



Mabbett & Associates, Inc.
5 Alfred Circle
Bedford, MA 01730-2318
Tel. 781-275-6050
info@mabbett.com
www.mabbett.com

PROJECT MEMORANDUM

To: William Junda, Chief Operating Officer, Gordon
From: Andrew Glucksman, Project Manager, Mabbett & Associates, Inc.
Date: September 21, 2018
Re: Massachusetts National Cemetery: Broad Brush Environmental Field Survey Reports
Contract: VA 101F-17-D-2828
Task Order: 36C10F18N3335
Gordon Project No: 3265-0701
Mabbett Project No: R20201831.003

As requested by Gordon, Mabbett & Associates, Inc. (Mabbett®) Team has completed the broad brush environmental field surveys specified under Phase 003A in the task order dated August 27, 2018, at the Massachusetts National Cemetery (MNC) in Bourne, Massachusetts. The field surveys included a Northern Long-eared Bat Habitat Assessment, an Eastern Box Turtle Habitat Assessment, and a Wetland Resource Area Assessment. These field surveys were completed within the approximately 500-acre undeveloped portion within the MNC property. The field surveys were completed from September 10 through 14, 2018. The methods and findings of each survey are provided in separate attachments to this memo. These attachments include: Attachment 1: Northern Long-eared Bat Habitat Assessment; Attachment 2: Eastern Box Turtle Habitat Assessment; and Attachment 3: Wetland Resource Area Assessment.

In addition to the attached broad brush field survey reports, this deliverable includes electronic GIS shapefiles of the general location of wetlands encountered within the undeveloped portion of the MNC property, as well as a detailed boundary file for the wetland that is adjacent to the MNC Maintenance Area.

The broad brush field surveys will complement focused environmental field surveys planned within the approximately 50-acre Phase 4 expansion area. These focused surveys would be completed once the Phase 4 expansion area boundary is confirmed by the VA and Gordon. Mabbett will issue a separate summary of findings once those focused surveys are completed.

We look forward to your review of the enclosed survey reports.

**Massachusetts National Cemetery
Broad Brush Environmental Field Survey Reports**

Attachment 1

Northern Long-eared Bat Habitat Assessment

Northern Long-eared Bat Habitat Assessment

Introduction

From September 10 through 14, 2018, a preliminary field reconnaissance and Northern long-eared bat (*Myotis septentrionalis*) (NLEB) habitat assessment was conducted by the Mabbett Team at the Veterans Affairs (VA) Massachusetts National Cemetery (MNC) property located in Bourne, Massachusetts. The NLEB is listed as a threatened species under the federal Endangered Species Act (ESA; 16 U.S.C. 1531 et seq.), which is managed in Massachusetts by the United States Fish and Wildlife Service (USFWS) New England Field Office (NEFO). Additionally, NLEB is listed as endangered under the Massachusetts Endangered Species Act (MESA; M.G.L. c. 131 A), which is managed by the Massachusetts Department of Environmental Protection (MA DEP) Natural Heritage and Endangered Species Program (NHESP).

The entire MNC property is approximately 750 acres in size, with approximately 250 acres currently developed and utilized as a cemetery facility. The habitat assessment was performed over the approximately 500 acres of remaining undeveloped land on the MNC property (Site). The Site is within the known range of the NLEB and the white nose syndrome zone for the species as identified within the USFWS final 4(d) rule for NLEB. Additionally, the Site is located within both Estimated and Priority Habitat for state-listed species as mapped by the NHESP.

A review of available MassGIS mapping from the NHESP (updated as of November 2016) that depicts known hibernacula and roost trees in Massachusetts was conducted to determine if any known or mapped hibernacula and/or roost trees are present on or proximal to the Site. According to the mapping, no hibernacula are known to occur on or proximate to the Site; however, there are mapped roost trees located within approximately 5 miles to the north of the Site, within the northeastern portion of the Joint Base Cape Cod (JBCC) near Route 6 in Bourne.

The Mabbett Team conducted a field reconnaissance to document the potential presence of habitat suitable for NLEB roosting as well as any potential hibernacula. The following information details observations made at the Site during the preliminary field reconnaissance. Potential for overwintering habitat (i.e., hibernacula) to occur at the Site is limited as there are no known caves, mines, boulder outcrops with deep pockets, or old abandoned buildings at the Site.

Potential summer habitat consisting of daytime roost trees and nighttime foraging areas were evaluated during the preliminary field reconnaissance. The tree canopy density and species distribution was evaluated to determine mature species composition, as well as size and presence of potential roost trees. Potential roost trees include all trees greater than 3-inches in diameter-at-breast-height (dbh) that exhibit cavities, cracks or crevices, or exfoliating bark located at least 10 feet in height from the ground. Tree snags (dead trees) can also provide suitable roosting habitat.

The Site includes a very large area of undeveloped forested woodland containing both hardwood and softwood trees (see attached representative site photographs) mainly comprised of oaks (*Quercus* spp.) and pitch pine (*Pinus rigida*). The tree canopy height ranges from an estimated 30-50 feet depending on specific location within the site and age of the forest. There are some individual tree snags (dead trees) scattered throughout the site, however there are no large dense areas of snags. The site is mainly dominated by a mixed overstory of pitch pine and oaks consisting of white oak (*Quercus alba*), scarlet

oak (*Quercus coccinea*), red oak (*Quercus rubra*), and scrub oak (*Quercus ilicifolia*), with a dense understory of black huckleberry (*Gaylussacia baccata*) and scrub oak. Canopy closure is fairly dense; however, the understory is fairly open within a large area of the western portion of the site.

The far eastern portion of the site is a somewhat younger aged successional mixed hardwood and pitch pine forest that has reclaimed a previously developed area of historic military housing complexes and a patchwork of access roads. Generally, the species of trees in this far eastern area of the Site are similar to those found on other portions of the Site; however, the trees are not as tall or as large in diameter and the density of the understory is thicker.

Trees on this Site do not appear to have extensive cracks, crevices, and cavities or extensive exfoliating bark (similar to shagbark hickory [*Carya ovata*]), although some individual pitch pines have some exfoliating and/or rough platy bark and may provide suitable habitat. Overall, trees on the Site have a diameter greater than 3-inches dbh and are therefore considered to be potential suitable summer roosting habitat, especially given the proximity to known roost trees in the northern end of the JBCC property.

Since extensive woodland habitat with trees greater than 3-inches dbh is present on the Site, there is potential suitable summer habitat for NLEB present; however, at this time it is unknown if NLEB currently utilize the Site.

Implications for Site Development

Given the presence of potentially suitable summer habitat for NLEB on the Site, the Mabbett Team recommends that the VA complete an informal consultation request with the USFWS NEFO for any proposed development at the Site. Additionally, it is recommended that the VA submit a NHESP Request for State-listed Species Information to determine all species known or potentially occurring on the Site. These submissions to USFWS NEFO and NHESP may result in identification of potential requirements for future presence-absence surveys on the Site and restrictions on the time of year that surveys can be performed (acoustic and mist-net surveys can only be performed between May 15 – July 31 in a given year). Discussions regarding potential time-of-year (TOY) restrictions for certain construction activities on the Site (including tree clearing), and other possible mitigation measures that may need to be incorporated into any project design and/or construction/development schedule can also begin once initial consultations have been completed.

The information presented below are conservation measures that are likely to be required or recommended by the USFWS NEFO for any development on the Site, and should be evaluated as part of any potential future development plans:

1. For all phases and components of project development, limit tree clearing to the extent practicable.
2. Plan to incorporate seasonal TOY restrictions for tree clearing to occur when NLEB are not likely to be present (i.e., November 1 to March 31). If this TOY restriction cannot be accommodated, then plan to avoid tree clearing activities during NLEB pup season (i.e., June 1 to July 31).
3. If seasonal TOY restrictions on tree clearing cannot be accommodated, USFWS may require presence-absence surveys for NLEB during the active season in May through July 2019 to determine if NLEB is present and utilizing the site as summer habitat.

Northern Long-eared Bat Habitat Assessment

Photograph Log

PHOTOGRAPHIC LOG

Project Name: VA MA National Cemetery

Site Location: VA MA National Cemetery
Bourne, MA

Project No. 60587570

Photo No.

1

Date:

9/10/18

Direction Photo Taken:
East



Description:

Representative view of the mixed hardwood-softwood forested woodland habitat (Pitch Pine – Oak Forest) with trees greater than 3 inches diameter-at-breast-height (dbh) that also contain some individual snags (dead trees). All trees greater than 3-inches dbh are considered potential summer roosting habitat for NLEB by USFWS.

Photo No.

2

Date:

9/10/18

Direction Photo Taken:
North



Description:

View of pitch pine (*Pinus rigida*) with rough, platy, exfoliating bark, potentially providing suitable roosting habitat for NLEB.

PHOTOGRAPHIC LOG

Project Name: VA MA National Cemetery

Site Location: VA MA National Cemetery
Bourne, MA

Project No. 60587570

Photo No.
3

Date:
9/10/18

Direction Photo Taken:
North

Description:
View of Wetland 6 that provides potential summer foraging habitat and contains some dead tree snags along the perimeter providing potential summer roosting habitat for NLEB.



Photo No.
4

Date:
9/10/18

Direction Photo Taken:
Southwest

Description:
Representative view of the hardwood forested woodland habitat (Mixed Oak Forest) with trees greater than 3 inches in diameter that also contain some individual snags (dead trees).



PHOTOGRAPHIC LOG

Project Name: VA MA National Cemetery

Site Location: VA MA National Cemetery
Bourne, MA

Project No. 60587570

Photo No.
5

Date:
9/13/18

Direction Photo Taken:
East

Description:
View of the forested woodland habitat with trees greater than 3 inches dbh that also contain some individual snags (dead trees).

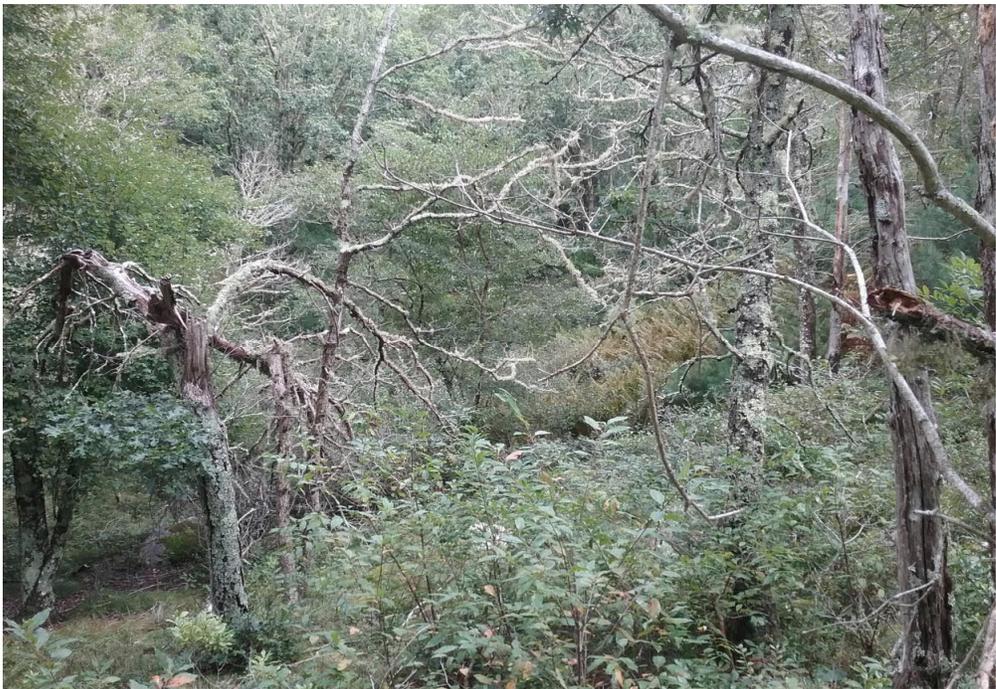


Photo No.
6

Date:
9/13/18

Direction Photo Taken:
Southeast

Description:
View of the mixed forested woodland habitat with hardwood (oak) and softwood (pitch pine) trees greater than 3 inches dbh that also contain some individual snags (dead trees).



PHOTOGRAPHIC LOG

Project Name: VA MA National Cemetery

Site Location: VA MA National Cemetery
Bourne, MA

Project No. 60587570

Photo No.
7

Date:
9/14/18

Direction Photo Taken:
Northeast

Description:
View of the forested woodland habitat with trees greater than 3 inches dbh that also contain some individual snags (dead trees).



Photo No.
8

Date:
9/14/18

Direction Photo Taken:
North

Description:
View of the forested woodland habitat with trees greater than 3 inches dbh that also contain some individual snags (dead trees).



**Massachusetts National Cemetery
Broad Brush Environmental Field Survey Reports**

Attachment 2

Eastern Box Turtle Habitat Assessment

Eastern Box Turtle Habitat Assessment

Introduction

From September 10 through 14, 2018, a preliminary field reconnaissance and Eastern box turtle (*Terrapene carolina*) (EBT) habitat assessment was conducted by the Mabbett Team at the Veterans Affairs (VA) Massachusetts National Cemetery (MNC) property located in Bourne, Massachusetts (Figure 1 in Attachment A). The entire MNC property is approximately 750 acres in size, with approximately 250 acres currently developed and utilized as a cemetery facility. The habitat assessment for EBT was performed over the approximately 500 acres of remaining undeveloped land on the MNC property (Site). According to the Massachusetts Natural Heritage and Endangered Species Program's (NHESP) Mapping of Priority & Estimated Habitats (14th Edition Natural Heritage Atlas, August 1, 2017) available from MassGIS and presented on Figure 1, the entire survey limits are mapped as Priority Habitat for state-listed species protected under the Massachusetts Endangered Species Act (MESA; M.G.L. c. 131 A). Given the habitats and natural plant communities observed on the Site (and described further below), there are a number of state-listed invertebrate and vertebrate species which are likely to occur in this area. In order to better understand the potential development limitations and mitigation scenarios of site development relative to state-listed endangered species concerns, Mabbett recommends filing a "Request for State-listed Species Information" (see Attachment B) with the NHESP to determine all of the state-listed species known to occur or potentially occur on the Site.

Based on previous experience in this area, Mabbett is aware that the EBT, a Massachusetts state-listed Species of Special Concern is known to occur in the area. In addition, this species was also observed on the Site during the 2018 site reconnaissance. Therefore, more species information is provided below.

EBTs use a wide variety of habitats over the course of the year including forested uplands and wetlands, open fields, early succession scrub-shrub and intervening ecotones (i.e., edge habitats) and disturbed areas. Upland areas are usually within dry sandy environments formed in glacial outwash materials. Turtle movements are based on seasonal availability of food items, life cycle requirements (e.g., nesting and hibernating) and body temperature regulation. A generalized breakdown of this seasonal habitat use is provided in the following list:

- April through June. EBTs are typically observed in open fields, early successional scrub-shrub/sapling areas and forest-field edges, but may be observed in forested habitats as well.
- June through September. Box turtles are typically observed in forested uplands and forested wetlands, but will sometimes use forest-field edges or dense shrubby areas.
- October through March. EBTs overwinter (i.e., hibernate) in forested habitats almost exclusively. These forested habitats typically support a well-developed duff/leaf-litter layer and a deep, soft humic layer in which EBTs can easily dig a shallow burrow, and are usually well protected from the elements (i.e., moderate to dense forest canopy cover). Hibernation areas are often in close proximity to forested wetlands.

EBTs are well camouflaged, and secretive in nature, spending a large proportion of their time buried beneath leaf litter or under small brush piles during the active season (typically from April 1 through October 31), making them difficult to find. During the inactive hibernation period, EBTs are impossible to find because they are buried under the root/duff layer of the forest floor and do not emerge until late spring.

During the 2018 habitat evaluations examples of the above referenced preferred habitats for EBT were present across the entire Site. The Mabbett Team observed mature mixed forests dominated in the overstory by tree species typical of the area including pitch pine (*Pinus rigida*), white pine (*Pinus strobus*), and scarlet oak (*Quercus coccinea*), while the understory was comprised of black huckleberry (*Gaylussacia baccata*), dwarf chinquapin oak (*Quercus prinoides*), scrub oak (*Quercus ilicifolia*), and assorted blueberries (*Vaccinium angustifolium*, *V. pallidum*). Following the Classification of Natural Communities of Massachusetts (version 2.0), the most common upland forest communities include Pitch Pine – Oak Forest Woodland, Pitch Pine – Scrub Oak Community, and Scrub-oak Shrubland. Although forested wetland habitats were limited in the landscape, these are often considered to play an important role in the EBT annual life-cycle; providing opportunities for re-hydration and thermoregulation during hotter and drier times of the year, and the ecotone between forested wetlands and adjacent forested uplands are often preferred overwintering habitat. Example photographs of these communities are provided in Attachment C.

Open areas dominated by grasses and forbs were primarily associated with landscaped and maintained lawn areas of the existing cemetery. Although these areas would not be considered primary habitat for EBTs, the species will readily cross these areas when moving about the landscape, and will utilize their edges with adjacent forest areas for feeding and thermoregulation. Other open and scrub-shrub habitats within the Site that are likely used during the active season include the maintained powerline rights-of-way on the site, the most significant of which is along the western edge of the site adjacent to Route 28 (Figure 2 in Attachment A). This area provides suitable open habitats for nesting and scrub-shrub areas used for feeding and thermoregulation during the active season. Approximately 90 acres of the property located between East and West Hospital Road was previously developed and appears to be the lowest quality EBT habitat on the Site. Although it is well vegetated, a significant amount of the area is still paved (see Attachment C). While this area may still provide limited foraging habitat and unobstructed movement across the landscape, overwintering habitat is extremely limited due to the existing pavement and disturbed soils with no duff/humic layer suitable for burrowing.

During the habitat assessment reconnaissance, a total of five individual EBTs were observed on the Site (Figure 2). These observations included two deceased EBTs observed in an area actively being used by the VA MNC maintenance staff for disposal of landscape waste (i.e., grass clippings, leaf litter and brush); a male/female pair that were observed mating in a small wet topographic depression adjacent to Committal Shelter 1; and one juvenile EBT that was observed approximately 630 linear feet east of the mating pair (see photographs in Attachment C).

Massachusetts Endangered Species Act Requirements

Under the Massachusetts Endangered Species Act (MESA; M.G.L. c. 131A) and its implementing regulations (321 CMR 10.00), Endangered, Threatened and Special Concern species are protected against direct harm to the individual, and protected against destruction or disturbance of their habitat. The NHESP within the Massachusetts Division of Fisheries and Wildlife (MDFW) is responsible for rare species inventory, research, and protection under MESA.

MESA and its regulations generally prohibit a “take” of a state-listed species. Under the regulations, a “take” in reference to animals means, “to harass, harm, pursue, hunt, shoot, hound, kill, capture, collect, process, disrupt the nesting, breeding, feeding, or migratory activity, or attempt to engage in any such conduct”; and in reference to plants, it means “to collect, pick, kill, transplant, cut or process or attempt to engage or assist in any such conduct” (321 CMR 10.02).

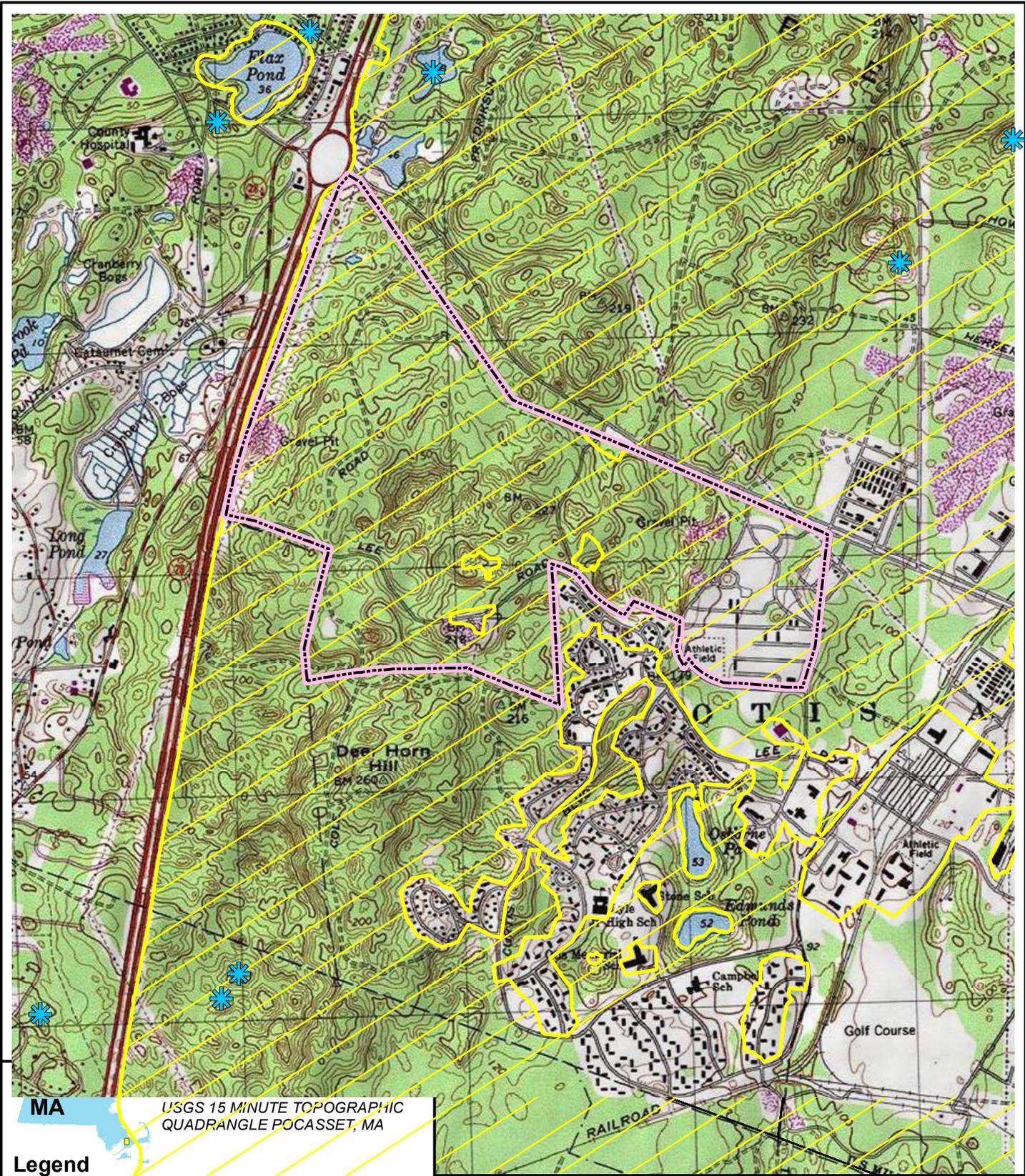
Due to the known presence of state-listed species on the Site, consultation with the NHESP will be required. Depending on the extent of proposed impacts to suitable habitat, the NHESP will typically require formal presence-absence surveys spanning an entire active season of the EBT (i.e., April 1 through October 31) be conducted. NHESP suggested surveys typically consist of visual encounter meander searches and a radio-telemetry tracking program designed to identify critical EBT habitat areas within the proposed impact areas.

Based on the results of the presence-absence surveys, the NHESP will determine whether a regulatory “take” will occur as a result of the proposed project. The MESA regulations contain a provision (321 CMR 10.23) authorizing the Director of the MDFW to permit a take, at his or her discretion, if: (a) the project proponent has “adequately addressed alternatives to both temporary and permanent impacts to State-listed Species”; (b) “an insignificant portion of the local population would be impacted”; and (c) the project proponent “agrees to carry out a conservation and management plan that provides a long-term Net Benefit to the conservation of the State-listed Species.”

Minimizing impacts to the local population and providing a long-term Net Benefit to the conservation of the State-listed Species (under “b” and “c” above) are often addressed through implementation of pre-construction surveys and the radio-telemetry program, implementation of a construction period monitoring and protection plan (with radio-telemetry), conservation of known EBT habitat, and/or monetary contributions to an endangered species fund that could be used for additional land conservation and/or research that would benefit the impacted species.

Eastern Box Turtle Habitat Assessment

Attachment A – Figures



MA

USGS 15 MINUTE TOPOGRAPHIC QUADRANGLE POCASSET, MA

Legend

-  Certified Vernal Pools (June 2018)
-  NHESP Priority Habitats of Rare Species
-  Property Boundary
-  Town Boundaries

0 1,000 2,000 4,000
 Feet



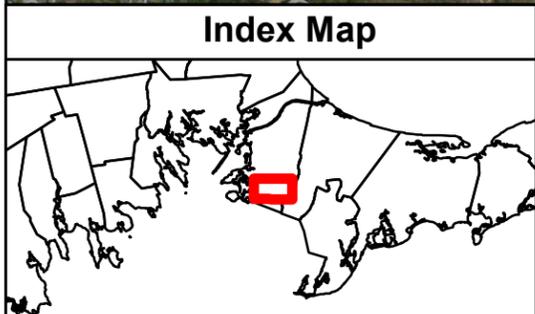
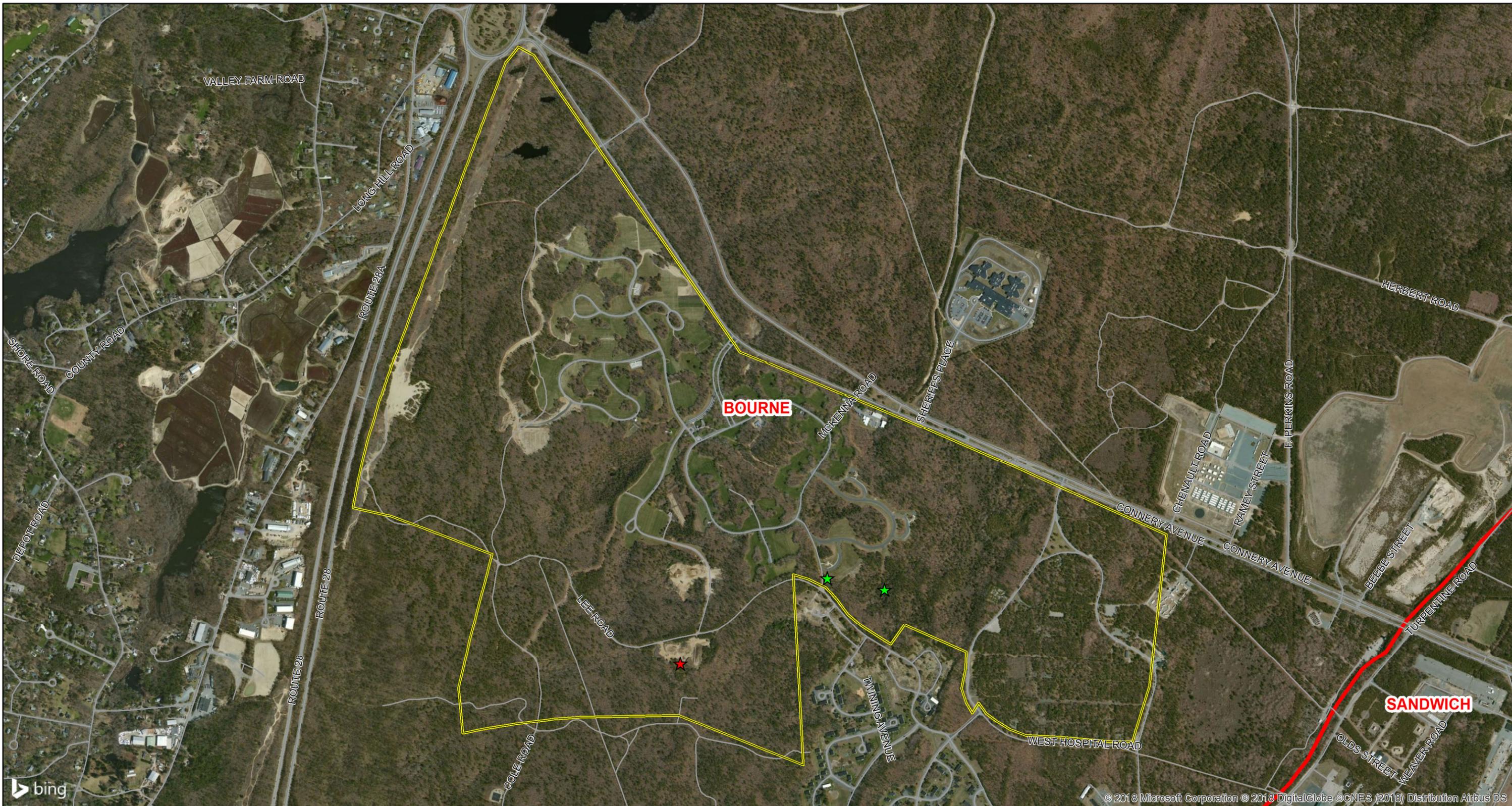
SITE LOCUS AND NHESP PRIORITY AND ESTIMATED HABITATS AND CERTIFIED VERNAL POOLS

Veterans Affairs Massachusetts National Cemetery
 Bourne, Massachusetts

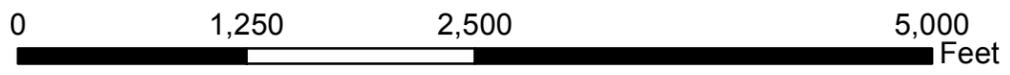
SCALE	DATE	PROJECT NO.
1:24000	09/20	60587570

Figure Number

1



- Legend**
- ★ Eastern Box Turtle-Alive
 - ★ Eastern Box Turtle-Dead
 - VA Massachusetts National Cemetery Property Boundary
 - Municipal Boundary



**VETERANS AFFAIRS
MASSACHUSETTS NATIONAL CEMETERY
EASTERN BOX TURTLE HABITAT
ASSESSMENT MAP**
Bourne, MA

FIGURE 2	
9/20/2018	

© 2018 Microsoft Corporation © 2018 DigitalGlobe © CNES (2018) Distribution Airbus DS

Eastern Box Turtle Habitat Assessment

Attachment B – NHESP Request for State-listed Species Information Form



MASSWILDLIFE

DIVISION OF FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581

p: (508) 389-6300 | f: (508) 389-7890

MASS.GOV/MASSWILDLIFE

Request for State-listed Species Information

Please complete this form to request state-listed species information from the Natural Heritage & Endangered Species Program for a particular location (please submit only one project per form).

Fee: \$50.00, Payable to Comm. of MA – NHESP (as required in 321 CMR 10.17(3))

No fee required if request is for conservation purposes or habitat management *and* you are a non-profit conservation group, government agency or are working with a government agency.

Requestor Information

Name:

Affiliation:

Address:

City:

State:

Zip Code:

Daytime Phone:

Ext.

Email address:

Project Information

Project or Site Name:

Location:

Town:

Name of Landowner or Project Proponent (if different from Requestor):

Acreage of the Property:

Description of Proposed Project and Current Site Conditions: (If necessary attach additional sheet)

Required: Enclose a map with the site location clearly marked and centered on the page.

Please **mail** this completed form, a topographic map, and fee (if applicable) to the above address, Attn: Regulatory Review.

If no fee is required, you can email the information to natural.heritage@state.ma.us.

A written response will be returned within 30 days of receipt of all information required.

MASSWILDLIFE

Eastern Box Turtle Habitat Assessment

Attachment C – Representative Site Photographs

PHOTOGRAPHIC LOG

Project Name: VA MA National Cemetery

Site Location: VA MA National Cemetery
Bourne, MA

Project No. 60587570

Photo No.
1 **Date:**
9/14/18

Direction Photo Taken:
East

Description:
View of Scrub-oak
Shrubland Community
located southwest of
Connery Ave and W.
Hospital Rd intersection



Photo No.
2 **Date:**
9/14/18

Direction Photo Taken:
Southwest

Description:
View of Pitch Pine – Scrub
Oak Community, forested
areas between VA
cemetery and E. Hospital
Rd.



PHOTOGRAPHIC LOG

Project Name: VA MA National Cemetery

Site Location: VA MA National Cemetery
Bourne, MA

Project No. 60587570

Photo No.
3 **Date:**
9/10/18

Direction Photo Taken:
North

Description:
View of Pitch Pine – Oak
Forest Woodland
Community in forested
areas west of E. Hospital
Rd.



Photo No.
4 **Date:**
9/15/18

Direction Photo Taken:
Northeast

Description:
View of maintained
powerline right-of-way and
edge habitats typically used
by EBTs located at
northeastern corner of site
adjacent to Connery Ave.



PHOTOGRAPHIC LOG

Project Name: VA MA National Cemetery **Site Location:** VA MA National Cemetery
Bourne, MA **Project No.** 60587570

Photo No.
5 **Date:**
9/10/18
Direction Photo Taken:
Northeast

Description:
View of Wetland 2, a Palustrine Emergent/ Open Water (PEM/POW) wetland located partially within the electrical transmission line right-of-way within the northwestern corner of the site. These habitats are often used by EBTs during the summer for re-hydration and thermoregulation.



Photo No.
6 **Date:**
9/10/18
Direction Photo Taken:
Southwest

Description:
View of Wetland 5 (500-series), a Palustrine Forested (PFO) wetland located within the northwestern corner of the site. Often used by EBTs during summer for re-hydration and thermoregulation, and will likely overwinter in directly adjacent forested uplands.



PHOTOGRAPHIC LOG

Project Name: VA MA National Cemetery

Site Location: VA MA National Cemetery
Bourne, MA

Project No. 60587570

Photo No.
7

Date:
9/10/18

Direction Photo Taken:
South

Description:
View of powerline right-of-way along western edge of property adjacent to Route 28. This habitat is often used by EBTs for nesting and foraging.



Photo No.
8

Date:
9/10/18

Direction Photo Taken:
Southeast

Description:
Juvenile EBT (est. 6-8 years old) found in forest block east of Committal Shelter 1.



PHOTOGRAPHIC LOG

Project Name: VA MA National Cemetery

Site Location: VA MA National Cemetery
Bourne, MA

Project No. 60587570

Photo No.
9

Date:
9/10/18

Direction Photo Taken:
N/A

Description:
Mating pair of EBTs found
near Committal Shelter 1



Photo No.
10

Date:
9/14/18

Direction Photo Taken:
East

Description:
Formerly developed area
between East and West
Hospital Rd.



PHOTOGRAPHIC LOG

Project Name: VA MA National Cemetery

Site Location: VA MA National Cemetery
Bourne, MA

Project No. 60587570

Photo No.
11

Date:
9/14/18

Direction Photo Taken:
East

Description:
Formerly developed area
between East and West
Hospital Rd.



**Massachusetts National Cemetery
Broad Brush Environmental Field Survey Reports**

Attachment 3

Wetland Resource Area Assessment

Wetland Resource Area Assessment

Introduction

From September 10 to 14, 2018, Mabbett Team wetland scientists conducted a wetland resource area assessment at the Veterans Affairs (VA) Massachusetts National Cemetery (MNC) property located in Bourne, Massachusetts. The wetland resource area assessment was performed over the entire 750 acres of land comprising the MNC property (Site), including both the approximately 250 acres of developed cemetery, as well as the approximately 500 acres of undeveloped land on the property.

The wetland assessment was performed to determine if wetland resource areas are present and under regulatory jurisdiction pursuant to the Town of Bourne Wetlands Protection Bylaw (Article 3.7) and Regulations, the Massachusetts Wetlands Protection Act (WPA; MGL Chapter 131, Section 40) and its implementing regulations (310 CMR 10.00), and Section 404 of the Clean Water Act (CWA; 33 U.S.C. 1344) administered by the United States Army Corps of Engineers (USACE).

As requested by Gordon, the approximate limits of the wetlands were located using global positioning system (GPS) for planning purposes in order to consider land constraints on the property. No detailed onsite field delineation of the precise wetland boundary was completed, with the exception of Wetland 1 (see below for further explanation).

Methodology

The following provides the methodology used to determine if wetlands resource areas are present at the Site and a description of the wetland areas.

The wetland assessment was performed pursuant to the Town of Bourne Wetlands Protection Bylaw and Regulations, the Massachusetts WPA and regulations, as well as the federal criteria for jurisdictional limits of “waters of the United States” pursuant to Section 404 of the Clean Water Act included in the USACE Regional Supplement of the USACE Wetland Delineation Manual for the Northeast Region 2012 (Regional Supplement).

The following three criteria outlined below must generally be present for an area to be considered as a “wetland”:

- *Hydrophytic Vegetation*: Plants growing in water or in a substrate that is at least periodically deficient in oxygen during a growing season as a result of excessive water content;
- *Hydric Soils*: Soils that, in an undrained condition, are saturated, flooded, or ponded long enough during a growing season to develop an anaerobic condition that supports the growth and regeneration of hydrophytic vegetation; and,
- *Wetland Hydrology*: Inundation or saturation by surface or groundwater at a frequency and duration during the growing season sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions.

It is the Mabbett Team's opinion that there are 16 areas on the MNC property which meet all three of the above referenced conditions and federal criteria for consideration as "wetland." All of the 16 wetland areas consist of isolated vegetated freshwater wetlands. No streams, rivers, or brooks were observed on the MNC property. Figure 1 (attached) depicts the locations of these wetlands on the MNC property. Additionally, representative photographs of the wetland areas are attached.

All of the 16 wetland areas identified on the MNC property would be protected "jurisdictional" wetlands under the Town of Bourne Wetlands Protection Bylaw, which protects any vegetated wetlands regardless of size or connection to any waterbodies (i.e., tidal or freshwater creeks, rivers, streams, ponds, lakes, oceans, seas, etc.); however, only some of the wetland areas would likely be jurisdictional under the Massachusetts WPA or the federal CWA as further described below.

Under the Massachusetts WPA, regulated freshwater wetlands include those "bordering" on creeks, rivers, streams, ponds, or lakes. In the absence of any creeks, rivers, streams or a lake, regulated inland wetlands may border on smaller isolated waterbodies including ponds. The term pond is further defined under the MA WPA implementing regulations as any open body of fresh water with a surface area observed or recorded within the last ten years of at least 10,000 square feet. In the absence of any areas meeting the definition of creeks, rivers, streams, ponds, or lakes, any vegetated wetlands would typically be considered "isolated" wetlands not subject to jurisdiction under the MA WPA. However, if an area of open water is too small in size to qualify as a pond, it may still be regulated under the MA WPA if it meets the definition of Isolated Land Subject to Flooding (ILSF), which is defined as an isolated depression or closed basin without an inlet or an outlet which at least once a year confines standing water to a volume of at least ¼ acre-feet and to an average depth of at least six inches. Even still, if an isolated wetland is determined not to be subject to jurisdiction under the MA WPA, any activity that results in the alteration of greater than 5,000 square feet of isolated wetland would be subject to MA Section 401 Water Quality Certification (WQC) Regulations (314 CMR 9.00). Additionally, any areas that have been certified by MA DEP as providing vernal pool habitat would receive protection under the MA Section 401 WQC Regulations (314 CMR 9.00) and Surface Water Quality Standards (314 CMR 4.00) that govern issuance of the federal CWA Section 401 WQC by MA DEP. However, no certified vernal pools are currently mapped on the Site by the NHESP.

Under the MA WPA, the process for determining jurisdiction under the law of areas satisfying the above criteria for classification as wetland is to submit a Request for Determination of Applicability (RDA) with the municipal Conservation Commission, whom is responsible for local implementation of the MA WPA (a copy is simultaneously submitted to the MA DEP). The RDA is a request that the Commission formally determine if the WPA and/or the local wetlands bylaw applies to these areas. The Commission may issue a negative determination if these areas are not jurisdictional under the WPA. Alternatively, an Abbreviated Notice of Resource Area Delineation (ANRAD) can also be filed with the Conservation Commission to seek clarification or confirmation of wetland resource area boundaries and jurisdiction under the local bylaw and/or MA WPA. As with the RDA, a copy of the ANRAD is simultaneously submitted to the MA DEP. During this process, the VA should anticipate that the local Conservation Commission and MA DEP will inquire as to whether any of the identified wetland areas are in fact vernal pools.

Under Section 404 of the CWA, the USACE has federal authority over the discharge of dredged or fill material into "waters of the United States" (a term which includes wetlands and all other aquatic areas). Only the USACE can determine whether or not a wetland area is jurisdictional under Section 404 of the

CWA through the Jurisdictional Determination process. It has been the Mabbett Team’s experience with the USACE New England District, that most (if not all) isolated vegetated freshwater wetlands are under USACE jurisdiction under the “significant nexus” standard used by the USACE; however, the USACE makes a determination of jurisdiction on a case-by-case basis.

The USACE will apply the “significant nexus” standard during a Jurisdictional Determination review and will include the following analysis to make that determination. A significant nexus analysis will include consideration of hydrologic and ecologic factors. Therefore, the USACE continues to assert jurisdiction over wetlands “adjacent” (bordering, contiguous or neighboring) to traditional navigable water (TNW) and wetlands adjacent to non-TNWs if the waterbody is relatively permanent, or if the waterbody is a wetland that directly abuts (e.g., the wetland is not separated from the tributary by uplands, a berm, dike, or similar feature) a relatively permanent water (RPW), or if a water body, in combination with all wetlands adjacent to that water body, has a significant nexus with TNWs or interstate waters. Non-RPWs are jurisdictional where there is a “significant nexus” with a TNW or interstate water. For each specific request for non-RPWs, USACE staff will need to perform significant nexus evaluation to determine if a tributary in combination with adjacent wetlands (if any) is jurisdictional.

Although the Site does not contain any rivers or streams, there are numerous TNWs and RPWs located within close proximity to the Site including Pocasset Harbor (tidal water less than one mile away), a perennial stream (less than 0.75 miles) associated with Cuffs Pond and Long Pond that is tributary to Pocasset Harbor, and Cape Cod Canal (a tidal water less than four miles). Additionally, some of the wetlands present on the Site are themselves RPWs and would likely be considered by the USACE as jurisdictional under Section 404 of the CWA. Based on Mabbett’s past experience, the USACE New England District would likely exert jurisdiction over most (if not all) wetlands on the Site as adjacent wetlands (neighboring) to these RPWs or by asserting that the wetlands onsite maintain a significant nexus to nearby RPWs and TNWs.

The table below presents a summary of Mabbett Team’s opinion based on our understanding the regulatory frameworks and past experience as to the level of regulatory jurisdiction of the 16 wetlands observed on the MNC property. Mabbett recommends that the VA initiate an informal dialogue with the USACE New England District to begin discussing development plans for the Site and potential jurisdiction of wetlands under the federal CWA. As previously noted, final determination of jurisdiction of wetland area can only be made by the USACE through the Jurisdictional Determination process, or the MA DEP/Local Conservation Commission through the RDA or ANRAD process.

Wetland ID	Regulatory Jurisdiction*		
	Town of Bourne Wetlands Protection Bylaw	Massachusetts Wetlands Protection Act	Federal Section 404 Clean Water Act
Wetland 1	Yes	No	Likely
Wetland 2	Yes	Likely ¹	Likely
Wetland 3	Yes	No	Likely
Wetland 4	Yes	No	Likely
Wetland 5	Yes	No	Likely
Wetland 6	Yes	Likely ¹	Likely
Wetland 7	Yes	No	Not Likely
Wetland 8	Yes	No	Not Likely
Wetland 9	Yes	No	Likely
Wetland 10	Yes	Likely ^{1, 2}	Likely
Wetland 11	Yes	No	Likely
Wetland 12	Yes	No	Likely
Wetland 13	Yes	No	Not Likely
Wetland 14	Yes	No	Not Likely
Wetland 15	Yes	No	Not Likely
Wetland 16	Yes	No	Not Likely

* The information in this table represents the opinion of the Mabbett Team on jurisdiction based on field observations and our prior experience with the USACE New England District on past projects. Only the USACE New England District can make a final determination as to whether or not a wetland area is jurisdictional under the CWA.

Notes:

1. May potentially meet the volumetric criteria (one quarter acre-foot of standing water) to be considered Isolated Land Subject to Flooding (ILSF) under the Massachusetts WPA and Regulations.
2. May potentially be protected as Land Under Water Bodies and Waterways (LUWW) as a pond under the Massachusetts WPA and Regulations. A pond means any open body of fresh water with a surface area observed or recorded within the last ten years of at least 10,000 square feet.

Wetlands

The Site contains undulating topography (hills and valleys), including large and small areas of glacially derived “kettle hole” depressions that mainly consist of uplands; however, there are approximately 16 wetland areas that were observed on the MNC property, some of which are located within these kettle hole type formations.

It should be noted there were also numerous areas of low-lying kettle holes that were considered by Mabbett to be uplands (non-wetlands) where stormwater runoff from adjacent access roads and culverts are being discharged to these areas; however, these areas were determined not to be regulated wetlands since they did not contain a predominance of wetland plants and hydric soils.

Wetland 1

Wetland 1 is an isolated vegetated freshwater wetland classified as a Palustrine Emergent/Forested (PEM/PFO) wetland located near the maintenance building complex within the northcentral portion of the Site. At the request of Mabbett Associates, a detailed onsite field-delineation and GPS location of the wetland boundary was conducted using the federal delineation methodology. The boundary was demarcated in the field using pink surveyor's flagging tape identified with flag numbers W-100 through W-113. This wetland would be locally regulated under the Town of Bourne Wetlands Protection Bylaw and Regulations. This wetland area is potentially a regulated wetland under the federal CWA as having a significant nexus to other nearby RPWs and/or TNWs; however, a JD would be required for a final determination on federal jurisdiction.

Dominant wetland vegetation includes red maple (*Acer rubrum*), bladder sedge (*Carex intumescens*), smartweed (*Polygonum pennsylvanicum*), soft rush (*Juncus effusus*), bidens (*Bidens frondosa*), barnyard grass (*Echinochloa crus-galli*) and common reed (*Phragmites australis*). Hydric soils were encountered within this wetland and also water stained ground and leaves. It should be noted that a culvert pipe outlet discharges stormwater to this wetland.

Wetland 2

Wetland 2 is an isolated vegetated freshwater wetland classified as a Palustrine Emergent/ Open Water (PEM/POW) wetland located near the northwestern corner of the Site within the electrical transmission line right-of-way (ROW). Wetland 2 contains an area of standing water that may provide vernal pool habitat. Wetland 2 appears to meet the volumetric criteria (one quarter acre-foot of standing water) to be considered Isolated Land Subject to Flooding (ILSF) under the Massachusetts WPA and Regulations; however, engineering calculations to determine the volume of water would need to be performed to properly determine whether or not this area qualifies as ILSF. This wetland would be regulated under the local Town of Bourne Wetlands Protection Bylaw and would likely be regulated under the federal CWA as a RPW itself or as an isolated wetland with a significant nexus to other nearby RPWs and/or TNWs.

Dominant wetland vegetation includes burred (*Sparganium eurycarpum*), woolgrass (*Scirpus cyperinus*), pickerelweed (*Pontederia cordata*), soft rush, New York fern (*Thelypteris noveboracensis*), highbush blueberry (*Vaccinium corymbosum*), pepperbush (*Clethra alnifolia*) and cattail (*Typha* sp.). Hydric soils were encountered in addition to the area of standing water.

Wetland 3

Wetland 3 is an isolated vegetated freshwater wetland classified as a Palustrine Emergent/Scrub-Shrub (PEM/PSS) wetland located near the northwestern corner of the Site, within the electrical transmission line right-of-way (ROW). Wetlands 2 and 3 are divided by the electrical transmission line access road (there is no culvert pipe or other direct surface hydrologic connection between the two wetland areas). This wetland would be regulated under the local Town of Bourne Wetlands Protection Bylaw and would likely be regulated under the federal CWA due to adjacency to a regulated RPW or as having a significant nexus to other nearby RPWs and/or TNWs. This wetland is not likely regulated by the MA DEP under the WPA.

Dominant wetland vegetation includes pussy willow (*Salix discolor*), pepperbush, smartweed, woolgrass, and barnyard grass. Evidence of standing water was observed by the presence of darkened water stained ground and leaves. Hydric soils were also present.

Wetland 4

Wetland 4 is an isolated vegetated freshwater wetland classified as a Palustrine Forested (PFO) wetland located near the northwestern corner of the Site. This wetland would be regulated under the local Town of Bourne Wetlands Protection Bylaw and would likely be regulated under the federal CWA as well as a wetland having a significant nexus to other nearby regulated RPWs and/or TNWs. This wetland is not likely regulated by the MA DEP under the WPA.

Dominant wetland vegetation includes red maple, highbush blueberry and wintergreen (*Gaultheria procumbens*). Hydric soils were also present.

Wetland 5

Wetland 5 is an isolated vegetated freshwater wetland classified as a Palustrine Forested (PFO) wetland located near the northwestern corner of the Site. This wetland would be regulated under the local Town of Bourne Wetlands Protection Bylaw and would likely be regulated under the federal CWA as well as an isolated wetland having a significant nexus to other nearby regulated RPWs and/or TNWs. This wetland is not likely regulated by the MA DEP under the WPA.

Dominant wetland vegetation includes red maple, highbush blueberry and wintergreen. Evidence of standing water was observed by the presence of darkened water stained ground and leaves. Hydric soils were also present.

Wetland 6

Wetland 6 is an isolated vegetated freshwater wetland classified as a Palustrine Emergent/ Open Water/ (PEM/POW) wetland with a narrow fringe of PFO wetland around the perimeter located near the northwestern corner of the Site. Wetland 6 contains an area of standing water that may provide vernal pool habitat. Wetland 6 also appears to meet the volumetric criteria (one quarter acre-foot of standing water) to be considered ILSF under the Massachusetts WPA; however, engineering calculations to determine the volume of water would need to be performed to properly determine whether or not this area qualifies as ILSF. This wetland would be regulated under the local Town of Bourne Wetlands Protection Bylaw and would likely be regulated under the federal CWA as a RPW itself or as an isolated wetland with a significant nexus to other nearby RPWs and/or TNWs.

Dominant wetland vegetation includes burred, woolgrass, manna grass (*Glyceria* sp.), peat moss (*Sphagnum* sp.), *Carex* sp., highbush blueberry and red maple. Hydric soils were present in addition to area of standing water.

Wetland 7

Wetland 7 is an isolated vegetated freshwater wetland classified as a Palustrine Forested (PFO) wetland located near the northwestern portion of the Site. Dominant wetland vegetation includes red maple, highbush blueberry, blackberry (*Rhubus* sp.) and sensitive fern (*Onoclea sensibilis*). Hydric soils were present.

This wetland would be regulated under the local Town of Bourne Wetlands Protection Bylaw. This wetland is not likely to be regulated by the MA DEP under the WPA due to its small size and isolated nature. This wetland area is not likely to be considered a regulated wetland under the federal CWA given the primary hydrology source being stormwater runoff and the lack of proximity to a TNW or RPW; however, a JD would be required for a final determination on federal jurisdiction.

Wetland 8

Wetland 8 is an isolated vegetated freshwater wetland classified as a Palustrine Forested (PFO) wetland located near the northwestern portion of the Site. This wetland would be regulated under the local Town of Bourne Wetlands Protection Bylaw. This wetland is not likely to be regulated by the MA DEP under the WPA due to its small size and isolated nature. This wetland area is not likely to be considered a regulated wetland under the federal CWA given the lack of proximity to a TNW or RPW; however, a JD would be required for a final determination on federal jurisdiction.

Dominant wetland vegetation includes red maple, highbush blueberry, pepperbush, maleberry (*Lyonia ligustrina*), swamp white oak (*Quercus bicolor*), sensitive fern, and blackberry. Hydric soils were present.

Wetland 9

Wetland 9 is an isolated freshwater wetland classified as a Palustrine Emergent/Open Water (PEM/POW) wetland with a narrow fringe of PFO wetland around the perimeter located near the northwestern portion of the Site. Wetland 9 contains an area of standing water that may provide vernal pool habitat. Wetland 9 does not appear to meet the volumetric criteria (one quarter acre-foot of standing water) to be considered ILSF under the Massachusetts WPA; however, engineering calculations to determine the volume of water would need to be performed to properly determine whether or not this area qualifies as ILSF. This wetland would be regulated under the local Town of Bourne Wetlands Protection Bylaw and would likely be regulated under the federal CWA as well as an isolated wetland having a significant nexus to other nearby regulated RPWs and/or TNWs.

Dominant wetland vegetation includes burreed, pepperbush, red maple and highbush blueberry. Hydric soils were encountered in addition to the area of standing water.

Wetland 10

Wetland 10 is a large isolated freshwater wetland classified as a Palustrine Open Water/Emergent (POW/PEM) wetland with a narrow fringe of PFO wetland around the perimeter located near the northwestern portion of the Site. Wetland 10 contains an area of standing water that may provide vernal pool habitat. Wetland 10 appears to meet the volumetric criteria (one quarter acre-foot of standing water) to be considered ILSF or LUWW meeting the definition of a pond (standing water greater than 10,000 square feet) under the Massachusetts Wetlands Protection Act; however, engineering calculations to determine the volume of water would need to be performed to properly determine whether or not this area qualifies as ILSF. This wetland would be regulated under the local Town of Bourne Wetlands Protection Bylaw and would likely be regulated under the federal CWA as a RPW itself or as an isolated wetland with a significant nexus to other nearby RPWs and/or TNWs.

Dominant wetland vegetation includes burreed, white water lily (*Nymphaeaceae odorata*), soft rush, sedges (*Carex*), and manna grass. Hydric soils were present in addition to standing/ponded water hydrology.

Wetland 11

Wetland 11 is an isolated freshwater wetland classified as a Palustrine Forested (PFO) wetland located near the northwestern portion of the Site, adjacent to the electrical transmission line ROW. Evidence of standing water was observed by the presence of darkened water stained ground and leaves. This wetland may provide vernal pool habitat. This wetland would be regulated under the local Town of Bourne

Wetlands Protection Bylaw and would likely be regulated under the federal CWA as well as an isolated wetland having a significant nexus to other nearby regulated RPWs and/or TNWs.

Dominant wetland vegetation includes red maple, swamp white oak, and briar (*Smilax* sp.). Hydric soils were also present.

Wetland 12

Wetland 12 is an isolated freshwater wetland classified as a Palustrine Emergent/Open Water (PEM/POW) wetland located near the central portion of the Site. Wetland 12 contains an area of standing water that may provide vernal pool habitat. Wetland 12 does not appear to meet the volumetric criteria (one quarter acre-foot of standing water) to be considered ILSF under the Massachusetts Wetlands Protection Act; however, engineering calculations to determine the volume of water would need to be performed to properly determine whether or not this area qualifies as ILSF. This wetland would be regulated under the local Town of Bourne Wetlands Protection Bylaw and would likely be regulated under the federal CWA as a RPW itself or as an isolated wetland with a significant nexus to other nearby RPWs and/or TNWs.

Dominant wetland vegetation includes cattail, sensitive fern, goldenrod (*Solidago* sp.), meadowsweet (*Spirea latifolia*), lurid sedge (*Carex lurida*), smartweed and softrush. Hydric soils were encountered in addition to area of standing water.

Wetland 13

Wetland 13 is an isolated freshwater wetland classified as a Palustrine Emergent/ (PEM) wetland located near the southcentral portion of the Site; adjacent to the landscape material disposal area. This wetland appears to receive stormwater runoff from the surrounding area of the landscape material disposal area. This wetland would be locally regulated under the Town of Bourne Wetlands Protection Bylaw and Regulations. This wetland is not likely to be regulated by the MA DEP under the WPA due to its small size and isolated nature. This wetland area is not likely to be considered a regulated wetland under the federal CWA given the primary hydrology source being stormwater runoff and the lack of proximity to a TNW or RPW; however, a JD would be required for a final determination on federal jurisdiction.

Dominant wetland vegetation includes cattail, woolgrass, goldenrod, sedges, softrush and manna grass. Hydric soils were encountered in addition to shallow areas of standing water.

Wetland 14

Wetland 14 is an isolated freshwater wetland classified as a Palustrine Emergent (PEM) wetland located near the southcentral portion of the Site; adjacent to the sand burrow pit and stockpile area. This wetland appears to receive stormwater runoff from the surrounding area of the sand burrow pit and stockpile area. This wetland would be locally regulated under the Town of Bourne Wetlands Protection Bylaw and Regulations. This wetland is not likely to be regulated by the MA DEP under the WPA due to its small size and isolated nature. This wetland area is not likely to be considered a regulated wetland under the federal CWA given the primary hydrology source being stormwater runoff and the lack of proximity to a TNW or RPW; however, a JD would be required for a final determination on federal jurisdiction.

Dominant wetland vegetation includes cattail, common reed, woolgrass, goldenrod, and softrush. Hydric soils were present in addition to shallow areas of standing water.

Wetland 15

Wetland 15 is an isolated freshwater wetland classified as a Palustrine Emergent/ (PEM) wetland located near the southcentral portion of the Site; adjacent to the sand burrow pit and stockpile area. This wetland appears to receive stormwater runoff from the surrounding area of the sand burrow pit and stockpile area. This wetland is not likely to be regulated by the MA DEP under the WPA due to its small size and isolated nature. This wetland would be locally regulated under the Town of Bourne Wetlands Protection Bylaw and Regulations. This wetland area is not likely to be considered a regulated wetland under the federal CWA given the primary hydrology source being stormwater runoff and the lack of proximity to a TNW or RPW; however, a JD would be required for a final determination on federal jurisdiction.

Dominant wetland vegetation includes cattail, common reed, woolgrass, and softrush. Hydric soils were encountered in addition to shallow areas of standing water.

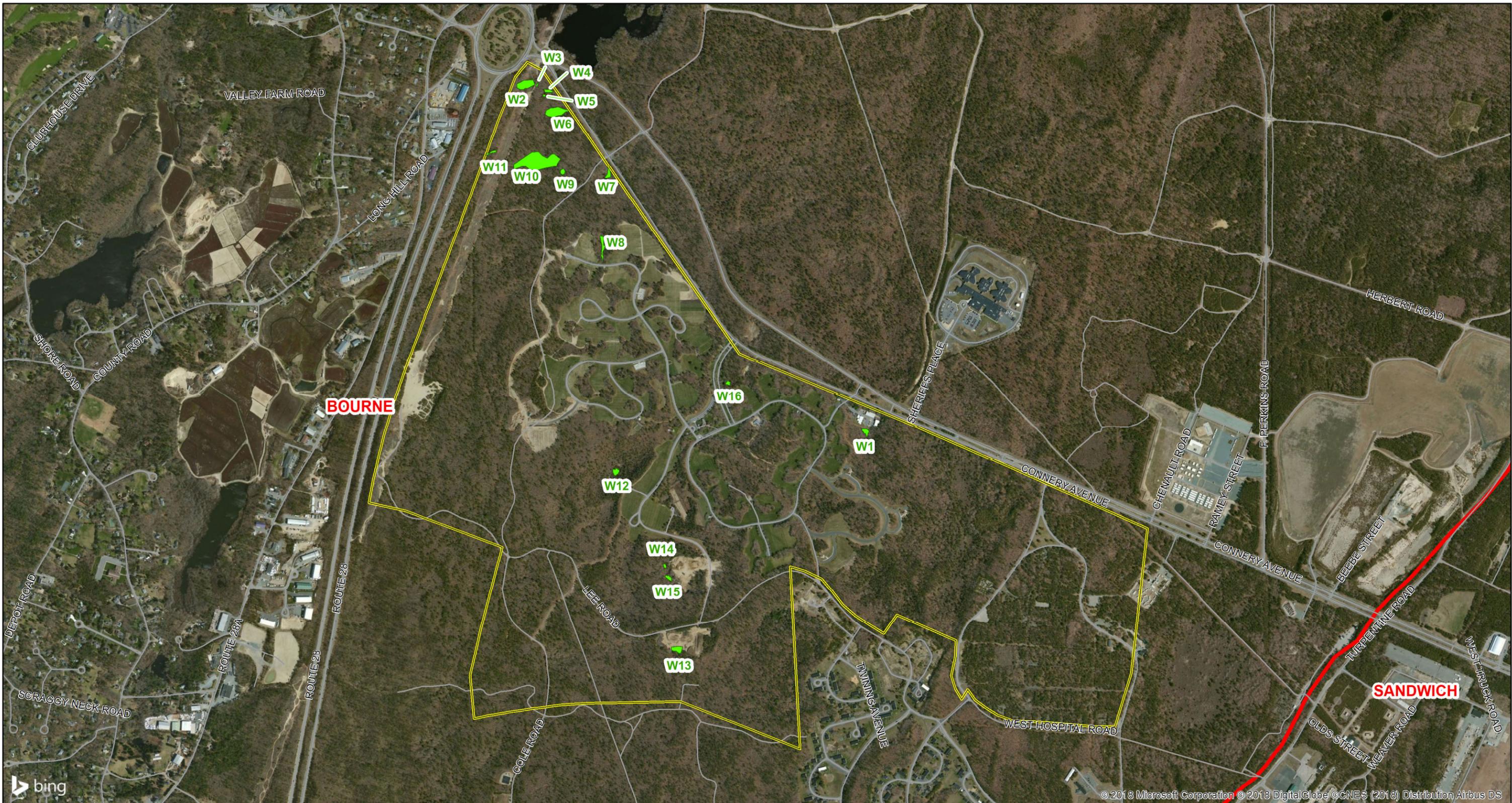
Wetland 16

Wetland 16 is an isolated freshwater wetland classified as a Palustrine Forested (PFO) wetland located near the central portion of the Site, adjacent to the cemetery's main entrance access road. A culvert pipe outlet discharges water to this wetland from the adjacent access road. This wetland would be locally regulated under the Town of Bourne Wetlands Protection Bylaw and Regulations. This wetland is not likely to be regulated by the MA DEP under the WPA due to its small size and isolated nature. This wetland area is not likely to be considered a regulated wetland under the federal CWA given the primary hydrology source being stormwater runoff and the lack of proximity to a TNW or RPW; however, a JD would be required for a final determination on federal jurisdiction.

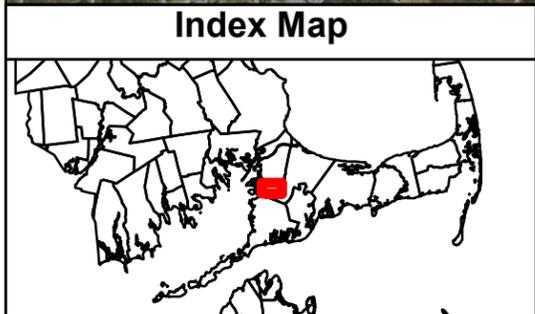
Dominant wetland vegetation includes pin oak (*Quercus palustris*), glossy buckthorn (*Rhamnus frangula*), sensitive fern, swamp rose (*Rosa palustris*) and blackberry. Hydric soils were also present.

Wetland Resource Area Assessment

Attachment A – Figures



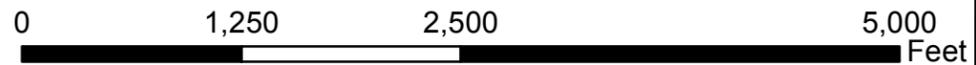
© 2018 Microsoft Corporation © 2018 DigitalGlobe © CNES (2018) Distribution Airbus DS



Index Map

Legend

- Wetland Area
- VA Massachusetts National Cemetery Property Boundary



**VETERANS AFFAIRS
MASSACHUSETTS NATIONAL
CEMETERY
WETLANDS ASSESSMENT MAP**
Bourne, MA

FIGURE 1
9/20/2018

Wetland Resource Area Assessment
Attachment B – Representative Site Photographs

PHOTOGRAPHIC LOG

Project Name: MA VA National Cemetery

Site Location: MA VA National Cemetery
Bourne, MA

Project No. 60587570

Photo No.
1

Date:
9/10/18

Direction Photo Taken:
East

Description:
View of Wetland 1, a Palustrine Emergent/Forested (PEM/PFO) wetland located near the maintenance building complex within the northcentral portion of the site.



Photo No.
2

Date:
9/10/18

Direction Photo Taken:
Northeast

Description:
View of Wetland 2, a Palustrine Emergent/ Open Water (PEM/POW) wetland located partially within the electrical transmission line Right-of-Way (ROW) within the northwestern corner of the site.



PHOTOGRAPHIC LOG

Project Name: MA VA National Cemetery

Site Location: MA VA National Cemetery
Bourne, MA

Project No. 60587570

Photo No.
3 **Date:**
9/10/18

Direction Photo Taken:
North

Description:
View of Wetland 3, a Palustrine Emergent/Scrub-Shrub (PEM/PSS) wetland located within the electrical transmission line Right-of-Way (ROW), adjacent to the ROW access road within the northwestern corner of the site. Note: no culvert was observed underneath the access road that connected Wetland 3 to Wetland 2.



Photo No.
4 **Date:**
9/10/18

Direction Photo Taken:
Southwest

Description:
View of Wetland 4, a Palustrine Forested (PFO) wetland located within the northwestern corner of the site.



PHOTOGRAPHIC LOG

Project Name: MA VA National Cemetery

Site Location: MA VA National Cemetery
Bourne, MA

Project No. 60587570

Photo No.
5

Date:
9/10/18

Direction Photo Taken:
Southwest

Description:
View of Wetland 5, a
Palustrine Forested (PFO)
wetland located within the
northwestern corner of the
site.



Photo No.
6

Date:
9/10/18

Direction Photo Taken:
Southeast

Description:
View of Wetland 6, a
Palustrine Emergent/Open
Water (PEM/POW) wetland
(with a narrow fringe of
PFO) located within the
northwestern portion of the
site.



PHOTOGRAPHIC LOG

Project Name: MA VA National Cemetery

Site Location: MA VA National Cemetery
Bourne, MA

Project No. 60587570

Photo No.
7

Date:
9/10/18

Direction Photo Taken:
Northeast

Description:
View of Wetland 7, a
Palustrine Forested (PFO)
wetland located within the
northwestern portion of the
site.



Photo No.
8

Date:
9/10/18

Direction Photo Taken:
North

Description:
View of Wetland 8, a
Palustrine Forested (PFO)
wetland located within the
northwestern portion of the
site.



PHOTOGRAPHIC LOG

Project Name: MA VA National Cemetery

Site Location: MA VA National Cemetery
Bourne, MA

Project No. 60587570

Photo No.
9

Date:
9/10/18

Direction Photo Taken:
Southeast

Description:
View of Wetland 9, a Palustrine Emergent/Open Water (PEM/POW) wetland (with a narrow fringe of PFO) located within the northwestern portion of the site.



Photo No.
10

Date:
9/10/18

Direction Photo Taken:
West

Description:
View of Wetland 10, a Palustrine Open Water/Emergent (POW/PEM) wetland (with a narrow fringe of PFO) located within the northwestern portion of the site.



PHOTOGRAPHIC LOG

Project Name: MA VA National Cemetery

Site Location: MA VA National Cemetery
Bourne, MA

Project No. 60587570

Photo No.
11 **Date:**
9/10/18

Direction Photo Taken:
East

Description:
View of Wetland 11, a
Palustrine Forested (PFO)
wetland located within the
northwestern portion of the
site, adjacent and west of
the electrical transmission
line ROW.



Photo No.
12 **Date:**
9/13/18

Direction Photo Taken:

Description:
View of Wetland 12, a
Palustrine Emergent/Open
Water (PEM/POW) wetland
located within the central
portion of the site.



PHOTOGRAPHIC LOG

Project Name: MA VA National Cemetery

Site Location: MA VA National Cemetery
Bourne, MA

Project No. 60587570

Photo No.
13 **Date:**
9/12/18

Direction Photo Taken:
West

Description:
View of Wetland 13, a
Palustrine Emergent (PEM)
wetland located within the
southcentral portion of the
site, adjacent to the
landscape material
disposal area.



Photo No.
14 **Date:**
9/12/18

Direction Photo Taken:
North

Description:
View of Wetland 14, a
Palustrine Emergent (PEM)
wetland located within the
southcentral portion of the
site, adjacent to the sand
borrow pit and stockpile
area.



PHOTOGRAPHIC LOG

Project Name: MA VA National Cemetery

Site Location: MA VA National Cemetery
Bourne, MA

Project No. 60587570

Photo No.
15 **Date:**
9/12/18

Direction Photo Taken:
West

Description:
View of Wetland 15, a
Palustrine Emergent (PEM)
wetland located within the
southcentral portion of the
site, adjacent to the sand
borrow pit and stockpile
area.



Photo No.
16 **Date:**
9/14/18

Direction Photo Taken:
West

Description:
View of Wetland 16, a
Palustrine Forested (PFO)
wetland located within the
northcentral portion of the
site, adjacent to the
cemetery main access
road.

