomas, Inc.</u>
Firm/Agency	Firm/Agency

<u>55 Technology Dr. #102</u>	<u>32 Court Street</u>
Street	Street

<u>Lowell, MA 01851</u>	<u>Plymouth, MA 02360</u>
Municipality/State/Zip	Municipality/State/Zip

<u>(888) 898-6273</u>	<u>(508) 366-0560</u>
Phone	Phone

*Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs*

MEPA Office

100 Cambridge St., Suite 900
Boston, MA 02114
Telephone 617-626-1020

The following should be completed and submitted to a local newspaper:

PUBLIC NOTICE OF ENVIRONMENTAL REVIEW

PROJECT: ADM Tihonet Mixed Use Development Phases C10 – C12:
27 Charge Pond Road PV+ES Project
140 Tihonet Road PV+ES Project
150 Tihonet Road PV+ES Project

LOCATION: 27 Charge Pond Road (aka 67 Tihonet Road), Wareham, MA
140 Tihonet Road (aka 0 and 169 Tihonet Road), Wareham, MA
150 Tihonet Road (aka 0 and 169 Tihonet Road), Wareham, MA

PROPONENT: Borrego Solar Systems, Inc.

The undersigned is submitting an Environmental Notification Form ("ENF") to the Secretary of Energy & Environmental Affairs on or before March 15, 2021.

This will initiate review of the above project pursuant to the Massachusetts Environmental Policy Act ("MEPA", M.G.L. c. 30, s.s. 61-62I). Copies of the ENF may be obtained from:

Stacy H. Minihane, Beals and Thomas, Inc.
32 Court Street, Plymouth, MA, 02360
(508) 366-0560
sminihane@bealsandthomas.com

During the interim Covid-19 response period, electronic copies of the ENF are also being sent to the Conservation Commissions and Planning Boards of the Towns of Wareham, Carver, and Plymouth.

The Secretary of Energy & Environmental Affairs will publish notice of the ENF in the Environmental Monitor, will receive public comments on the project for 20 days, and will then decide, within ten days, if an Environmental Impact Report is needed. A site visit and consultation session on the project may also be scheduled. All persons wishing to comment on the project, or to be notified of a site visit or consultation session, should

email MEPA@mass.gov. Mail correspondence will continue to be accepted, though responses may be delayed. Mail correspondence should be direct to the Secretary of Energy & Environmental Affairs, 100 Cambridge St., Suite 900, Boston, Massachusetts 02114, Attention: MEPA Office, referencing the above project.

By: Borrego Solar Systems, Inc. (*Proponent*)

Section 2.0
Project Narrative

2.0 **PROJECT NARRATIVE**

2.1 **Introduction and Background**

This EENF addresses three individual ground-mounted solar and energy storage Projects proposed as part of the TMUD: the 27 Charge Pond Road PV+ES Project, 140 Tihonet Road PV+ES Project, and the 150 Tihonet Road PV+ES Project. The three Projects are consistent with and advance the Commonwealth's admirable renewable energy initiatives, including the 2050 Net Zero Emissions target.

As MEPA is aware, the ADM TMUD Project consists of the phased development of a mixed-use village community within a 5,666.91±-acre Parcel located in the towns of Wareham, Carver and Plymouth. The Project incorporates the principles of smart growth, open space preservation, LID, traditional village design, pedestrian orientation, TDR, and conservation of environmental resources. The TMUD Project is currently in Phase C, with several sub-phases (Phases C1 through C9) previously reviewed by MEPA, consisting of ground-mounted solar projects and agricultural uses including a soil blending facility, cranberry bogs, and an agricultural canal.

The prior development plan for Phase C, previously reviewed by MEPA in 2010, included: 372 single-family homes in Plymouth; 405 single family homes as well as 1,509,800 sf of various commercial and industrial uses in the Business Development Overlay District in Wareham; and 524 single-family homes, 380 condominium/town house units, and 110 apartment units in Carver. The Phase C program has been reduced with each subsequent MEPA filing. As of the current conceptual plan, discussed in additional detail in Section 3.0 herein, all of the residential uses are hereby eliminated, and the commercial and industrial uses have been reduced to a maximum of 1,070,000 sf.

Based on the information provided herein, the proposed solar developments will result in fewer impacts to the environment than the previously-approved residential developments. Specifically, the impacts from road development (land clearing and creation of impervious surfaces) in addition to the impacts of residential uses (land clearing, traffic generation, sewage disposal systems, and nitrogen loading) and an increase in required municipal services would generate substantially more environmental impacts than the proposed solar Projects. Furthermore, the greenhouse gas emissions analysis referenced in in Section 2.3.12 herein demonstrates that there is a considerable net benefit of the renewable energy produced by the proposed Projects when compared to the carbon sequestration of the forests at the sites of the proposed solar Projects. Given the current market, the costs to construct and mitigate a residential development are not warranted considering the appropriateness of the Sites to house solar developments.

To date, the landowner has transferred 436.84 acres of former TMUD land adjacent to Myles Standish State Forest to the Commonwealth of Massachusetts for conservation purposes. An additional 409± acres of conservation lands adjacent to the state forest are also earmarked for conservation. These acres at the TMUD are in addition to other significant conservation lands created by the landowner in association with the separate Redbrook project in Plymouth, as well as proactive conservation areas not associated with development projects placed in the Maple Springs area and at Century Bog.

2.2 MEPA Review Thresholds

The 27 Charge Pond Road PV+ES Project, the 140 Tihonet Road PV+ES Project, and the 150 Tihonet Road PV+ES Project exceed the ENF review threshold for direct alteration of 25 or more acres of land. Furthermore, the 140 Tihonet Road PV+ES Project exceeds the EIR review threshold for direct alteration of 50 or more acres of land. Only the 150 Tihonet Road PV+ES Project has an associated Agency Action; accordingly, the 27 Charge Pond Road PV+ES Project and 140 Tihonet Road PV+ES Project would not be subject to MEPA jurisdiction were it not for the SRP Certificate.

2.3 Existing and Proposed Conditions

2.3.1 Introduction

Each Project consists of a ground-mounted solar energy facility, including solar modules, transformers, inverters, battery storage, internal access drives, and security fencing. Upon completion of construction, the disturbed areas will be stabilized with herbaceous groundcover.

2.3.1.1 Phase C10 – 27 Charge Pond Road PV+ES Project

The Site is located to the east of Parker Mills Pond and is accessed via Charge Pond Road, an existing public way. The Site is generally forested and undeveloped, although a 1.8± acre previously cleared/disturbed area is located in the northeastern portion of the Site.

The Project consists of an approximately ±5-megawatt (MW) AC/±11.6 MW DC ground-mounted solar array and energy storage system on a 42.1-acre Site, resulting in a total of 40.1± acres of clearing.

Permanent impacts are limited to land clearing and grading, while temporary impacts consist of traffic associated with construction. The number of trees to be removed has been minimized with consideration of the proposed use, which requires access to maximum sunlight over as long a period of time per day as possible. A tree evaluation was conducted by a Massachusetts Licensed Forester who determined that the health of the trees is generally fair to good, with many standing dead and downed trees observed.

Traffic trips will be essentially limited to the construction period. Following construction, traffic to the Site will be limited to the infrequent trips required for normal operation and maintenance of the solar facility.

Figures 1 through 3 depict the 27 Charge Pond Road PV+ES Project (USGS Map, Aerial Map and Site Plans).

2.3.1.2 Phase C11 – 140 Tihonet Road PV+ES Project

The Site is located south of an existing electric utility easement, and east of Tihonet Pond and Tihonet Road. The Site is accessed via Tihonet Road, an existing sand track agricultural road. The Site is generally forested and undeveloped with the exception of existing unimproved agricultural access roads.

The Project consists of an approximately ± 5 MW AC/ ± 19.3 MW DC ground-mounted solar array and energy storage system, resulting in a total of ± 65.3 acres of clearing within a 66.2 acre Site.

Permanent impacts are limited to land clearing and grading, while temporary impacts consist of traffic associated with construction.

The number of trees to be removed has been minimized with consideration of the proposed use, which requires access to maximum sunlight over as long a period of time per day as possible. A tree evaluation was conducted by a Massachusetts Licensed Forester who determined that the health of the trees on each site is generally fair to good. Furthermore, a portion of this Site may be cleared regardless of the solar project, to harvest high-quality sand in association with agricultural operations.

Traffic trips will be essentially limited to the construction period. Following construction, traffic to the Site will be limited to the infrequent trips required for normal operation and maintenance of the solar facility.

Figures 4 through 6 depict the 140 Tihonet Road PV+ES Project (USGS Map, Aerial Map and Site Plans).

2.3.1.3 Phase C12 – 150 Tihonet Road PV+ES Project

The Site is located north of an existing electric utility easement, and east of Tihonet Pond and Tihonet Road. The Site is accessed via Tihonet Road, an existing sand track agricultural road. The Site is generally forested and undeveloped.

The Project consists of an approximately ± 5 MW AC/ ± 15.5 MW DC solar array and energy storage system, resulting in a total of ± 49.2 acres of clearing.

Permanent impacts are limited to land clearing and grading, while temporary impacts consist of traffic associated with construction. The number of trees to be removed has been minimized with consideration of the proposed use, which requires access to maximum sunlight over as long a period of time per day as possible. A tree evaluation was conducted by a Massachusetts Licensed Forester who determined that the health of the trees on the Site is generally fair to good. Traffic trips will be essentially limited to the construction period. Following construction, traffic to the Site will be limited to the infrequent trips required for normal operation and maintenance of the solar facility.

Figures 7 through 9 depict the 150 Tihonet Road PV+ES Project (USGS Map, Aerial Map and Site Plans).

2.3.2 Wetlands and Water Resources

The three Sites are located within the Buzzards Bay major basin. The Sites are not located within a Zone I or Zone II to a public water supply, nor are they located within an Interim Wellhead Protection Area. There are no Outstanding Resource Waters designated on or proximate to the Sites. The Sites overlie the Plymouth Carver Sole-Source Aquifer. The Projects will not result in water withdrawals, and water quality impacts are not anticipated. Specifically, the materials within the solar arrays are inert and therefore, are not potential pollutants. Equipment (inverters and battery storage) will be properly housed per electric code standards so as to avoid potential pollution.

Multiple wetland resource areas are present on the Sites, as depicted on Figures 3, 6, and 9. No work is proposed within these wetland resource areas, although work is proposed within the 100-foot buffer zone as described further in the sections below. Where work lies within the 100-foot buffer zone, in nearly all cases, it is a minimum of 50' from wetlands, with the exception of improvements to an existing agricultural road associated with the 140 Tihonet Road PV+ES project.

2.3.2.1 Phase C10 – 27 Charge Pond Road PV+ES Project

The majority of the 27 Charge Pond Road PV+ES project has been sited outside jurisdictional areas, although work is proposed within the 100-foot buffer zone associated with Bank to Parkers Mill Pond, as well as to bordering vegetated wetlands (BVW) and locally-regulated isolated vegetated wetlands (IVW) present throughout Site. The proposed arrays are nearly entirely located outside of the 100-foot buffer zone. Appurtenant structures, excepting the fence but including inverters and battery storage, are located outside of the 100-foot buffer zone. Stormwater facilities lie within the buffer zone in some areas.

At the request of the Wareham Conservation Commission, the Proponent has committed to restoring an area of historic fill/debris/dumping area within a portion of the BVW and buffer zone. The proposed restoration is intended to remove anthropogenic fill and debris within the buffer zone and wetland, such that original grades are generally restored and the debris is no longer present. This work includes approximately ±6,500 sf of temporary impact. An Order of Conditions allowing the project has been issued by the Wareham Conservation Commission which was not appealed; accordingly, no Permit is required, and the threshold at 301 CMR 11.03(3)(b)1(d) is not exceeded.

2.3.2.2 Phase C11 – 140 Tihonet Road PV+ES Project

The majority of the 140 Tihonet Road PV+ES Project has been sited outside jurisdictional areas, although work is proposed within buffer zone to the Bank of an agricultural canal in the southern portion of the Site, as well as the locally-jurisdictional buffer zone to two IVWs in the western portion of the project Site. The proposed arrays are nearly entirely located outside of the 100-foot buffer zone. Appurtenant structures, excepting the fence but including inverters and battery storage, are located outside of the 100-foot buffer zone. Stormwater facilities lie within the buffer zone in some areas. All work is maintained at least 50 feet away from wetlands, with the exception of improvements to an existing agricultural access road. In that instance, the buffer zone is associated with an agricultural canal, and work is located on the far side of the existing road from the canal. A Notice of Intent for this work was filed with the Wareham Conservation Commission on June 2, 2020 and the Project is currently in the final stages of review with the Town.

2.3.2.3 Phase C12 – 150 Tihonet Road PV+ES Project

The majority of the 150 Tihonet Road PV+ES Project has been sited outside jurisdictional areas, although work is proposed within buffer zone to Bank, BVW, and IVW. The proposed arrays are nearly entirely located outside of the 100-foot buffer zone. Appurtenant structures, excepting the fence but including inverters and battery storage, are located outside of the 100-foot buffer zone. Stormwater facilities lie within the buffer zone in some areas. An Order of Conditions allowing the project has been issued by the Wareham Conservation Commission.

2.3.3 Rare Species and Wildlife Habitat

As previously noted, the design of the Sites has been undertaken to minimize the area of tree clearing while maximizing the energy output from the facilities. Significant wooded areas will remain on the overall TMUD Parcel in the vicinity of the Sites subsequent to completion of these projects.

The three Project Sites are not located within areas identified on the Natural Heritage and Endangered Species Program (NHESP) maps as Priority Habitats of Rare Species or Estimated Habitats of Rare Wildlife. However, a portion of the 150 Tihonet Road PV+ES Project Site is located within acknowledged habitat for various pine barren species and as such permitting with NHESP is being undertaken. Mitigation will be provided as described in Section 2.5.

During the course of wetlands field work, multiple potential vernal pools were identified at various locations on the three Sites. In all cases a minimum 100-foot setback has been maintained from these pools.

2.3.4 Topography, Geology, and Soils

For all three Sites, the pile bases to support the array structures will be hydraulically advanced into the ground to reduce the excavation and exposure of soil associated with normal construction practices. In addition, sedimentation controls will be implemented during construction to protect adjacent resource areas and existing infrastructure features, and the Sites will be subject to the EPA's National Pollutant Discharge Elimination System Construction General Permit.

A brief description of existing topographic, geologic, and soils conditions for each Site is provided below.

2.3.4.1 27 Phase C10 – Charge Pond Road PV+ES Project

The general topography of the Site slopes east to west with exceptions in the form of isolated depressions throughout, some of which house wetland resource areas. The primary design point, DP-1, used for the stormwater analysis represents flows to Parker Mills Pond. Additional design points include DP-2, which represents flows to the south to an adjacent property containing a natural gas distribution facility. DP-3, 4, 5, and 6 consider flows to existing depressions that contain resource areas. DP-7 represents flows to the east onto a Town owned parcel with ball fields.

The surficial geology of the Site is composed mainly of large sand deposits, with floodplain alluvium associated with Parker Mills Pond in the western portion of the Site. The Natural Resources Conservation Service (NRCS) lists the on-Site soils types as predominantly hydrologic soil class A. These soil groups include Windsor loamy sand, Deerfield loamy fine sand, and Udipsamments. Another area partially on-site to the north is mapped as Udorthents, refuse substratum, which is considered hydrologic soil class B. Finally, a small area of hydrologic soil class D soils is present at the southwestern corner of the proposed Project locus, which is mapped as Scarboro muck, coastal lowland.

2.3.4.2 Phase C11 – 140 Tihonet Road PV+ES Project

Runoff from the Site drains radially outward from the existing hilltop ridge. Flows to the west go towards Tihonet Road and Tihonet Pond. Flows to the southwest are directed to an existing agricultural channel that flows southeast from Tihonet Pond into existing cranberry bogs south of the proposed array. Runoff also flows to existing cranberry bogs both on-site as well as off-site to the southeast, and easterly to an existing wetland system.

The surficial geology of the Site is composed mainly of sand and gravel. NRCS lists the on-Site soils types as predominantly hydrologic soil class A. These soil groups include Poquonock sand, Plymouth-Carver complex, Carver loamy coarse sand, and Hinckley loamy sand, and Gloucester-Canton complex. A small area of hydrologic soil class D soils is present at the southwestern corner of the proposed Project locus, which is classified as Udipsamments-wet substratum.

2.3.4.3 Phase C12 – 150 Tihonet Road PV+ES Project

Runoff from the easternmost portion of the Site flows to a wetland system on the east side of the Site. Runoff from the westernmost portion of the Site flows to a wetland and potential vernal pool system on the west side of the Site. Runoff from the southwestern portion of the Site drains to a wetland system on the southwest side of the Site. Runoff from the northwestern portion of the Site drains to a wetland and potential vernal pool system on the northwest side of the Site. Runoff from the southwest, west and northwest wetland system ultimately discharges to Tihonet Pond.

The surficial geology of the Site is composed of a mix of large sand deposits and sand and gravel. NRCS lists the on-Site soils groups as hydrologic soil class A, B and D. The soil groups classified by NRCS as hydrologic soil class A include Carver coarse sand, Poquonock sand, and Windsor loamy sand. These soil groups constitute a large portion of the Project area.

On-site areas mapped as Canton fine sandy loam are classified as hydrologic soil class B. Hydrologic soil class D series found on-site include Birchwood sand, Massasoit-complex and Udipsamments.

2.3.5 Zoning and Land Use

The proposed solar use on the three Sites is harmonious with surrounding uses. Furthermore, the Sites provide an appropriate geographic context for the solar array (including significant setbacks to existing residential areas).

2.3.5.1 27 Phase C10 – Charge Pond Road PV+ES Project

The Site is located in the R-60 District as indicated on the Town of Wareham Zoning Map. The Project will not be generally visible from public ways and will not visually impact neighborhoods due to its distance from residences and generally low height profile, and because the layout was positioned to avoid visual impacts.

2.3.5.2 Phase C11 – 140 Tihonet Road PV+ES Project

The Site is located in the R-60 District as indicated on the Town of Wareham Zoning Map. The proposed solar use is in harmony with the adjacent agricultural uses and sustainable practices in general on the larger land holdings of ADM. In addition, the Project will not be generally visible from public ways and will not visually impact neighborhoods due to its distance from residences and generally low height profile, and because the layout was positioned to avoid visual impacts.

2.3.5.3 Phase C12 – 150 Tihonet Road PV+ES Project

The Site is located in the R-60 District as indicated on the Town of Wareham Zoning Map. The proposed solar use is in harmony with the adjacent agricultural uses and sustainable practices in general on the larger land holdings of ADM. In addition, the Project will not be generally visible from public ways and will not visually impact neighborhoods due to its distance from residences and generally low height profile, and because the layout was positioned to avoid visual impacts.

2.3.6 Cultural Resources

Based on a review of the Massachusetts Cultural Resource Information System (MACRIS), the Project Sites do not include structures, sites or districts listed in the State Register of Historic Place. The Proponent engaged The Public Archaeology Laboratory, Inc. to conduct an intensive archaeological survey for all three Sites.

The intensive survey included archival research, a walkover survey, and subsurface testing to locate and identify any potentially significant archaeological resources that may be affected by Project construction. Project Notification Forms were submitted to the Massachusetts Historical Commission (MHC).

The results of the investigations are as follows:

2.3.6.1 27 Phase C10 – Charge Pond Road PV+ES Project

No pre- or post-contact cultural material was recovered during the subsurface investigations. As a result, the Project is not anticipated to impact any potentially significant archaeological resources and no further archaeological investigation was recommended.

2.3.6.2 Phase C11 – 140 Tihonet Road PV+ES Project

Two pieces of pre-contact cultural material were recovered from isolated test pits during the subsurface investigations. Supplemental testing around each test pit did not recover additional cultural material. The recovered pre-contact cultural materials document a Native American presence in the general area. However, the isolated nature of the finds and the absence of any evidence of subsurface features limit the information potential of these materials which has been exhausted by the intensive survey. As a result, the Project is not anticipated to impact any potentially significant archaeological resources and no further archaeological investigation was recommended.

2.3.6.3 Phase C12 – 150 Tihonet Road PV+ES Project

No pre- or post-contact cultural material was recovered during the subsurface investigations. As a result, the Project is not anticipated to impact any potentially significant archaeological resources and no further archaeological investigation was recommended.

2.3.7 Recreation and Open Space

The Sites are privately held, and therefore do not provide opportunities for public recreation. The proposed solar facilities result in fewer open space impacts than other potential uses as described elsewhere herein.

2.3.8 Stormwater Management and Hydrology

The proposed 27 Charge Pond Road PV+ES Project, the 140 Tihonet Road PV+ES Project, and the 150 Tihonet Road PV+ES Project will result in a change in vegetative cover type under proposed conditions. To mitigate changes in peak rates and volumes of stormwater runoff, open stormwater management systems have been designed to collect and infiltrate overland stormwater runoff from the project. The proposed stormwater management systems have been designed in compliance with the MassDEP Stormwater Handbook. Comprehensive Stormwater Management Reports including calculations was submitted during the local permitting process for each project.

2.3.9 Transportation

The proposed Projects will not result in a significant permanent increase in traffic on local roadways. Vehicle trips to the Sites will be limited to the construction period and to subsequent, but infrequent, trips related to the operation and maintenance of the solar arrays. Specifically, it is conservatively estimated that there may be 50± average daily trips per project during the Site preparation (grading) period. This activity is anticipated to occur for approximately ten weeks per Project (dependent upon weather and truck availability).

Subsequently, 20± average daily trips are anticipated per Project during the remainder of the construction period. Once the construction activity is completed, normal operation and maintenance of the solar facilities involves minimal traffic. The Projects will not require the construction of new roads, although the Proponent has coordinated with the Wareham Fire Department to ensure that adequate emergency access is incorporated into the design of the Sites.

2.3.10 Water Supply

The Sites overlie the Plymouth-Carver Sole Source Aquifer. The proposed Projects will not generate any water demands, nor will they impact the aquifer. Specifically, the materials within the solar arrays are inert and therefore, are not potential pollutants. Equipment (inverters and battery storage) will be properly housed per electric code standards so as to avoid potential pollution.

2.3.11 Wastewater

No sanitary wastewater discharge will occur as a result of the Projects. Therefore, no potential impacts, such as nutrient loading, associated with wastewater disposal will result.

The elimination of the previously-contemplated residential uses in favor of the proposed solar uses reduces Phase C wastewater generation and commensurate nutrient loading from sewage disposal systems. Please refer to Table 3-2 for comprehensive updated impact estimates for the Phase C portion of the overall TMUD Project.

2.3.12 Air Quality – GHG Analysis

The MEPA Greenhouse Gas Emissions Policy and Protocol (the GHG Policy), dated May 5, 2010, applies to projects that require an EIR. Although one of the projects (140 Tihonet Road PV+ES Project) exceeds the EIR threshold for land alteration, there are no associated Agency Actions required for the Project. The Proponent respectfully requests a waiver the need to prepare an EIR for the reasons outline elsewhere herein.

In the event that an EIR is required, the policy states, “*The MEPA Office acknowledges that some projects that require an EIR will have little or no GHG emissions, and this Policy shall not be applied to such projects.*” The 140 Tihonet Road PV+ES Project will not create GHG emissions outside of the construction period. In fact, the Project will create a source of renewable energy consistent with the Commonwealth’s net-zero emissions goal for 2050. Accordingly, the Proponent believes that the Project is exempt from the GHG Policy pursuant to this de minimis exception.

However, the Proponent engaged Applied Economics Clinic to estimate the total CO₂ emissions from carbon sequestration losses as compared to energy grid emission savings from each of the Projects. Please refer to the summary memorandum included in Section 8.0, which addresses the “positive” CO₂ emissions savings from the electric grid due to renewable energy generation and “negative” CO₂ emissions due to carbon sequestration losses from felled trees.

As indicated in the memorandum, taken together, the three solar “...projects offset roughly 30 times more CO₂ emissions than is lost in potential carbon sequestration.” More specifically, each project individually results in positive CO₂ reductions as listed below:

- 27 Charge Pond Road PV+ES Project: Reduction of 149,300 metric tons CO₂ between 2021 and 2040
- 140 Tihonet Road PV+ES Project: Reduction of 245,335 metric tons CO₂ between 2021 and 2040
- 150 Tihonet Road PV+ES Project: Reduction of 197,804 metric tons CO₂ between 2021 and 2040

It is worth noting that the calculation for the 140 Tihonet PV+ES Project assumes the clearing will be completed at the time of the construction of the solar Project. However, a portion of the 140 Tihonet Road PV+ES site may be cleared prior to construction of the solar project, in association with agricultural operations to harvest high-quality sand.

2.4 Alternatives Analysis

The following sections summarize alternatives to the three proposed solar Projects:

2.4.1 Construction Alternatives/Alternative Site Configurations

Construction alternatives for the Projects include the no-build alternative, which is not consistent with the Proponent's goals. Furthermore, the Projects are also consistent with the Commonwealth's renewable energy goals and 2050 Net Zero emissions target.

Additional construction alternatives evaluated for the Projects include alternate solar panel footing options, consisting of either individual posts with concrete footings, or a "tray" (i.e. concrete ballast) extending the length of each row. Posts with concrete footings may allow for a shallower foundation, but would also require significantly larger surface area disturbance. Concrete ballast trays do not penetrate the ground, but a significant surface area is required to deploy the necessary amount of concrete. In addition to the direct impacts resulting from the placement of the concrete footings or ballast, additional impacts would potentially be necessary for construction of stormwater management facilities to offset the increase in impervious area. Accordingly, the proposed piles are the least impactful footing alternative.

Increasing or decreasing the megawatts of the facilities would generally result in commensurate increases or decreases in the associated impacts. The Proponent originally submitted designs for larger arrays to the Wareham Planning Board and Conservation Commission. Specifically, the Proponent proposed to construct a ± 5 MW AC/ ± 12.2 MW DC solar facility within a ± 44 acre cleared area at 27 Charge Pond Road, to construct a ± 5 MW AC/ ± 21 MW DC solar facility within a ± 76.5 -acre cleared area at 140 Tihonet Road, and to construct a ± 5 MW AC/ ± 20 MW DC solar facility within a ± 67 -acre cleared area at 150 Tihonet Road. Prior to local permitting, during the conceptual planning stages, the array footprints were larger than what was ultimately submitted to the Town, but were reduced based on field evaluations of wetland resource areas.

Based on feedback from local permitting authorities, the submitted designs were reduced to increase the setback from Tihonet Pond for the 27 Charge Pond Road PV+ES Project, and to maintain a 150-foot minimum setback from Tihonet Road for the 140 Tihonet Road PV+ES Project and the 150 Tihonet Road PV+ES Project. Further decreasing the megawatts would not meet the energy goals of the Projects, similar to the no-build alternative.

2.4.2 Alternative Site Locations

Alternative locations for the 27 Charge Pond Road PV+ES Project, the 140 Tihonet Road PV+ES Project, and the 150 Tihonet Road PV+ES Project within the overall ADM Tihonet Mixed-Use Parcel were generally not considered as the current Sites offer several benefits:

- Availability of interconnection at these locations
- Avoidance of vegetated wetlands
- Contiguous areas of land sufficient in size to accommodate the facilities
- Outside of mapped state-listed species habitat, and outside acknowledged habitat for various pine barren species for the 27 Charge Pond Road PV+ES Project and the 140 Tihonet Road PV+ES Project
- Distance and screening from residential properties
- A portion of the 140 Tihonet Road PV+ES Site may be cleared for agricultural purposes prior to installation of the solar modules, transformers, and inverters

2.4.3 Alternative Site Uses

Other potential uses for the Sites include construction of cranberry bogs, agricultural reservoirs, or single-family homes as also discussed in Section 2.1; however the residential uses previously included in Phase C are hereby eliminated from the Master Plan. Therefore, overall environmental impacts are decreased with these Projects. Given the landowner's Phase C2 cranberry bog project, additional cranberry bogs are not necessary at this time, and these locations are not appropriately sited for agricultural reservoirs in relation to the landowner's on-going cranberry bog operations. The construction of residential development would require significant infrastructure investments by the town, and would also result in greater potential environmental and municipal fiscal impacts than the proposed renewable energy Projects.

Specifically, the impacts from road development (land clearing and creation of impervious surfaces) in addition to the impacts of residential uses (land clearing, traffic generation, sewage disposal systems, and nitrogen loading) and an increase in required municipal services would generate substantially more environmental impacts than the proposed solar Projects. Given the current market, the costs to construct and mitigate a residential development are not warranted considering the appropriateness of the Sites to house solar developments.

2.4.4 Preferred Alternative

The preferred alternative for each Project is as previously described in detail herein, in summary, to construct a ± 5 MW AC/ ± 11.6 MW DC solar facility within a ± 42.1 acre limit of work (± 40.1 acres of clearing) area at 27 Charge Pond Road, to construct a ± 5 MW AC/ ± 19.3 MW DC solar facility within a ± 66.2 -acre limit of work at 140 Tihonet Road (± 65.3 acres of clearing), and to construct a ± 5 MW AC/ ± 15.5 MW DC solar facility within a ± 49.2 -acre limit of work/cleared area at 150 Tihonet Road. These facilities are similar to other solar projects implemented by the landowner and various solar developers, including the Proponent, such as Rosebrook Solar, Charlotte Furnace Solar, Tihonet West Solar, Tihonet East Solar, and 64 Farm-to-Market Road (aka 299 Farm-to-Market Road) PV+ES Project all in Wareham, and Federal Road East Solar, Federal Road West Solar, 276 Federal Road Carver PV+ES Project, and 0 Hammond Street Carver PV+ES Project in Carver. Energy generated by the facilities will be transmitted to the electrical grid.

2.5 Mitigation

Environmental impacts have been avoided and minimized to the extent practicable. The following mitigation measures are proposed for the Projects.

Significant decommissioning bond amounts have been established for the projects as follows:

- \$321,492 for the 27 Charge Pond Road PV+ES Project
- \$598,580 for the 140 Tihonet Road PV+ES Project
- \$450,321 for the 150 Tihonet Road PV+ES Project

Beyond the renewable energy benefits, the Proponent has committed to providing the estimated economic benefit that results from the tree clearing for the Projects to the Town of Wareham for its use in undertaking its preferred mitigation project(s). This equates to the following mitigation funding for each Project:

- \$21,320 for the 27 Charge Pond Road PV+ES Project
- \$22,255 for the 140 Tihonet Road PV+ES Project
- \$36,500 for the 150 Tihonet Road PV+ES Project

The Projects will result in rollback taxes to the Town as the Sites are removed from Chapter 61A. The Proponent and the Town have also reached significant PILOT agreements that address future, real, and personal property taxes.

For the 27 Charge Pond Road PV+ES Project, at the request of the Wareham Conservation Commission, the Proponent has committed to restoring an area of historic fill/debris/dumping area within a portion of the BVW and buffer zone. The proposed restoration is intended to remove anthropogenic fill and debris within the buffer zone and wetland, such that original grades are generally restored and the debris is no longer present. The restoration area is depicted approximately on the enclosed Figure 3d.

Finally, for the 150 Tihonet Road PV+ES Project impacts to unmapped but acknowledged pine barrens habitat will be mitigated in coordination with NHESP through the conservation of forested areas located proximate to Myles Standish State Forest and other conservation lands previously established by the landowner, as well as habitat funding.

2.6 Permits/Approvals Required

The following permits and approvals are required for the proposed solar Projects:

- Order of Conditions, Wareham Conservation Commission
- Site Plan Approval, Wareham Planning Board
- Project Notification Form, Massachusetts Historic Commission
- Conservation and Management Permit, Massachusetts Division of Fisheries and Wildlife (150 Tihonet Road PV+ES Project only)
- Construction General Permit (CGP), National Pollutant Discharge Elimination System (NPDES)

The 27 Charge Pond Road PV+ES Project and 150 Tihonet Road PV+ES Project have completed local permitting with the Town of Wareham. The 140 Tihonet Road PV+ES Project is in the process of obtaining local permits; any design changes are anticipated to result in decreases to the project size and impact. Furthermore, the Proponent has commenced consultation with NHESP regarding the 150 Tihonet Road PV+ES Project.

Section 3.0
Conceptual Plan

3.0 CONCEPTUAL PLAN

This Section provides an update as to the current Phase C Conceptual Plan.

3.1 Phase C Conceptual Plan

3.1.1 Introduction

A revised and updated Phase C Conceptual Plan is presented herein and depicted on Figure 12 Phase C Conceptual Plan (Potential Uses). Specifically, the Phase C Conceptual Plan has been updated to reflect the currently proposed Phase C10 27 Charge Pond Road PV+ES Project, Phase C11 140 Tihonet Road PV+ES Project, and Phase C12 150 Tihonet Road PV+ES Project. Concomitantly, these Projects result in the elimination of previously contemplated residential uses in the Phase C areas of Wareham.

It remains infeasible to fully identify specific component locations, development boundaries, and infrastructure plans associated with the remainder of Phase C, given the extended timeframe for the implementation of Phase C and unknown future market conditions. However, development impacts have been estimated where feasible based on potential development programs. Through the implementation of the Phase C Conceptual Plan, the Proponent will continue to identify significant areas of open space and conservation lands. To date, over 400-acres adjacent to Myles Standish State Forest have been placed in Conservation Restriction (CR) with the underlying fee sold to the Commonwealth, and additional hundreds of acres of CR lands have been designated although not yet formally placed. This conservation area represents mitigation for impacts to mapped and potential state-listed species habitat associated with Phases A, B, and C1 – C12 as applicable.

Additional non-net usable land area is also considered conservation area in the Conceptual Plan (but is not included in the previously reported acreages of conservation land). Non-net usable land area is defined as:

- Wetlands, bog, streams, rivers and water bodies based upon Massachusetts Geographic Information System (“MassGIS”) DEP Wetlands, USGS map indication of wetlands, U.S. Fish and Wildlife Service’s National Wetlands Inventory Online Mapper, and field mapping/reconnaissance
- Land within the 100 year floodplain determined through an engineering flood analysis, and MassGIS FEMA flood information
- Land within 100 feet of perennial streams

- In Wareham and Plymouth, land within 50 feet of wetlands
- In Carver, land within 65 feet of wetlands

Developed land, such as utility easements, existing buildings, etc. is also non-net usable, but may not be considered conservation.

The landowner will continue to consult and coordinate with NHESP and acknowledges that significant acres of additional conservation land will be established as future components of Phase C are advanced.

To the extent feasible, this updated Phase C Conceptual Plan identifies potential uses quantified by town.

3.1.2 Summary

Phase C consists of 5,287.2± acres. The Phase C area is comprised predominantly of expansive wooded uplands and cranberry bogs, as well as streams, wetlands, floodplain, and vernal pools. It also contains the corporate headquarters of the A.D. Makepeace Company. It is important to understand that specific details regarding the overall Phase C Development Program have not been finalized, and that consistent with the SRP, this section serves to provide an updated conceptual overview of the impacts.

Current plans continue the assumption that Phase C will most likely consist of agricultural, mixed commercial, and conservation uses in Wareham, Carver, and Plymouth, although residential uses beyond those already reviewed by MEPA have now been eliminated. Renewable energy (solar) projects have also been added to the Phase C mix of uses, as indicated in prior MEPA filings. It is anticipated that future projects in Phase C will continue to be undertaken in “sub-phases” (i.e. Phase C1, C2, etc.).

When combined, Phases A, B, and C of the TMUD Project will create a mixture of uses including, but not limited to: village-scale retail and housing, office/commercial development, open space, recreation, renewable energy projects, and ongoing or expanded agricultural operations. Depending on favorable zoning changes, the Proponent intends to replicate the traditional New England village development pattern in a manner that is consistent with the villages in other areas of Wareham, Carver and Plymouth. The creation of such village settings, along with more contemporary, smart-growth style commercial and recreational development components will require zoning changes by the Town of Wareham. Additionally, the landowner has engaged in ongoing coordination with the three communities to develop land use concepts achievable through the implementation of innovative zoning and regulatory techniques that will benefit stakeholders and the environment alike.

The landowner continues to work cooperatively with Plymouth and Carver to develop, implement and utilize Transfer of Development Rights (TDRs) and other innovative zoning bylaws. As a result, any development will continue to undergo extensive public review during the local zoning approval processes, as well as state permitting review processes. Additionally, the landowner continues to consult with NHESP in order to identify lands to be protected and preserved in order to maintain areas of valuable wildlife habitat.

It is possible that various types of housing may be constructed over the development period, facilitated by the use of TDR and Cluster Development to concomitantly protect large contiguous areas of open space, consistent with the landowner's Conceptual Master Plan for the property. However, at present, previously contemplated housing in Phase C has been eliminated from the current version of the Master Plan. The overarching principles guiding future residential developments, if undertaken, will be the application of smart growth, low-impact design and pedestrian-scaled development to achieve vibrant and sustainable villages. In addition to incorporating the aforementioned principles, the Project will also integrate open space preservation, traditional village design, TDR, and environmental preservation.

Due to the large scale and extended time frame for a full-build out of the TMUD Project, the current Phase C Conceptual Plan identifies a variety of potential uses that will generate renewable energy, create local jobs, and generate tax revenues, in addition to preserving open space:

Carver (1,817 acres)

32 acres Agricultural (constructed as Phase C1)

24.5-acre Soil blending facility (Phase C2)

177.5 acres Solar (Phase C4 – Federal Road Solar; Phase C6 – Federal Road West Solar; Phase C7 – 276 Federal Road Carver PV+ES; and Phase C8 – 0 Hammond Street Carver PV+ES)

Wareham (2,116 acres)

20,000 gsf Retail

205,000 gsf Manufacturing

125,000 gsf Warehouse

425,000 gsf Light Industrial

110,000 gsf General Office

25,000 gsf Medical Office

160,000 gsf Research & Development

(Total of 1,070,000 gsf of commercial and industrial uses)

6-acre Agricultural bypass canal (Phase C2)

257.9 acres Solar (Phase C3 – Tihonet West Solar; Phase C5 – Tihonet East Solar; Phase C9 – 64 Farm-to-Market Road (aka 299 Farm-to-Market Road) PV+ES); Phase C10 – 27 Charge Pond Road PV+ES Project; Phase C11 – 140 Tihonet Road PV+ES Project; and Phase C12 – 150 Tihonet Road PV+ES Project)

Plymouth (1,354 acres)

217-acres Agricultural (Phase C2)

5-acre Agricultural bypass canal (Phase C2)

Please refer to Table 3-1 below for a complete distribution of the Commercial/Industrial uses proposed for each Phase C Development Area. Additionally, general locations of agricultural and conservation uses are indicated on Figure 12: Phase C Conceptual Plan (Potential Uses).

Table 3-1: Phase C Conceptual Plan Summary of Commercial Components

Development Area	Development Area Size (acres)	Proposed Use (gsf)								Total (gsf)
		Retail	Manufacturing ¹	Warehouse ²	Light Industrial	Office ³	Medical Office	Research & Development	Hotel	
<i>A (Previously replaced by Tihonet West Solar)</i>										
<i>B (Previously replaced by 77 Farm-to-Market Road PV+ES)</i>										
<i>C (Previously replaced by Tihonet West Solar)</i>										
<i>E</i>	8.9				50,000	10,000				60,000
<i>G (Rev)</i>	20.5		50,000	25,000						75,000
<i>K (Rev)</i>	13.7		75,000	25,000						100,000
<i>L</i>	10.5		50,000	25,000						75,000
<i>M</i>	3.4							10,000		10,000
<i>N</i>	6.5							25,000		25,000
<i>O (Previously replaced by 64 Farm-to-Market Road PV+ES)</i>										
<i>P</i>	6.0					15,000				15,000
<i>S</i>	16.1				75,000	15,000				90,000
<i>T</i>	20.9				50,000	10,000				60,000
<i>U</i>	4.6							50,000		50,000
<i>V</i>	31.4			25,000	100,000	10,000		50,000		185,000
<i>W</i>	14.3			25,000	75,000	30,000				130,000
<i>X</i>	4.5	20,000					25,000			45,000
<i>A-A</i>	19.6				75,000			25,000		100,000
<i>GC2 – Route 28</i>	2.7		30,000			20,000				50,000
TOTAL	183.6	20,000	205,000	125,000	425,000	110,000	25,000	160,000	0	1,070,000

¹ It had been anticipated that portions of the manufacturing and office gsf noted for various Development Areas would be reallocated to the previously proposed Phase C outparcel within the Phase A1 area, to achieve 35,200 gsf total of manufacturing and office use at that location. Since that outparcel is now replaced by solar, some part of the 35,200 gsf will need to be removed at a future time.

² Warehousing consists of uses that are ancillary to a primary allowed use (for example, a manufacturing use may require a storage area before product is sold; this storage has been designated as a warehouse use for the purposes of the Development Program)

³ It had been anticipated that portions of the manufacturing and office gsf noted for various Development Areas would be reallocated to the previously proposed Phase C outparcel within the Phase A1 area, to achieve 35,200 gsf of manufacturing and office use at that location. Since that outparcel is now replaced by solar, some part of the 35,200 gsf will need to be removed at a future time.

3.1.3 MEPA Review Thresholds

It is not anticipated that there will be any new MEPA Review Thresholds exceeded by Phase C as reported in the Phase C Conceptual Plan Section 4.1.1 of the Notice of Project Change/Phase B Draft EIR dated September 2010 as a result of the conceptual plan updates noted in Section 3.1.2. If anything certain threshold exceedances may be reduced/eliminated due to the elimination of residential components from Phase C.

3.1.4 Permits and Approvals Summary

It is not anticipated that other additional permits or approvals will be required for the overall Phase C beyond those reported in the Phase C Conceptual Plan Section 4.1.2 of the Notice of Project Change/Phase B Draft EIR dated September 2010 and in the Phase C2 Proposed Cranberry Bogs/Infrastructure ENF dated October 2012.

3.1.5 Environmental Impacts

A detailed discussion of sensitive resources, opportunities and constraints associated with Phase C was included in Section 4.3 of the Notice of Project Change/Phase B Draft EIR dated September 2010. The opportunities and constraints associated with the updated Phase C Conceptual Plan presented herein remain consistent with that discussion.

With regard to environmental impacts associated with Phase C, in general they have been decreased since the most recent MEPA filing due to the elimination of 375 single family homes and replacement with solar. The elimination of these residential uses reduces Phase C wastewater generation and commensurate nutrient loading from sewage disposal systems. Please refer to Table 3-2 below for comprehensive updated impact estimates for the Phase C portion of the Project.

Table 3-2: Estimated Phase C Environmental Impacts

Impacts	Phase C1 Wankinco Cranberry Bog Expansion	Phase C2			Phase C3 Tihonet West Solar	Phase C4 Federal Road Solar	Phase C5 Tihonet East Solar	Phase C6 Federal Road West Solar	Phase C7 276 Federal Road Carver PV+ES Project	Phase C8 0 Hammond Street Carver PV+ES Project	Phase C9 64 Farm-to- Market Road (aka 299 Farm- to-Market Road) PV+ES Project	Phase C10 27 Charge Pond Road PV+ES Project	Phase C11 140 Tihonet Road PV+ES Project	Phase C12 150 Tihonet Road PV+ES Project	Remaining Phase C	Total Phase C
		Cranberry Bog	Bypass Canal	Soil Blending Facility												
Land																
Total site area (ac)	56±	217±	11±	24.5±	16±	66±	49.5±	49.5±	36±	45±	13±	42.1± ⁴	66.2±	49.2±	4,546.2±	5,287.2±
Land altered (ac)	32±	217±	11±	0± ⁵	16±	47±	49.5±	49.5±	36±	45±	0.45±	40.1±	65.3±	49.2±	TBD	--
Acres of impervious area	0	0.17±	0 ⁶	5.76±	0.05±	0.28±	0.3±	0.03±	±0.29	±0.11	±0.02	0.07±	0.16±	0.15±	TBD	--
BVW alteration (sf) ⁷	0	4,404± ⁸	0	0	0	0	0	0	0	0	0	0	0	0	TBD	TBD
Other wetland alteration ⁹	Bank (lf)	0	198±	0	0	0	0	0	0	0	0	0	0	0	TBD	TBD
	BLSF (sf)	0	5,609± ¹⁰	0	0	0	0	0	0	0	19,300± ¹¹	0	0	0	TBD ¹³	TBD
	RFA (sf)	0	0	0	0	0	0	0	0	0	28,800± sf ¹²	0	0	0	TBD	TBD
	LUWW (sf)	0	250±	0	0	0	0	0	0	0	0	0	0	0	TBD	TBD
	IVW (sf)	0	0	0	0	0	0	0	0	0	0	0	0	0	TBD	TBD
Alteration to NHESP Priority/Estimated Mapped Habitat (ac)	32±	217±	0	0	0	0	21.2±	0	0	0	0 ¹⁴	0	0	0 ¹⁵	TBD ¹⁶	--
Structures																
Gross square footage	196±	7,400±	0	101,590± ¹⁷	0	0	0	0	0	0	0	0	0	0	1,070,000±	1,179,186±
Number of housing units	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0±	0±
Maximum height (ft)	NA	NA	NA	45±	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	TBD	--

⁴ Excludes area of wetland restoration

⁵ The Phase C2 soil blending facility Development Area is located entirely within a previously disturbed area.

⁶ Excludes water control structures

⁷ Excludes impacts associated with activities that are considered normal improvement of land in agricultural use pursuant to 310 CMR 10.04 Agriculture (c)

⁸ Includes 3,530± sf of impact to existing bog

⁹ Excludes impacts associated with activities that are considered normal improvement of land in agricultural use pursuant to 310 CMR 10.04 Agriculture (c)

¹⁰ Work will result in increased flood storage capacity.

¹¹ No change in grade

¹² Includes potential RFA

¹³ Impact previously reported as ±13,380 sf associated with off-site transportation improvements, but has not been reevaluated with regard to the significantly reduced Phase C program reflected herein. Additional potential on-site impacts are unknown at present.

¹⁴ Portions of the interconnection route, which lie largely within existing agricultural access roads, are located within agreed-upon but not formally mapped Eastern Box Turtle habitat. Impacts are temporary and were approved by NHESP in accordance with CMP No. 107-301 via email dated February 18, 2019.

¹⁵ A portion of the Project lies within not formally mapped habitat but agreed-upon pine barrens habitat

¹⁶ Underground electric conduit will be installed within/along agricultural access roads, portions of which lie in Eastern Box Turtle habitat designated pursuant to the Master Eastern Box Turtle Conservation and Management Permit. NHESP has reviewed and approved this work subject to protection measures during the turtle active hatch season if work lies outside the existing agricultural access roads.

¹⁷ Consists of 34,450 sf of buildings and 67,140 sf of open roof canopy system covering the raw and finished material storage areas.

Transportation																
Vehicle trips per day	100± (temp.) ¹⁸	230± (temp.) ¹⁸	0	230±	20± (temp.) ¹⁹	20± (temp.) ¹⁹	20± (temp.) ¹⁹	50± (temp.) ¹⁹	TBD ²⁰	--						
Parking spaces	0	0	0	20±	0	0	0	0	0	0	0	0	0	0	TBD	--
Water/Wastewater																
Water use (gpd)	0 ²¹	0 ²¹	0	108.3±	0	0	0	0	0	0	0	0	0	0	57,000±	--
Water withdrawal (gpd) ²²	0	0	0	119±	0	0	0	0	0	0	0	0	0	0	Not previously reported	--
Wastewater generation (gpd)	0	0	0	187.5±	0	0	0	0	0	0	0	0	0	0	51,800±	--
Length of water mains (mi)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	TBD	--
Length of sewer mains (mi)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	TBD	--

¹⁸ Only during earth removal/bog construction activities. Once the construction activity is completed, normal farming practices involve minimal traffic.

¹⁹ Only during construction. Once the construction activity is completed, the operation and maintenance of the facility involve minimal traffic.

²⁰ Impact previously reported as ±13,300 vehicle trips per day but has not been reevaluated with regard to the significantly reduced Phase C program reflected herein.

²¹ Water use/withdrawals occur within the capacity of existing permits and registrations.

²² Excludes non-agricultural irrigation.

3.2 Consistency with Conceptual Plan

Although various commercial and industrial development is reflected within the Business Development Overlay District (BDOD) as part of the Phase C Master Plan, the Proponent does not anticipate constructing such uses within Phase C in the next 25 years. The solar Projects detailed herein are consistent with the Phase C master plan as presented in the most recent MEPA filing. Historically, when the ADM TMUD was initially proposed, solar was not contemplated. However, the landowner's plans for the TMUD began to incorporate solar when the Commonwealth's policy initiatives changed to incentivize alternative energy sources. At that time, the landowner explored small-scale hydropower and wind energy, in addition to ground-mounted solar. Given the current solar market and complexities of both the intermittently renewing credit system and interconnection, it is difficult to determine at present the extent of additional solar or other renewable energy projects that may be undertaken in the future. It is anticipated that new small- to mid-scale renewable energy projects may come to fruition in the future in the Phase C BDOD and elsewhere in Phase C.

Section 4.0
Cumulative Impact Assessment

4.0 CUMULATIVE IMPACT ASSESSMENT

The proposed 27 Charge Pond Road PV+ES Project, 140 Tihonet Road PV+ES Project, and 150 Tihonet Road PV+ES Project are part of the overall ADM TMUD Project consisting of the phased development of a mixed-use village community within a 5,666.91±-acre Parcel located in the towns of Wareham, Carver and Plymouth. The TMUD Project incorporates the principles of smart growth, open space preservation, LID, traditional village design, pedestrian orientation, TDR, and conservation of environmental resources. The TMUD Parcel is divided into three geographical phases:

- Phase A (consisting of three sub-phases: Phase A1 first component of Tihonet Technology Park now replaced by Phase C9 64 Farm-to-Market Road (aka 299 Farm-to-Market Road) PV+ES Project, Phase A2 medical office building, and Phase A3 cranberry bog)
- Phase B (consisting of the remainder of Rosebrook Business Park, Rosebrook Place, Rosebrook Solar Energy, and Charlotte Furnace Solar Energy)
- Phase C (with multiple sub-phases reviewed by MEPA to date: C1 Wankinco Cranberry Bog Expansion, C2 Proposed Cranberry Bogs/Infrastructure, C3 Tihonet West Solar, C4 Federal Road Solar, C5 Tihonet East Solar, C6 Federal Road West Solar, C7 276 Federal Road Carver PV+ES Project, C8 0 Hammond Street Carver PV+ES Project, and C9 64 Farm-to-Market Road (aka 299 Farm-to-Market Road) PV+ES Project)

This EENF now adds three solar projects as Phase C10, C11, and C12 as described herein.

Please refer to Figures 10 through 11, which provide a USGS and Aerial Phase Location Indexes as well as a Context Map.

Cumulative impacts associated with the prior phases (A, B, C1 – C9) and the current phases (C10 – C12) are summarized in the following table. The remaining Phase C portion of the TMUD Project remains conceptual, and associated impacts noted herein represent best estimates based on available information.

In addition to demonstrating that this EENF is sufficient for the proposed Phase C10 27 Charge Pond Road PV+ES Project, Phase C11 140 Tihonet Road PV+ES Project, and Phase C12 150 Tihonet Road PV+ES Project, the information contained within this filing demonstrates the severability of the Phases C10, C11, and C12 Projects from future phases. Specifically, Phases C10, C11, and C12 will not preclude options to avoid, minimize or mitigate environmental impacts associated with future phases of the ADM TMUD.

Table 4-1: Cumulative Impact Summary

Impacts		Phase A ²³	Phase B	Phase C1	Phase C2	Phase C3	Phase C4	Phase C5	Phase C6	Phase C7	Phase C8	Phase C9	Phase C10	Phase C11	Phase C12	Remaining Phase C	Total
Land																	
Total site area (ac)		45.7±	334.01±	56±	252.5±	16±	66±	49.5±	49.5±	36.0±	45.0±	13.0±	42.1± ²⁴	66.2±	49.2±	4,546.2±	5,666.91±
Land altered (ac)		40.85±	80.49±	32±	228±	16±	47±	49.5±	49.5±	36.0±	45.0±	0.45±	40.1±	65.3±	49.2±	TBD	--
Acres of impervious area		15.28±	13.3±	0	5.93±	0.05±	0.28±	0.3	0.03±	0.29±	0.11±	0.02±	0.07±	0.16±	0.15±	TBD	--
BVW alteration (sf)		1,790±	0	0	4,404±	0	0	0	0	0	0	0	6,500±	0	0	TBD	--
Other wetland alteration	Bank (lf)	175±	0	0	0	0	0	0	0	0	0	0	0	0	0	TBD	--
	BLSF	40,040± sf	0	0	0	0	0	0	0	0	19,300± sf	0	0	0	0		
	RFA (sf)	58,370±	0	0	0	0	0	0	0	0	28,800± sf	0	0	0	0		
	LUWW (sf)	175±	0	0	0	0	0	0	0	0	0	0	0	0	0		
	IVW (sf)	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Alteration to NHESP Habitat ²⁵ (sf)		29±	52±	32±	217±	23.3±	0±	21.2±	0	0	0	0	0	0	0± ²⁶	TBD	--
Structures																	
Gross square footage		148,355±	362,450±	196±	108,990±	0	0	0	0	0	0	0	0	0	0	TBD	--
Number of housing units		0	34±	0	0	0	0	0	0	0	0	0	0	0	0	0±	34±
Maximum height (ft)		42±	40±	NA	45±	NA	NA	NA	TBD	--							
Transportation																	
Vehicle trips per day		2,928±	7,180±	100± ²⁷	460± ²⁸	20± ²⁹	20± ²⁹	20± ²⁹	50± ²⁹	50± ²⁹	50± ²⁹	TBD ³⁰	--				
Parking spaces		560±	931±	0	20±	0	0	0	0	0	0	0	0	0	0	TBD	--
Water/Wastewater																	
Water use (gpd)		5,567±	25,798±	0	108.3±	0	0	0	0	0	0	0	0	0	0	57,000±	--
Water withdrawal (gpd) ³¹		6,123.9±	28,377.8±	0	119±	0	0	0	0	0	0	0	0	0	0	TBD	--
Wastewater generation (gpd)		10,622±	45,104±	0	187.5±	0	0	0	0	0	0	0	0	0	0	51,800±	--
Length of water mains (mi)		0.96±	0	0	0	0	0	0	0	0	0	0	0	0	0	TBD	--
Length of sewer mains (mi)		0.4±	0	0	0	0	0	0	0	0	0	0	0	0	0	TBD	--

²³ Formerly consisted of three sub-phases (Phase A1 Tihonet Technology Park, Phase A2 Rosebrook Business Park medical office building, and Phase A3 Cranberry Bog). The Phase A2 area has since been reduced and partially replaced by Phase C3 Tihonet West Solar in the northerly portion of the Tihonet Technology Park. The remaining Phase A1 area is comprised of the 77 Farm-to-Market Road Wareham PV+ES, which is located within the southerly portion of the Tihonet Technology Park (fka Phase A1/C in-parcel). For the purposes of this filing, Phase A is reported as Phase A2 Rosebrook Business Park and Phase A3 Cranberry Bog, and the 77 Farm-to-Market Road Wareham PV+ES Project.

²⁴ Excludes area of wetland restoration

²⁵ Habitat includes mapped and unmapped but identified habitat

²⁶ 31.18 ac of not formally mapped habitat but agreed-upon pine barrens habitat

²⁷ Trips are temporary in association with cranberry bog construction

²⁸ 230 trips are temporary in association with cranberry bog construction

²⁹ Trips are temporary in association with construction

³⁰ Impact previously reported as ±13,300 vehicle trips per day but has not been reevaluated with regard to the updated Phase C program reflected herein

³¹ Excludes non-agricultural irrigation

Section 5.0
Public Outreach

5.0 **PUBLIC OUTREACH**

The landowner continued to hold quarterly public outreach meetings until the governor's state of emergency declaration related to COVID-19, on March 10, 2020. To date, forty-seven public meetings have been held regarding the TMUD. Although no interested parties attended the October 2019 quarterly update meeting, the agenda included discussion of solar opportunities, including the projects discussed in this EENF. The January 2020 quarterly update meeting was also a pre-filing meeting, and was specifically advertised and noticed as being relative to potential future solar projects. Attendees at the January 2020 pre-filing and quarterly update meeting were provided with an overview of potential future solar and agricultural projects and SMART Program solar opportunities. The three projects addressed by this EENF were discussed specifically as forthcoming. A summary of conservation lands placed to date in association with the TMUD was also provided. An additional quarterly public outreach and pre-filing meeting has been scheduled and noticed for March 22, 2021, which is prior to the Environmental Monitor publication date for this present EENF. With this March 2021 meeting, there will have been a total of three meetings for which these solar projects were included on the meeting agendas, including two pre-filing meetings held in specific relation to the three projects discussed herein.

Section 6.0
Circulation List

6.0 CIRCULATION LIST

Circulation list notified via U.S. Mail unless otherwise noted

* Hard Copy

**Compact Disc/Flash Drive

***Email (file share site posting with email notification)

***Secretary of Energy & Env. Affairs, Executive Office of Energy and Environmental Affairs, Attn: MEPA Office MEPA@mass.gov	
*Town of Carver Board of Selectmen	***Town of Plymouth Conservation Commission rvacca@plymouth-ma.gov
*Town of Carver Planning Board	**Town of Plymouth, Board of Health
***Town of Carver Conservation Commission brooke.monroe@carverma.gov	*Town of Wareham Board of Selectmen
*Town of Plymouth Board of Selectmen	***Town of Wareham Planning Board kbuckland@wareham.ma.us sraposo@wareham.ma.us
***Town of Plymouth Planning Board lhartmann@townhall.plymouth.ma.us	***Town of Wareham Conservation Commission dpichette@wareham.ma.us
Town of Carver, Board of Health	*MA Department of Energy Resources, Attn: MEPA Coordinator paul.ormond@mass.gov brendan.place@mass.gov
***MA Department of Environmental Protection, Commissioner's Office helena.boccardo@mass.gov	***MA DEP – Southeast Regional Office, Attn: MEPA Coordinator george.zoto@mass.gov jonathan.hobill@mass.gov
***Energy Facilities Siting Board, Attn: MEPA Coordinator andrew.greene@mass.gov geneen.bartley@mass.gov	***Ms. Mary Mckenzie Wicked Local
***Massachusetts DOT, Public/Private Development Unit MassDOTPPDU@dot.state.ma.us	***MA Department of Transportation - District #5, Attn: MEPA Coordinator barbara.lachance@dot.state.ma.us
*Massachusetts Historical Commission, Attn: Brona Simon	***Old Colony Planning Council kmowatt@ocpcrpa.org
***Southeastern Regional Planning & Economic Development District bnap@srpedd.org	***Massachusetts Coastal Zone Management, Attn: Project Review Coordinator robert.boeri@mass.gov patrice.bordonaro@mass.gov

Mr. Andrew Cunningham, Superintendent, Wareham Fire District	*Natural Heritage and End. Spec. Prog., Division of Fisheries and Wildlife melany.cheeseman@mass.gov emily.holt@mass.gov
Town of Wareham, Board of Health	*Div. of Marine Fisheries (South Shore), Attn: Environmental Reviewer DMF.EnvReview-South@mass.gov
***Dept. of Agricultural Resources, Attn: MEPA Coordinator barbara.hopson@mass.gov	***Massachusetts Bay Transit Authority, Attn: MEPA Coordinator MEPAcoordinator@mbta.com
***Ms. Sarah Hewins	**Plymouth Area Chamber of Commerce
**Wareham Land Trust	**Ms. E. Heidi Ricci, Senior Policy Analyst, Mass Audubon
**Mr. Mark Rasmussen, Executive Director, Coalition for Buzzards Bay	**Ms. Korrin N. Petersen, Advocacy Director, Coalition for Buzzards Bay
**Ms. Marie Oliva, Cape Cod Canal Reg., Chamber of Commerce	*Plymouth Public Library
**Mr. David Belluche	**Plymouth Carver Aquifer Advisory Committee
**Mr. Robert Wilber, Director of Land Protection, Mass Audubon	*Wareham Free Library
*Carver Public Library	***Mr. Jim Dugan
***Ms. Debbie Norcross	**Chief Craig Weston, Carver Fire Department
**Ms. Sally Durrell	**Ms. Lisa Bindas and Ms. Jaci Barnett
***Ms. Marina Choubina	***Mr. Simon Price
Ms. Helen Hapgood	*Ms. Margit Price
**Mr. Bob O'Connor, Division of Conservation Services, Exec. Office of Energy & Environ. Affairs	**Mr. Bill Lockwood, Lockwood Architects
*Mr. David Gould, Env. Resources Mgr., Town of Plymouth dgould@townhall.plymouth.ma.us	**Ms. Sandy Slavin, Wareham Open Space and Cons Comm.
*Mr. Jonathan Hobill, MA DEP Southeast Regional Office	***Mr. Dmitri Boukine
***Ms. Jane Winn	***Ms. Mia Berger
***Mr. Steven Berger	** The Nature Conservancy
***Mr. Leighton Price, Six Ponds Improvement Association	**Mr. Dave Walton
***Ms. Mary Calore and Mr. Frank Calore	**Mr. David Keddell, Regulatory Office, New England District, U.S. Army Corps of Engineers
Mr. Joe Costa, Buzzards Bay National Estuary Program, Massachusetts Coastal Zone Management	*Mr. Sean Bogart
Mr. Joe and Mrs. Lois Constantino	*Ms. Eileen Ormond
Mr. Edward Pacewicz	* Phillip and Terri Biancucci
** Wareham Zoning Board of Appeals	***Ms. Jen Bogart

Ms. Melissa Arrighi, Town Mgr., Town of Plymouth	*Mr. Alan Slavin, Town of Wareham, Board of Selectmen
**Mr. Derek Sullivan, Wareham Interim Town Administrator	**Mr. Doug Sanford and Ms. Kathy Messenger
Mr. Nathaniel Tipton, MEPA Review Coordinator/Resource Mgmt. Planner, MA Dept of Conservation and Recreation	*Mr. Stan Allgor
Mr. Steven Lydon	*Mr. Robert Belbin
***Mr. Walter Cruz	**Mr. Richard LaFond, Carver Town Administrator
**Mr. Brian Wick, Executive Director, Cape Cod Cranberry Growers' Association	**Editor, Wareham Courier
***Ms. Kathy Gallerani	

Section 7.0
MHC Documentation



The Commonwealth of Massachusetts
William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

November 20, 2020

Zak Farkes
Borrego Solar Systems, Inc.
55 Technology Drive, Suite 102
Lowell, MA 01851

RE: Borrego Solar Project, 27 Charge Pond Road, A.D. Makepeace Property, Wareham, MA.
MHC #RC.68426.

Dear Mr. Farkes:

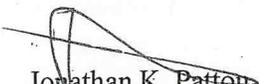
Staff of the Massachusetts Historical Commission (MHC) have reviewed the archaeological report, *Intensive (Locational) Archaeological Survey, Borrego Solar Project: 27 Charge Pond Road, Wareham, Massachusetts*, prepared and submitted by the PAL for the project referenced above.

The intensive (locational) archaeological survey for the project did not identify any significant archaeological resources. Since no significant historic or archaeological resources were identified within the project impact area no further archaeological survey is recommended for the project impact area, as proposed.

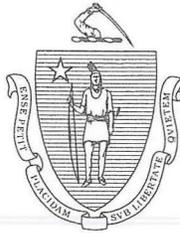
In the MHC's staff opinion, the solar array project as proposed is unlikely to affect significant historic or archaeological resources. If project plans change in future, then current project information should be submitted to the MHC for review and comment.

These comments are offered to assist in compliance with Massachusetts General Laws, Chapter 9, Sections 26-27C (950 CMR 70-71) and MEPA (301 CMR 11). If you have any questions please contact me, at this office.

Sincerely,


Jonathan K. Patton
Staff Archaeologist/Preservation Planner
Massachusetts Historical Commission

xc: Jim Kane, A.D. Makepeace Company
Deborah C. Cox, PAL, Attn: A. Peter Mair, II



The Commonwealth of Massachusetts
William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

October 6, 2020

Zak Farkes
Borrego Solar Systems, Inc.
55 Technology Drive, Suite 102
Lowell, MA 01851

RE: Borrego Solar Project, 140 Tihonet Road South, A.D. Makepeace Property, Wareham, MA.
MHC #RC.66364.

Dear Mr. Farkes:

Staff of the Massachusetts Historical Commission (MHC) have reviewed the archaeological report, *Intensive (Locational) Archaeological Survey, Borrego Solar Project: 140 Tihonet Road, Wareham, Massachusetts*, prepared and submitted by the PAL for the project referenced above.

The intensive (locational) archaeological survey conducted for the project identified the 140 Tihonet Road Find Spots 1 and 2. Find Spot 1 includes a low density deposit of the lithic debris byproducts of stone tool maintenance or manufacture. Find Spot 2 is an isolated broken rhyolite projectile point whose style is characteristic of the Meadowood type associated with the Early Woodland Period (3,000 to 1,650 years ago). While the find spots provides information on ancient Native American land use and occupation in the inland portion of Wareham, they do not possess substantial research value. No further archaeological investigations of the find spots are recommended. In the MHC's staff opinion, the proposed project is unlikely to affect significant historic and archaeological resources.

These comments are offered to assist in compliance with Massachusetts General Laws, Chapter 9, Sections 26-27C (950 CMR 70-71) and MEPA (301 CMR 11). If you have any questions, please contact Jonathan K. Patton at this office.

Sincerely,

A handwritten signature in cursive script that reads "Brona Simon".

Brona Simon
Executive Director
State Historic Preservation Officer
State Archaeologist
Massachusetts Historical Commission

xc: Jim Kane, A.D. Makepeace Company
Deborah C. Cox, PAL, Attn: A. Peter Mair, II



The Commonwealth of Massachusetts
William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

October 6, 2020

Zak Farkes
Borrego Solar Systems, Inc.
55 Technology Drive, Suite 102
Lowell, MA 01851

RE: Borrego Solar Project, 150 Tihonet Road, A.D. Makepeace Property, Wareham, MA. MHC #RC.66363.

Dear Mr. Farkes:

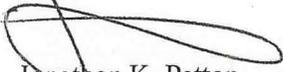
Staff of the Massachusetts Historical Commission (MHC) have reviewed the archaeological report, *Intensive (Locational) Archaeological Survey, Borrego Solar Project: 150 Tihonet Road, Wareham, Massachusetts*, prepared and submitted by the PAL for the project referenced above.

The intensive (locational) archaeological survey for the project did not identify any significant archaeological resources. Since no significant historic or archaeological resources were identified within the project impact area no further archaeological survey is recommended for the project impact area, as proposed.

In the MHC's staff opinion, the solar array project as proposed is unlikely to affect significant historic or archaeological resources. If project plans change in future, then current project information should be submitted to the MHC for review and comment.

These comments are offered to assist in compliance with Massachusetts General Laws, Chapter 9, Sections 26-27C (950 CMR 70-71) and MEPA (301 CMR 11). If you have any questions please contact me, at this office.

Sincerely,


Jonathan K. Patton
Staff Archaeologist/Preservation Planner
Massachusetts Historical Commission

xc: Jim Kane, A.D. Makepeace Company
Deborah C. Cox, PAL, Attn: A. Peter Mair, II

Section 8.0
Greenhouse Gas Documentation



MEMO

To: Zak Farkes, Borrego Solar

From: Joshua R. Castigliogio; Chirag Lala; Eliandro Tavares; and Elizabeth A. Stanton, PhD

Date: March 12, 2021

Re: Net change in carbon dioxide emissions estimates for Borrego Solar’s project sites in Wareham, MA

This Applied Economics Clinic memo estimates the net change in carbon dioxide (CO₂) emissions of Borrego Solar’s proposed solar projects at three sites located in Wareham, Massachusetts. The net emission savings of these proposed solar projects is the sum of “positive” CO₂ emissions savings from the electric grid due to renewable energy generation and “negative” CO₂ emissions due to carbon sequestration losses from felled trees.

I. Net Emissions Benefit and Summary of Findings

Borrego Solar’s proposed Wareham solar projects produce a net emission savings. The renewable energy produced by the proposed projects more than offsets the lost carbon sequestration from these developments (see Table 1). Across the three proposed sites, the renewable energy generated displaces approximately 614,000 metric tons CO₂ in total over the next 20 years. Clearing trees from the three sites would result in carbon sequestration losses of roughly 21,000 metric tons CO₂ in total over the 20-year time period. The result is a net gain of approximately 592,000 metric tons CO₂ savings. Borrego Solar’s proposed projects offset roughly 30 times more CO₂ emissions than is lost in potential carbon sequestration.

Table 1. Twenty-year net change in CO₂ emissions of Borrego Solar’s proposed Wareham projects

Project Site	Acreage	Grid Emission Savings	Sequestration Losses	Net Change in Emissions
		<i>(metric tons CO₂, 2021-2040)</i>		
27 Charge Pond Road	42.1	153,331	-4,031	149,300
150 Tihonet Road	66.6	205,695	-7,891	197,804
140 Tihonet Road	74.1	254,716	-9,381	245,335
TOTAL	182.8	613,742	-21,303	592,439

These calculations are likely conservative in that they do not include (i) the carbon sequestration resulting from the meadow that will grow beneath the panels and (ii) the increased future volume of sequestration when the forest regenerates after project decommissioning (young, growing forests sequester carbon at a considerably higher rate than mature forests).



II. Carbon sequestration losses at Wareham project sites

Borrego Solar’s three proposed Wareham sites contain various tree species that currently provide carbon sequestration benefits. The removal of these trees would result in additional CO₂ emissions due to carbon sequestration losses. (The removed trees would no longer be able to store new carbon dioxide each year as they once did, resulting in a net increase in annual greenhouse gas emissions.) These future emissions do not take into account the carbon that is currently stored in the trees (commonly referred to as “carbon stocks”), which would only be released into the atmosphere if the felled timber were burned—an assumption that we do not make in this analysis.

Carbon sequestration estimates

The estimated annual CO₂ emissions due to future carbon sequestration losses are presented in Table 2. (Please see the Methodology section below for a more detailed discussion of the development of these estimates.) Tree removal at the proposed Wareham sites would result in carbon sequestration losses of approximately 21,000 metric tons CO₂ in total from 2021 to 2040, or a little over 1,000 metric tons CO₂ annually.

Table 2. CO₂ emissions due to carbon sequestration losses at three Wareham project sites

Project Site	Acreage	Sequestered Carbon (metric tons CO ₂ , 2021-2040)	
		Annual	20-Year Total
27 Charge Pond Road	42.1	202	4,031
150 Tihonet Road	66.6	395	7,891
140 Tihonet Road	74.1	469	9,381
TOTAL	182.8	1,065	21,303

Methodology

To estimate the total CO₂ emissions from carbon sequestration losses, AEC quantified the difference between current and future carbon stocks of forests located each of the Wareham project sites over a 20-year period. AEC was provided with site-specific data by Jeff Golay of Northeast Survey Consultants on tree characteristics for each of the proposed Wareham project sites broken down by tree species and diameter-at-breast height (DBH) measurements where applicable.¹ The three Wareham sites contain the following tree species: white pine, pitch pine, white oak, black oak, red maple, paper birch, and bigtooth aspen.²

¹ Personal communication with Jeff Golay of Northeast Survey Consultants.

² White pine and pitch pine are both classified as softwood trees, while the other species are classified as hardwood trees. White pine was the most abundant tree species across the three sites accounting for two-thirds of total trees.



To estimate the current carbon stock of the forest on each Wareham site, AEC converted the weight of living biomass (i.e., aboveground and belowground) from short tons to metric tons for each tree species at each DBH measurement, then calculated the dry weight of the trees by multiplying by the dry weight ratio of an average tree of 72.5 percent.³

AEC calculated the carbon content of the trees by multiplying the dry weight of the trees by carbon factors of 0.521 and 0.498 for hardwood and softwood trees, respectively, then converted the carbon stock from C to CO₂ emissions by multiplying by the molar mass ratio of CO₂ to C (44 units CO₂/12 units C ≈ 3.67).⁴

To calculate the future carbon stock of the forests on the Wareham project sites, AEC first estimated the rate of tree growth over the 20-year analysis period and the relationship between DBH and biomass weight for each tree species (see below for further details on these steps in the methodology). The project site's 2040 carbon stock was projected from the current carbon stock based on these factors. Finally, AEC estimated the CO₂ emissions due to carbon sequestration losses at each Wareham site by subtracting the future carbon stocks from the current carbon stocks for each site (see Table 3).

Table 3. Current and future carbon stocks at three project sites in Wareham, MA

Project Site	Carbon Stocks (<i>metric tons CO₂</i>)		
	Current Carbon Stocks in 2021	Future Carbon Stocks in 2040	Total Carbon Sequestered from 2021-2040
27 Charge Pond Road	5,054	9,085	4,031
150 Tihonet Road	4,838	12,729	7,891
140 Tihonet Road	9,166	18,547	9,381
TOTAL	19,059	40,361	21,303

To estimate tree growth, AEC used a simplified, linear growth rate formula, where the rate of growth is a function of a tree's age and DBH. AEC estimated the average growth rate for trees located on the Wareham project sites by dividing the mean DBH measurements of each species by the average age of each species, then averaged across tree species resulting in an average growth rate of roughly 0.14 inches per year. AEC approximated the total tree growth over the 20-year analysis period by multiplying the average growth rate (0.14 inches per year) by twenty years to yield a total 20-year growth of approximately three inches in DBH.

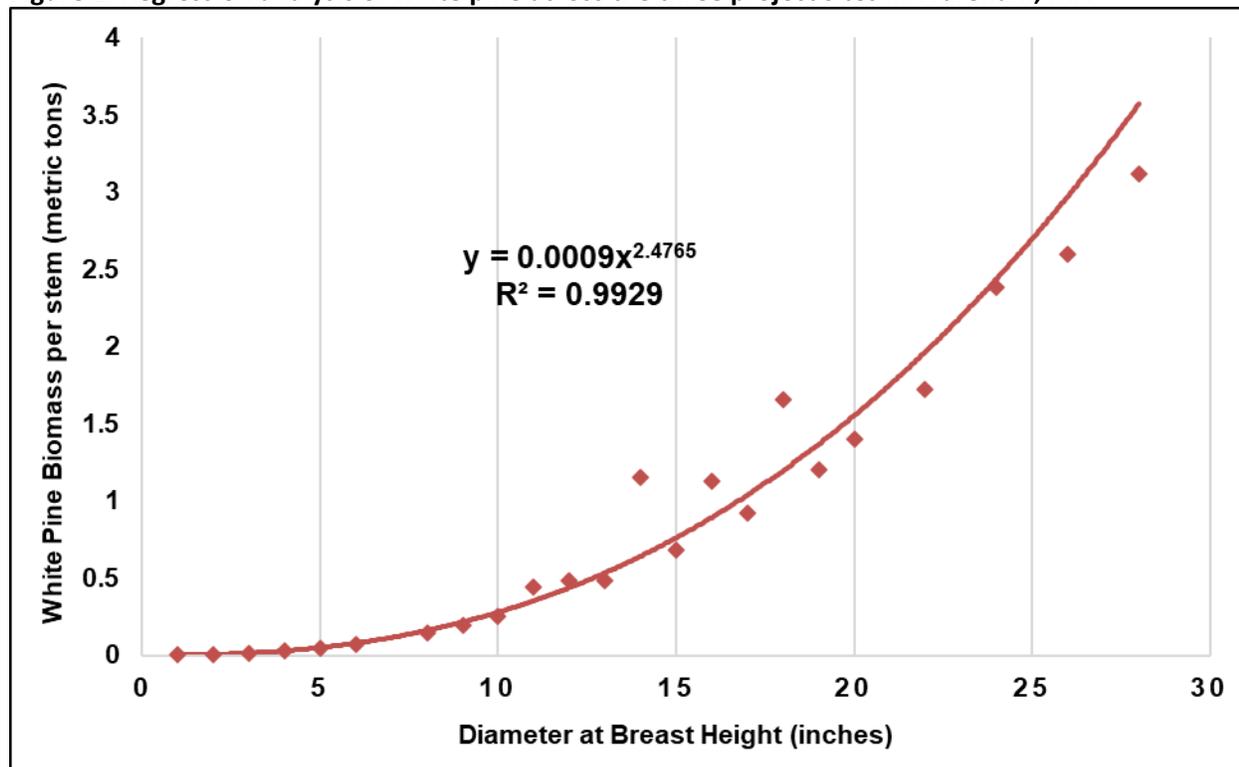
³ University of New Mexico. "How to calculate the amount of CO₂ sequestered in a tree per year". Available at: https://www.unm.edu/~jbrink/365/Documents/Calculating_tree_carbon.pdf

⁴ Earth Labs. November 11, 2019. "Living in a Carbon World – Part B: Carbon Storage in Local Trees". Available at: <https://serc.carleton.edu/eslabs/carbon/1b.html>



To estimate the relationship between total biomass and DBH, AEC conducted a regression analysis by tree species to construct species-specific allometric equations.⁵ To determine this allometric relationship, AEC calculated the total biomass per stem across the three Wareham sites for each tree species by dividing the total biomass (in metric tons) by the total number of stems at each DBH measurement, then regressed that ratio against the DBH measurements. The resulting allometric equations measure the biomass-per-stem ration as a function of DBH across the three sites for each tree species (see Figure 1 for the white pine regression analysis).

Figure 1. Regression analysis of white pine across the three project sites in Wareham, MA



Comparison to EPA methodology

The U.S. Environmental Protection Agency (EPA) provides a different, more generic methodology for calculating the net annual change in biomass carbon stocks provides a generic estimate of the change in annual carbon stocks on a per hectare basis for forestland anywhere in the United States of 0.52 metric tons carbon (C) sequestered per hectare per year.⁶

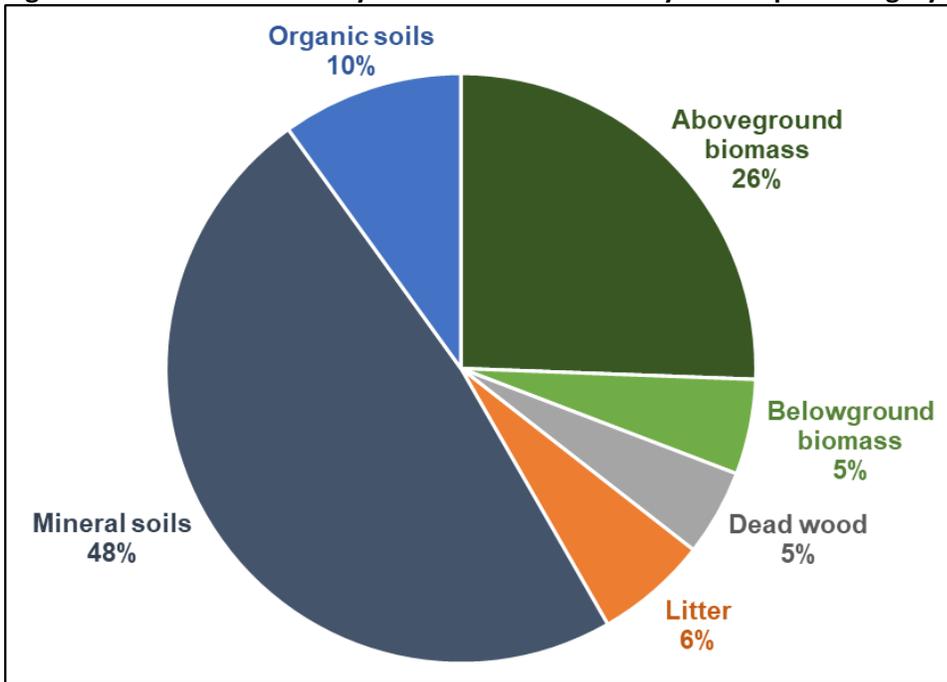
⁵ Allometric equations are commonly used in forestry to describe the relationship between tree characteristics. The allometric equations used in this analysis were in the form of a power function (i.e., $Biomass = a * DBH^b$). Picard, Saint-André, & Henry. 2012. *Manual for building tree volume and biomass allometric equations: from field measurement to prediction*. Cirad; FAO. Available at: <http://www.fao.org/3/i3058e/i3058e.pdf>

⁶ EPA's estimate includes carbon sequestration from five carbon pools: aboveground biomass, belowground biomass, dead wood, litter, and soil (including mineral and organic soils).



For the purpose of comparison to AEC’s carbon sequestration estimates above, AEC modified EPA’s forest sequestration factor to only include carbon sequestered by living biomass (i.e., aboveground and belowground biomass). Although EPA does not provide a breakdown of the annual change in sequestration factor by carbon pool category, the agency does provide a breakdown is provided for its carbon stock density estimate (210 metric tons C per hectare) as shown in Figure 2.⁷

Figure 2. Carbon stock density of U.S. forests in 2017 by carbon pool category



Source: U.S. EPA. “Greenhouse Gases Equivalencies Calculator - Calculations and References.” Available at: <https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references>

Using this breakdown, AEC calculated the proportion of total carbon density attributable to living biomass to be 31 percent (shown in green in Figure 2). This proportion was then applied to EPA’s total forest sequestration factor (0.52 metric tons C per hectare per year) to result in the sequestration factor for living biomass in U.S. forests of 0.16 metric tons C per hectare per year.

AEC converted the annual sequestration factor for living biomass (0.16 metric tons C per hectare) from C to CO₂ emissions by multiplying by the molar mass ratio of CO₂ to C (44 units CO₂/12 units C ≈ 3.67). Finally, AEC converted the annual CO₂ emissions factor (due to sequestration losses from living biomass) to a per acre basis (0.24 metric tons CO₂ per acre) and then multiplied this ratio by the acreage of each proposed project site in Wareham.

The tons C per hectare values provided by EPA are a simple method of estimating a U.S. average annual change in biomass carbon stocks based on nationwide inventories that are tailored neither by region or tree species. The rate of carbon sequestration in trees varies greatly between different regions and tree

⁷ U.S. EPA. “Greenhouse Gases Equivalencies Calculator - Calculations and References.” Available at: <https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references>



species with climatic conditions playing a major role in carbon storage potential. Without differentiating these characteristics, EPA’s methodology falls short in providing an accurate estimate for carbon sequestration at the three Wareham project sites.

AEC’s estimates of carbon sequestration rates across the three Wareham sites averages out to roughly 5.68 metric tons CO₂ per acre per year compared to the 0.24 metric tons CO₂ per acre per year derived from EPA’s methodology (see Table 4). The difference between these rates of 5.44 metric tons CO₂ per acre per year is largely attributed to the geographical and temporal characteristics of each methodology. AEC’s carbon sequestration estimates account for site-specific characteristics by utilizing data collected at each of the three proposed project sites in Wareham, Massachusetts, while EPA’s methodology utilizes data from 2017 to assess generic U.S. carbon sequestration rates.

Table 4. Comparison of AEC’s carbon sequestration rates to EPA’s methodology

Project Site	Sequestered Carbon (<i>metric tons CO₂ per acre per year</i>)		
	AEC Rate	EPA Rate	Difference
27 Charge Pond Road	4.79	0.24	4.55
150 Tihonet Road	5.92	0.24	5.69
140 Tihonet Road	6.33	0.24	6.09
AVERAGE	5.68	0.24	5.44

III. Emissions savings from the grid at Wareham project sites

The proposed solar projects at the three sites in Wareham, Massachusetts would produce clean, renewable electricity that would displace fossil fuel generation on the grid. Renewable energy resources like solar cost virtually nothing to operate making them cheaper than conventional gas- and oil-fired electricity generators. By adding renewables to the electric system, the dirtier, more expensive fossil fuel generators that are typically on the margin are no longer needed to meet customer demand.⁸ By displacing fossil fuel generation, renewable energy resources result in lower electric grid emissions.

Grid emissions savings estimates

The estimated grid emissions savings Borrego Solar’s proposed Wareham projects are presented in Table 5 and Figure 3 below. (Please see the Methodology section below for a more detailed discussion of the development of these estimates.) In total, the proposed Wareham projects would result in an emissions savings from the grid of approximately 614,000 metric tons CO₂ over the 20-year period between 2021 and 2040, or roughly 31,000 metric tons CO₂ annually.

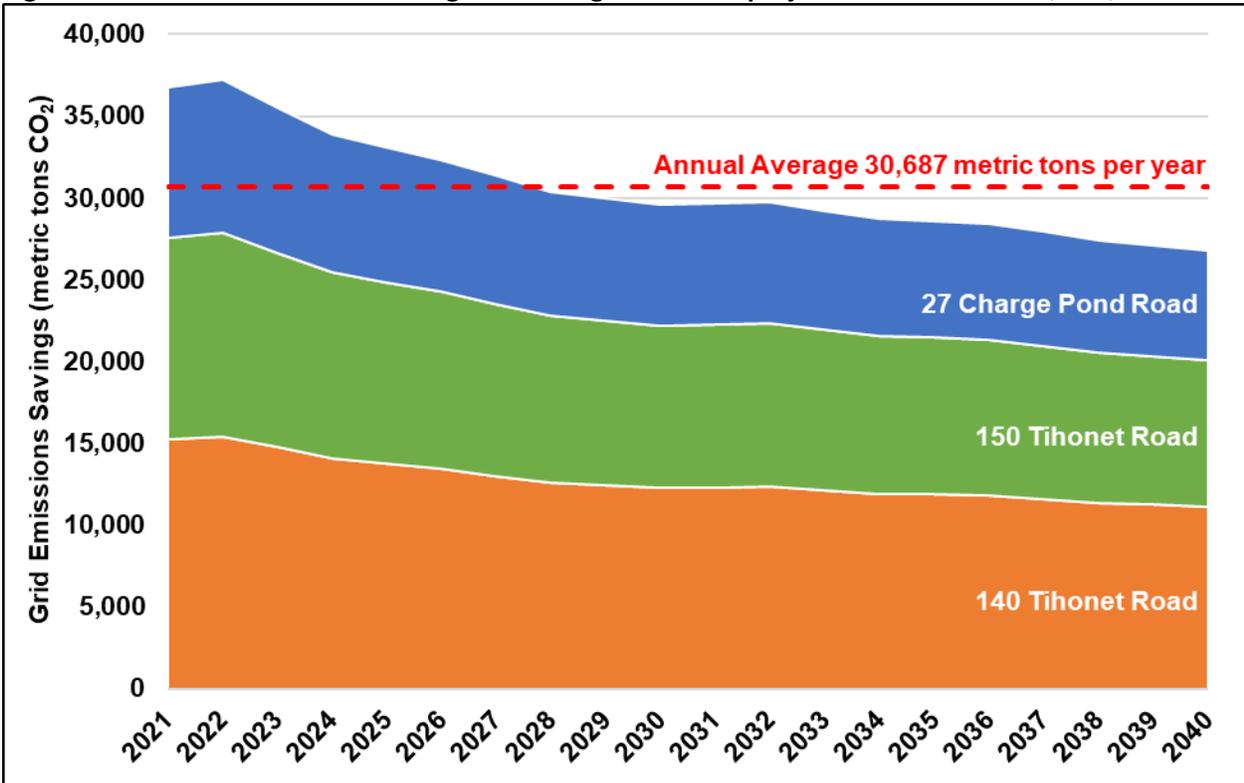
⁸ The margin is point at which sufficient electricity is procured in the energy market. The last, and most expensive, generating resource procured to meet customer demand is the marginal resource (or "on the margin") and sets the clearing price for the market.



Table 5. CO₂ emissions savings from the grid at three project sites in Wareham, MA

Project Site	Project Size (MW DC)	Annual Generation (MWh)	Grid Emissions Savings (metric tons CO ₂ , 2021-2040)	
			Annual Average	20-Year Total
27 Charge Pond Road	11.6	15,068	7,667	153,331
150 Tihonet Road	15.6	20,214	10,285	205,695
140 Tihonet Road	19.3	25,032	12,736	254,716
TOTAL	46.4	60,315	30,687	613,742

Figure 3. Annual CO₂ emissions savings from the grid at three project sites in Wareham, MA, 2021-2040



Methodology

To estimate the total CO₂ emissions savings from the grid, AEC quantified the marginal emissions that would be displaced as a result of the proposed solar projects at each of the Wareham project sites using the “short-run” marginal emission rates for Massachusetts from the National Renewable Energy Laboratory’s (NREL) Cambium model.⁹

⁹ National Renewable Energy Laboratory (NREL). 2020. *Cambium Viewer*. Available at: <https://cambium.nrel.gov/>

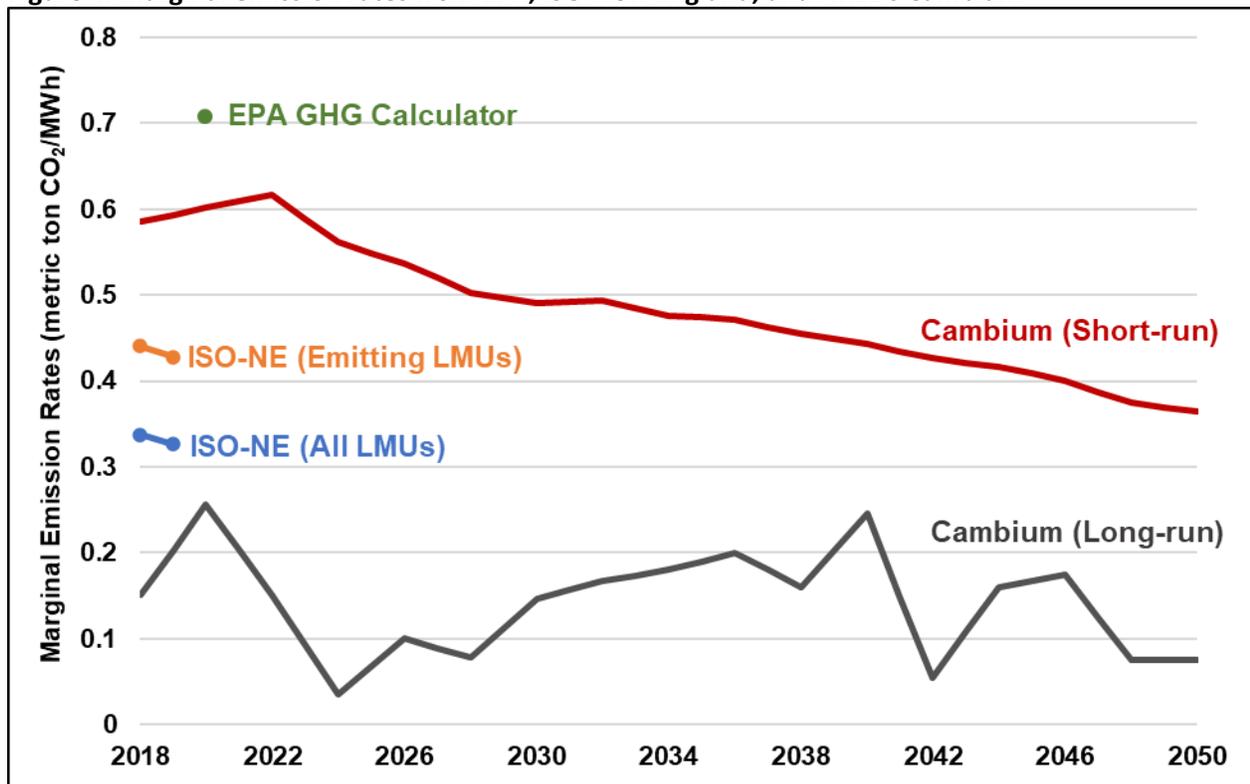


AEC utilized the Cambium “short-run” marginal emission rates from the Mid-case of the 2020 Standard Scenarios¹⁰ for Massachusetts, which are based on current renewable portfolio standards and emission reduction laws causing them to shrink over time (see “Cambium (Short-run)” in Figure 4 below). AEC calculated the annual emissions savings from the grid in metric tons CO₂ by multiplying the Massachusetts’ marginal emission rate in each year by the annual production in MWh of each proposed solar project in Wareham. Finally, AEC calculated the 20-year total emissions savings from the grid of each proposed solar project by summing the annual emissions savings from 2021 through 2040 based on projected marginal emission rates for each year.

Comparison of marginal emission rate estimates

Renewable energy resources reduce emissions by displacing fossil fuel generation that would have otherwise resulted in the emission of greenhouse gases. These “avoided” emissions, or emission savings, are estimated using the emission rate of the marginal resource—the last, and most expensive, generating resource procured to meet customer demand. Figure 4 below compares estimated marginal emission rates from three different sources, covering different geographical boundaries and timeframes, and using different methodologies: EPA’s GHG Calculator, ISO-New England, and NREL’s Cambium model.

Figure 4. Marginal emission rates from EPA, ISO-New England, and NREL’s Cambium



¹⁰ National Renewable Energy Laboratory (NREL). 2020. “2020 Standard Scenarios Report: A U.S. Electricity Sector Outlook.” Available at: <https://www.nrel.gov/docs/fy21osti/77442.pdf>



The EPA GHG Calculator rate (in green) is an average of marginal emissions as modeled in AVERT for regions throughout the United States.¹¹ Because New England has lower marginal emissions than most other U.S. regions, the EPA's GHG calculator yields too high of an emission rate to be appropriate for Massachusetts.

Marginal emissions for the New England grid (in orange and blue) are measured by ISO-New England, the regional grid operator, in their annual emission reports.¹² The "All LMUs" rates are probably the most comparable for the purposes of calculating emission savings since it includes all generators on the system.¹³ ISO-New England's marginal emission rate estimates reflect the New England region as a whole—not Massachusetts specifically—and are only available as historical data; the ISO doesn't publish emission rate projections.

Cambium is a new model from NREL designed specifically to project avoided marginal emissions from the electric sector over time. NREL's results show projected emissions shrinking over time as more renewables are added to the grid. Cambium estimates both "short-run" and "long-run" marginal emission rates. The Cambium "long-run" marginal emissions (in black) are an attempt to project the effect of persistent change in end-use demand as a result of increased use of renewable energy technologies (e.g., electric vehicle charging, installation of heat pumps, etc.), while considering the structural changes to the grid in response to the change in demand—these estimates are currently experimental and require further development.¹⁴ The Cambium "short-run" emissions (in red) are Massachusetts-specific and shrink over time as expected since they are based on current renewable portfolio standards and emission reduction laws.

¹¹ US Environmental Protection Agency (EPA). March 2020. "Greenhouse Gas Equivalencies Calculator". Available at: <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

¹² ISO-New England. February 2021. "2019 DRAFT ISO New England Electric Generator Air Emissions Report". Available at: <https://www.iso-ne.com/system-planning/system-plans-studies/emissions/?document-type=Emissions%20Reports>

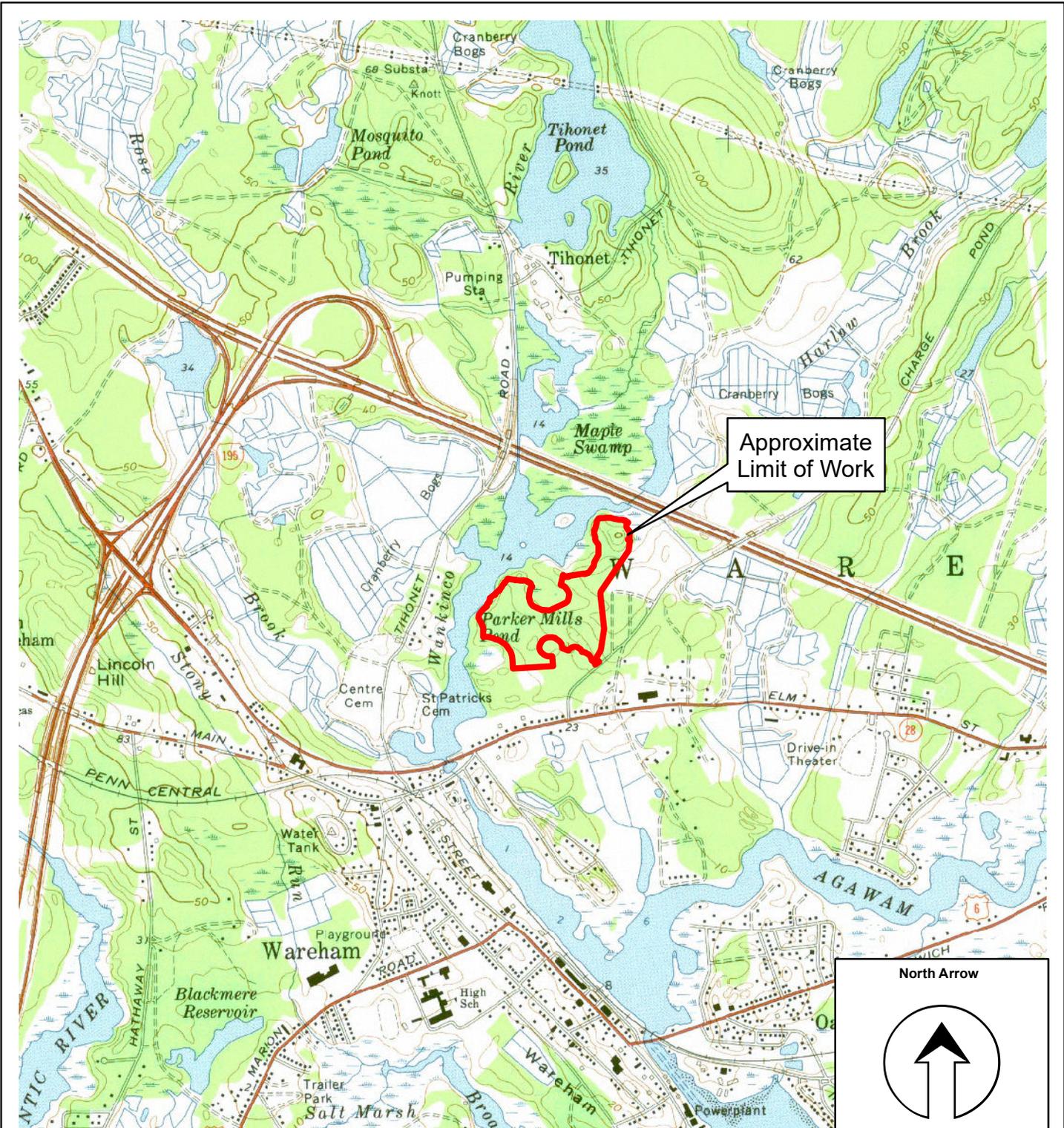
¹³ LMU stands for locational marginal unit.

¹⁴ Gagnon, P. et al. 2020. "Cambium Documentation: Version 2020." National Renewable Energy Laboratory (NREL). Available at: <https://www.nrel.gov/docs/fy21osti/78239.pdf>

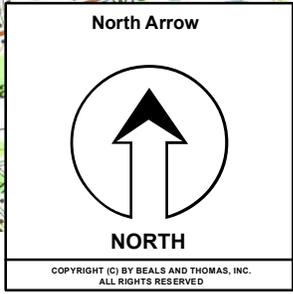
Section 9.0

Figures

- 1: Phase C10 27 Charge Pond Road PV+ES Project USGS Map
- 2: Phase C10 27 Charge Pond Road PV+ES Project Aerial Map
- 3: Phase C10 27 Charge Pond Road PV+ES s Project Site Plan
- 4: Phase C11 140 Tihonet Road PV+ES Project USGS Map
- 5: Phase C11 140 Tihonet Road PV+ES Project Aerial Map
- 6: Phase C11 140 Tihonet Road PV+ES Project Site Plan
- 7: Phase C12 150 Tihonet Road PV+ES Project USGS Map
- 8: Phase C12 150 Tihonet Road PV+ES Project Aerial Map
- 9: Phase C12 150 Tihonet Road PV+ES Project Site Plan
- 10: USGS Revised Phase Location Index
- 11: Updated Context Map
- 12: Phase C Conceptual Plan (Potential Uses)
- 13: NHESP Map



Approximate
Limit of Work



Digital USGS Map of Wareham, MA, dated 1972, provided by the Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services.



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**PROJECT: 27 Charge Pond Road
PV+ES Project**
Wareham, Massachusetts

Locus Map
Figure 1

PREPARED FOR:
Borrego Solar Systems, Inc.
55 Technology Dr. #102
Lowell, MA 01851

Scale: 1" = 2,000'

Date: 02/02/2021

Source File 1833109P602B.mxd
B+T Project No. 1833.109



Approximate
Limit of Work

Digital orthophotograph, dated 2019, provided by the Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services.



North Arrow

NORTH

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**PROJECT: 27 Charge Pond Road
PV+ES Project**
Wareham, Massachusetts

PREPARED FOR:
Borrego Solar Systems, Inc.
55 Technology Dr. #102
Lowell, MA 01851

Aerial Map
Figure 2

Scale: 1" = 500'

Date: 02/02/2021

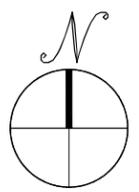
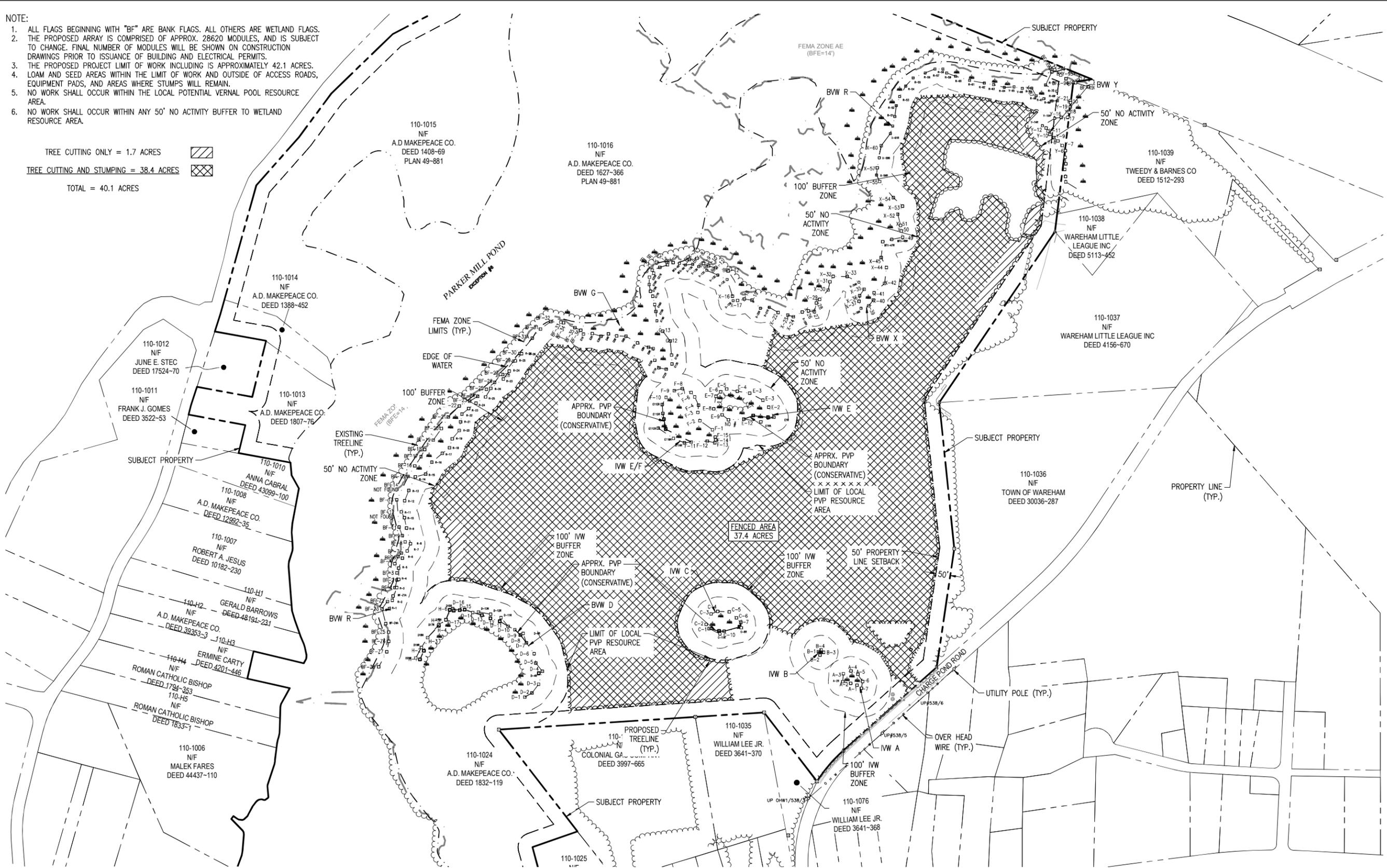
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B+T Project No. 1833.109

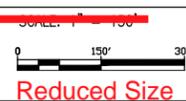
NOTE:

1. ALL FLAGS BEGINNING WITH "BF" ARE BANK FLAGS. ALL OTHERS ARE WETLAND FLAGS.
2. THE PROPOSED ARRAY IS COMPRISED OF APPROX. 28620 MODULES, AND IS SUBJECT TO CHANGE. FINAL NUMBER OF MODULES WILL BE SHOWN ON CONSTRUCTION DRAWINGS PRIOR TO ISSUANCE OF BUILDING AND ELECTRICAL PERMITS.
3. THE PROPOSED PROJECT LIMIT OF WORK INCLUDING IS APPROXIMATELY 42.1 ACRES.
4. LOAM AND SEED AREAS WITHIN THE LIMIT OF WORK AND OUTSIDE OF ACCESS ROADS, EQUIPMENT PADS, AND AREAS WHERE STUMPS WILL REMAIN.
5. NO WORK SHALL OCCUR WITHIN THE LOCAL POTENTIAL VERNAL POOL RESOURCE AREA.
6. NO WORK SHALL OCCUR WITHIN ANY 50' NO ACTIVITY BUFFER TO WETLAND RESOURCE AREA.

TREE CUTTING ONLY = 1.7 ACRES
 TREE CUTTING AND STUMPING = 38.4 ACRES
 TOTAL = 40.1 ACRES



TREE CLEARING PLAN



Reduced Size

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Jeffrey R. Murphy
10/16/2020

27 CHARGE POND RD
 27 CHARGE POND ROAD, WAREHAM, MA 02571

PROJECT NUMBER:
905-2712

REV	DATE	DRAWN	CHECKED	RELEASE LEVEL
1	04/27/20	WS	CDS	PLAN SET CREATION
2	04/28/20	JPL	CDS	UPDATED TITLE PAGE
3	05/22/20	WS	CDS	UPDATED TO MATCH DESIGN CHANGES
4	05/28/20	WS	CDS	ISSUED FOR LOCAL PERMITTING
5	09/16/20	WS	JM	REVISIONS PER PEER REVIEW COMMENTS
6	10/16/20	WS	JM	REVISIONS TO ENTRANCE AND INTX.

SCALES STATED ON DRAWINGS ARE VALID ONLY WHEN PLOTTED ARCH D 24" X 36"

C-2.0
TREE CLEARING PLAN

Figure 3a

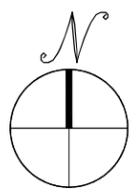
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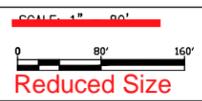


FEMA ZONE AE (BFE=14')

ZONING TABLE	
ZONING DISTRICT - RESIDENTIAL R-60 DISTRICT	
NON RESIDENTIAL USE REQUIREMENTS	
MINIMUM LOT AREA	130,680 SF
MINIMUM FRONTAGE	180 FT
MINIMUM FRONT SETBACK	50 FT
MINIMUM SIDE SETBACK	50 FT
MINIMUM REAR SETBACK	50 FT
MAXIMUM HEIGHT	35 FT
MAXIMUM BUILDING COVERAGE	-
MAXIMUM IMPERVIOUS SURFACE	-



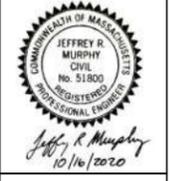
LAYOUT AND MATERIALS PLAN - SOUTHWEST



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WAREHAM, MA 02571

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2	04/28/20	JPL	CDS	UPDATED TITLE PAGE
3	05/22/20	WS	CDS	UPDATED TO MATCH DESIGN CHANGES
4	05/28/20	WS	CDS	ISSUED FOR LOCAL PERMITTING
5	09/16/20	WS	JM	REVISIONS PER PEER REVIEW COMMENTS
6	10/16/20	WS	JM	REVISIONS TO ENTRANCE AND INTX.

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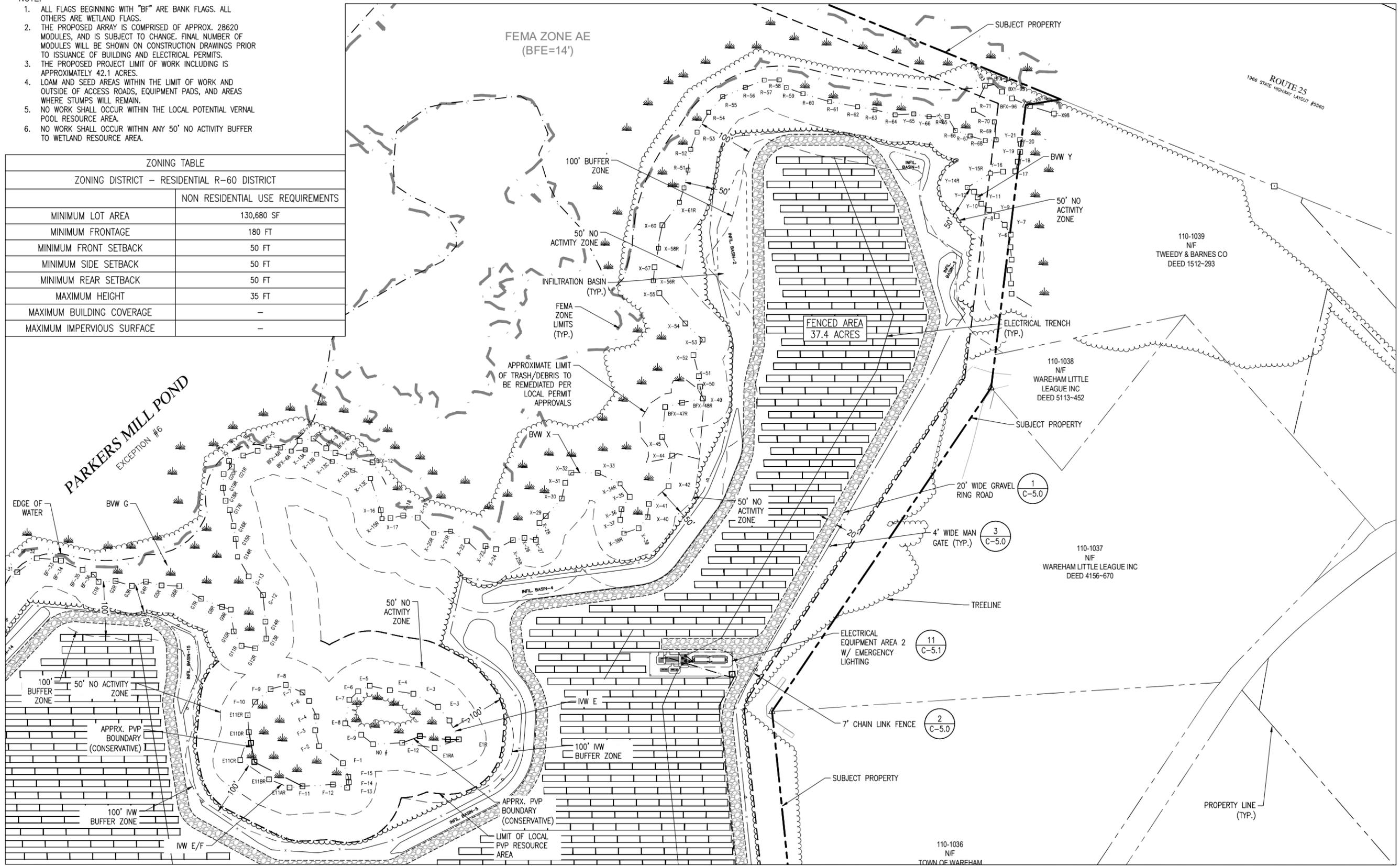
C-3.1

LAYOUT AND MATERIALS PLAN - SOUTHWEST

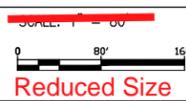
Figure 3b

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ZONING TABLE	
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MINIMUM LOT AREA	130,680 SF
MINIMUM FRONTAGE	180 FT
MINIMUM FRONT SETBACK	50 FT
MINIMUM SIDE SETBACK	50 FT
MINIMUM REAR SETBACK	50 FT
MAXIMUM BUILDING HEIGHT	35 FT
MAXIMUM BUILDING COVERAGE	-
MAXIMUM IMPERVIOUS SURFACE	-



LAYOUT AND MATERIALS PLAN - NORTHEAST



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10/16/2020

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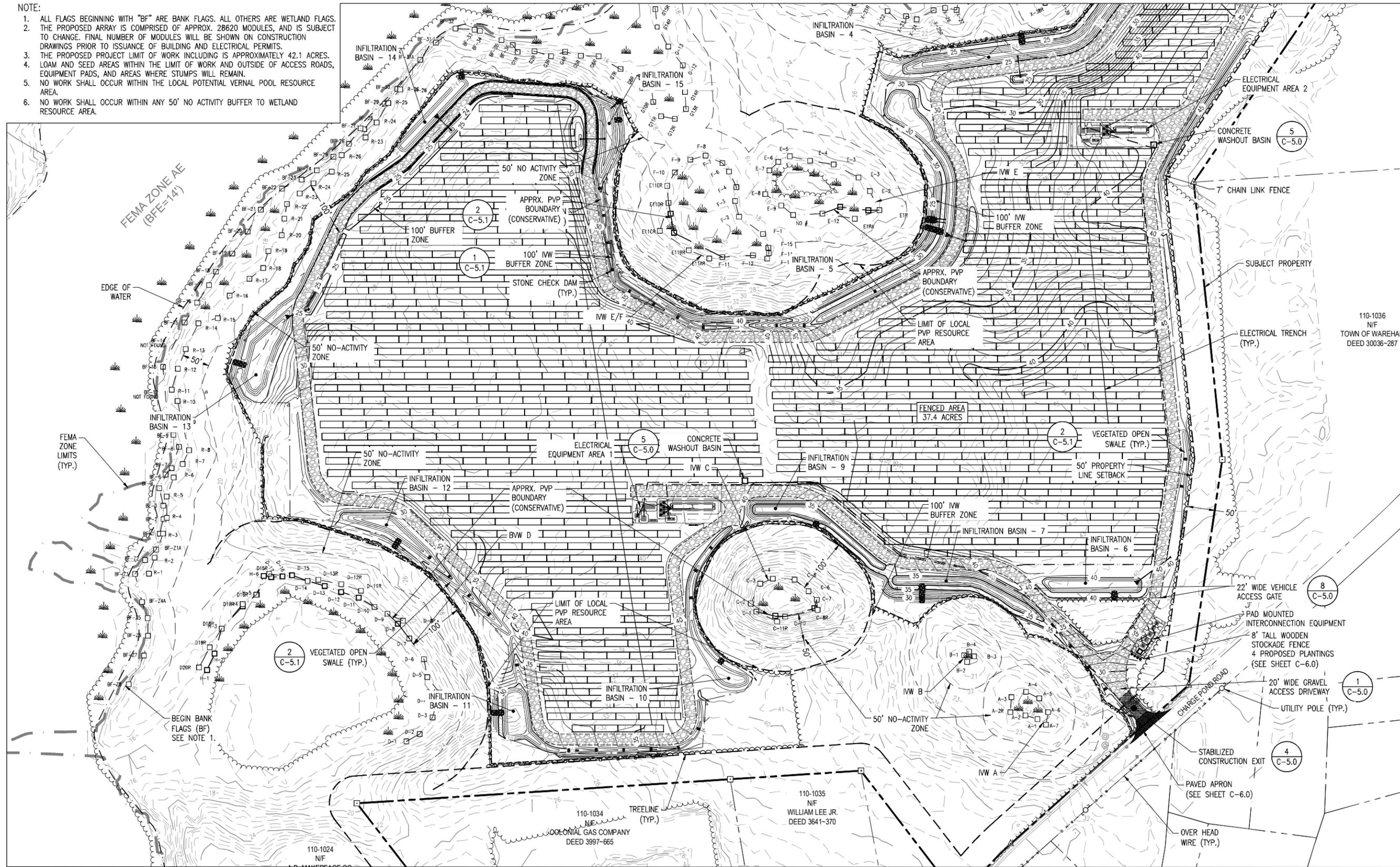
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5	09/16/20	WS	JM	REVISIONS PER PEER REVIEW COMMENTS
6	10/16/20	WS	JM	REVISIONS TO ENTRANCE AND INTX.

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C-3.2
LAYOUT AND MATERIALS PLAN - NORTHEAST

Figure 3c

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COMMONWEALTH OF MASSACHUSETTS
 JEFFREY R. MURPHY
 CIVIL
 No. 51800
 REGISTERED PROFESSIONAL ENGINEER
 Jeffrey R. Murphy
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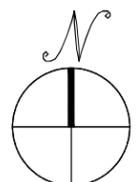
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2	04/28/20	JPL	CDS	UPDATED TITLE PAGE
3	05/22/20	WS	CDS	UPDATED TO MATCH DESIGN CHANGES
4	05/28/20	WS	CDS	ISSUED FOR LOCAL PERMITTING
5	09/16/20	WS	JM	REVISIONS PER PEER REVIEW COMMENTS
6	10/16/20	WS	JM	REVISIONS TO ENTRANCE AND INTX.

SCALES STATED ON DRAWINGS ARE VALID ONLY WHEN PLOTTED ARCH D 24" X 36"

C-4.1
 GRADING AND EROSION CONTROL PLAN - SOUTHWEST



GRADING AND EROSION CONTROL PLAN - SOUTHWEST

SCALE: 1" = 80'
 0 80' 160'
 Reduced Size

Figure 3d

NOTE:

1. ALL FLAGS BEGINNING WITH "BF" ARE BANK FLAGS. ALL OTHERS ARE WETLAND FLAGS.
2. THE PROPOSED ARRAY IS COMPRISED OF APPROX. 28620 MODULES, AND IS SUBJECT TO CHANGE. FINAL NUMBER OF MODULES WILL BE SHOWN ON CONSTRUCTION DRAWINGS PRIOR TO ISSUANCE OF BUILDING AND ELECTRICAL PERMITS.
3. THE PROPOSED PROJECT LIMIT OF WORK INCLUDING IS APPROXIMATELY 42.1 ACRES.
4. LOAM AND SEED AREAS WITHIN THE LIMIT OF WORK AND OUTSIDE OF ACCESS ROADS, EQUIPMENT PADS, AND AREAS WHERE STUMPS WILL REMAIN.
5. NO WORK SHALL OCCUR WITHIN THE LOCAL POTENTIAL VERNAL POOL RESOURCE AREA.
6. NO WORK SHALL OCCUR WITHIN ANY 50' NO ACTIVITY BUFFER TO WETLAND RESOURCE AREA.

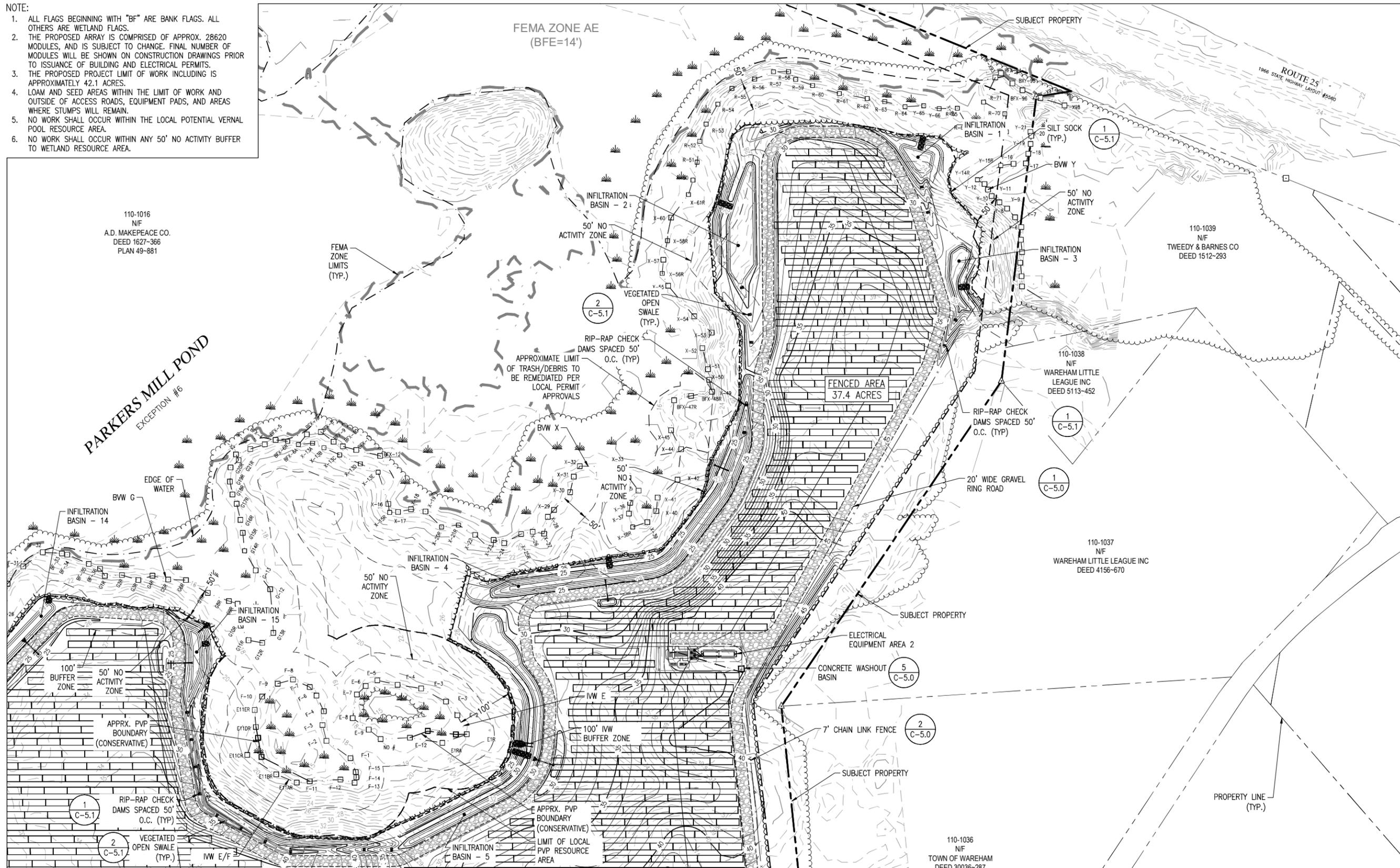
110-1016
N/F
A.D. MAKEPEACE CO.
DEED 1627-366
PLAN 49-881

110-1039
N/F
TWEEDY & BARNES CO
DEED 1512-293

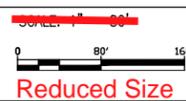
110-1038
N/F
WAREHAM LITTLE LEAGUE INC
DEED 5113-452

110-1037
N/F
WAREHAM LITTLE LEAGUE INC
DEED 4156-670

110-1036
N/F
TOWN OF WAREHAM
DEED 30036-287



GRADING AND EROSION CONTROL PLAN - NORTHEAST



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NOT FOR CONSTRUCTION



Jeffrey R. Murphy
10/16/2020

27 CHARGE POND RD
27 CHARGE POND ROAD, WAREHAM, MA 02571

PROJECT NUMBER:
905-2712

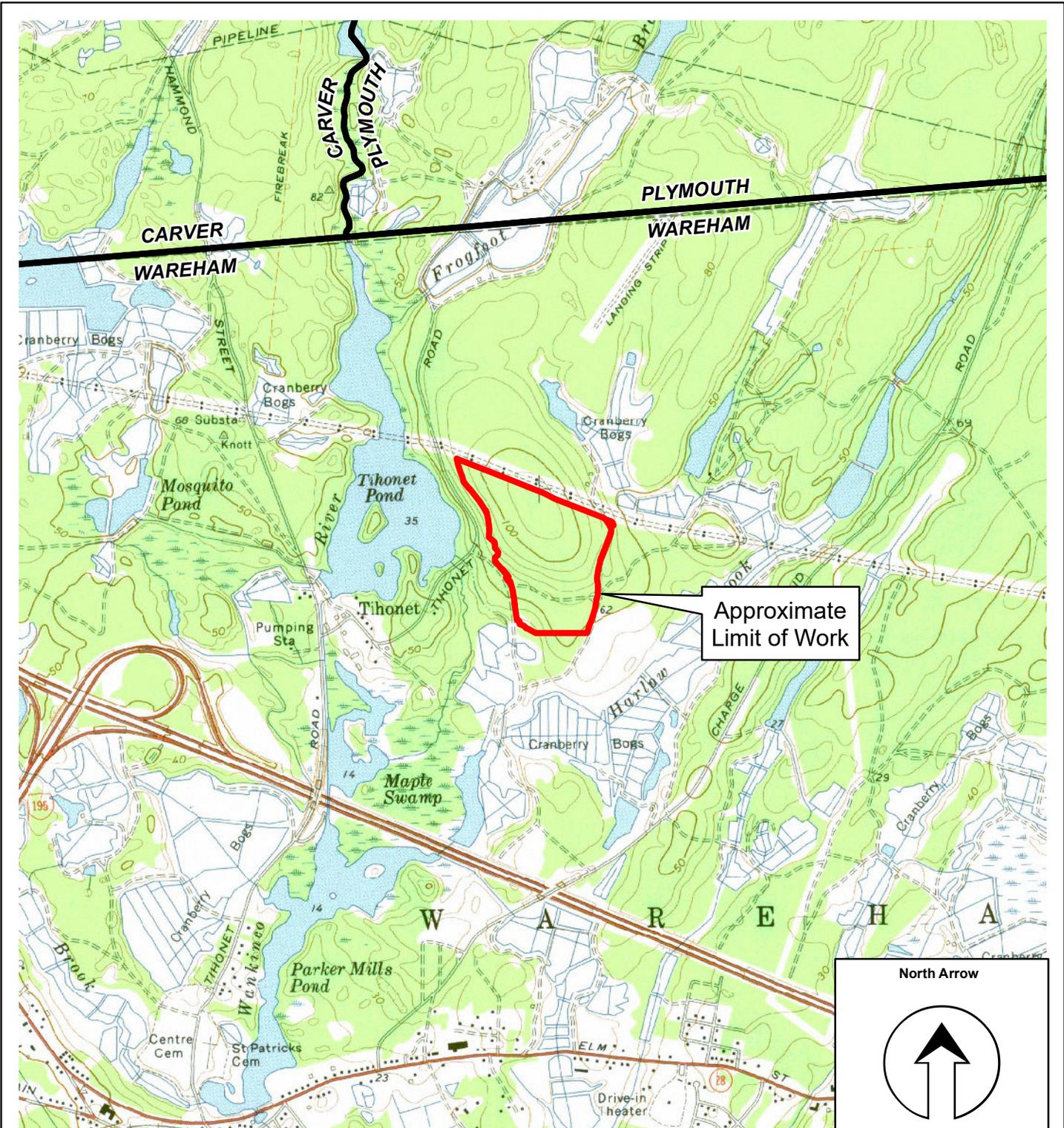
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2	04/28/20	JPL	CDS	UPDATED TITLE PAGE
3	05/22/20	WS	CDS	UPDATED TO MATCH DESIGN CHANGES
4	05/28/20	WS	CDS	ISSUED FOR LOCAL PERMITTING
5	09/16/20	WS	JM	REVISIONS PER PEER REVIEW COMMENTS
6	10/16/20	WS	JM	REVISIONS TO ENTRANCE AND INTX.

SCALES STATED ON DRAWINGS ARE VALID ONLY WHEN PLOTTED ARCH D 24" X 36"

C-4.2

GRADING AND EROSION CONTROL PLAN - NORTHEAST

Figure 3e



Digital USGS Map of Wareham, MA, dated 1972, provided by the Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services.

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PROJECT: **140 Tihonet Road
PV+ES Project**
Wareham, Massachusetts

Locus Map
Figure 4

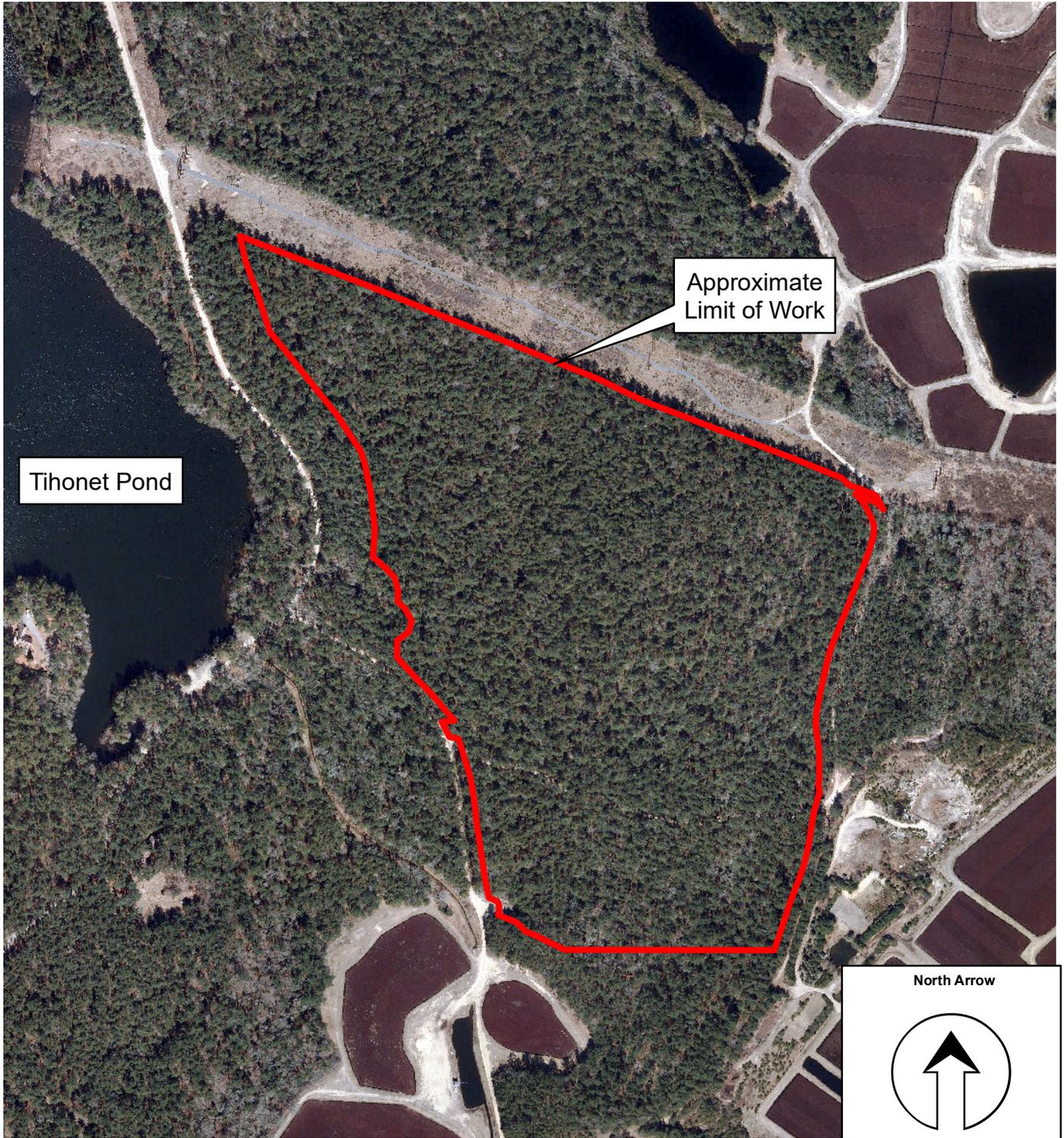
PREPARED FOR:
Borrego Solar Systems, Inc.
55 Technology Dr. #102
Lowell, MA 01851

Scale: 1" = 2,000'

Date: 02/02/2021

Source File 1833112P595B.mxd

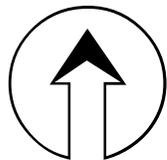
B+T Project No. 1833.112



Tihonet Pond

Approximate
Limit of Work

North Arrow



NORTH

Digital orthophotograph, dated 2019, provided by the Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services.

0 250 500 1,000
FEET

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PROJECT: 140 Tihonet Road
PV+ES Project
Wareham, Massachusetts

PREPARED FOR:
Borrego Solar Systems, Inc.
55 Technology Dr. #102
Lowell, MA 01851

Aerial Map
Figure 5

Scale: 1" = 500'

Date: 02/02/2021

Source File 1833112P595B.mxd

B+T Project No. 1833.112

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 55 TECHNOLOGY DRIVE, SUITE 102
 LOWELL, MA 01801
 PHONE: (978) 808-6273
 FAX: (978) 843-6778
 WWW.BORREGOSOLAR.COM

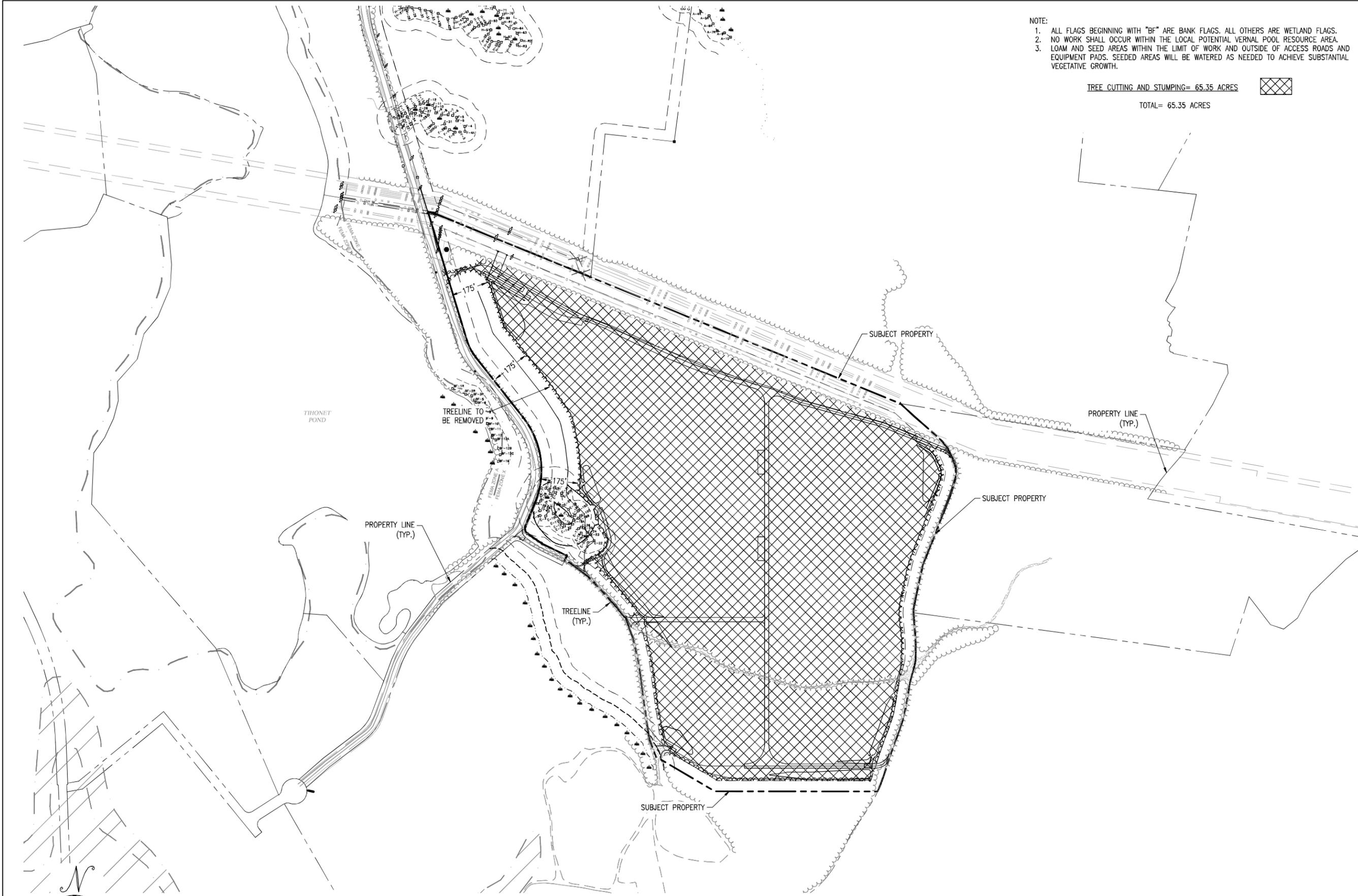
NOTE:

1. ALL FLAGS BEGINNING WITH "BF" ARE BANK FLAGS. ALL OTHERS ARE WETLAND FLAGS.
2. NO WORK SHALL OCCUR WITHIN THE LOCAL POTENTIAL VERNAL POOL RESOURCE AREA.
3. LOAM AND SEED AREAS WITHIN THE LIMIT OF WORK AND OUTSIDE OF ACCESS ROADS AND EQUIPMENT PADS. SEEDED AREAS WILL BE WATERED AS NEEDED TO ACHIEVE SUBSTANTIAL VEGETATIVE GROWTH.

TREE CUTTING AND STUMPING= 65.35 ACRES



TOTAL= 65.35 ACRES



NOT FOR CONSTRUCTION



Charles D. Smith
 2/19/21

SITE USE PLAN
 140 THONET ROAD
 WAREHAM, MA 02571

PROJECT NUMBER:
 905-2708

REV	DATE	DRAWN	CHECKED	RELEASE LEVEL
	06/02/20	WS	CDS	ISSUED FOR LOCAL PERMITTING
	08/19/20	WS	CDS	CREATE SIGHT LINE EXHIBIT
	01/19/21	WS	JM	RESUBMISSION TO LOCAL AHJ
	02/02/21	WS	JM	ADDRESS PEER REVIEW COMMENTS
	02/19/21	WS	JM/DS	ADDRESS PEER REVIEW COMMENTS

SCALES STATED ON DRAWINGS ARE VALID ONLY WHEN PLOTTED ARCH D 24" X 36"

C-2.0
 TREE CLEARING PLAN



TREE CLEARING PLAN

SCALE: 1" = 200'



Reduced Size

Figure 6a

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 LOWELL, MA 01801
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 FAX: (978) 843-6778
 WWW.BORREGOSOLAR.COM

ZONING TABLE	
ZONING DISTRICT - RESIDENTIAL R-60 DISTRICT	
	NON RESIDENTIAL USE REQUIREMENTS
MINIMUM LOT AREA	130,680 SF
MINIMUM FRONTAGE	180 FT
MINIMUM FRONT SETBACK	50 FT
MINIMUM SIDE SETBACK	50 FT
MINIMUM REAR SETBACK	50 FT
MAXIMUM HEIGHT	35 FT
MAXIMUM BUILDING COVERAGE	-
MAXIMUM IMPERVIOUS SURFACE	-

- NOTE:
- ALL FLAGS BEGINNING WITH "BF" ARE BANK FLAGS. ALL OTHERS ARE WETLAND FLAGS.
 - THE PROPOSED ARRAY IS COMPRISED OF APPROX. 47547 MODULES, AND IS SUBJECT TO CHANGE. FINAL NUMBER OF MODULES WILL BE SHOWN ON CONSTRUCTION DRAWINGS PRIOR TO ISSUANCE OF BUILDING AND ELECTRICAL PERMITS.
 - THE PROPOSED PROJECT LIMIT OF WORK INCLUDING IS APPROXIMATELY 66.18 ACRES.
 - LOAM AND SEED AREAS WITHIN THE LIMIT OF WORK AND OUTSIDE OF ACCESS ROADS AND EQUIPMENT PADS. SEEDED AREAS WILL BE WATERED AS NEEDED TO ACHIEVE SUBSTANTIAL VEGETATIVE GROWTH.
 - NO WORK SHALL OCCUR WITHIN THE LOCAL POTENTIAL VERNAL POOL RESOURCE AREA OR WETLAND RESOURCE AREA.

NOT FOR CONSTRUCTION

CHARLES D. SMITH
 CIVIL
 No. 95198
 PROFESSIONAL ENGINEER
Charles D. Smith
 2/19/21

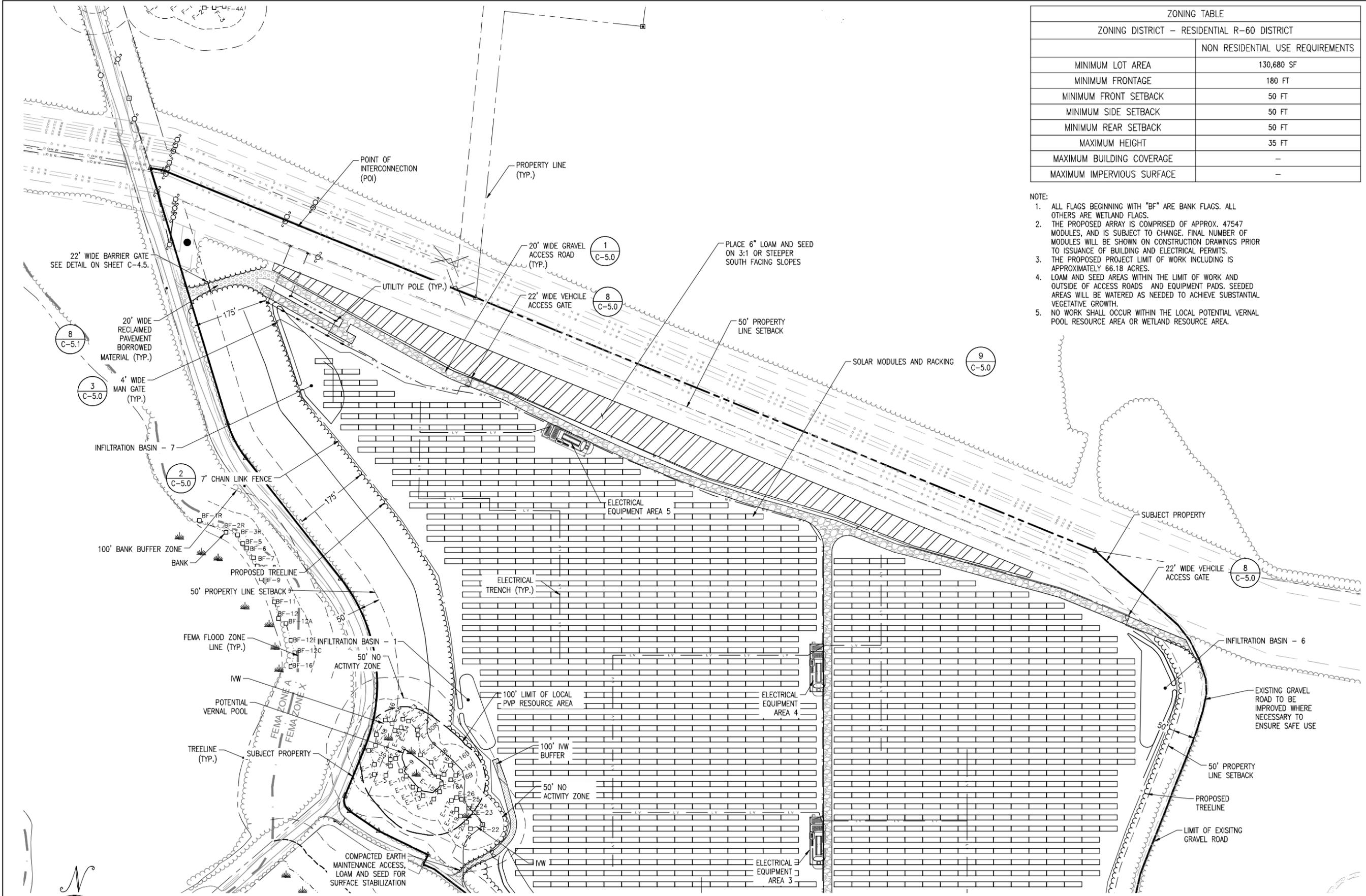
SITE USE PLAN
 140 THONET ROAD
 WAREHAM, MA 02571

PROJECT NUMBER:
 905-2708

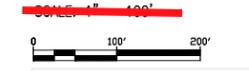
REV	DATE	DRAWN	CHECKED	RELEASE LEVEL	COMMENTS
06/02/20	WS	CDS		ISSUED FOR LOCAL PERMITTING	
08/19/20	WS	CDS		CREATE SIGHT LINE EXHIBIT	
01/19/21	WS	JM		RESUBMISSION TO LOCAL A/H	
02/02/21	WS	JM		ADDRESS PEER REVIEW COMMENTS	
02/19/21	WS	JM/DS		ADDRESS PEER REVIEW COMMENTS	

SCALES STATED ON DRAWINGS ARE VALID ONLY WHEN PLOTTED ARCH D 24" X 36"

C-3.1
 LAYOUT AND MATERIALS - NORTH



LAYOUT AND MATERIALS - NORTH



Reduced Size

Figure 6b

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 WWW.BORREGOSOLAR.COM

NOT FOR CONSTRUCTION

CHARLES D. SMITH
 CIVIL
 No. 95198
 PROFESSIONAL ENGINEER
 Commonwealth of Massachusetts
Charles D. Smith
 2/19/21

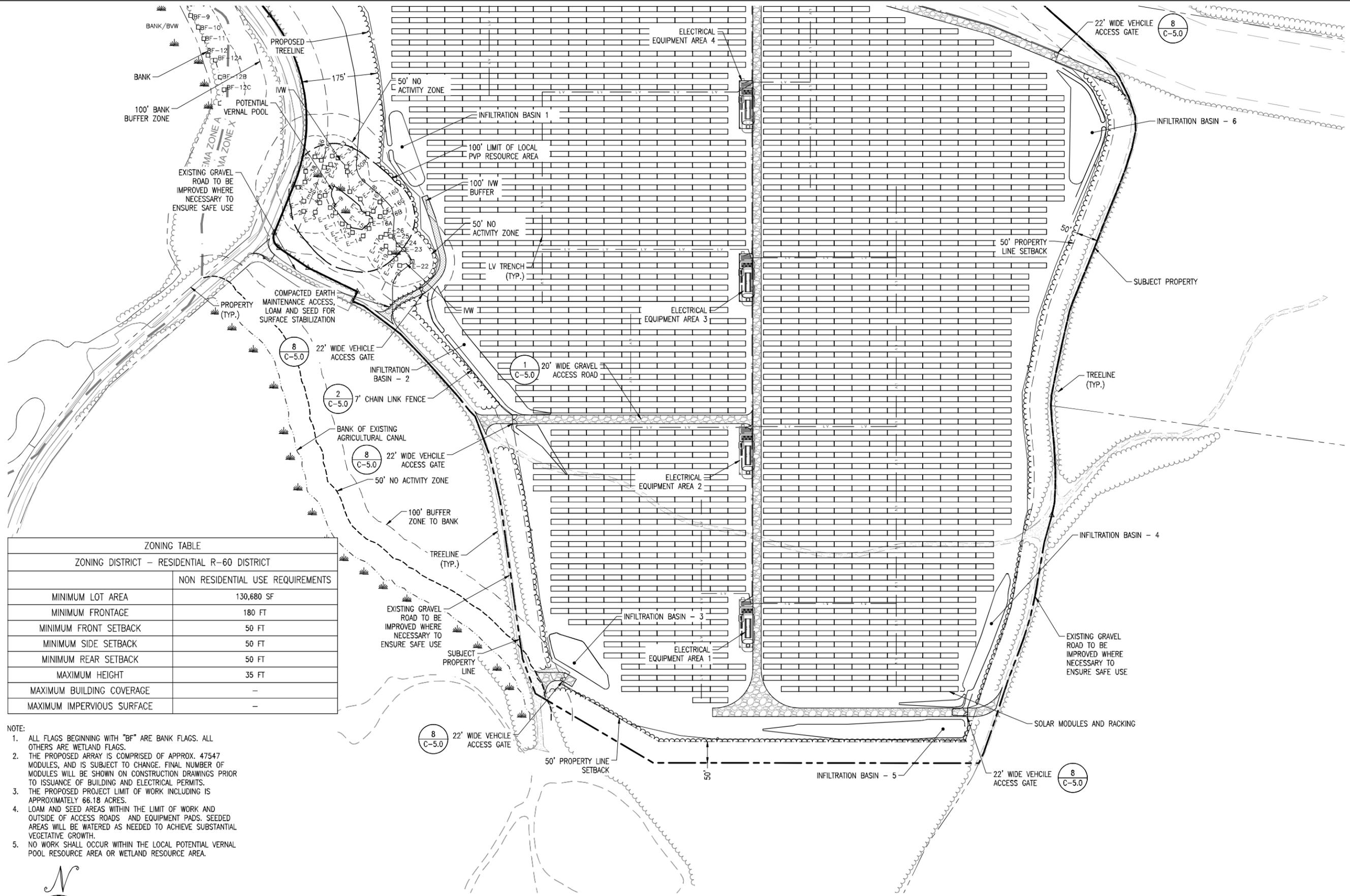
SITE USE PLAN
 140 THONET ROAD
 WAREHAM, MA 02571

PROJECT NUMBER:
 905-2708

REV	DATE	DRAWN	CHECKED	RELEASE LEVEL
	06/02/20	WS	CDS	ISSUED FOR LOCAL PERMITTING
	08/19/20	WS	CDS	CREATE SIGHT LINE EXHIBIT
	01/19/21	WS	JM	RESUBMISSION TO LOCAL A/HJ
	02/02/21	WS	JM	ADDRESS PEER REVIEW COMMENTS
	02/19/21	WS	JM/DS	ADDRESS PEER REVIEW COMMENTS

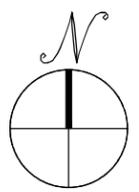
SCALES STATED ON DRAWINGS ARE VALID ONLY WHEN PLOTTED ARCH D 24" X 36"

C-3.2
 LAYOUT AND MATERIALS - SOUTH

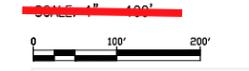


ZONING TABLE	
ZONING DISTRICT - RESIDENTIAL R-60 DISTRICT	
	NON RESIDENTIAL USE REQUIREMENTS
MINIMUM LOT AREA	130,680 SF
MINIMUM FRONTAGE	180 FT
MINIMUM FRONT SETBACK	50 FT
MINIMUM SIDE SETBACK	50 FT
MINIMUM REAR SETBACK	50 FT
MAXIMUM HEIGHT	35 FT
MAXIMUM BUILDING COVERAGE	-
MAXIMUM IMPERVIOUS SURFACE	-

- NOTE:
- ALL FLAGS BEGINNING WITH "BF" ARE BANK FLAGS. ALL OTHERS ARE WETLAND FLAGS.
 - THE PROPOSED ARRAY IS COMPRISED OF APPROX. 47547 MODULES, AND IS SUBJECT TO CHANGE. FINAL NUMBER OF MODULES WILL BE SHOWN ON CONSTRUCTION DRAWINGS PRIOR TO ISSUANCE OF BUILDING AND ELECTRICAL PERMITS.
 - THE PROPOSED PROJECT LIMIT OF WORK INCLUDING IS APPROXIMATELY 66.18 ACRES.
 - LOAM AND SEED AREAS WITHIN THE LIMIT OF WORK AND OUTSIDE OF ACCESS ROADS AND EQUIPMENT PADS. SEEDED AREAS WILL BE WATERED AS NEEDED TO ACHIEVE SUBSTANTIAL VEGETATIVE GROWTH.
 - NO WORK SHALL OCCUR WITHIN THE LOCAL POTENTIAL VERNAL POOL RESOURCE AREA OR WETLAND RESOURCE AREA.



LAYOUT AND MATERIALS - SOUTH



Reduced Size

Figure 6c

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NOT FOR CONSTRUCTION



Charles D. Smith
2/19/21

SITE USE PLAN
140 THONET ROAD
WAREHAM, MA 02571

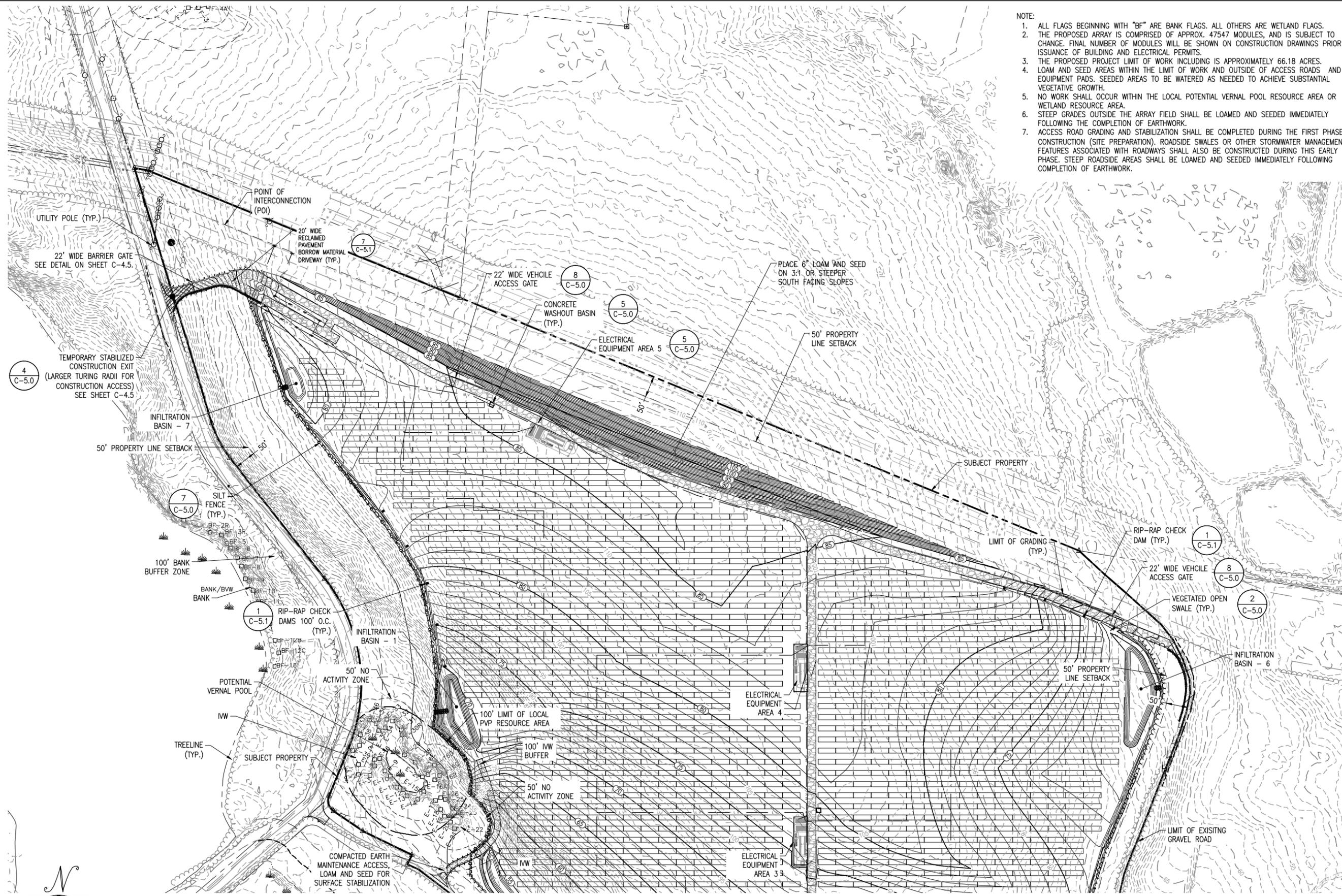
PROJECT NUMBER:
905-2708

REV	DATE	DRAWN	CHECKED	RELEASE LEVEL
06/02/20	WS	CDS	ISSUED FOR LOCAL PERMITTING	
08/19/20	WS	CDS	CREATE SIGHT LINE EXHIBIT	
01/19/21	WS	JM	RESUBMISSION TO LOCAL A/H	
02/02/21	WS	JM	ADDRESS PEER REVIEW COMMENTS	
02/19/21	WS	JM/DS	ADDRESS PEER REVIEW COMMENTS	

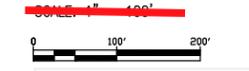
SCALES STATED ON DRAWINGS ARE VALID ONLY WHEN PLOTTED ARCH D 24" X 36"

C-4.1
GRADING AND EROSION CONTROL PLAN - NORTH

- NOTE:
- ALL FLAGS BEGINNING WITH "BF" ARE BANK FLAGS. ALL OTHERS ARE WETLAND FLAGS.
 - THE PROPOSED ARRAY IS COMPRISED OF APPROX. 47547 MODULES, AND IS SUBJECT TO CHANGE. FINAL NUMBER OF MODULES WILL BE SHOWN ON CONSTRUCTION DRAWINGS PRIOR TO ISSUANCE OF BUILDING AND ELECTRICAL PERMITS.
 - THE PROPOSED PROJECT LIMIT OF WORK INCLUDING IS APPROXIMATELY 66.18 ACRES.
 - LOAM AND SEED AREAS WITHIN THE LIMIT OF WORK AND OUTSIDE OF ACCESS ROADS AND EQUIPMENT PADS. SEEDED AREAS TO BE WATERED AS NEEDED TO ACHIEVE SUBSTANTIAL VEGETATIVE GROWTH.
 - NO WORK SHALL OCCUR WITHIN THE LOCAL POTENTIAL VERNAL POOL RESOURCE AREA OR WETLAND RESOURCE AREA.
 - STEEP GRADES OUTSIDE THE ARRAY FIELD SHALL BE LOAMED AND SEEDED IMMEDIATELY FOLLOWING THE COMPLETION OF EARTHWORK.
 - ACCESS ROAD GRADING AND STABILIZATION SHALL BE COMPLETED DURING THE FIRST PHASE OF CONSTRUCTION (SITE PREPARATION). ROADSIDE SWALES OR OTHER STORMWATER MANAGEMENT FEATURES ASSOCIATED WITH ROADWAYS SHALL ALSO BE CONSTRUCTED DURING THIS EARLY PHASE. STEEP ROADSIDE AREAS SHALL BE LOAMED AND SEEDED IMMEDIATELY FOLLOWING COMPLETION OF EARTHWORK.



GRADING AND EROSION CONTROL PLAN - NORTH



Reduced Size

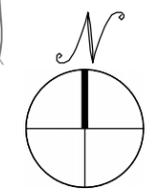


Figure 6d

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 PHONE: (980) 898-6273
 FAX: (980) 843-6778
 WWW.BORREGOSOLAR.COM

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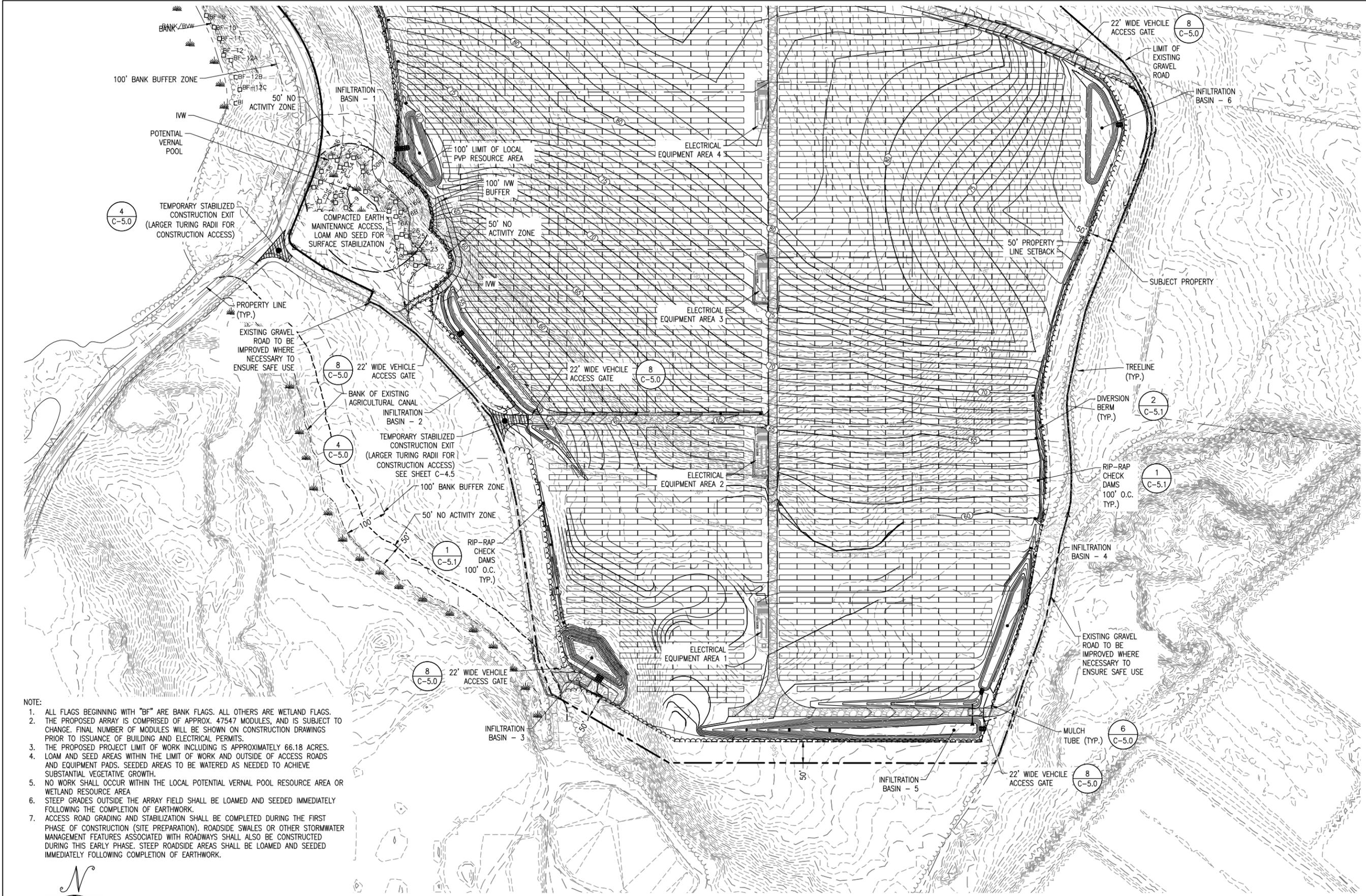
CHARLES D. SMITH
 CIVIL
 No. 25136
 REGISTERED PROFESSIONAL ENGINEER
 STATE OF MASSACHUSETTS

SITE USE PLAN
 140 THONET ROAD
 WAREHAM, MA 02571

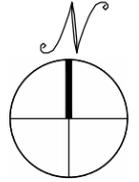
PROJECT NUMBER:
 905-2708

REV	DATE	DRAWN	CHECKED	RELEASE LEVEL
06/02/20	WS	CDS	ISSUED FOR LOCAL PERMITTING	
08/19/20	WS	CDS	CREATE SIGHT LINE EXHIBIT	
01/19/21	WS	JM	RESUBMISSION TO LOCAL A/HJ	
02/02/21	WS	JM	ADDRESS PEER REVIEW COMMENTS	
02/19/21	WS	JM/DS	ADDRESS PEER REVIEW COMMENTS	

SCALES STATED ON DRAWINGS ARE VALID ONLY WHEN PLOTTED ARCH D 24" x 36"
C-4.2
 GRADING AND EROSION CONTROL PLAN - SOUTH



- NOTE:
1. ALL FLAGS BEGINNING WITH "BF" ARE BANK FLAGS. ALL OTHERS ARE WETLAND FLAGS.
 2. THE PROPOSED ARRAY IS COMPRISED OF APPROX. 47547 MODULES, AND IS SUBJECT TO CHANGE. FINAL NUMBER OF MODULES WILL BE SHOWN ON CONSTRUCTION DRAWINGS PRIOR TO ISSUANCE OF BUILDING AND ELECTRICAL PERMITS.
 3. THE PROPOSED PROJECT LIMIT OF WORK INCLUDING IS APPROXIMATELY 66.18 ACRES.
 4. LOAM AND SEED AREAS WITHIN THE LIMIT OF WORK AND OUTSIDE OF ACCESS ROADS AND EQUIPMENT PADS. SEEDED AREAS TO BE WATERED AS NEEDED TO ACHIEVE SUBSTANTIAL VEGETATIVE GROWTH.
 5. NO WORK SHALL OCCUR WITHIN THE LOCAL POTENTIAL VERNAL POOL RESOURCE AREA OR WETLAND RESOURCE AREA
 6. STEEP GRADES OUTSIDE THE ARRAY FIELD SHALL BE LOAMED AND SEEDED IMMEDIATELY FOLLOWING THE COMPLETION OF EARTHWORK.
 7. ACCESS ROAD GRADING AND STABILIZATION SHALL BE COMPLETED DURING THE FIRST PHASE OF CONSTRUCTION (SITE PREPARATION). ROADSIDE SWALES OR OTHER STORMWATER MANAGEMENT FEATURES ASSOCIATED WITH ROADWAYS SHALL ALSO BE CONSTRUCTED DURING THIS EARLY PHASE. STEEP ROADSIDE AREAS SHALL BE LOAMED AND SEEDED IMMEDIATELY FOLLOWING COMPLETION OF EARTHWORK.

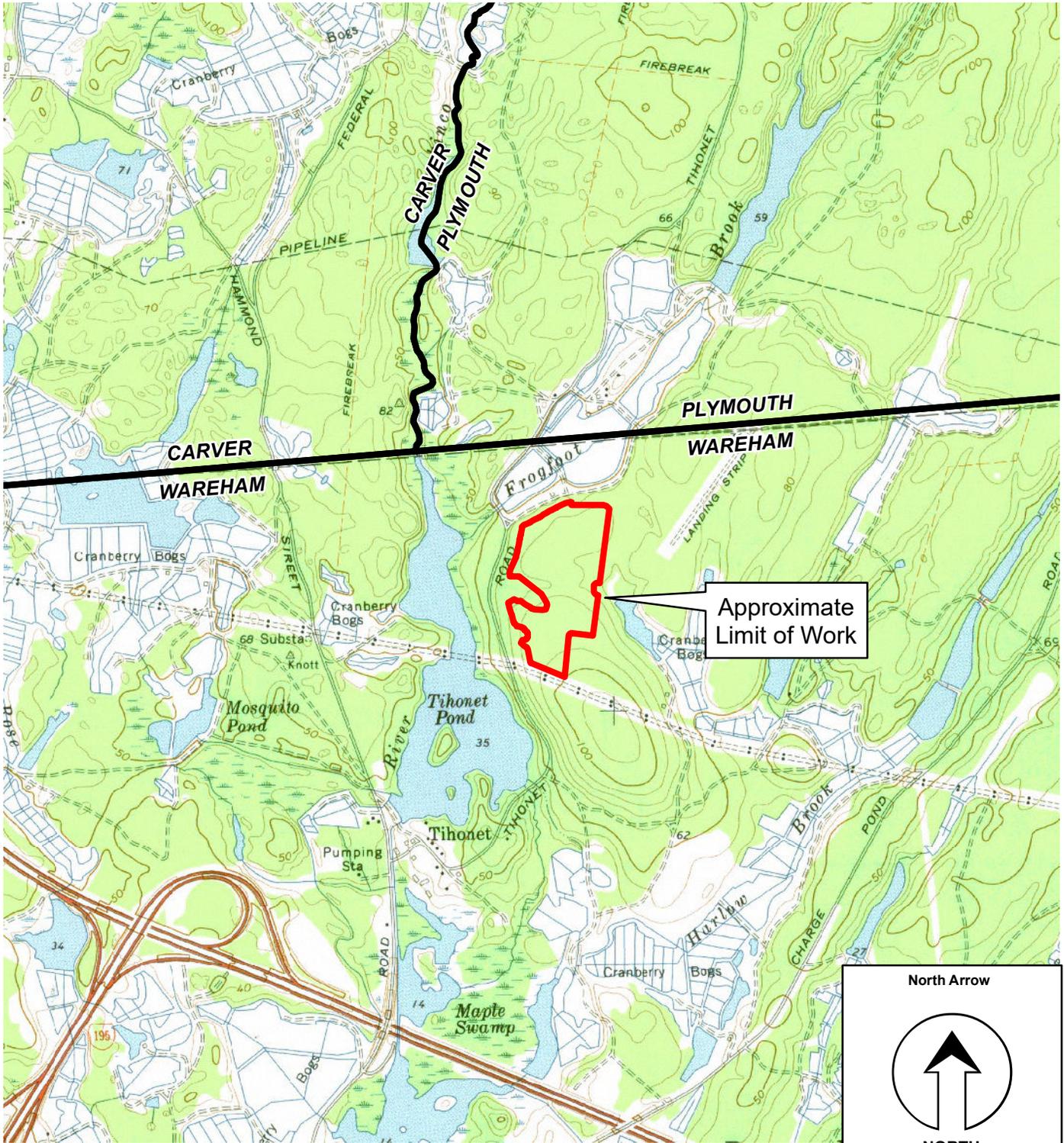


GRADING AND EROSION CONTROL PLAN - SOUTH

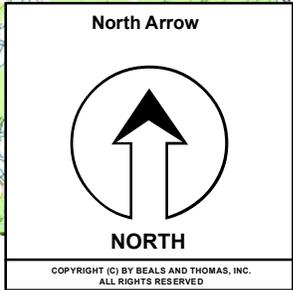
SCALE: 1" = 100'
 0 100' 200'

Reduced Size

Figure 6e



Approximate
Limit of Work



Digital USGS Map of Wareham, MA, dated 1972, provided by the Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services.



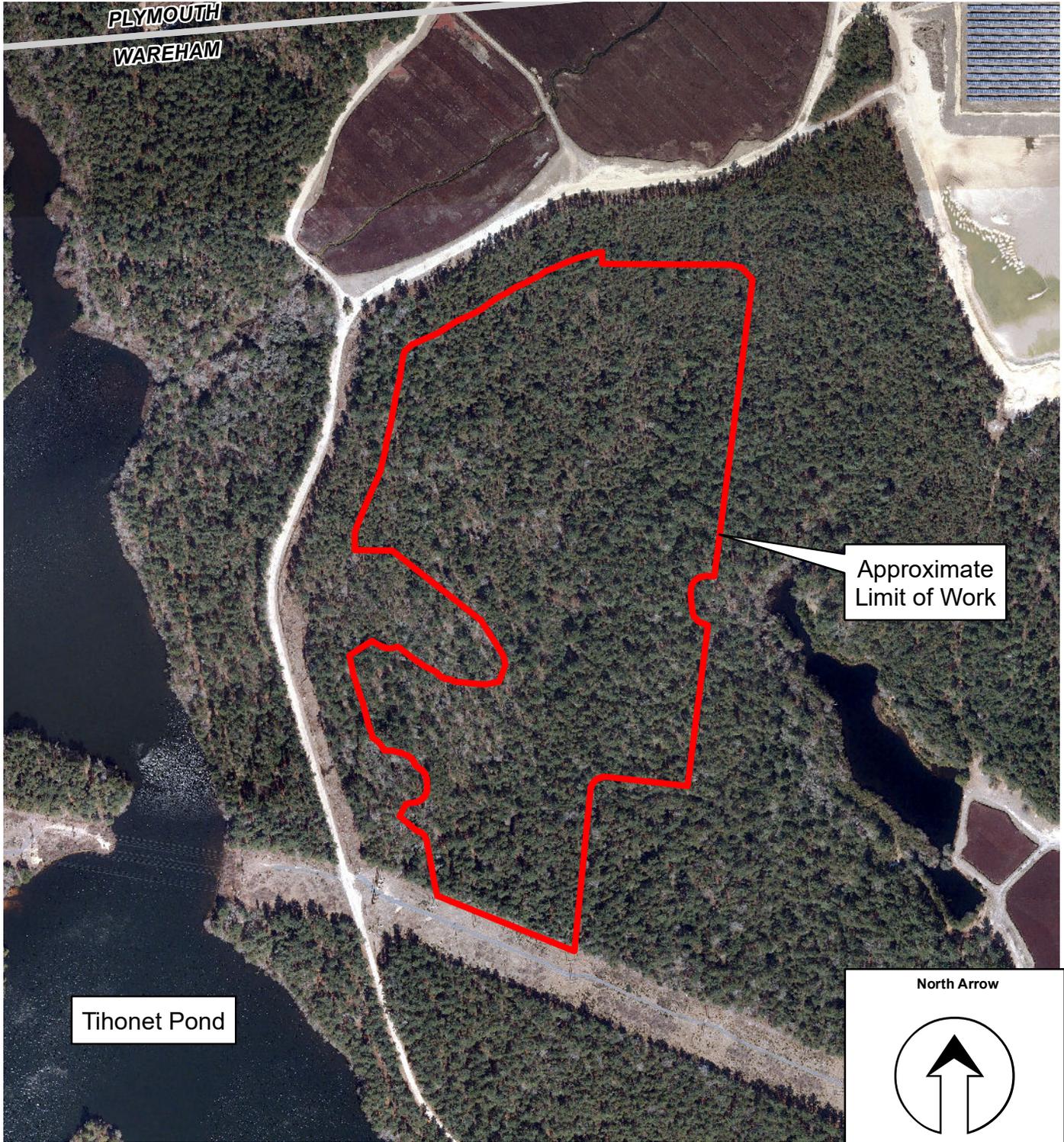
PROJECT: **150 Tihonet Road
PV+ES Project**
Wareham, Massachusetts

PREPARED FOR:
Borrego Solar Systems, Inc.
55 Technology Dr. #102
Lowell, MA 01851

Locus Map
Figure 7

Scale: 1" = 2,000' Date: 02/02/2021

Source File 1833112P597B.mxd
B+T Project No. 1833.112



Tihonet Pond

Approximate
Limit of Work

North Arrow

NORTH

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Digital orthophotograph, dated 2019, provided by the Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services.



PROJECT:	150 Tihonet Road PV+ES Project Wareham, Massachusetts
PREPARED FOR:	Borrego Solar Systems, Inc. 55 Technology Dr. #102 Lowell, MA 01851

Aerial Map Figure 8	
Scale: 1" = 500'	Date: 02/02/2021
Source File 1833112P598B.mxd B+T Project No. 1833.112	

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 LOWELL, MA 01851
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 FAX: (978) 843-4778
 WWW.BORREGOSOLAR.COM

NOT FOR CONSTRUCTION

JEFFREY R. MURPHY
 CIVIL
 No. 51900
 PROFESSIONAL ENGINEER
 12/15/2020

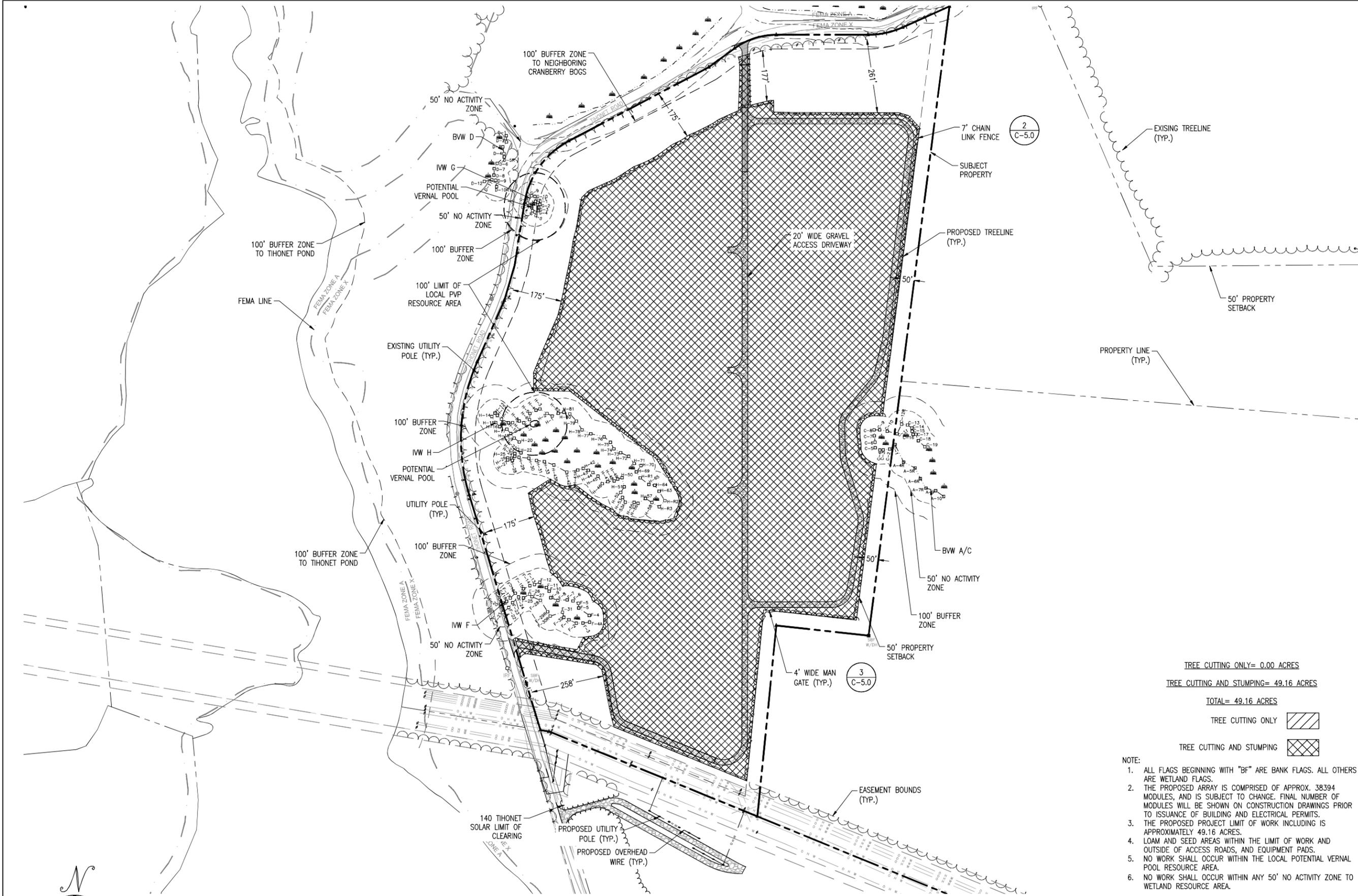
SITE USE PLANS
 150 THONET ROAD
 WAREHAM, MA 02571

PROJECT NUMBER:
 905-2710

REV	DATE	DRAWN	CHECKED	RELEASE LEVEL
06/09/20	WS	DTL	AW	ISSUED FOR LOCAL PERMITTING
08/14/20	WS	DTL	AW	UTILITY SUBMISSION
08/19/20	WS	DTL	AW	CREATE SIGHT LINE EXHIBIT
11/02/20	WS	DTL	AW	RESUBMISSION TO LOCAL AHJ
11/23/20	WS	DTL	AW	RESUBMISSION TO LOCAL AHJ
12/15/20	WS	DTL	AW	RESUBMISSION TO LOCAL AHJ

SCALES STATED ON DRAWINGS ARE VALID ONLY WHEN PLOTTED ARCH D 24" X 36"

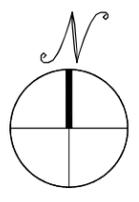
C-2.0
 TREE CLEARING PLAN



TREE CUTTING ONLY= 0.00 ACRES
 TREE CUTTING AND STUMPING= 49.16 ACRES
 TOTAL= 49.16 ACRES

TREE CUTTING ONLY [diagonal hatching symbol]
 TREE CUTTING AND STUMPING [cross-hatching symbol]

- NOTE:
- ALL FLAGS BEGINNING WITH "BF" ARE BANK FLAGS. ALL OTHERS ARE WETLAND FLAGS.
 - THE PROPOSED ARRAY IS COMPRISED OF APPROX. 38394 MODULES, AND IS SUBJECT TO CHANGE. FINAL NUMBER OF MODULES WILL BE SHOWN ON CONSTRUCTION DRAWINGS PRIOR TO ISSUANCE OF BUILDING AND ELECTRICAL PERMITS.
 - THE PROPOSED PROJECT LIMIT OF WORK INCLUDING IS APPROXIMATELY 49.16 ACRES.
 - LOAM AND SEED AREAS WITHIN THE LIMIT OF WORK AND OUTSIDE OF ACCESS ROADS, AND EQUIPMENT PADS.
 - NO WORK SHALL OCCUR WITHIN THE LOCAL POTENTIAL VERNAL POOL RESOURCE AREA.
 - NO WORK SHALL OCCUR WITHIN ANY 50' NO ACTIVITY ZONE TO WETLAND RESOURCE AREA.



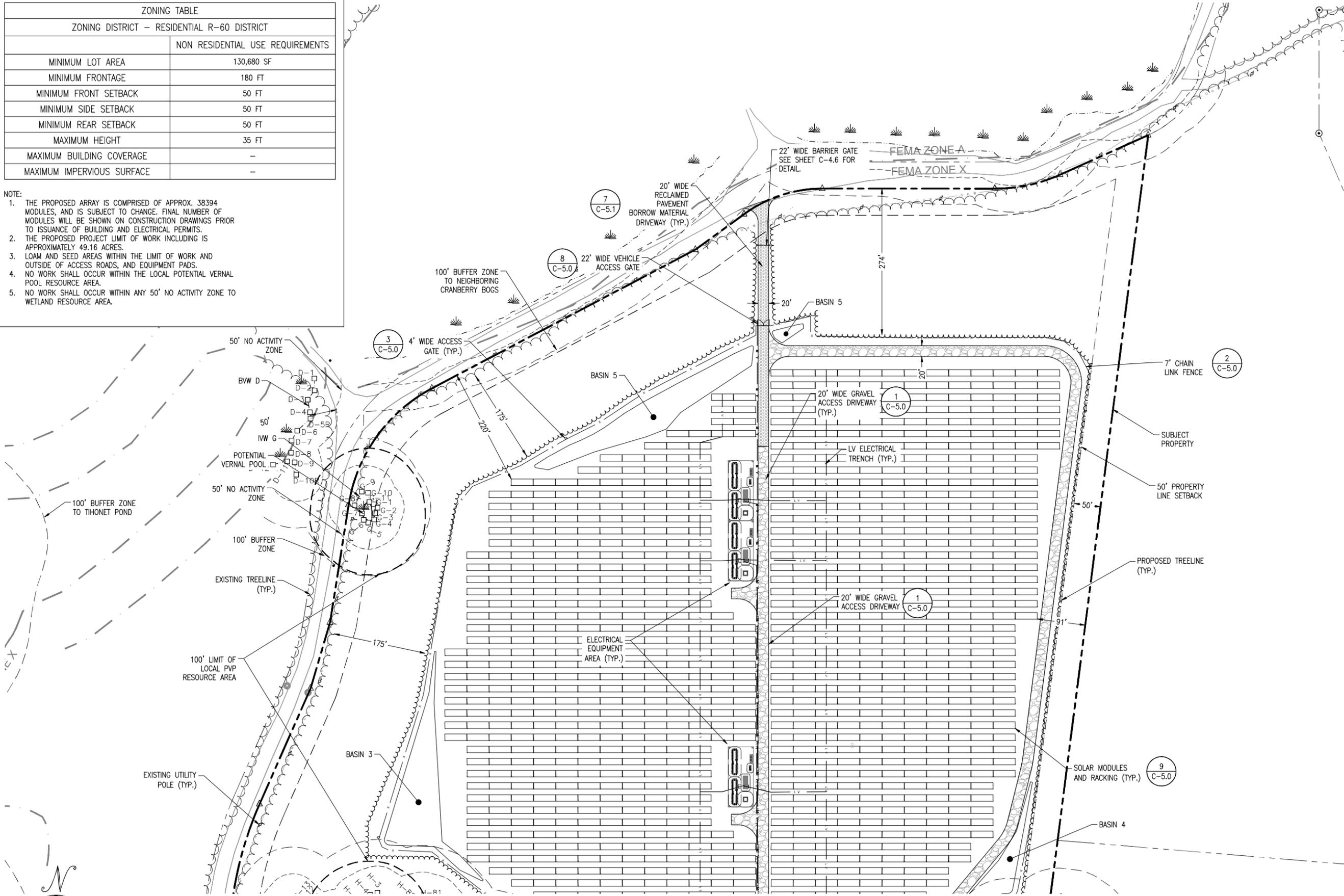
TREE CLEARING PLAN



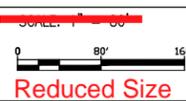
Figure 9a

ZONING TABLE	
ZONING DISTRICT – RESIDENTIAL R-60 DISTRICT	
	NON RESIDENTIAL USE REQUIREMENTS
MINIMUM LOT AREA	130,680 SF
MINIMUM FRONTAGE	180 FT
MINIMUM FRONT SETBACK	50 FT
MINIMUM SIDE SETBACK	50 FT
MINIMUM REAR SETBACK	50 FT
MAXIMUM HEIGHT	35 FT
MAXIMUM BUILDING COVERAGE	-
MAXIMUM IMPERVIOUS SURFACE	-

- NOTE:
1. THE PROPOSED ARRAY IS COMPRISED OF APPROX. 38394 MODULES, AND IS SUBJECT TO CHANGE. FINAL NUMBER OF MODULES WILL BE SHOWN ON CONSTRUCTION DRAWINGS PRIOR TO ISSUANCE OF BUILDING AND ELECTRICAL PERMITS.
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LAYOUT AND MATERIALS PLAN - NORTH



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PHONE: (800) 898-8273
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WWW.BORREGOSOLAR.COM

NOT FOR CONSTRUCTION

COMMONWEALTH OF MASSACHUSETTS
JEFFREY R. MURPHY
CIVIL
No. 51800
REGISTERED PROFESSIONAL ENGINEER
12/15/2020

SITE USE PLANS
150 THONET ROAD
WAREHAM, MA 02571

PROJECT NUMBER:
905-2710

REV	DATE	DRAWN	CHECKED	RELEASE LEVEL
06/08/20	WS	DS	DS	ISSUED FOR LOCAL PERMITTING
08/14/20	DTL	AW	AW	UTILITY SUBMISSION
08/19/20	WS	DS	DS	CREATE SIGHT LINE EXHIBIT
11/02/20	WS	JM	JM	RESUBMISSION TO LOCAL AHJ
11/23/20	WS	JM	JM	RESUBMISSION TO LOCAL AHJ
12/15/20	WS	JM	JM	RESUBMISSION TO LOCAL AHJ

SCALES STATED ON DRAWINGS ARE VALID ONLY WHEN PLOTTED ARCH D 24" X 36"

C-3.1
LAYOUT AND MATERIALS PLAN - NORTH

Figure 9b

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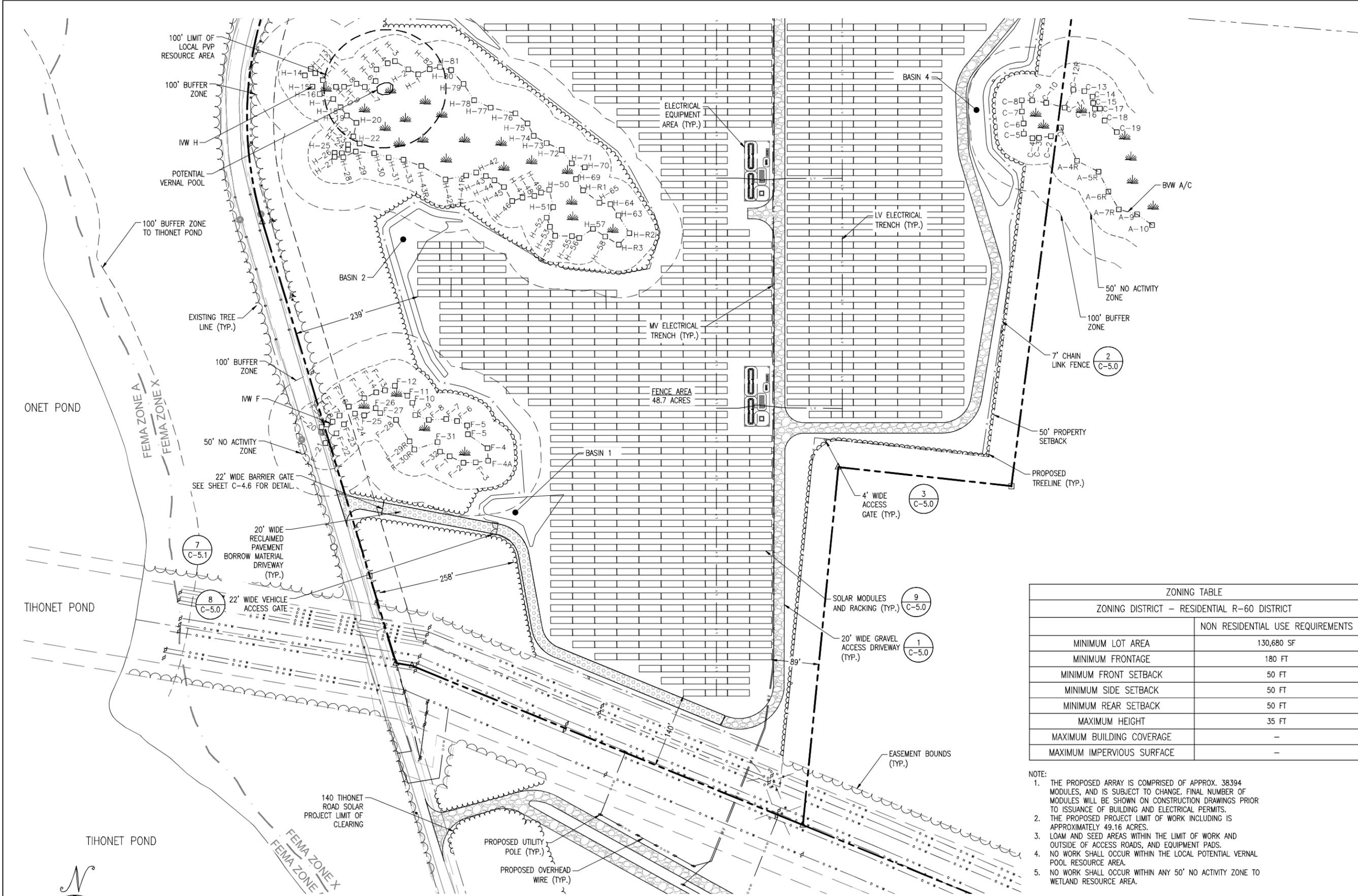
COMMONWEALTH OF MASSACHUSETTS
 REGISTERED PROFESSIONAL ENGINEER
 JEFFREY R. MURPHY
 No. 51900
 12/15/2020

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	12/15/20	WS	JM	RESUBMISSION TO LOCAL AHJ

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C-3.2
 LAYOUT AND MATERIALS PLAN - SOUTH



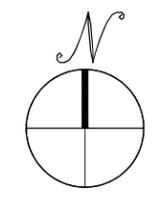
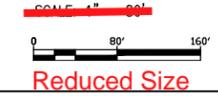
ZONING TABLE

ZONING DISTRICT - RESIDENTIAL R-60 DISTRICT

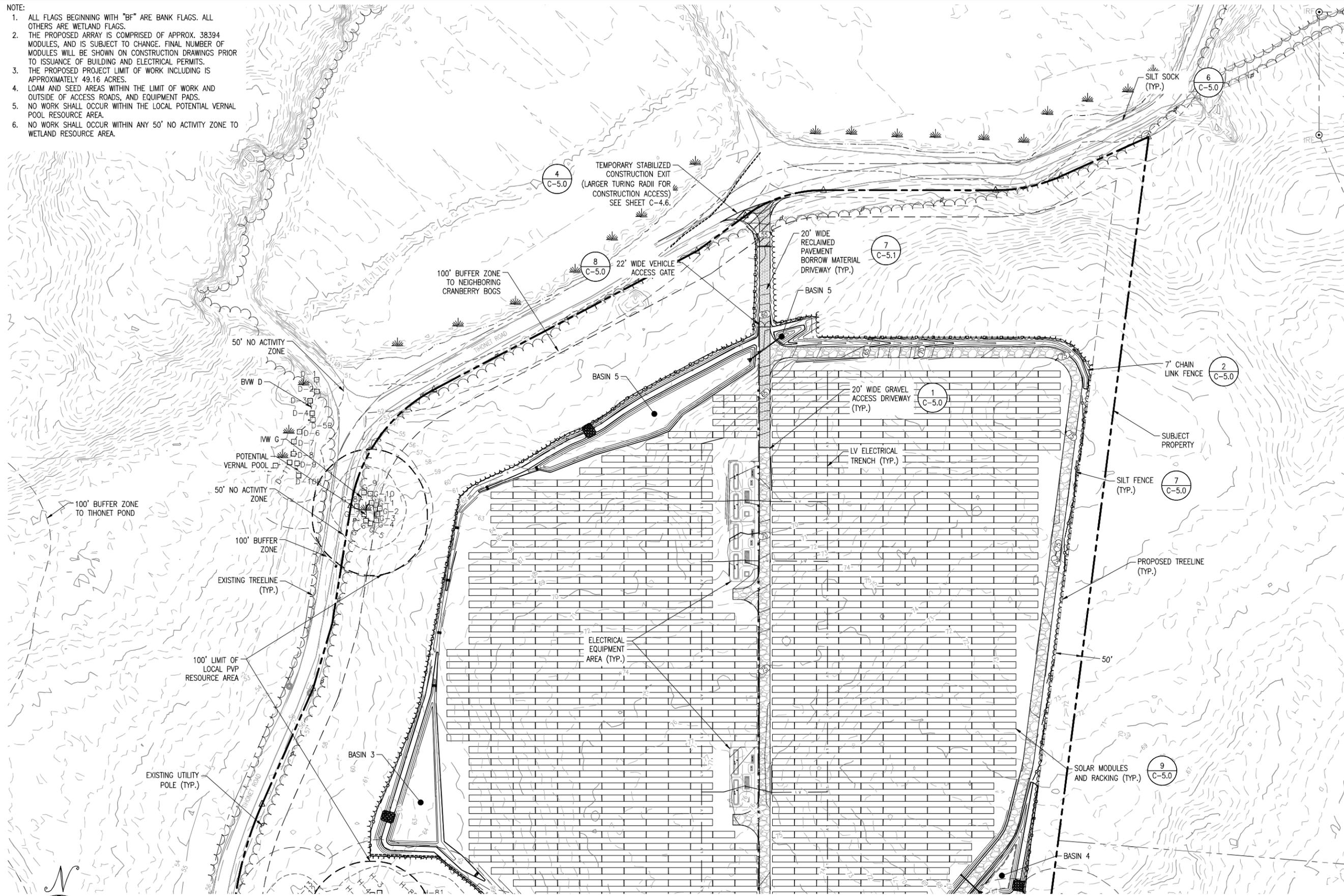
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MAXIMUM BUILDING COVERAGE	-
MAXIMUM IMPERVIOUS SURFACE	-

- NOTE:
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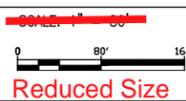
LAYOUT AND MATERIALS PLAN - SOUTH



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GRADING AND EROSION CONTROL PLAN - NORTH



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 CIVIL
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SITE USE PLANS
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 WAREHAM, MA 02571

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C-4.1
 GRADING AND EROSION CONTROL PLAN - NORTH

Figure 9d

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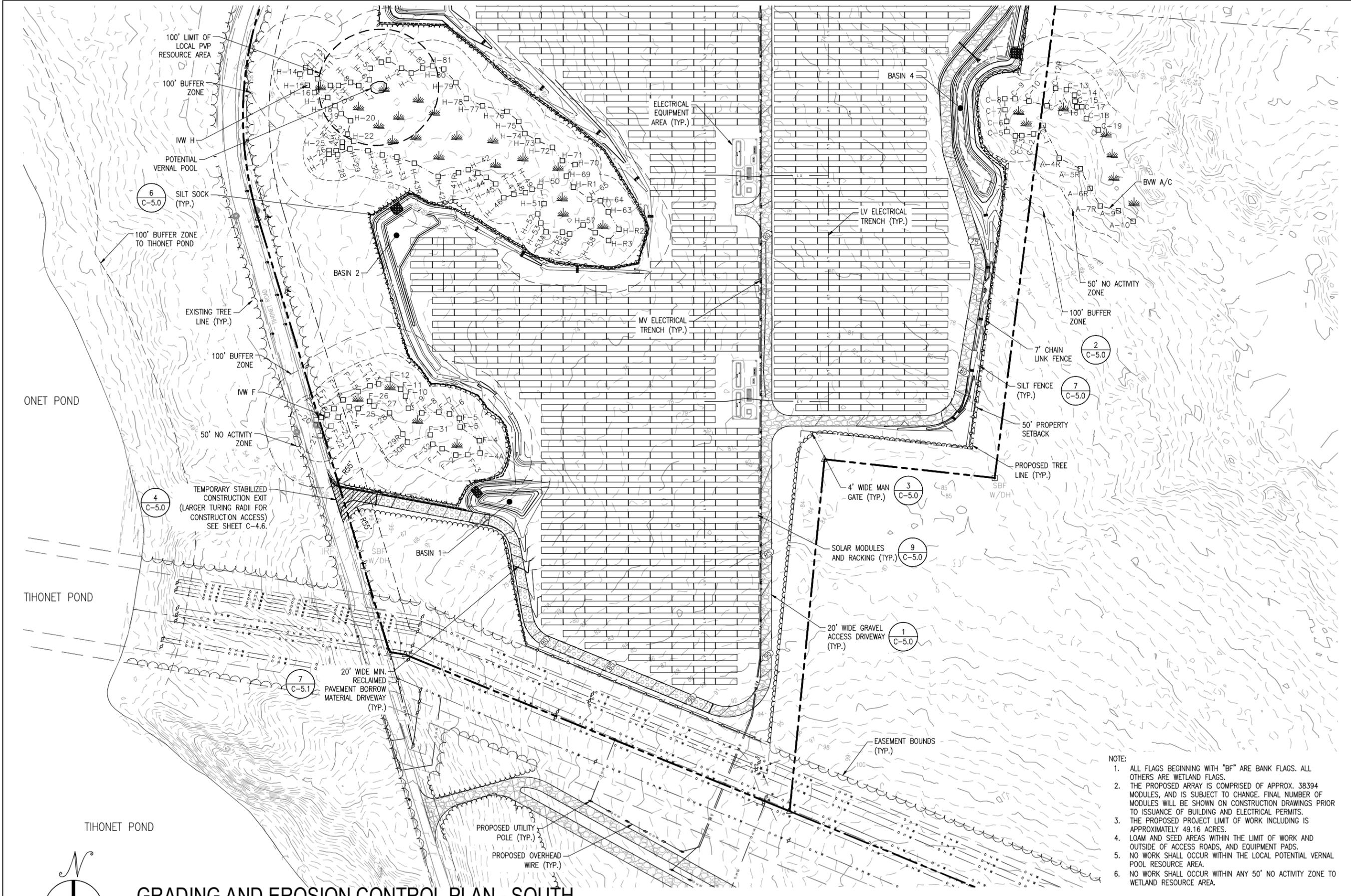
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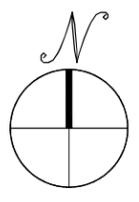
SCALES STATED ON DRAWINGS ARE VALID ONLY WHEN PLOTTED ARCH D 24" x 36"

C-4.2
 GRADING AND EROSION CONTROL PLAN - SOUTH



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GRADING AND EROSION CONTROL PLAN - SOUTH



ONET POND

THONET POND

THONET POND

100' LIMIT OF LOCAL PVP RESOURCE AREA

100' BUFFER ZONE

NW H

POTENTIAL VERNAL POOL

6
C-5.0

100' BUFFER ZONE TO THONET POND

EXISTING TREE LINE (TYP.)

100' BUFFER ZONE

NW F

50' NO ACTIVITY ZONE

4
C-5.0

TEMPORARY STABILIZED CONSTRUCTION EXIT (LARGER TURNING RADI FOR CONSTRUCTION ACCESS) SEE SHEET C-4.6.

7
C-5.1

20' WIDE MIN. RECLAIMED PAVEMENT BORROW MATERIAL DRIVEWAY (TYP.)

ELECTRICAL EQUIPMENT AREA (TYP.)

MV ELECTRICAL TRENCH (TYP.)

BASIN 4

LV ELECTRICAL TRENCH (TYP.)

BWV A/C

50' NO ACTIVITY ZONE

100' BUFFER ZONE

2
C-5.0

7' CHAIN LINK FENCE

7
C-5.0

SILT FENCE (TYP.)

50' PROPERTY SETBACK

PROPOSED TREE LINE (TYP.)

3
C-5.0

4' WIDE MAN GATE (TYP.)

9
C-5.0

SOLAR MODULES AND RACKING (TYP.)

1
C-5.0

20' WIDE GRAVEL ACCESS DRIVEWAY (TYP.)

EASEMENT BOUNDS (TYP.)

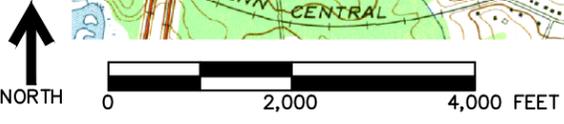
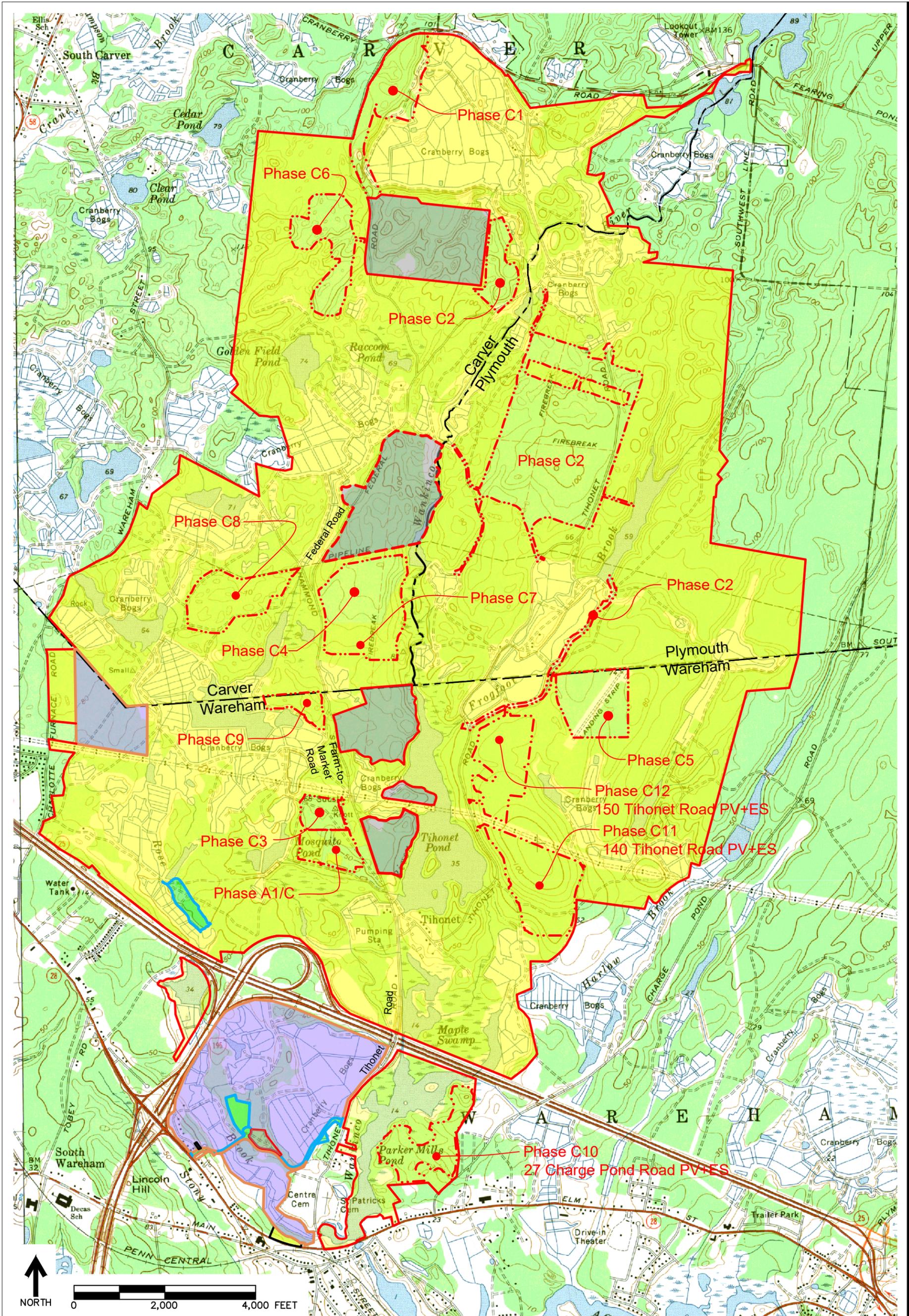
PROPOSED UTILITY POLE (TYP.)

PROPOSED OVERHEAD WIRE (TYP.)

BASIN 2

BASIN 1

20' WIDE MIN. RECLAIMED PAVEMENT BORROW MATERIAL DRIVEWAY (TYP.)



Legend

- Phase A Area
- Phase B Area
- Phase C Area
- - - Outparcel owned by A.D. Makepeace Company
- - - Individual Phase C Development Area
- Outparcel
- - - Town Line

- Phase A Area
- Phase B Area
- Phase C Area

Figure 10
 USGS
 Revised Phase Location Index
 ADM Tihonet
 Mixed Use Development
 Wareham, Carver and
 Plymouth, Massachusetts

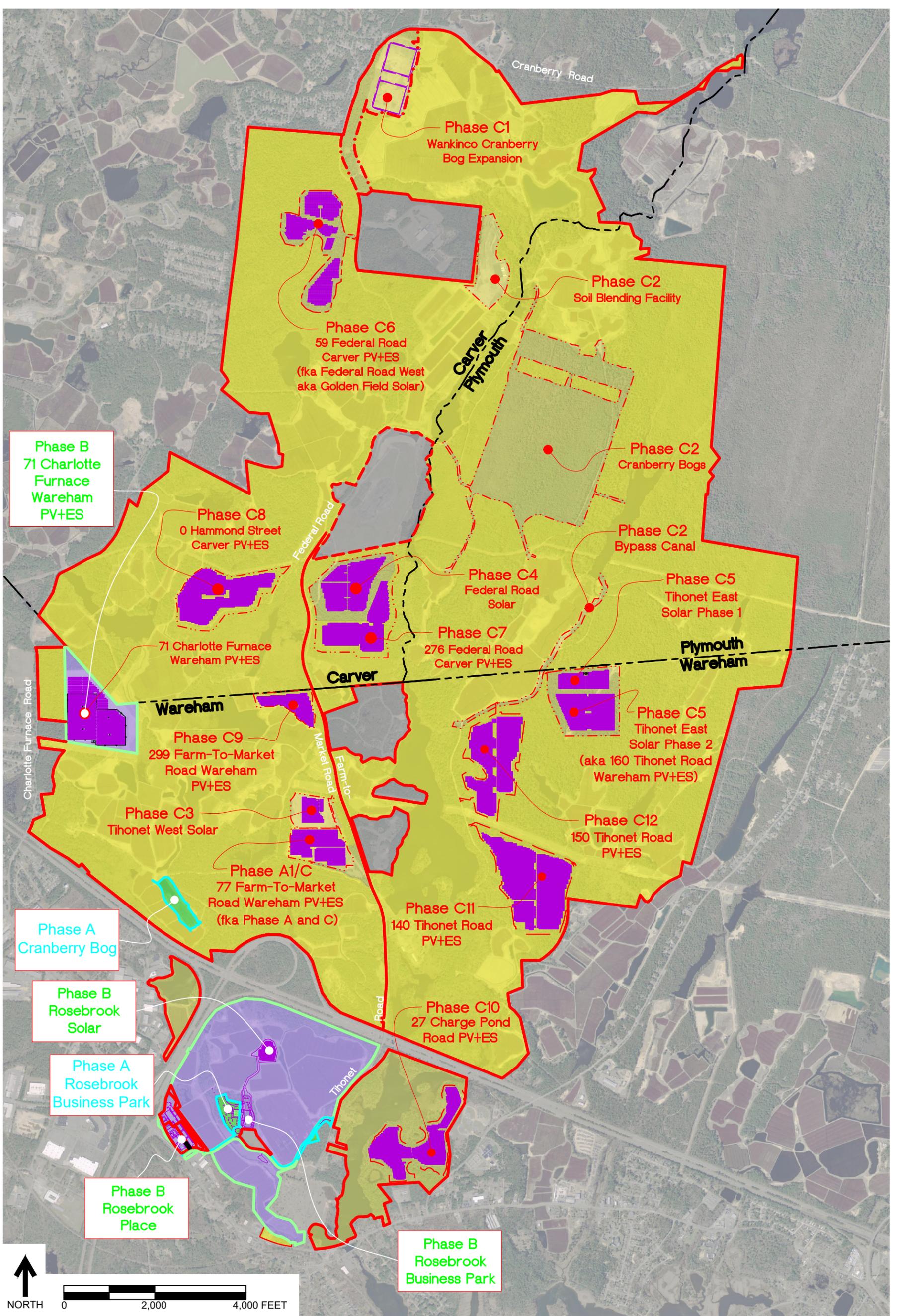


Figure 11
 Updated Context Map
 ADM Tihonet
 Mixed Use Development
 Wareham, Carver and
 Plymouth, Massachusetts

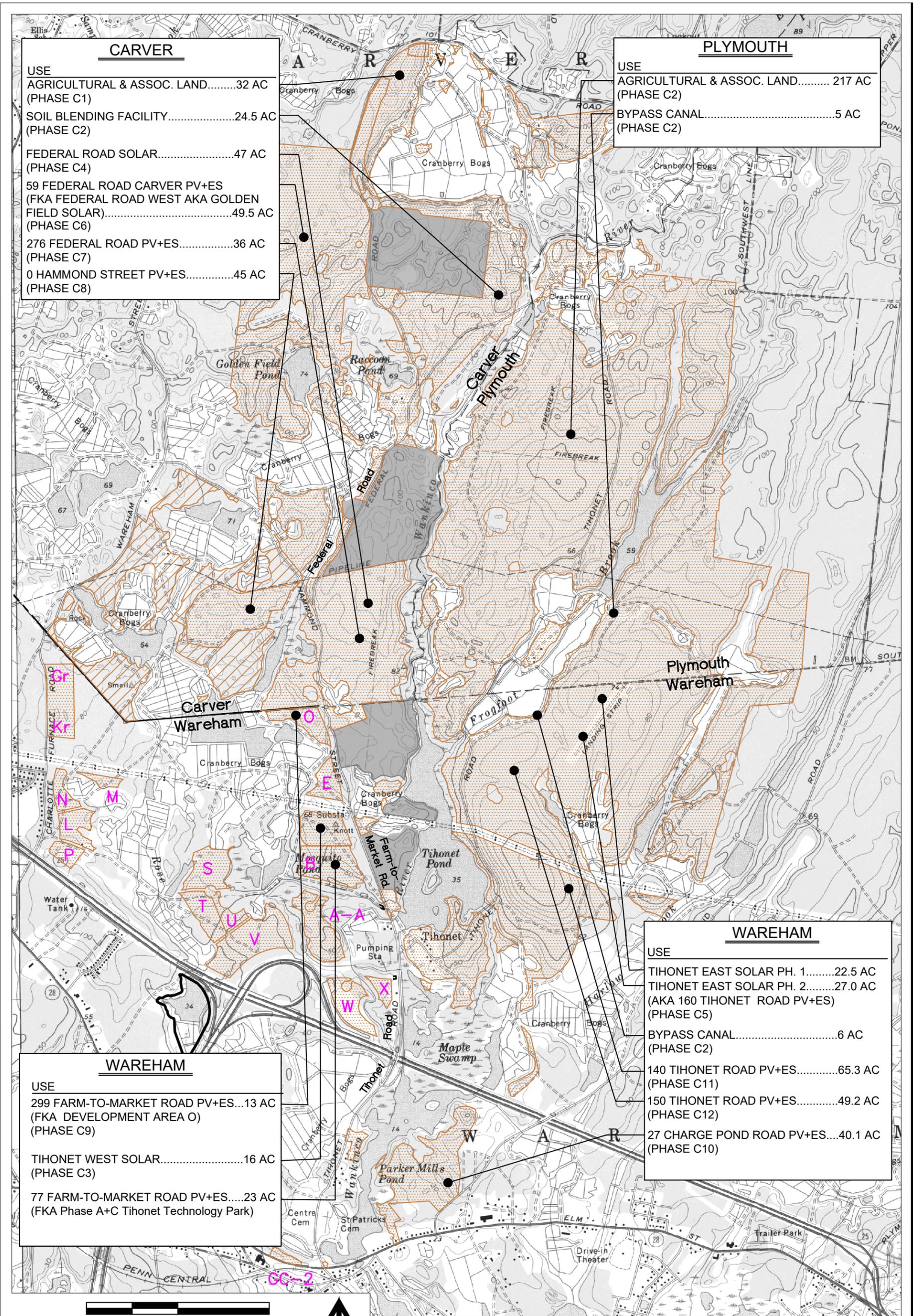
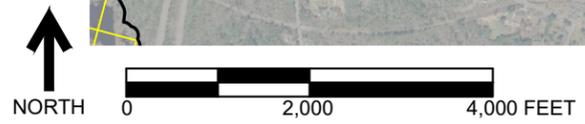
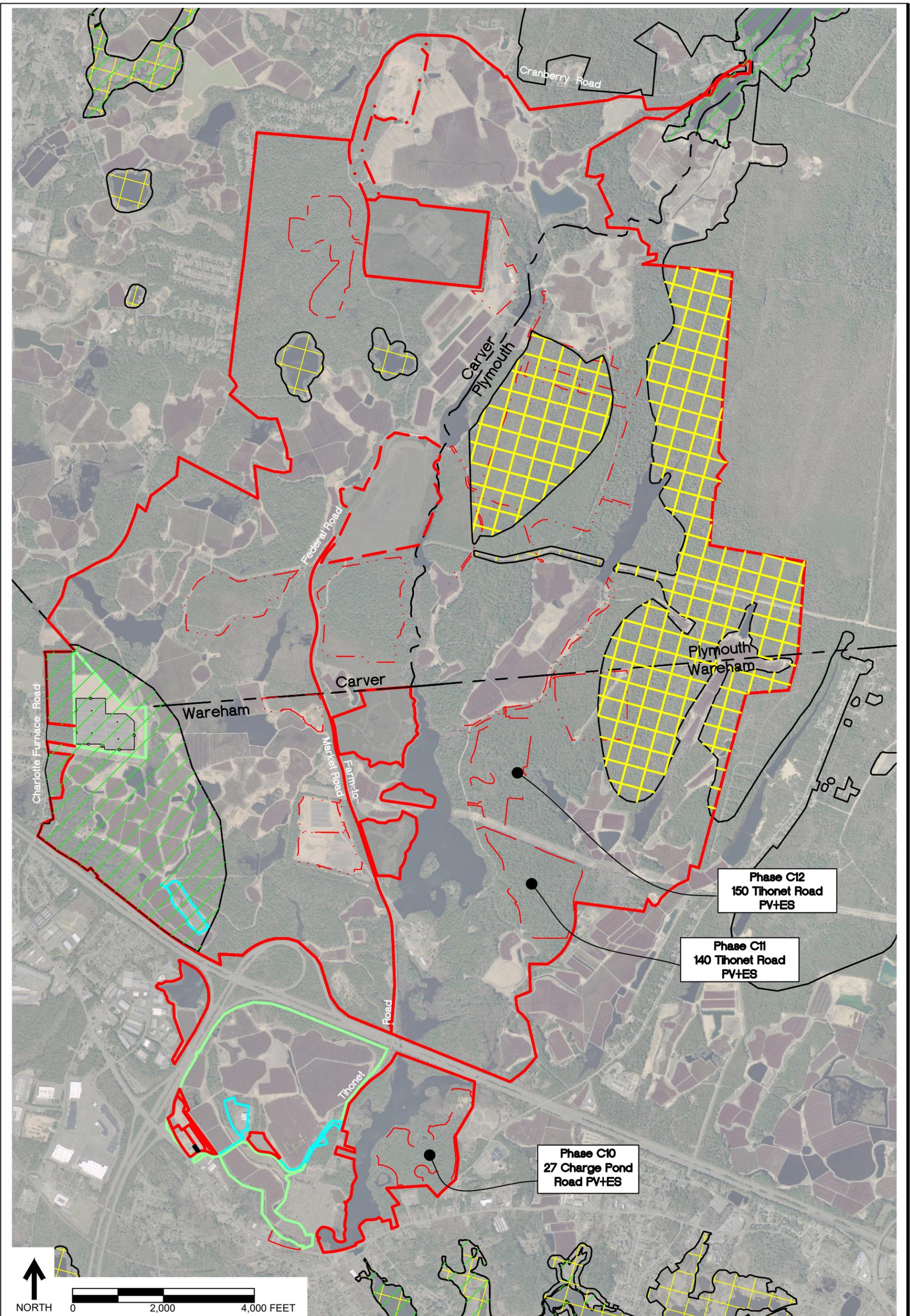


Figure 12
Phase C Conceptual Plan
(Potential Uses)
ADM Tihonet
Mixed Use Development
Wareham, Carver and
Plymouth, Massachusetts



Legend			
	Phase A Area		NHESP Estimated Habitats of Rare Wildlife
	Phase B Area		NHESP Priority Habitats of Rare Species
	Phase C Area		
	Individual Phase C Development Area		
	Town Line		

Figure 13
 NHESP Map
 ADM Tihonet
 Mixed Use Development
 Wareham, Carver and
 Plymouth, Massachusetts