June 10, 2022
Revised July 5, 2022

Wildlife Habitat Assessment & Vernal Pool Survey

0 School Street
Manchester-by-the-Sea

Submitted to:
Manchester-by-the-Sea Zoning Board of Appeals
10 Central Street
Manchester-by-the-Sea, MA 01944

Prepared for:
SLV School Street, LLC
257 Hillside Avenue
Needham, MA 02494

Table of Contents

1. Introduction

The subject parcel is approximately 23.7 acres of forested land located on School Street in Manchester-by-the-Sea (Map: 43, Parcel: 18). As shown in Figure 1, the site is located in the southeastern corner of a large (1,700+ acre) area of natural woodland and wetland complex. Adjacent land is restricted conservation land with other small portions still privately owned. Directly to the south of the site is Route 128 and areas become more developed to the south (closer to the downtown area) and ultimately leads to the coast.

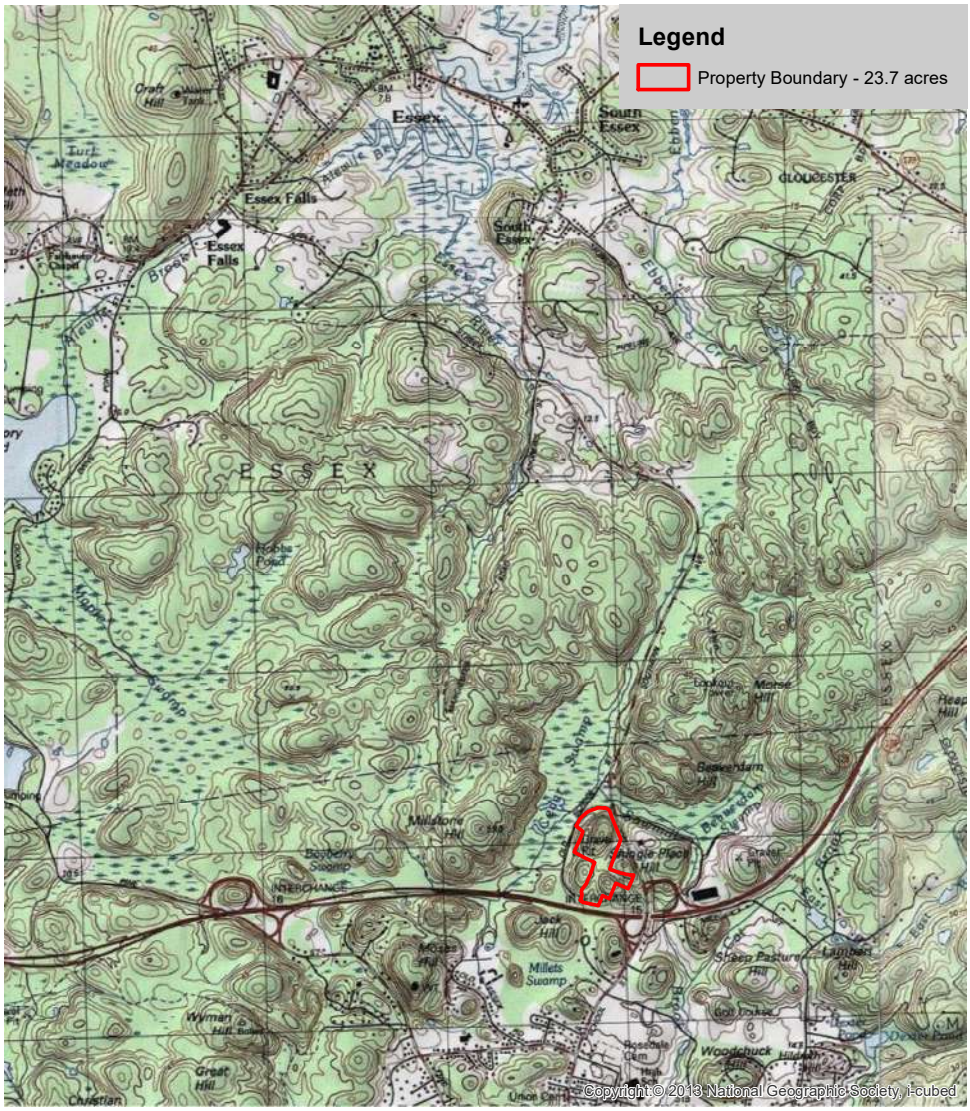

Figure 1. Subject Property and Surrounding Areas
0 School Street, Manchester-by-the-Sea, MA
(Map: 43, Lot: 18)

N
Date: 5/31/2022
0 1,250 2,500 Feet
1 inch = 2,500 feet

GIS Data Source: "Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, MassIT"

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The property consists of two large hills reaching approximately 150ft in elevation and contains a Bordering Vegetated Wetland (BVW) system running north to south and several vernal pools largely between the northern and southern portions of the overall site. Tree cover is dominated by coniferous species such as white pine and eastern hemlock and deciduous species like American beech, red oak, and white oak (Figure 2). As seen in Figure 2, areas were determined to be either “deciduous dominant” or “coniferous dominant” if the canopy cover of the analyzed area featured over 80% of deciduous or coniferous species.

Figure 2. Existing Cover Types
0 School Street, Manchester-by-the-Sea, MA
(Map: 43, Lot: 18)

N
Date: 6/2/2022
0 125 250
Feet
1 inch = 250 feet

GIS Data Source: "Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, MassIT"

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The proposed project intends to develop approximately 7.2 acres atop the hill in the northern coniferous dominant section of the property (Figure 3). Figure 3 shows a closer view of the existing canopy characteristics within the proposed limit of work. There are more coniferous trees within the limit of work.

Figure 3. Existing Cover Types within Limit of Work
0 School Street, Manchester-by-the-Sea, MA
(Map: 43, Lot: 18)

N
Date: 6/2/2022
0 75 150
Feet
1 inch = 150 feet

GIS Data Source: "Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, MassIT"

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The site is mostly undisturbed except for portions of the northern and western sides where there were historic alterations around the existing cart path (Figure 4) that is approximately 8-10' wide

and supports some limited vehicular access. The extent of major disturbance was approximated based on historic aerials from between 1955-1995.

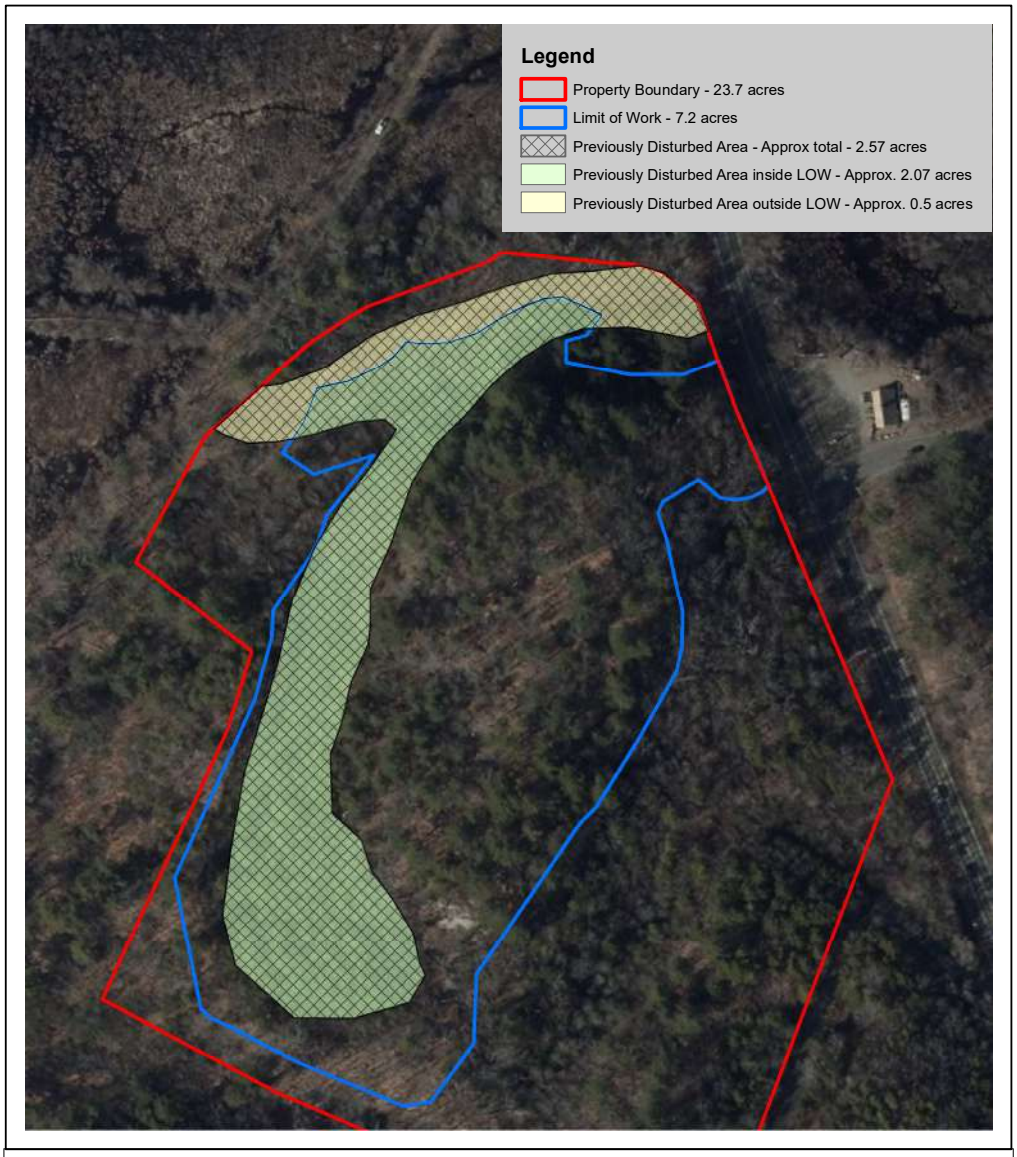

Figure 4. Approximate Previsouly Disturbed Area
0 School Street, Manchester-by-the-Sea, MA
(Map: 43, Lot: 18)

The following photos show an old cart path connected to Old School Street, which is the main path that runs through a portion of the site. This cart path and area around it was used from the early 1960s to 1980s; research of historical records suggest these portions of the property were used as a gravel pit and are labeled as such on USGS topographic maps (Figure 1). To this day

signs of past activity are visible in the form of large boulder piles, topography changes (such as unnatural bowls in the earth), and the overall younger age of trees in this area.

Photo 1. View of main cart path, looking into the site from Old School St.

Photo 2. Signs of past disturbance in the northern portion of the site.

In the northern portion of the site, there is an approximately 6,422 square foot area of Japanese knotweed, an invasive plant that easily spreads through disturbed areas and outcompetes native species (Figure 5). This area of invasive plants is the only portion of the site that contains a large amount of invasive species, a few scattered invasives were identified along the cart path.

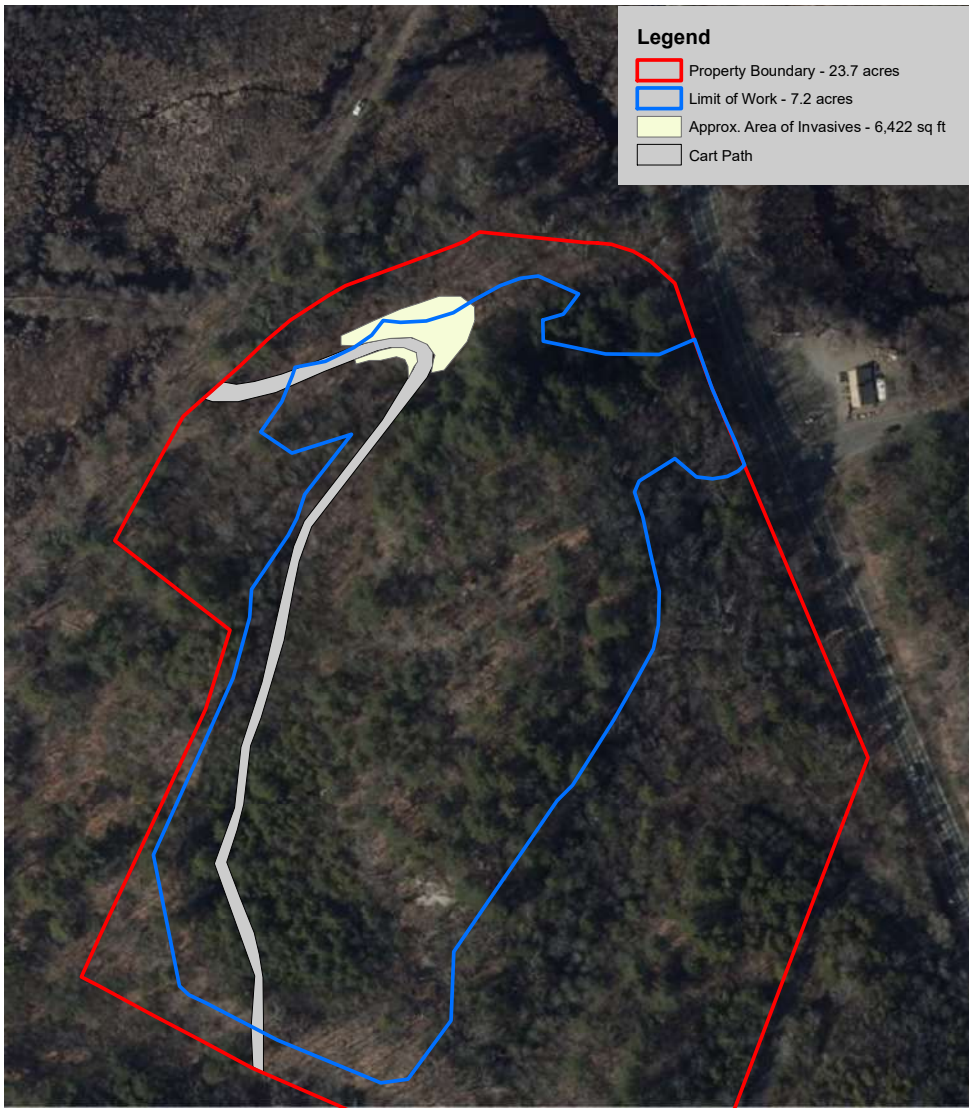

Figure 5. Approximate Size and Location of Japanese Knotweed
0 School Street, Manchester-by-the-Sea, MA
(Map: 43, Lot: 18)

N
Date: 6/2/2022
0 75 150 Feet
1 inch = 150 feet

GIS Data Source: "Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, MassIT"

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Photo 3. Invasive Japanese knotweed found in the northern section along the cart path.

Goddard Consulting undertook an intensive vernal pool survey of pools located on and immediately adjacent to the site. Goddard also conducted an overall wildlife study of the site to determine wildlife usage between March 8, 2022, and May 29, 2022. Representatives from the ZBA's peer review consultancy firm Beals and Thomas (B&T), joined Goddard on several field visits to monitor both the vernal pool surveys and wildlife habitat evaluation. B&T representatives were present for many of the vernal pool surveys and for portions of the wildlife corridor study and habitat evaluation.

The wildlife habitat study responds to the requests made by the Manchester Conservation Commission through the Zoning Board of Appeals during this comprehensive permit application process. The technical analysis contained herein illustrates how the proposed project will have a negligible impact on wildlife in the area and will not adversely impact the function of vernal pools with respect to wildlife interests.

On February 15, 2022, the Manchester Conservation Commission during their scheduled Conservation Commission meeting unanimously voted to require the applicant to conduct a wildlife study in accordance with their bylaw:

> *RESOLVED, that the Applicant is required to conduct at its own expense a Wildlife Habitat Study, under Manchester Wetlands Bylaw Section 9.10, based on the importance of wildlife corridors in the area, proximity to other areas suitable for wildlife, and actual*

or possible presence of rare plant or animal species in the area. The Wildlife Habitat Study will be conducted by a qualified professional acceptable to the Manchester Conservation Administrator beginning no later than March 1 during the upcoming 2022 breeding season, in and around all identified potential and certified vernal pools on and nearby 0 School Street, including:

1. potential vernal pools in the "A-Series" BVW,

2. certified vernal pools in the "B-Series" wetland,

3. certified vernal pools within Riverfront Area of Sawmill Brook just north of the property line, and

4. certified vernal pools along Cedar Swamp just south of the boardwalk and west of Old School Street.

The Study will include egg mass observation and counts in the vernal pools, along with amphibian collection using (e.g.) drift nets and pit traps in the areas upgradient of the vernal pools. Motion: Mr. Gang Second: Dr. Hayes Actual Vote: 7-0.

Details and further discussion of the wildlife habitat study, including wildlife corridors and overall suitability of on-site habitat as required under the bylaw, is described in section 3 of this report. This study also accounts for the possible presence of rare plant and animal species, but none were found on-site as described further in section 4.8.

2. Wildlife Habitat Evaluation

In 1986 the Massachusetts legislature recognized that wetlands can provide wildlife habitat and added "wildlife habitat" to the list of interests protected under the Wetlands Protection Act, M.G.L. c.131, §40. The following year, the Massachusetts Department of Environmental Protection (MassDEP) revised the Wetlands Regulations (310 CMR 10.00) to incorporate protection of wildlife habitat as a wetlands interest and adopted standards and procedures to protect important wildlife habitat functions in wetland resource areas.

The Massachusetts Wetland Protection Act regulations (310CMR 10.60) regarding wildlife habitat evaluations states:

(1) Measuring Adverse Effects on Wildlife Habitat.

(a) To the extent that a proposed project on inland Banks, Land under Water, Riverfront Area, or Land Subject to Flooding will alter vernal pool habitat or will alter other wildlife habitat beyond the thresholds permitted under 310 CMR 10.54(4)(a)5., 10.56(4)(a)4., 10.57(4)(a)3. and 10.58(4)(d)1., such alterations may be permitted only if they will have no adverse effects on wildlife habitat. Adverse effects on wildlife habitat mean the alteration of any habitat characteristic listed in 310 CMR 10.60(2), insofar as such alteration will, following two growing seasons of project completion and thereafter (or, if a project would eliminate trees, upon the maturity of replanted saplings) substantially reduce its capacity to provide the important wildlife habitat functions listed in 310 CMR 10.60(2). Such performance standard, however, shall not apply to the habitat of rare species, which are covered by the performance standards established under 310 CMR 10.59.

(2) Wildlife Habitat Characteristics of Inland Resource Areas.

(a) Banks. The topography, soil structure, and plant community composition and structure of banks can provide the following important wildlife habitat functions:

1. *Food, shelter and migratory and breeding areas for wildlife*
2. *Overwintering areas for mammals and reptiles.*

(b) Land under Water Bodies or Waterways. The plant community and soil composition and structure, hydrologic regime, topography and water quality of land under water bodies or waterways can provide the following important wildlife habitat functions:

1. *Food, shelter and breeding areas for wildlife;*
2. *Overwintering areas for mammals, reptiles and amphibians.*

(c) Vernal Pool Habitat. The topography, soil structure, plant community composition and structure, and hydrologic regime of vernal pool habitat can provide the following important wildlife habitat functions:

1. Food, shelter, migratory and breeding areas, and overwintering areas for amphibians;
2. Food for other wildlife.

(d) Lower Floodplains. The hydrologic regime, plant community and soil composition and structure, topography, and proximity to water bodies and waterways of lower floodplains can provide the following important wildlife habitat functions:

1. *Food, shelter, migratory and overwintering areas for wildlife;*
2. *Breeding areas for birds, mammals and reptiles.*

(e) Riverfront Area. The topography, soil structure, plant community composition and structure, and hydrologic regime can provide the following important wildlife habitat functions:

1. Food, shelter, overwintering and breeding areas for wildlife, including turtle nesting areas, nesting sites for birds which typically reuse specific nesting sites, cavity trees, and isolated depressions that function as vernal pools.
2. Migratory areas along the riparian corridor including the movement of wildlife unimpeded by barriers within the riverfront area.

When conducting a wildlife habitat evaluation, the first step is to complete a technical analysis to determine each Massachusetts Wetland Protection Act resource area that could be adversely affected by the proposed work. Then for each resource area, the second step is to determine whether the scope of work is above the "significance" threshold, and whether it is in vernal pool habitat or mapped Habitat of Potential Regional or Statewide Importance. The third step is, for each resource area, to determine whether an Appendix A or Appendix B is required. Based on the findings from this step, the fourth step is to complete an Appendix A and/or B as required. The last step is, based on the findings from Appendix A and/or B for each resource area, to determine whether the work will have either (1) no adverse effect; (2) an adverse effect that *can* be avoided via redesign, mitigation, or conditioning; or (3) an adverse effect that *cannot* be avoided via redesign, mitigation, or conditioning. Figure 6 on the following page shows the resource areas and associated buffer zones subject to protection under the WPA and shows that very little proposed work takes place within a resource area subject to protection.

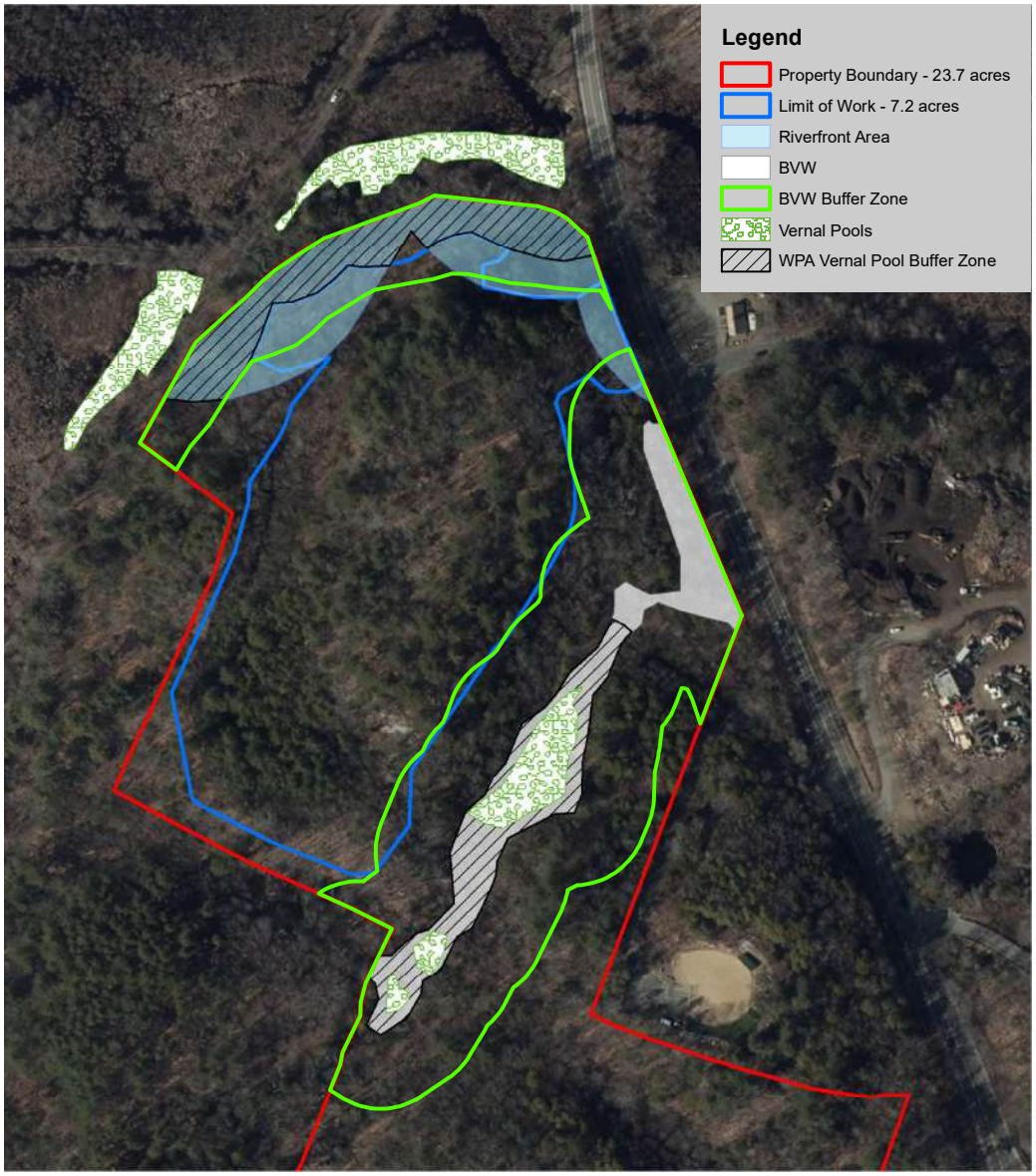

Figure 6. WPA Resource Areas and Buffer Zones
0 School Street, Manchester-by-the-Sea, MA
(Map: 43, Lot: 18)

N
Date: 6/6/2022
0 100 200
Feet
1 inch = 200 feet

GIS Data Source: "Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, MassIT"

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This wildlife study and evaluation was based on a document published by DEP titled *Massachusetts Wildlife Habitat Protection Guidance for Inland Wetlands.* This document is primarily intended to provide guidance to determine if proposed projects will or will not meet the standard of "No Adverse Effect", which means that a project site will not substantially reduce the site's capacity to provide important wildlife habitat functions for species other than rare or

endangered species following two growing seasons. These wildlife habitat evaluations are usually conducted for impacts to resource areas when certain thresholds are surpassed.

For work within an undeveloped Riverfront Area which exceeds 5,000 square feet, the issuing authority may require a wildlife habitat evaluation study under 310 CMR 10.60. In relation to Riverfront Area, the DEP guidance document states:

> *The entire Riverfront Area is presumed to be significant for wildlife habitat. However, different review requirements apply depending on whether the riverfront is undeveloped (310 CMR 10.58(4)), previously developed (310 CMR 10.58(5)) or if the activity is grandfathered or exempted from requirements for the riverfront area (310 CMR 10.58(6)).*
>
> *ALTERATIONS TO UNDEVELOPED RIVERFRONT ABOVE 5000 S.F.*
> *Applicants should submit a simplified wildlife habitat evaluation (Appendix A) and must demonstrate that the project will not adversely affect wildlife habitat (Section V) for all projects altering greater than 5000 s.f. of undeveloped riverfront area. Applicants must submit a detailed wildlife habitat evaluation (Appendix B) for all alterations that are greater than 5000 s.f. that alter any portion of Habitat of Potential Regional or Statewide Importance or for any size alteration to certified or documented vernal pool habitat.*

According to the regulations and guidance document, we completed an Appendix A for the proposed work within Riverfront. Appendix A did not identify any important habitat features listed and the proposed activities within the Riverfront Area do not trigger an Appendix B. This project would not meet or exceed any other thresholds described in the guidance document. However, we used this document to provide guidance and insight into habitat features on-site and determine if this project could have an adverse impact on wildlife habitat per state regulations. This technical analysis indicates that the project will meet the WPA's standard of "No Adverse Impact" to wildlife habitat at the Manchester site.

2.1 Local Regulations (Wildlife Habitat)

While subject to waiver under G.L. c. 40B, we undertook analysis under the local wetlands bylaw and regulations. The local wetland bylaw section 9.10 states in part: *the ConCom may require a wildlife habitat study of a project area, to be paid for by the applicant, whenever it deems appropriate, regardless the type of Resource Area or the amount or type of alteration proposed. The decision shall be based upon the ConCom's estimation of the importance of the habitat area considering (but not limited to) such factors as proximity to other areas suitable for wildlife, importance of wildlife corridors in the area, or actual or possible presence of rare plant or animal species in the area.*

This local requirement goes above and beyond the state standard that sets "significance" thresholds that must be met or exceeded to require an evaluation. This local requirement is highly dependent on the Conservation Commission's estimation and interpretation of the wildlife habitat on any given site. The bylaw only calls out conducting habitat evaluations for any type of Resource Area as defined in the Bylaw and is specific to wetland resource area, not upland habitats. The town's wetland regulations do not set forth guidance or standards to be used in wildlife habitat evaluations. However, it is presumed that the DEP guidance document is to be

used, so we have used the standard forms and guidance from DEP's requirements for evaluations.

The local wetlands bylaw only regulates areas subject to protection under the bylaw. Despite the fact that jurisdiction is enhanced under the local bylaw (as compared to the State Wetlands Protection Act), the vast majority of the proposed work for the Project is outside the jurisdiction of the bylaw. Only a small portion of the proposed work takes place within a Resource Area or Resource Area Buffer Zone as defined under the local wetlands bylaw. As shown in Figure 7, under the local bylaw, there is approximately 2 acres of disturbance to Buffer Zone to the vernal pools.

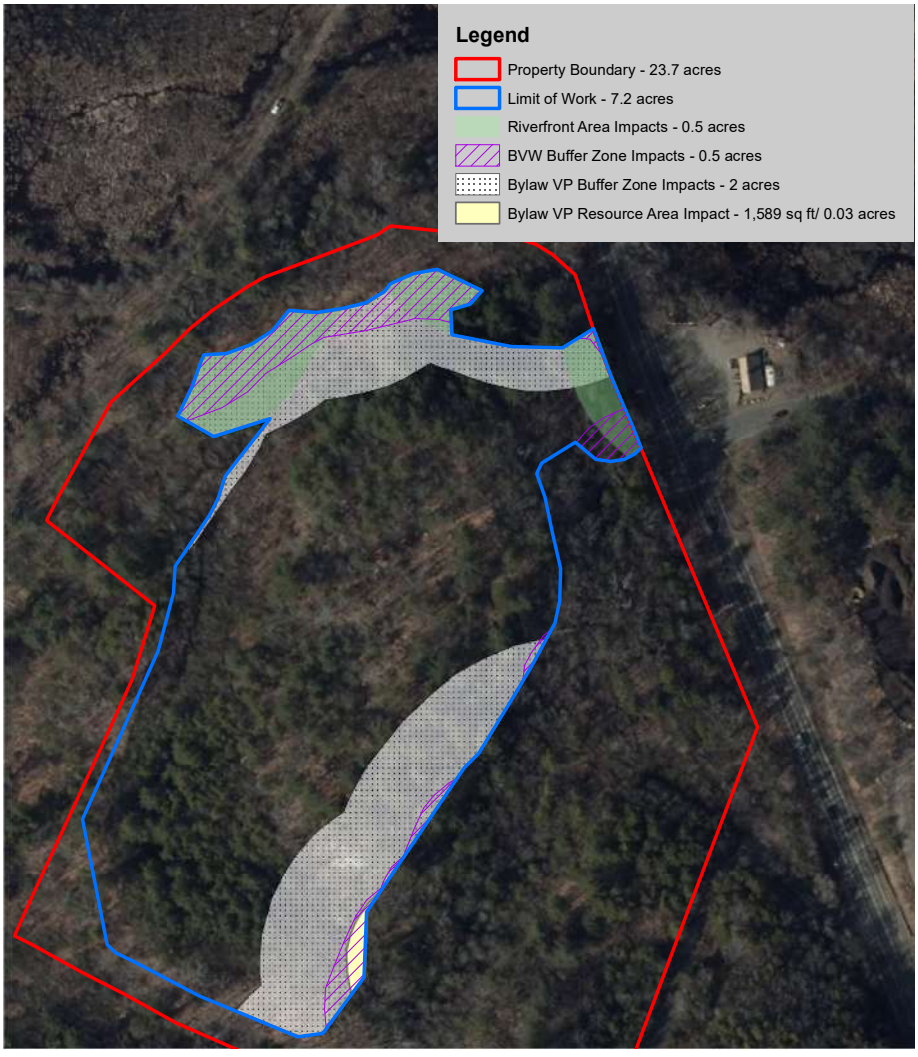

Figure 7. Bylaw Resource Area and Buffer Zone Impacts
0 School Street, Manchester-by-the-Sea, MA
(Map: 43, Lot: 18)

N
Date: 6/6/2022
0 75 150
Feet
1 inch = 150 feet

GIS Data Source: "Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, MassIT"

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There is a simplified wildlife habitat evaluation (Appendix A) for work within Riverfront Area and two detailed wildlife habitat evaluation forms (Appendix Bs) attached to this report which represent areas of study on the project site: the first Appendix B is for inside the proposed limit of work, and the second Appendix B is for outside the limit of work. These evaluations (Appendices A and Bs) encompass the entire site - both resource areas (wetlands) and non-resource areas (uplands). These evaluations are typically reserved for areas subject to protection; both the WPA and local Bylaw do not have jurisdiction over areas outside resource areas. However, for this evaluation and in an effort to be comprehensive, we did evaluate all upland areas throughout the site.

2.2 Methods (Wildlife Habitat)

Using the guidance document, we thoroughly surveyed (via direct observation) the entire site for plant species, percent plant cover, habitat continuity, connectivity to ensure wildlife access to adjoining natural habitats, habitat degradation, and identified habitat features and characteristics frequently used by wildlife that are specifically called out in the guidance document.

2.3 Findings Inside Limit of Work (Riverfront Area, Bylaw VP Buffer Zone)

Inside the proposed limit of work, the following wildlife habitat features were identified:

- Upland/wetland food plants (hard mast and/or berry producers)
- Shrub thickets or streambeds with abundant earthworms (American Woodcock)
- Dead standing trees (see attached Appendix B for details)
- Small mammal burrows
- Dense herbaceous cover (voles, small mammals, amphibians & reptiles)
- Large woody debris on ground (small mammals, mink, amphibians & reptiles)
- Rock piles, crevices, or hollow logs (suitable for mink, porcupine, bobcat)

The above-listed identified habitat features are common and abundant inside the limit of work, throughout the site, and surrounding area off-site. The mature oak and pine trees present within the limit of work are presumed to provide wildlife habitat in the form of foraging, sheltering and nesting habitat to small mammals and birds. Their acorns and pinecones are valuable to deer, squirrels, chipmunks, blue jays, and other birds. The dead standing trees offer habitat as possible nesting locations for some birds. Less than half of the dead standing trees identified on-site are within the limit of work and only 11 of the dead standing trees are within an area subject to protection. The woody debris and rocks throughout this area offer good cover and foraging opportunities to small mammals and snakes. Figure 8 shows all dead standing trees and woody debris piles that were identified during site visits. These features are spread throughout the site and nearby area. Even with the construction of the project, there will continue to be an abundance of these features.

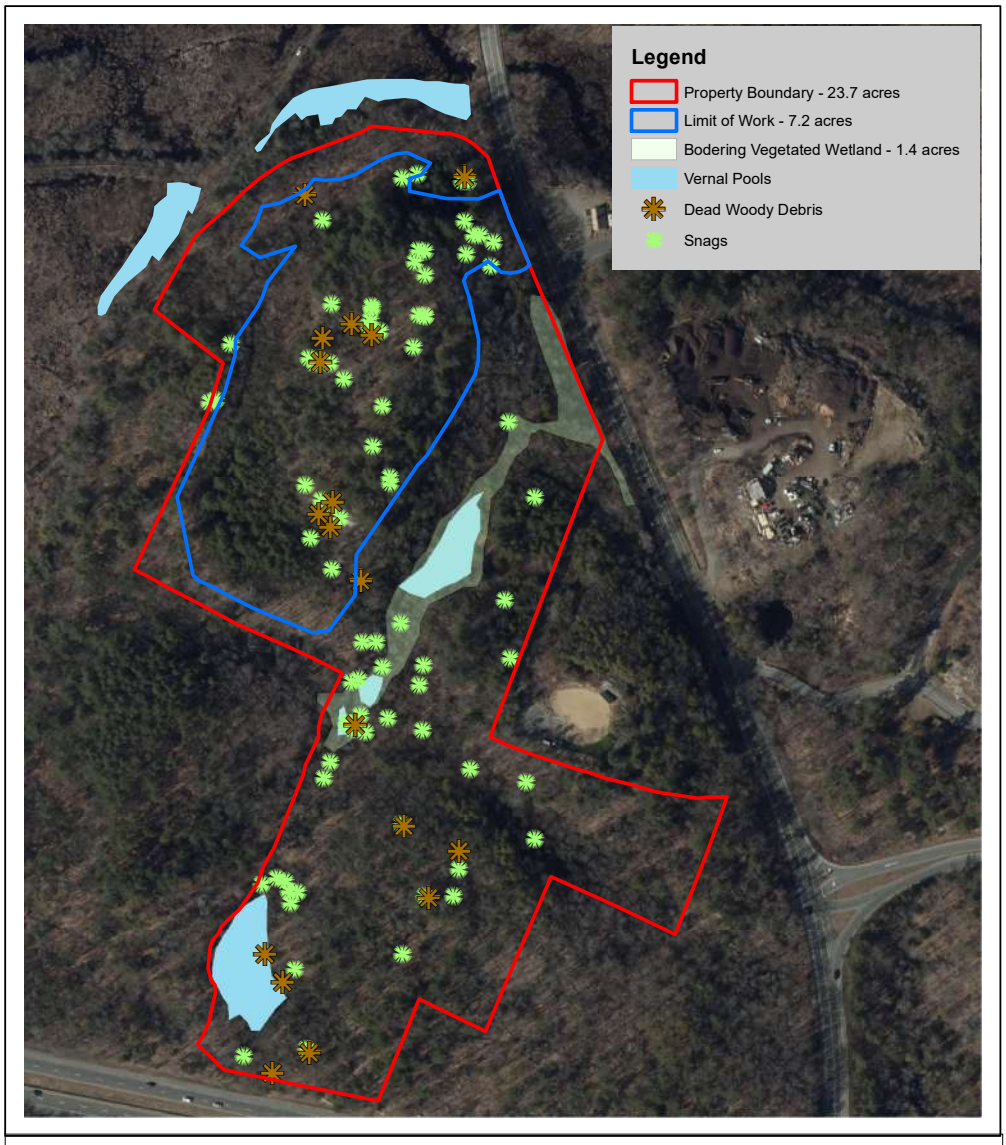

Figure 8. Existing Snags and Woody Debris
0 School Street, Manchester-by-the-Sea, MA
(Map: 43, Lot: 18)

2.4 Impacts to Areas Subject to Protection under Bylaw

A total of 11 dead standing trees within the resource areas will be removed. There will be 43 dead standing trees that will remain on the site that will provide habitat for a variety of species. Dead standing trees are abundant on-site and in the surrounding larger environment. The rock piles found in the northern portion of the site exist due to the past gravel pit operations. Rock piles will continue to be present throughout the site after construction. The eastern slope and central BVW contain many rock piles and there are several rock walls found around the site.

These rock slopes and walls will continue to support the small mammals, amphibians, and reptiles that use these features for shelter and foraging.

2.5 Findings Outside Limit of Work (BVW, Vernal Pools, Buffer Zone, Upland)

Outside the proposed limit of work, the following important wildlife habitat characteristics were identified:

- Wetland/aquatic food plants
- Upland/wetland food plants (hard mast and/or berry producers)
- Shrub thickets or streambeds with abundant earthworms (American Woodcock)
- Dead standing trees (see attached Appendix B for details)
- Small mammal burrows
- Dense herbaceous cover (voles, small mammals, amphibians & reptiles)
- Large woody debris on ground (small mammals, mink, amphibians & reptiles)
- Rocks, crevices, logs, tree roots or hummocks under water's surface (turtles, snakes, frogs)
- Rocks, crevices, fallen logs, overhanging branches, or hummocks at or within 1m above the water's surface (turtles, snakes, frogs, wading birds, wood duck, mink, racoon)
- Rock piles, crevices, or hollow logs suitable for: mink, porcupine, bobcat
- Live or dead standing vegetation overhanging water or offering good visibility of open water (e.g., osprey, kingfisher, flycatchers, cedar waxwings)
- Depressions that may serve as seasonal (vernal/autumnal) pools
- Standing water present for at least part of the growing season, suitable for use by: breeding amphibians, non-breeding amphibians (foraging, re-hydration), turtles, foraging waterfowl
- Sphagnum hummocks or mats, moss-covered logs or saturated logs, overhanging or directly adjacent to pools of standing water in spring

Photo 4. Typical view of dead woody debris piles found throughout the site.

The characteristics of the on-site BVW and vernal pools indicate they are not likely deep enough to support over-wintering by turtles. No turtle nesting habitat (exposed, sparsely vegetated sandy soils) was observed within the property. Painted turtles have been observed in Cedar Swamp directly adjacent and it is unlikely they migrate onto the site for nesting, foraging, or sheltering.

Other wildlife that may make use of the wetland system include small mammals such as chipmunks, voles, shrews, mice and moles which could find invertebrates, seeds and berries for food and rotting logs for shelter. Mammals such as skunks and raccoons could forage for invertebrate prey and use the wetland as a migratory corridor. Large mammals such as deer, foxes and coyotes likely use the wetland as a migratory corridor to connect with the adjacent parcels but would not be expected to use the wetland as a denning site. Garter snakes may forage for insects and amphibians and take shelter under the numerous crevices and logs. A variety of birds likely make use of the nut-and-berry-producing plant species present within the BVW and surrounding area for food, and possibly for nesting in the tree or shrub canopy.

2.6 Discussion

No unique or uncommon wildlife habitat features will be eliminated for construction of the project. All the existing habitat features identified above (tree cavities, large trees, nut-and-berry-producing plants, rotting logs/woody debris, etc.) are common and are present and/or abundant

elsewhere within the site's undeveloped wetland and upland resource areas, so the loss of some of these features will be negligible in the landscape context. Water will continue to be present within the non-developed central portion of the site during the wettest periods of the year, and will therefore continue to provide foraging, sheltering, and breeding habitat to amphibians and other wildlife. The footprint and magnitude of the wildlife habitat impacts are small relative to the amount of forested wetland and upland forest that will remain in place upon completion of the project.

It is our professional opinion that this project will not substantially reduce the site's capacity to provide important wildlife habitat functions, upon two growing seasons, function will fully resume, as exists today. For example, the site contains many dead standing trees (also known as "snags") of varying sizes which may be used by different species of birds and/or mammals. In all, there are approximately 81 dead standing trees ranging in size from 6"- >24" DBH (Diameter at Breast Height). Due to the presence of additional dead standing trees outside the limit of work, the proposed project will not affect the overall healthy balance of snags. Due to the wetland resources outside the limit of work, there were more important habitat features identified. There are no plans to affect any of these important habitat features identified outside the limit of work and the land located east and south of the proposed work is planned to be permanently protected with a conservation restriction totaling approximately 13.2 acres. This meets DEP's standard of "No Adverse Effect" as set forth in the regulations and the guidance document.

3. Wildlife Corridor Study

"Wildlife corridors" is generally a term used for an area designed or protected for wildlife to move between two or more open natural landscapes usually meant for migratory species. These areas tend to be a narrow tunnel or bridge to avoid roads or a wide swath of land between human developments that allow wildlife especially migratory species to travel between summer and overwintering grounds. Massachusetts lacks true migratory species besides birds and some insects, although some animals may make small migrations between areas depending on seasons. In the context of wildlife corridors as it relates to this area, these corridors are better viewed as the main areas that local wildlife uses to travel within their home ranges.

3.1 Methods and Findings

To identify and quantify the species and usage of the site, we deployed game cameras in a variety of locations throughout the site. Each camera was set to take a photo and 30-second video when motion was detected. The initial two cameras were placed on-site on 3/4/22 when there was still snow on the ground and animal tracks could be identified. The animal tracks helped us to determine the areas used most by animals in the area. These cameras were placed along trails and near sources of water (the area's most likely to be used by animals). The game cameras were placed both within the limit of work and outside the limit of work to determine which species used the site. Two additional cameras were set out approximately two weeks later. These additional cameras were placed were on top of the hill to determine the wildlife that frequently use this area. We were interested in seeing if animals used the site differently based on the topography of the site, so cameras were placed at different elevations. Below are some of the images of species that were captured on the game cameras.

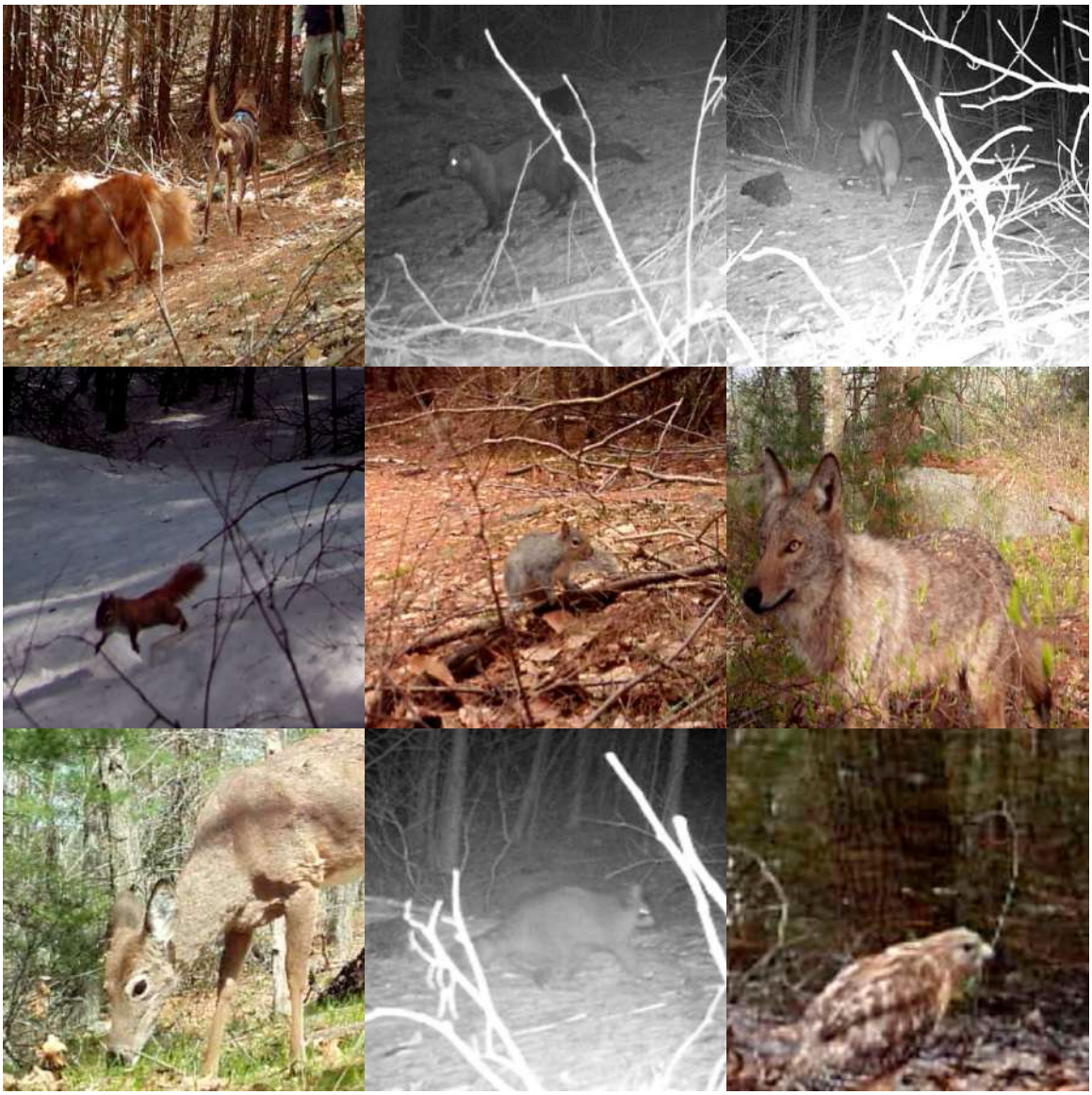

Photo 5. Wildlife captured on the game cameras. By row, left to right:
Human and dogs, fisher, red fox, red squirrel, gray squirrel, coyote, deer, raccoon, and red-shouldered hawk.

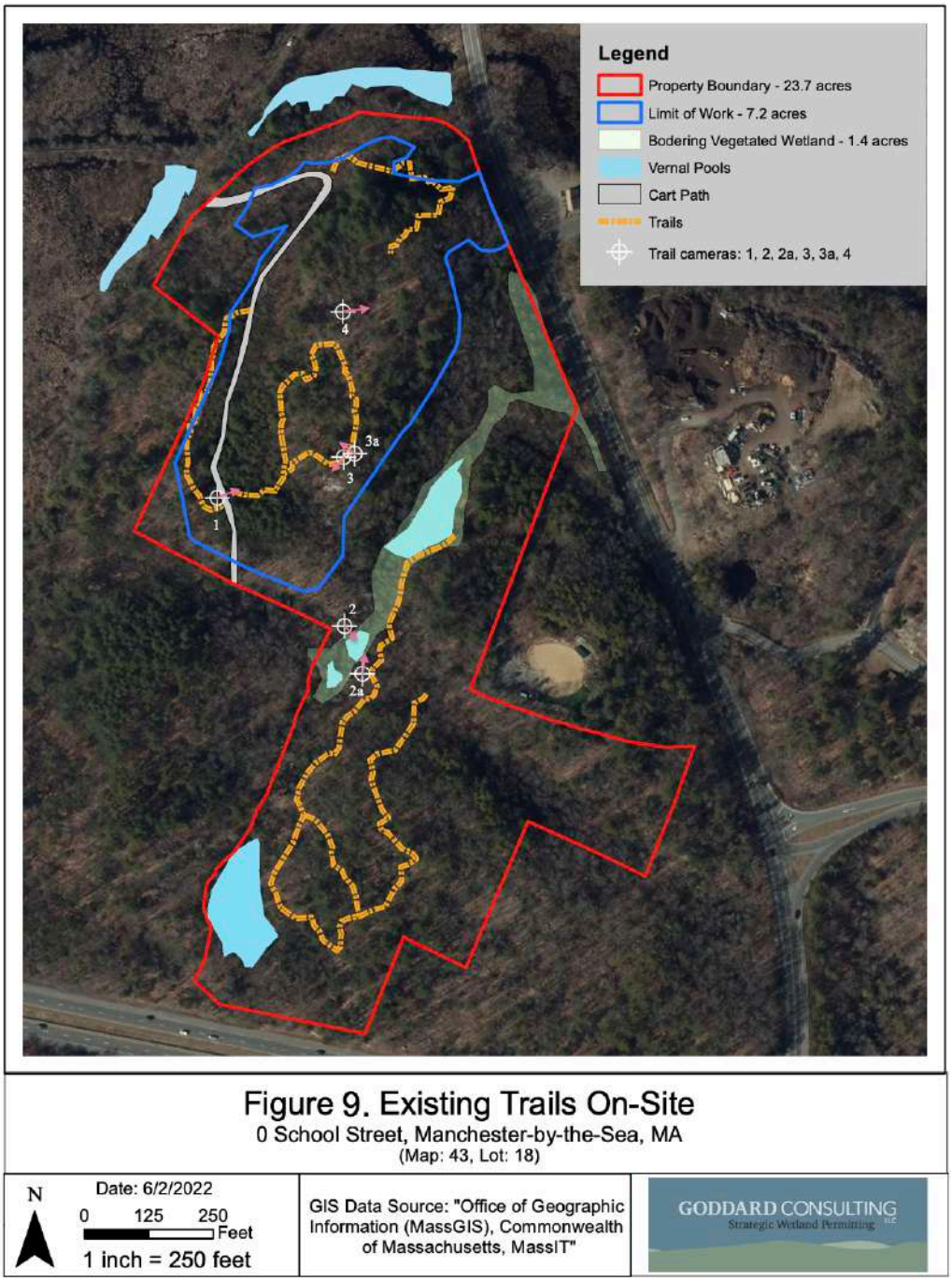

Figure 9. Existing Trails On-Site
0 School Street, Manchester-by-the-Sea, MA
(Map: 43, Lot: 18)

As shown above, Figure 9 shows the existing trails and the location of the game cameras. Camera 1 was placed at the intersection of the old cart path (facing north-northeast) and a game trail. This was an ideal place for the camera as it could detect animals moving to/from three directions and this was located at a mid-level elevation. This camera was by far the most active and captured the most species. Camera 2 was placed at potential vernal pool A (facing southeast and the lowest elevation). This area is outside the limit of work and is likely a good water source for a portion of the year for the wildlife in the area. After 2-3 weeks, the camera did not have many detections, so the camera was moved to the opposite side of the same vernal pool (facing

north). Camera 3 was placed inside the limit of work near the top of the hill (facing southwest and highest elevation), on the eastern side. The camera was moved slightly after 2 weeks due to many false triggers and no animal detections. The new spot (facing northwest), approximately 12 feet away from the original camera spot, had many more accurate detections. Camera 4 was also placed inside the limit of work at the top of the hill (facing east). Approximately half of all captures were false triggers. Many of the false triggers were set off by branches and leaves moving in the wind, which are common false triggers for all game cameras.

	Camera 1	Camera 2	Camera 3	Camera 4
Eastern Coyote (*Canis latrans*)	X	X	X	X
White-tailed Deer (*Odocoileus virginianus*)	X	X	X	X
Northern Racoon (*Procyon lotor*)	X			
Fisher (*Martes pennanti*)	X		X	
Red Squirrel (*Tamiasciurus hudsonics*)	X			
Eastern Gray Squirrel (*Sciurus carolinensis*)	X			X
Dogs/Humans	X	X	X	X
Red Fox (*Vulpes vulpes*)	X			
Red Shouldered Hawk (*Buteo lineatus*)		X		

Table 1. Animal species detected by the game cameras in each location.

In addition to the game cameras placed to identify wildlife, Goddard noted of all the bird species that were seen or heard on-site during all site visits. Birds that were identified on-site include: Black-capped chickadee (*Poecile atricapillus*), Ovenbird (*Seiurus aurocapilla*), Tufted titmouse (*Baeolophus bicolor*), Northern flicker (*Colapets auratus*), American Crow (*Corvus brachyrhynchos*), American Robin (*Turdus migratorius*), Gray Catbird (*Dumetella carolinensis*), White breasted nuthatch (*Sitta carolinensis*), Barred owl (*Strix varia*), Blue jay (*Cyanocitta cristata*), Dark eyed junco (*Junco hyemalis*), Downy woodpecker (*Dryobates pubescens*), and Red-shouldered hawk (*Buteo lineatus*).

Photo 6. Barred Owl found on-site on 4/8/22.

3.2 Discussion

The trails found both on and off site are the main corridors that wildlife use to traverse this site and the adjacent land (Figure 11). These trails offer animals the path of least resistance-- it is well documented that animals prefer to use trails (when available) to move across landscapes. As shown in Figure 11, the main wildlife corridors follow existing trails and topography across the site. Animals will tend to not travel up and down steep slopes if there is no path. The trails throughout the site offer easy access to certain areas, such as the top of the hill, that otherwise would likely be used less if no trails were present. With a major highway (Rt. 128) along the southern property boundary, acting as a major wildlife barrier, it is likely some animals never move south of this site. Sawmill Brook is found north of the site and any animals wanting to travel across the brook will use Old School St, the boardwalk on MECT land that cuts across the wetland, and/or travel along School Street. Some may attempt to cross Rt. 128; however, the land becomes more developed and populated as you travel south towards the coast. This site sits at the southeastern corner of a very large (1,700+ acres) generally undisturbed natural environment (Figure 1). This site is likely the southern portion of many of the animals' home ranges. As shown in Figure 10, we can expect wildlife to use the trails on the site and the likely areas they access off-site. Animals in this general area are likely to use the many miles of trails throughout the conservation land adjacent to this site.

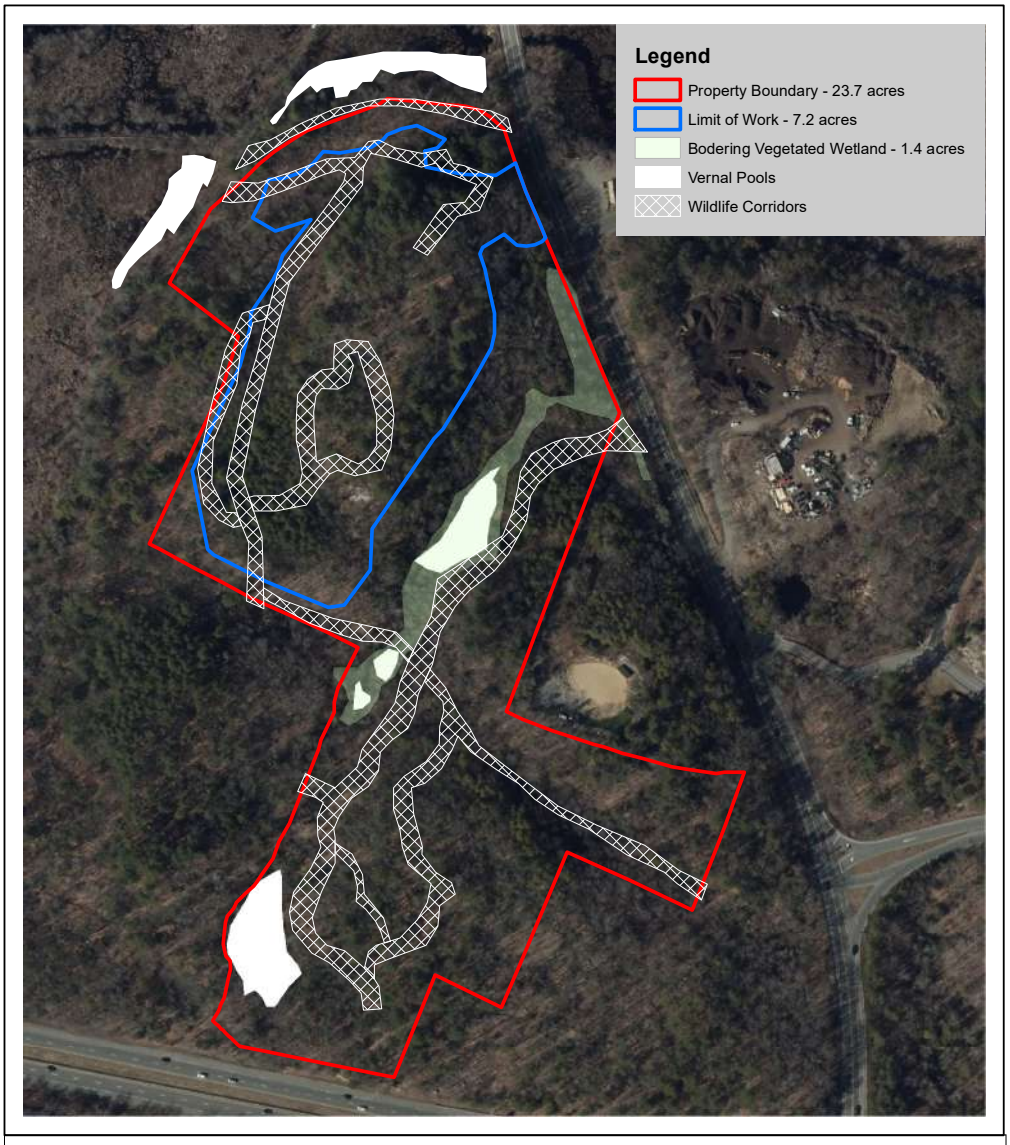

Figure 10. Wildlife Corridors
0 School Street, Manchester-by-the-Sea, MA
(Map: 43, Lot: 18)

All the wildlife found on-site are highly adaptable and often co-exist with humans. The proposed project will result in the loss of approximately 7.2 acres of wooded habitat, provided however, that a portion of the site is planned to be native meadow mix that will exponentially improve the pollinator habitat found in this area. The addition of many native trees and shrubs as part of the proposed landscaping plan along with the surrounding natural vegetation, this area could likely be used by a wider variety of species. Wildlife will still be able to move across the area using different available routes. As shown in Figure 10, wildlife generally uses these corridors to travel between wetland resource areas. Even with the proposed development, there are abundant

opportunities for wildlife to move across the landscape and the development will not restrict animals from moving freely.

Figure 3 illustrates how the area inside the proposed limit of work has an abundance of coniferous trees. White pine and red oak are the dominant species found on top of the hill with a few areas dominated by other species. The entire site has almost 100% canopy cover, although the top of the hill has slightly less canopy coverage. There are a couple of sections within this area that have a fairly dense shrub layer made up of black huckleberry and lowbush blueberry. There is slightly more openness in this area which has allowed grass species to grow in this area. There is no other portion of the site that has a large amount of grasses growing like this area. For example, the southern portion of the limit of work is dominated by eastern hemlock. Eastern hemlock can be found throughout the site and is common around the wetland areas. During site inspections we found signs of the Woolly Adelgid, an invasive, aphid-like insect that attacks hemlock trees, on some of the hemlocks found on site. Indeed, there appears to be a minor infestation of the Woolly Adelgid. This species feeds off the nutrients from the trees and will eventually kill the tree in 4-10 years. The woolly adelgid is causing the widespread death and decline of hemlock trees throughout the eastern United States. The minor infestation of the Woolly Adelgid at the site is something to keep an eye on, as they could wipe out the hemlock trees within the next decade. Surrounding areas should also be monitored for signs of the Woolly Adelgid.

4. Vernal Pools

There are four vernal pools found on-site and two found just to the north and west of the site (Figure 6). Vernal pools are ephemeral pools that typically fill every year from precipitation, runoff, and rising groundwater. Most years they become completely dry by mid to late summer losing water through transpiration and evaporation. This wet-dry cycle prevents fish populations from becoming established, which is critical to the reproductive success of many amphibian and invertebrate species. Vernal pools are variable in appearance, water source, time of filling, surrounding habitat, plant and animal content, and many other factors (Burne & Kenney 2009).

Photo 7. Vernal pool A found in the center of the site looking north.

Vernal pools are important because they are essential habitat for portions of the life cycles of many species, particularly amphibians. They also can provide an important water source for other animals acting as links within upland habitat as amphibians and animals move across the landscape.

4.1 Massachusetts Wetlands Protection Act: Vernal Pool Habitat

Vernal pools are not considered a wetland resource area under the Wetlands Protection Act and are instead considered a wildlife habitat function. The MA Wetlands Protection Act defines Vernal Pool Habitat as:

> *Vernal Pool Habitat means confined basin depressions which, at least in most years, hold water for a minimum of two continuous months during the spring and/or summer, and which are free of adult fish populations, as well as the area within 100 feet of the mean annual boundaries of such depressions, to the extent that such habitat is within an Area Subject to Protection under M.G.L. c. 131, § 40 as specified in 310 CMR 10.02(1). These areas are essential breeding habitat and provide other extremely important wildlife habitat functions during non-breeding season as well, for a variety of amphibian species such as wood frog (Rana sylvatica) and the spotted salamander (Ambystoma macultum), and are important habitat for other wildlife species.*

The vernal pool definition in the WPA regulations is often misinterpreted as providing a 100-foot buffer around certified vernal pools. The inclusion of the 100-foot "vernal pool habitat" zone is an acknowledgement of the importance of surrounding land to vernal pool dependent wildlife.

However, WPA jurisdiction does not extend beyond the wetland boundary, so the 100-foot habitat zone is truncated at the wetland boundary. It is important to note that vernal pool habitat is only granted protection under DEP when the pool is certified, or credible evidence is provided to the Department during the NOI process. As stated in the above section of the regulations, vernal pool habitat includes the area within 100 feet of the mean annual boundaries, to the extent that such habitat is within a resource area as defined in the WPA. For example, if vernal pool A found on-site was certified, its "buffer zone" would only extend to the limit of the BVW that it is contained within. Since vernal pool Q is certified, it is afforded protection and has a 100-foot buffer under state regulations. In the case of vernal pool Q, it has the full 100-foot buffer because its buffer is within Riverfront Area, an area subject to protection under the WPA. The proposed development is not proposing any work within WPA vernal pool habitat.

Vernal pools in Massachusetts can be certified by providing biological and physical evidence to NHESP. There are two methods to certifying pools, the obligate method and facultative method. The obligate method is the easiest and best way to receive certification through NHESP. Obligate species are those species that must use vernal pools for various parts of their life cycle. These obligate species are, Wood Frog (*Lithbates sylvaticus*), Spotted Salamander (*Ambystoma maculatum*), Blue-spotted Salamander (*Ambystoma laterale*), Jefferson Salamander (*Ambystoma jeffersonianum*), Marbled Salamander (*Ambystoma opacum*), and Fairy Shrimp (*Eubranchipus sp.*). By providing evidence of breeding evidence and evidence the pool meets the physical criteria, the pool will become certified and gain protection under the WPA. More detailed information regarding the certification of vernal pools can be found in *Guidelines for the Certification of Vernal Pool Habitat* by NHESP.

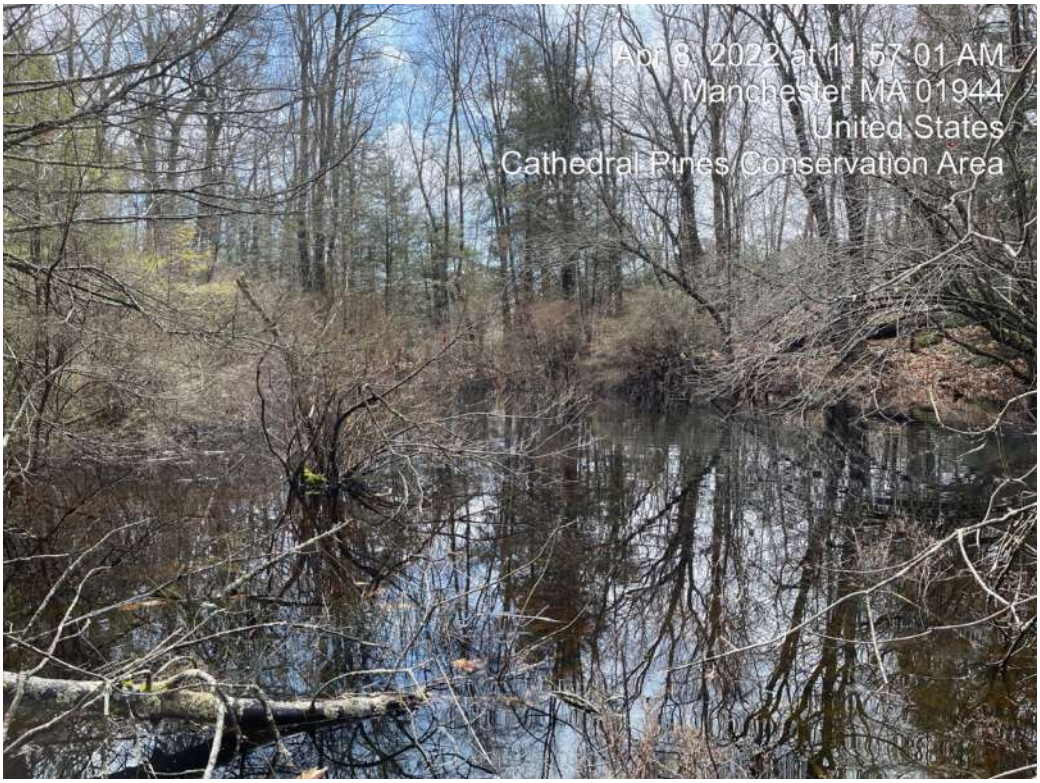

Photo 8. Certified vernal pool B located in the southern portion of the site.

4.2 Local Wetlands Bylaw: Vernal Pool Resource Area

It is important to note that, although the State Wetlands Protection Act does not consider vernal pools to be a distinct wetland resource, the protection of vernal pool function is subject to thorough review under the normal NOI process with a presiding Conservation Commission. That process will certainly take place in this matter, as the MBTS Conservation Commission retains jurisdiction under the Wetlands Protection Act.

Notwithstanding the protection afforded under the Wetlands Protection Act, Manchester's General Wetlands Bylaws protect vernal pools as an additional resource area. The bylaw defines a vernal pool as:

> *2.9 "Vernal Pool" shall mean, in addition to scientific definitions found in the Regulations, any confined basin or depression not occurring in existing lawns, gardens, landscaped areas or driveways which:*
>
> > *2.9.1 in most years holds water for a minimum of two continuous months during the spring and/or summer;*
> >
> > *2.9.2 contains at least 200 cubic feet of water at some time during most years;*
> >
> > *2.9.3 is free of adult predatory fish populations; and*
> >
> > *2.9.4 provides essential breeding and rearing habitat functions for amphibian, reptile or other vernal pool community species, regardless of whether the site has been certified by the Massachusetts Division of Fisheries and Wildlife.*
> >
> > *2.9.5 The boundary of the Resource Area for vernal pools shall be the 100 feet perpendicular to the mean annual high-water line defining the depression.*

Figure 11 shows the resource areas subject to protection under the local Bylaw, including this expanded resource area and buffer zone of Vernal Pools. Additional resource areas regulated under the Bylaw found on-site include Bordering Vegetated Wetland and associated 100-foot buffer zone and Riverfront Area from Sawmill Brook. There is no work proposed within WPA vernal pool habitat.

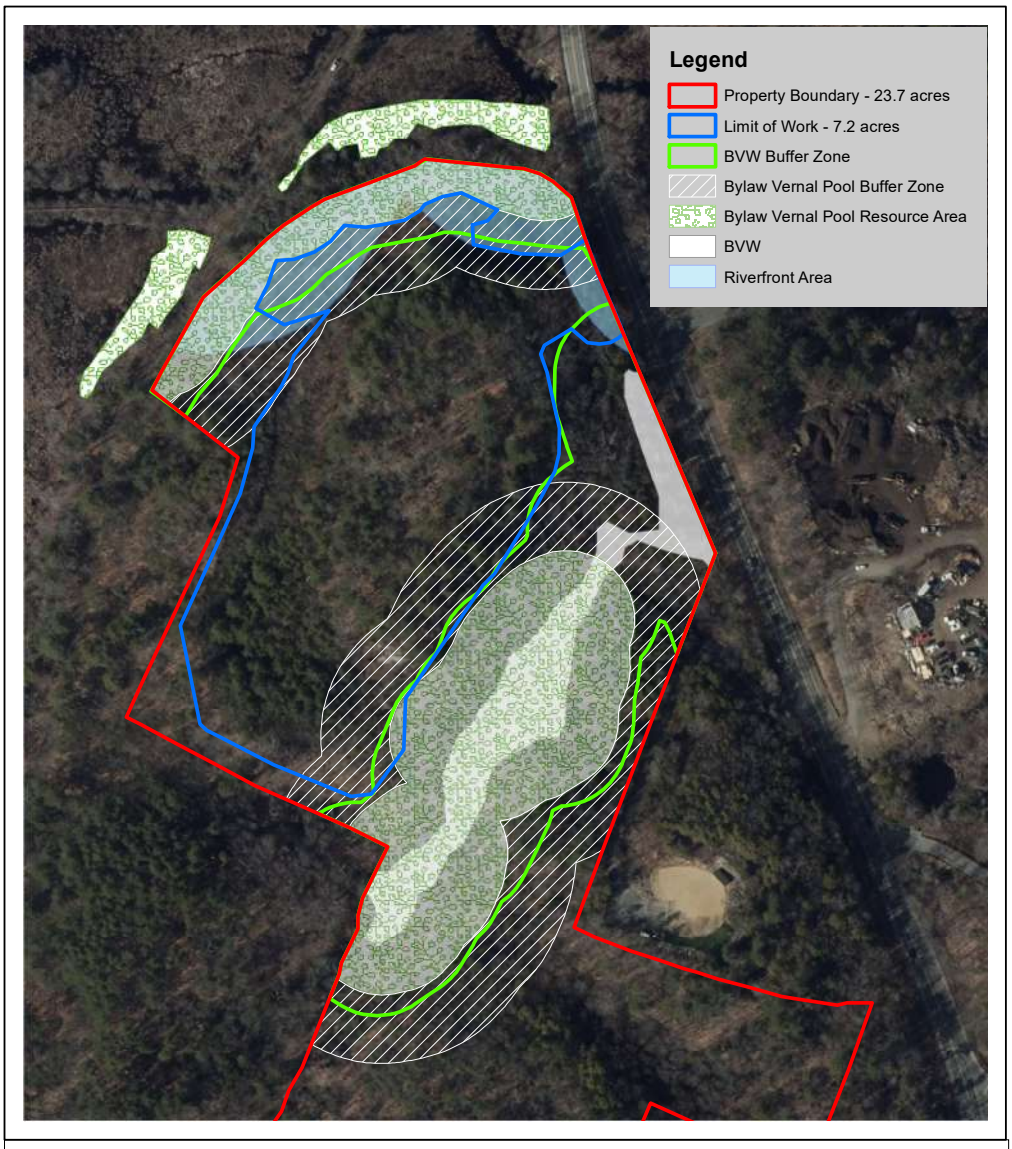

Figure 11. Bylaw Resource Areas and Buffer Zones
0 School Street, Manchester-by-the-Sea, MA
(Map: 43, Lot: 18)

4.3 Wood Frog Ecology

Wood frogs (*Rana sylvatica)* are widespread throughout New England and can be found in mesic woods, often far from water during the summer months (DeGraaf and Yamasaki 2001). Wood frogs are medium sized (1.5-2.5") and light tan to dark brown with a distinct dark "mask" extending from each eye back through the tympanum (Burne & Kenney 2009). Wood frogs breed and lay eggs in woodland ephemeral pools in early spring before returning to their terrestrial habitats. Egg masses are a fist-sized gelatinous blob containing up to 1,500 individual eggs. Egg masses are attached to vegetation or branches hanging into the water in sunny portion

of a pool. Egg masses are often laid in the same area creating large communal clusters know as a "raft". Eggs hatch in about 28 days and by June, the tadpoles have developed legs and emerge onto land. Tadpoles are preyed upon by various aquatic insects (diving beetles and giant water bugs, etc.) as well as snakes, turtles, and various wading birds (Burne & Kenney 2009).

4.4 Spotted Salamander Ecology

Spotted salamanders (*Ambystoma maculatum*) are a large (4.5-8") amphibian named for their distinctive yellow spots across their black body. During the breeding season, males deposit spermatophores and females pick up the sperm and her eggs are fertilized internally. Within a few days females produce a single egg mass containing 30-250 individual eggs. Spotted salamanders are also known to produce communal egg mass clusters. Egg masses are easily distinguishable from other salamander eggs by their firm texture, similar to set gelatin. Eggs hatch within 6-8 weeks of being deposited. Larvae have feathery external gills to allow for breathing underwater. Larvae are also commonly preyed upon by predatory insects and turtles. As pools dry, development accelerates, and they develop legs and lungs. The external gills disappear as they transition into their terrestrial dwelling life stage.

Photo 9. Spotted salamander egg masses in CVP Q on 4/8/22.

4.5 Vernal Pool Surveys

A total of 6 vernal pools were surveyed as part of this study (including one new vernal pool identified while surveying). There are three certified vernal pools, two of which are located off site but are near the project site. The other certified vernal pool is in the southern portion of the property. The three other pools that are not certified are not currently mapped as potential. However, these three potential vernal pools do have the necessary biological and physical criteria set forth by Natural Heritage to be certified. All these areas, except the new area identified this year, were surveyed in the spring of 2021 as part of the ANRAD permitting process with the Manchester Conservation Commission. All vernal pools were meticulously surveyed using polarized sunglasses to reduce the glare off the water's surface and a dip net to survey for fairy shrimp and other macro invertebrates. As stated earlier, representatives from B&T witnessed many of the surveys.

In a given year, only a portion of the adult spotted salamander population breeds. The percent of breeding adults varies by population, and can range from about 33% to 90% (Husting 1965; Windmiller 1996; Douglas & Monroe 1981; Whitford and Vinegar 1966). This year, many more egg masses were found than in 2021 (Table 2). This could be due to the natural year-to-year variations in the amount of egg masses that can be expected for any site. Vernal pool activity that we surveyed for included wood frog chorusing or in amplexus, salamander congressing, spermatophores and/or egg masses.

Pool ID	Certified/Potential Status	Number of Egg Masses 2022	
		Spotted Salamander	Wood Frog
VP A	Potential	69	0
VP B	Certified (#8196)	215	105
VP Q (CVP 8197)	Certified (#8197)	68	0
VP R (CVP 8198)	Certified (#8198)	26	0
VP S	Potential	5	0
VP T	Potential	67	0

Table 2. The number of egg masses found in each vernal pool during the 2022 vernal pool breeding season.

Pool ID	Certified/Potential Status	Number of Egg Masses 2021		Number of Egg Masses 2022	
		Spotted Salamander	Wood Frog	Spotted Salamander	Wood Frog
VP A	Potential	13	0	69	0
VP B	Certified (#8196)	103	115	215	105
VP Q (CVP 8197)	Certified (#8197)	17	0	68	0
VP R (CVP 8198)	Certified (#8198)	18	0	26	0
VP S*	Potential	-	-	5	0
VP T	Potential	18	0	67	0

Table 3. Egg mass counts found in each vernal pool in 2021 and 2022.
*VP S was identified in 2022.

Wood frogs at this site have only been found in certified vernal pool B, located in the very southern portion of the property. In both 2021 and 2022, over 100 wood frog egg masses were identified in this pool. All the other surveyed pools only had Spotted salamander egg masses. It is unclear why vernal pool B is the only pool that contains wood frogs. It is well known that both wood frogs and spotted salamanders return to their natal pools to breed, although some studies have shown that there can be movement between pools. Vernal pool B is the biggest and deepest pool and may not dry up completely most years, except in drought conditions. Vernal pool B also contains good underwater and emergent vegetation as well as downed tree and branches that act as places for attachment of egg masses and refugia for developing larvae. Given that this pool is the only one that has for at least the last two years have wood frog breeding activity, and is outside the scope of work, it can be surmised that the proposed project will not have any impact on the wood frog population.

Photo 10. Wood frog egg masses in Certified vernal pool B in the southern portion of the site.

4.6 Site Visits

Visit 1 -- 3/18/22
During the site visit on 3/18, we discovered minnow traps placed in the certified vernal pools located in vernal pools Q and R. At this time, Goddard was unaware of the responsible party or reasoning for these traps, but it was suspected that they were surveying for vernal pool organisms and/or other freshwater invertebrates. On the 3/18 visit we noticed a couple of tadpoles, likely green frog and/or bull frog tadpoles in a few of the minnow traps. There were no signs of obligate species activity on 3/18 in any of the vernal pools, in fact about half of them still had some sort of snow or ice covering portions of them.

Visit 2 -- 3/25/22
During the site visit on 3/25 Goddard found signs of obligate vernal pool activity in all the pools. In vernal pool R, found at the intersection of Old School Street and the boardwalk, we found 40+ Spotted salamanders in the minnow traps that were set out in this certified vernal pool. In addition to the salamanders, we identified two spotted salamander egg masses. During our inspection of this vernal pool, we noticed that all the traps were all completely submerged underwater with no access to air, which was a major concern for us. Larval-stage salamanders have external gills but develop lungs as they get ready to leave the vernal pools. Adult salamanders need air to breathe, and we were unsure of how long they had been underwater or how often the responsible party checked the traps. We counted the number of salamanders in

each trap without opening them and then placed the traps back into the water in a way that allowed the salamanders to have access to air (Table 3).

Photo 10. Spotted salamanders in one of the minnow traps in CVP R on 3/25/22.

We found out that the Manchester Essex Conservation Trust was doing a vernal pool study to gather data and with the hopes of finding the state listed Blue-Spotted salamander or other rare species. These traps were removed by 4/8/22. It should be noted that we did not see any Blue-spotted salamander egg masses in any of the vernal pools during our surveys.

Trap Number	Number of Spotted salamanders in trap
7	20*
8	14
9	8
10	1
11	1
12	2

Table 4. Number of Spotted salamanders found in each trap in CVP R on 3/25/22.
*One dead Spotted salamander was found next to this trap.

In vernal pools A and T, 10 and 16 Spotted salamander egg masses were found respectively and spermatophores were found in each pool as well. In certified vernal pool B, we found 30 Spotted salamander egg masses, spermatophores, and heard wood frogs were chorusing.

Visit 3 -- 4/1/22
A new vernal pool was identified during this site visit. This small vernal pool is located just south of vernal pool A, and is delineated with flags now known as vernal pool S. This small vernal pool contained 5 Spotted salamander egg masses, which would meet the criteria for certification under Natural Heritage. It is possible that in some years this small pool isn't used by salamanders, or it may not hold enough water in the spring or dry up too quickly to support vernal pool life. All other pools continued to see an increase in the number of egg masses identified from prior weeks. Spring peepers, a facultative vernal pool organism, could be heard chorusing in certified vernal pool Q.

Visit 4 -- 4/8/22
Subsequent surveys after 4/8 revealed no new egg masses and it could be assumed that all the salamanders and frogs that were going to breed this year had already bred and laid eggs. The final count of the number of egg masses discovered in each vernal pool are listed in Table 1. We turned more of our focus to continuing to evaluate the site for wildlife and habitat features.

4.7 Spotted Salamander Terrestrial Habitat

The *Ambystoma* family of salamanders are also known as mole salamanders. Salamanders in this family spend almost all their time underground or under moist leaf litter which makes them incredibly secretive and seldom seen. Pool-breeding mole salamanders usually migrate to and from breeding ponds in early spring and spend the remainder of the year in underground refugia (Petranka, 1998). They commonly use small mammal tunnels and burrows, which there is an abundance of at this site. These salamanders can sometimes be found under leaf litter if the area is moist from recent rain, otherwise they risk dying from desiccation (drying out). Forest characteristics that are important for maintaining salamander populations are the amount of canopy cover, size of forested area, the depth of leaf litter, size and decay class of large woody debris, adequate soil moisture, and presence of small mammal tunnels (NHESP 2007, rev. 2016). Many salamanders show a decided preference for a breeding pond and return year after year. Others may adopt a new breeding pond if displaced (Shoop, C. R. 1965). There is an abundance of large woody debris of varying decay class throughout the site.

Recently metamorphosed spotted salamanders make initial movements out of natal wetlands on the scale of 20–50 m (Osbourn, 2012). Mortality during this initial movement phase is considerable; c. 17% of spotted salamanders may survive 1 year after metamorphosis (Rothermel & Semlitsch, 2002, 2006). Documented causes of mortality during this initial movement phase include desiccation (Rothermel & Luhring, 2005), predation (Rittenhouse, Semlitsch & Thompson, 2009), depletion of energy (Scott et al., 2007) and density effects (Harper & Semlitsch, 2007). Spotted salamanders have lower survival in open as opposed to close-canopy habitats (Rothermel & Semlitsch, 2002), and population persistence is highly dependent on the amount of forested habitat surrounding breeding ponds (Porej, Micacchion & Hetherington, 2004; Skidds et al., 2007). At the landscape scale, dispersing spotted salamanders are likely to avoid open habitat from urban or agricultural development, which may limit functional connectivity but increase the survival of juveniles in existing populations. (Pittman & Semlitsch, 2013). This study suggests that juvenile salamanders are able to behaviorally mitigate some degree of habitat loss by biasing movement toward quality habitat. (Pittman & Semlitsch, 2013).

4.8 Discussion

The site's rocky lower hillsides combined with predominantly deciduous forest cover over most of the site and create an ideal habitat for Spotted salamanders. The large boulders and rock formations near the bottom of the hills provide abundant tunnels and crevices for the spotted salamanders and other wildlife to live in. Burrows in well-drained soils are preferred as wet soils are not well oxygenated (Windmiller, 1996) Similarly, burrows in south-facing slopes may be preferred since they will freeze later in the fall and thaw earlier in the spring, because of longer exposure to solar insolation. (NHESP 2007, rev. 2016).

Photo 12. Typical view of the lower rocky hillsides offering cover and foraging opportunities for wildlife.

With the amount of egg masses found, it can be concluded that there is a healthy population of spotted salamanders on-site. The deciduous forested areas on site make favorable habitats in drier years and better overwintering habitat due to the greater diversity on the forest floor and deeper leaf litter. Salamanders and frogs may be less likely to use the coniferous dominant areas of the site due to the lack of good leaf litter. The top of the site (inside the limit of work) has a higher percentage of coniferous canopy coverage which in turn leads to less leaf litter on the ground.

Photo 13. Coniferous dominant area on top of hill, notice lack of leaf litter and more open canopy.

The lack of leaf litter, overall lack of a dense shrub layer, and higher topography in this area lead to drier soil conditions that are inhospitable to both spotted salamander and wood frog survivorship. The lower hillsides, gentler slopes, rocky boulder areas, and thick deciduous leaf litter are much more optimal habitats for spotted salamanders and wood frogs for their terrestrial ecology and overwintering habits. As Shown in Figure 12, only 0.7 acres (8.5%) of high-quality upland habitat will be impacted within the limit of work. The remaining approximately 1.3 acres of the upland vernal pool habitat is of poor quality. Based on knowledge of spotted salamander ecology and direct field observations, the quality of habitat was determined on the following factors: canopy cover, leaf litter, slope, invasive species, paths, dead woody debris, and boulders. The cart path and area of invasive species do not offer good quality habitat. Areas that generally contained more coniferous trees resulted in less leaf litter and less forest floor diversity which decreases the quality of habitat.

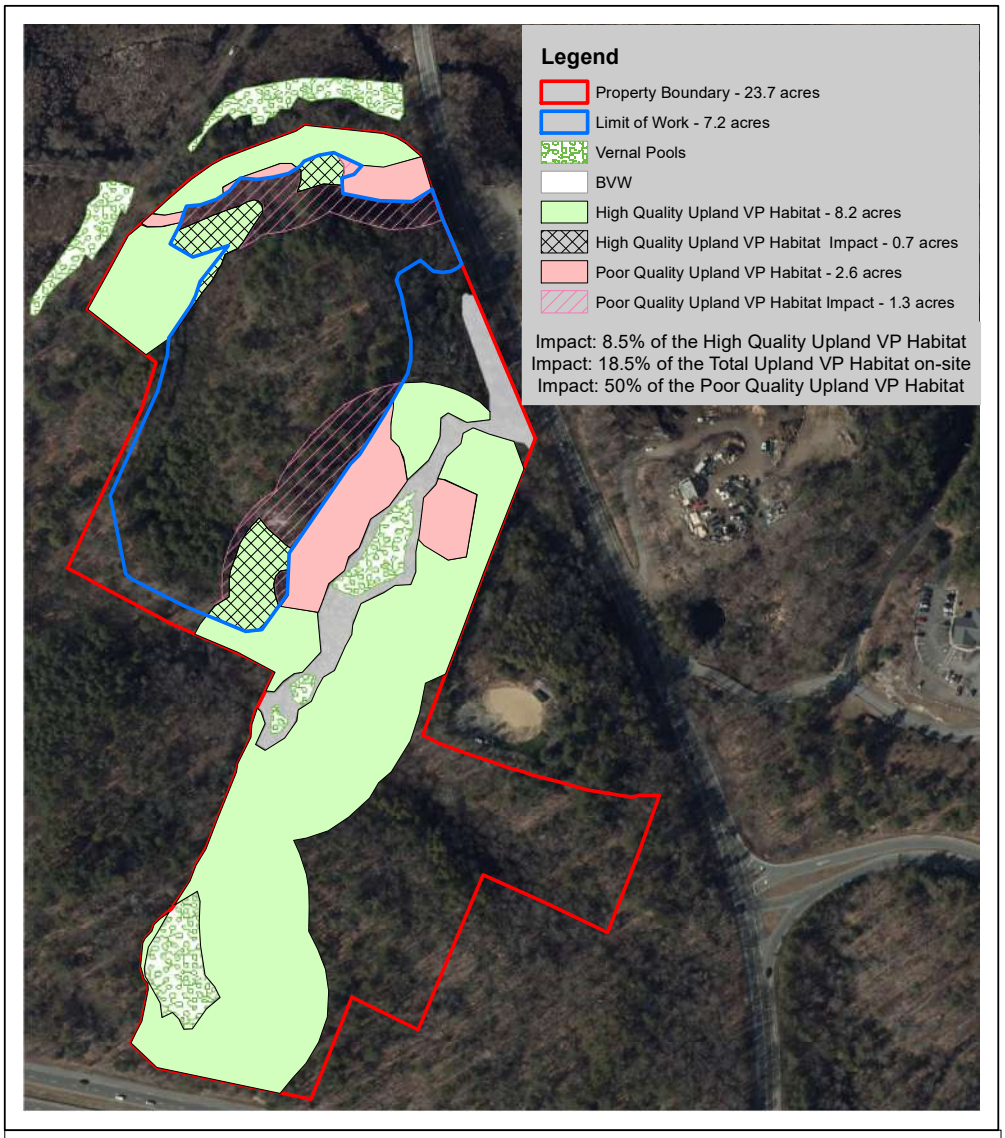

Figure 12. Quality of Bylaw Vernal Pool Habitat and Impacts
0 School Street, Manchester-by-the-Sea, MA
(Map: 43, Lot: 18)

N
Date: 6/6/2022
0 125 250 Feet
1 inch = 250 feet

GIS Data Source: "Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, MassIT"

GODDARD CONSULTING LLC
Strategic Wetland Permitting

During our vernal pool surveys and wildlife study, we never came across any rare plants or animals. All plants and animals observed and identified on-site are common and are not listed as either Special Concern, Threatened, or Endangered by Natural Heritage. No portion of the site is mapped for potential or priority habitat for rare species by NHESP. As shown in Figure 13 below, there are two priority habitat polygons identified by NHESP to the north of the site. Priority habitat 1794 is approximately 320 feet away and priority habitat 1787 is approximately 1,040 feet away from the site. We are not aware of which species these areas are mapped for but based on data from NHESP, and on-site surveys, we can presume that there are no rare plant or animal species on-site.

Figure 13. NHESP Priority Habitat
0 School Street, Manchester-by-the-Sea, MA
(Map: 43, Lot: 18)

5. Mitigation Opportunities

A recommended mitigation measure is to encircle the limit of work in silt fence prior to the start of work in early to mid-March. This would ensure that any salamanders or frogs that may be within the limit of work would be placed on the opposite side of the fence (wetland) and allow them to go to the vernal pools and breed.

Approximately half of the dead woody debris piles found on-site are within the limit of work. Creating additional dead woody debris piles on the forest floor is an easy and effective way to

improve habitat for a variety of species, especially salamanders and frogs. These additional woody debris piles can be created by moving existing piles from inside the limit of work to outside the limit of work. These piles can also be created from cut tree material such as root balls, logs, and branches of various sizes during clearing operations.

6. Conclusion

Based on the technical analysis included in this report, which is reflective of our in collective experience in assessing wetland alterations posed by development projects within the context and boundaries of all governing regulations, we conclude that:

The project will not substantially or materially reduce the site's capacity for wildlife or wildlife functions. The proposed project will minimally alter areas subject to protection under both the WPA and local bylaw. However, the project will meet all standards under the WPA and will not have either a significant immediate or cumulative effect on the resource areas found on site or proximate to the site. All the vernal pools will continue to receive water during the wetter months and will continue to provide the essential breeding habitat for both spotted salamanders and wood frogs. During and after construction, while some species will be temporarily displaced, every animal observed on-site can and will adapt to the site's change and will be able to freely move around the site. Most of the site will remain undeveloped and will continue to provide essential habitat for the species that call this area home.

Very truly yours,

Goddard Consulting, LLC

Scott Goddard
Principal, PWS

Ryan Roseen
Wildlife Biologist & Wetland Scientist

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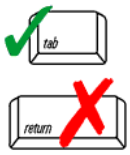
Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wetlands program

Wildlife Habitat Protection Guidance

Appendix A: Simplified Wildlife Habitat Evaluation

Project Information

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



0 School Street, Manchester-by-the-Sea
Project Location (from NOI)

Scott Goddard & Ryan Roseen
Name of Person Completing Form

6/6/2022
Date

Important Habitat Features

Direct alterations to the following important habitat features in resource areas may be permitted only if they will have no adverse effect (refer to Section V).

☐ Habitat for state-listed animal species (receipt of a positive opinion or permit from MNHESP shall be presumed to be correct. Do not refer to Section V).

☐ Sphagnum hummocks and pools suitable to serve as nesting habitat for four-toed salamanders

☐ Trees with large cavities (≥18" tree diameter at cavity entrance)

☐ Existing beaver, mink or otter dens

☐ Areas within 100 feet of existing beaver, mink or otter dens (if significant disturbance)

☐ Existing nest trees for birds that traditionally reuse nests (bald eagle, osprey, great blue heron)

☐ Land containing freshwater mussel beds

☐ Wetlands and waterbodies known to contain open water in winter with the capacity to serve as waterfowl winter habitat

☐ Turtle nesting areas

☐ Vertical sandy banks (bank swallows, rough-winged swallows or kingfishers)

The following habitat characteristics when not commonly encountered in the surrounding area:

☐ Stream bed riffle zones (e.g. in eastern MA)

☐ Springs

☐ Gravel stream bottoms (trout and salmon nesting substrate)

☐ Plunge pools (deep holes) in rivers or streams

☐ Medium to large, flat rock substrates in streams

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wetlands program

Wildlife Habitat Protection Guidance

Appendix A: Simplified Wildlife Habitat Evaluation

Activities

When any one of the following activities is proposed within resource areas, applicants should complete a Detailed Wildlife Habitat Evaluation (refer to Appendix B).

- ☐ Activities located in mapped "Habitat of Potential Regional or Statewide Importance"
- ☐ Activities affecting certified or documented vernal pool habitat, including habitat within 100' of a certified or documented vernal pool when within a resource area
- ☐ Activities in bank, land under water, bordering land subject to flooding (presumed significant) where alterations are more than twice the size of thresholds
- ☐ Activities affecting vegetated wetlands >5000 sq. ft. occurring in resource areas other than Bordering Vegetated Wetland
- ☐ Activities affecting the sole connector between habitats >50 acres in size
- ☐ Installation of structures that prevent animal movement
- ☐ Activities for the purpose of bank stabilization using hard structure solutions that significantly affect ability of stream channel to shift and meander, or disrupt continuity in cover that would inhibit animal passage
- ☐ Dredging (greater than 5,000 sf)

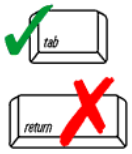
Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 1. Summary Sheet

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



The Sanctuary
Project Name

0 School Street, Manchester-by-the-Sea
Location

7.2 acres
Size of Area Being Impacted

6/10/2022
Date

Impact Areas (linear feet, square feet, or acres for each of the impact areas within the site)

Name	Waterbody/ Waterway	Wetland	Upland*	Total Area
1. Within limit of work		0	7.2	7.2
2.				
3.				
4.				
5.				
6.				
7.				

*Riverfront Area/BLSF

Attach Sketch map and/or photos of the Impact Areas

Narrative Description of Site (attach separate page if necessary)

See attached narrative

Certification

I hereby certify that this project has been designed to avoid, minimize, and mitigate adverse effects on wildlife habitat, and that it will not, following two growing seasons of project completion and thereafter, substantially reduce its capacity to provide important wildlife habitat functions.

Signature of Wildlife Specialist (per 310 CMR 10.60 (1) (b))

Scott Goddard & Ryan Roseen
Typed or Printed Name

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (for each wetland or non-wetland resource area)

I. General Information

0 School Street, Manchester-by-the-Sea
Project Location (from NOI page 1)

Inside the Limit of Work
Impact Area (number/name)

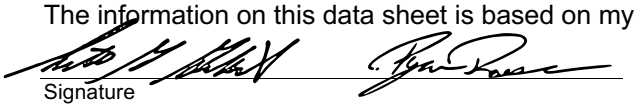
3/4, 3/18, 3/25, 4/1, 4/8, 4/22
Date(s) of Site Visit(s) and Data Collection

3/4: mostly sunny-40, 3/18: overcast to sunny-50, 3/25: partly cloudy-50, 4/1: overcast, light rain-54, 4/8: overcast to partly sunny-55, 4/22: mostly sunny-65, 5/12: cloudy-57

Scott Goddard & Ryan Roseen
Person completing form per 310 CMR 10.60(1)(b)

6/10/2022
Date this form was completed

The information on this data sheet is based on my observations unless otherwise indicated


Signature

II. Site Description (complete A or B under Classification - see instructions for full description)

A. Classification

1. For Wetland Resource Areas, complete the following:

System: Palustrine
Subsystem:
Class: Forested
Subclass: Mixed Coniferous/Deciduous

Hydrology/Water Regime

- ☐ Permanently flooded
- ☐ Saturated
- ☐ Intermittently exposed
- ☐ Temporarily flooded
- ☐ Semi-permanently flooded
- ☐ Intermittently flooded
- ☐ Seasonally flooded
- ☐ Artificially flooded

2. For Riverfront or Bordering Land Subject to Flooding Resource Areas, complete the following. Use a terrestrial classification system such as one of the two listed below:
   a. "Classification of the Natural Communities of Massachusetts (Draft)" by Patricia C. Swain and Jennifer B. Kearsley, MA DFW NHESP, Westborough, MA. July 2000. (Department of Fish & Game Website)
   b. "New England Wildlife: Habitat, Natural History, and Distribution" by Richard M. DeGraaf and Deborah D. Rudis, USDA Forest Service, Northeastern Forest Experiment Station. General Technical Report NE-108. August 1992. 491 pages.

Coastal Forest/Woodlands and Oak-Hemlock-White Pine Forest
Community Name

Coastal Forest/Woodlands is a variant of the widespread broadly defined Oak-Hemlock-White Pine Forest. A low shrub layer dominated by lowbush blueberry and black huckleberry. Herbaceous layer usually sparse.
Vegetation Description

Coastal Forest/Woodlands are within a few miles of the coast. They are not affected by salt spray on a daily basis, but receive storm winds and spray. Predominantly deciduous with canopies usually at about 30-60 feet.
Physical Description

Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

B. Inventory (Plant community)

% Cover:	85	50	5	10	30
	Trees (> 20')	Shrubs (< 20')	Woody vines	Mosses	Herbaceous

Plant Lists (species that comprise 10% or more of the vegetative cover in each strata; "*" designates a dominant plant species for the strata):

Strata	Plant Species	Strata	Plant Species
Tree	White Pine	Shrub	Lowbush Blueberry
Tree/Shrub	American Beech	Shrub	Black Huckleberry
Tree	Red Oak	Woody vines	Greenbrier
Tree/Shrub	Hemlock	Mosses	Moss Sp.
Tree	Red Maple	Herbaceous	Hay scented fern
Tree	Gray Birch		

C. Inventory (Soils)

102E-Chatfield-Hollis-Rock outcrop complex, 15-35% slopes

Well drained (Drainage Class)

Gravelly fine sandy loam (Texture (upper part))

2-30 inches (Depth)

More than 80 inches (Depth to Water Table)

III. Important Habitat Features (complete for all resource areas)

If the following habitat characteristics are present, describe & quantify them on a separate sheet & attach.

Wildlife Food

Important Wetland/Aquatic Food Plants (smartweeds, pondweeds, wild rice, bulrush, wild celery)

☐ Abundant ☐ Present ☒ Absent

Important Upland/Wetland Food Plants (hard mast and fruit/berry producers)

☒ Abundant ☐ Present ☐ Absent

Shrub thickets or streambeds with abundant earthworms (American woodcock)

☒ Present ☐ Absent

Shrub and/or herbaceous vegetation suitable for veery nesting

☐ Present ☒ Absent

Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

Number of trees (live or dead) > 30" DBH: 0

Number (or density) of Standing Dead Trees (potential for cavities and perches):

19	16	4	0
6-12" dbh	12-18" dbh	18-24" dbh	> 24" dbh

Number of Tree Cavities in trunks or limbs of:

4
6-12" diameter (e.g., tree swallow, saw whet owl, screech owl, bluebird, other songbirds)

0
12-18" diameter (e.g., hooded merganser, wood duck, common goldeneye, mink)

0
>18" diameter (e.g., hooded merganser, wood duck, common goldeneye, common merganser, barred owl, mink, raccoon, fisher)

Small mammal burrows

☒ Abundant ☐ Present ☐ Absent

Cover/Perches/Basking/Denning/Nesting Habitat

☒ Dense herbaceous cover (voles, small mammals, amphibians & reptiles)

☒ Large woody debris on the ground (small mammals, mink, amphibians & reptiles)

☐ Rocks, crevices, logs, tree roots or hummocks under water's surface (turtles, snakes, frogs)

☐ Rocks, crevices, fallen logs, overhanging branches or hummocks at, or within 1m above the water's surface (turtles, snakes, frogs, wading birds, wood duck, mink, raccoon)

☒ Rock piles, crevices, or hollow logs suitable for:

☐ otter ☒ mink ☒ porcupine ☐ bear ☒ bobcat ☐ turkey vulture

☐ Live or dead standing vegetation overhanging water or offering good visibility of open water (e.g., osprey, kingfisher, flycatchers, cedar waxwings)

Depressions that may serve as seasonal (vernal/autumnal) pools

☐ Present ☒ Absent

Standing water present at least part of the growing season, suitable for use by

☐ Breeding amphibians ☐ Non-breeding amphibians (foraging, re-hydration)

☐ Turtles ☐ Foraging waterfowl

Sphagnum hummucks or mats, moss-covered logs or saturated logs, overhanging or directly adjacent to pools of standing water in spring (four-toed salamander)

☐ Present ☒ Absent

Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

Important habitat characteristics (if present, describe and quantify them on a separate sheet)

Medium to large (> 6"), flat rocks within a stream (cover for stream salamanders and nesting habitat for spring & two-lined salamanders)

☐ Present ☒ Absent

Flat rocks and logs on banks or within exposed portions of streambeds (cover for stream salamanders and nesting habitat for dusky salamanders)

☐ Present ☒ Absent

Underwater banks of fine silt and/or clay (beaver, muskrat, otter)

☐ Present ☒ Absent

Undercut or overhanging banks (small mammals, mink, weasels)

☐ Present ☒ Absent

Vertical sandy banks (bank swallow, kingfisher)

☐ Present ☒ Absent

Areas of ice-free open water in winter

☐ Present ☒ Absent

Mud flats

☐ Present ☒ Absent

Exposed areas of well-drained, sandy soil suitable for turtle nesting

☐ Present ☒ Absent

Wildlife dens/nests (if present, describe & quantify them on the back of this sheet)

Turtle nesting sites

☐ Present ☒ Absent

Bank swallow colony

☐ Present ☒ Absent

Nest(s) present of ☐ Bald Eagle ☐ Osprey ☐ Great Blue Heron

Den(s) present of ☐ Otter ☐ Mink ☐ Beaver

Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

Project area is within:

☐ 100' of beaver, mink or otter den, bank swallow colony or turtle nesting area

☐ 200' of Great Blue Heron or osprey nest(s)

☐ 1400' of a Bald Eagle nest[1]

Emergent Wetlands (if present, describe & quantify them on a separate sheet)

Emergent wetland vegetation at least seasonally flooded during the growing season (wood duck, green heron, black-crowned night heron, king rail, Virginia rail, coot, etc.)

Flooded > 5 cm	☐ Present	☒ Absent
Flooded > 25 cm (pied-billed grebe)	☐ Present	☒ Absent

Persistent emergent wetland vegetation at least seasonally flooded during the growing season (mallard, American bittern, sora, common snipe, red-winged blackbird, swamp sparrow, marsh wren)

Flooded > 5 cm	☐ Present	☒ Absent
Flooded > 25 cm (least bittern, common moorhen)	☐ Present	☒ Absent

Cattail emergent wetland vegetation at least seasonally flooded during the growing season

Flooded > 5 cm (marsh wren)	☐ Present	☒ Absent
Flooded > 25 cm (least bittern, common moorhen)	☐ Present	☒ Absent

Fine-leafed emergent vegetation (grasses and sedges) at least seasonally flooded during the growing season (common snipe, spotted sandpiper, sedge wren)

Flooded > 5 cm	☐ Present	☒ Absent
Flooded > 25 cm (least bittern, common moorhen)	☐ Present	☒ Absent

IV. Landscape Context

A. **Habitat Continuity** (if present, describe the landscape context on a separate sheet and its importance for area-sensitive species)

Is the impact area part of an emergent marsh at least	1.0 acre in size?	☐ Yes	☒ No
(marsh and waterbirds)	2.0 acres in size?	☐ Yes	☒ No
	5.0 acres in size?	☐ Yes	☒ No
	10.0 acres in size?	☐ Yes	☒ No

[1] 1400 feet is the distance used by NHESP for evaluating potential disturbance impacts on eagle nests under MESA. Keep in mind, however, that this doesn't give jurisdiction within 1400' of an eagle's nest; it only identifies it on the checklist so that adverse effects can be avoided if work in a resource area is within 1400 feet.

Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

Is the impact area part of a wetland complex at least	2.5 acres in size?	☐ Yes	☒ No
(turtles, frogs, waterfowl, mammals)	5.0 acres in size?	☐ Yes	☒ No
	10.0 acres in size?	☐ Yes	☒ No
	25.0 acres in size?	☐ Yes	☒ No

For upland resource areas is the impact area part of contiguous forested habitat at least

(forest interior nesting birds)	50 acres in size?	☒ Yes	☐ No
	100 acres in size?	☒ Yes	☐ No
	250 acres in size?	☒ Yes	☐ No
	500 acres in size?	☒ Yes	☐ No
(grassland nesting birds)	> 1.0 acre in size?	☐ Yes	☒ No
(special habitat such as gallery floodplain forest, alder thicket, etc.)	> 1.0 acre in size?	☐ Yes	☒ No

B. **Connectivity with adjoining natural habitats**

- ☐ No direct connections to adjacent areas of wildlife habitat (little connectivity function)
- ☒ Connectors numerous or impact area is embedded in a large area of natural habitat (limited connectivity function)
- ☐ Impact area contributes to a limited number of connectors to adjacent areas of habitat (somewhat important for connectivity function)
- ☐ Impact area serves as *part of* a sole connector to adjacent areas of habitat (important for connectivity function)
- ☐ Impact area serves as *only* connector to adjacent areas of habitat (very important for connectivity function)

V. Habitat Degradation (describe degradation and wildlife impacts on the back of the sheet)

- ☐ Evidence of significant chemical contamination
- ☐ Evidence of significant levels of dumping
- ☐ Evidence of significant erosion or sedimentation problems
- ☐ Significant invasion of exotic plants (e.g., purple loosestrife, *Phragmites*, glossy buckthorn)
- ☐ Disturbance from roads or highways ☒ Other human disturbance
- ☐ Is the site the only resource area in the vicinity of an otherwise developed area

Note: These are not the only important habitat features that may be observed on a site. If the wildlife specialist identifies other features they should be noted in the application.

Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

VI. Quantification Table for Important Habitat Characteristics

Habitat Characteristic	Amount Impacted in Impact Area	Current (entire site)	Post-Construction (entire site)
Example: standing dead trees 6-12” dbh	4	12	8
Standing dead trees 6-12"	19	34	15
Standing dead trees 12-18"	16	35	19
Standing dead trees 18-24"	4	11	7
Standing dead trees >24"	0	1	1
Woody debris piles	9	18	9

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 1. Summary Sheet

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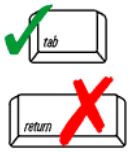


The Sanctuary
Project Name

0 School Street, Manchester-by-the-Sea
Location

0 — Size of Area Being Impacted

6/10/2022 — Date

Impact Areas (linear feet, square feet, or acres for each of the impact areas within the site)

Name	Waterbody/ Waterway	Wetland	Upland*	Total Area
1. Outside the limit of work		1.77 acres	14.4 acres	16.17 acres
2.				
3.				
4.				
5.				
6.				
7.				

*Riverfront Area/BLSF

Attach Sketch map and/or photos of the Impact Areas

Narrative Description of Site (attach separate page if necessary)

See attached narrative

Certification

I hereby certify that this project has been designed to avoid, minimize, and mitigate adverse effects on wildlife habitat, and that it will not, following two growing seasons of project completion and thereafter, substantially reduce its capacity to provide important wildlife habitat functions.

Signature of Wildlife Specialist (per 310 CMR 10.60 (1) (b))

Scott Goddard & Ryan Roseen
Typed or Printed Name

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (for each wetland or non-wetland resource area)

I. General Information

0 School Street, Manchester-by-the-Sea
Project Location (from NOI page 1)

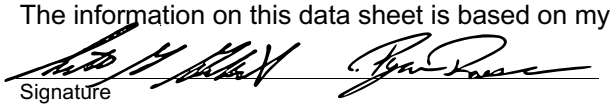
Outside the limit of work
Impact Area (number/name)

3/4, 3/18, 3/25, 4/1, 4/8, 4/22, 5/12
Date(s) of Site Visit(s) and Data Collection

3/4: mostly sunny-40, 3/18: overcast to sunny-50, 3/25: partly cloudy-50, 4/1: overcast, light rain-54, 4/8: overcast to partly sunny-55, 4/22: mostly sunny-65, 5/12: cloudy-57

Scott Goddard & Ryan Roseen — 6/10/2022
Person completing form per 310 CMR 10.60(1)(b) — Date this form was completed

The information on this data sheet is based on my observations unless otherwise indicated


Signature

II. Site Description (complete A or B under Classification - see instructions for full description)

A. Classification

1. For Wetland Resource Areas, complete the following:

System: Palustrine — Subsystem:

Class: Forested — Subclass: Mixed Coniferous/Deciduous

Hydrology/Water Regime

- ☐ Permanently flooded
- ☒ Intermittently exposed
- ☐ Semi-permanently flooded
- ☒ Seasonally flooded
- ☐ Saturated
- ☐ Temporarily flooded
- ☐ Intermittently flooded
- ☐ Artificially flooded

2. For Riverfront or Bordering Land Subject to Flooding Resource Areas, complete the following. Use a terrestrial classification system such as one of the two listed below:
   a. "Classification of the Natural Communities of Massachusetts (Draft)" by Patricia C. Swain and Jennifer B. Kearsley, MA DFW NHESP, Westborough, MA. July 2000. (Department of Fish & Game Website)
   b. "New England Wildlife: Habitat, Natural History, and Distribution" by Richard M. DeGraaf and Deborah D. Rudis, USDA Forest Service, Northeastern Forest Experiment Station. General Technical Report NE-108. August 1992. 491 pages.

Community Name

Vegetation Description

Physical Description

Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

B. Inventory (Plant community)

% Cover:	>90	60	5	15	25
	Trees (> 20')	Shrubs (< 20')	Woody vines	Mosses	Herbaceous

Plant Lists (species that comprise 10% or more of the vegetative cover in each strata; "*" designates a dominant plant species for the strata):

Strata	Plant Species	Strata	Plant Species
Tree/Shrub	White Pine	Shrub	Lowbush blueberry
Tree/Shrub	Beech	Woody Vines	Greenbrier
Tree	Red oak	Mosses	Moss Sp.
Tree	Red Maple	Herbaceous	Spinulose wood fern
Tree/Shrub	Hemlock	Herbaceous	Grass Sp.
Tree	Gray Birch		

C. Inventory (Soils)

102E-Chatfield-Hollis-Rock outcrop complex, 15-35% slopes

Well drained (Drainage Class)

Gravelly fine sandy loam (Texture (upper part))

2-30 inches (Depth)

More than 80 inches (Depth to Water Table)

III. Important Habitat Features (complete for all resource areas)

If the following habitat characteristics are present, describe & quantify them on a separate sheet & attach.

Wildlife Food

Important Wetland/Aquatic Food Plants (smartweeds, pondweeds, wild rice, bulrush, wild celery)

☐ Abundant ☒ Present ☐ Absent

Important Upland/Wetland Food Plants (hard mast and fruit/berry producers)

☒ Abundant ☐ Present ☐ Absent

Shrub thickets or streambeds with abundant earthworms (American woodcock)

☒ Present ☐ Absent

Shrub and/or herbaceous vegetation suitable for veery nesting

☐ Present ☒ Absent

Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

Number of trees (live or dead) > 30" DBH: 0

Number (or density) of Standing Dead Trees (potential for cavities and perches):

15	19	7	1
6-12" dbh	12-18" dbh	18-24" dbh	> 24" dbh

Number of Tree Cavities in trunks or limbs of:

3
6-12" diameter (e.g., tree swallow, saw whet owl, screech owl, bluebird, other songbirds)

0
12-18" diameter (e.g., hooded merganser, wood duck, common goldeneye, mink)

0
>18" diameter (e.g., hooded merganser, wood duck, common goldeneye, common merganser, barred owl, mink, raccoon, fisher)

Small mammal burrows

☒ Abundant ☐ Present ☐ Absent

Cover/Perches/Basking/Denning/Nesting Habitat

☒ Dense herbaceous cover (voles, small mammals, amphibians & reptiles)

☒ Large woody debris on the ground (small mammals, mink, amphibians & reptiles)

☒ Rocks, crevices, logs, tree roots or hummocks under water's surface (turtles, snakes, frogs)

☒ Rocks, crevices, fallen logs, overhanging branches or hummocks at, or within 1m above the water's surface (turtles, snakes, frogs, wading birds, wood duck, mink, raccoon)

☒ Rock piles, crevices, or hollow logs suitable for:

☐ otter ☒ mink ☒ porcupine ☐ bear ☒ bobcat ☐ turkey vulture

☒ Live or dead standing vegetation overhanging water or offering good visibility of open water (e.g., osprey, kingfisher, flycatchers, cedar waxwings)

Depressions that may serve as seasonal (vernal/autumnal) pools

☒ Present ☐ Absent

Standing water present at least part of the growing season, suitable for use by

☒ Breeding amphibians ☒ Non-breeding amphibians (foraging, re-hydration)

☒ Turtles ☒ Foraging waterfowl

Sphagnum hummucks or mats, moss-covered logs or saturated logs, overhanging or directly adjacent to pools of standing water in spring (four-toed salamander)

☒ Present ☐ Absent

Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

Important habitat characteristics (if present, describe and quantify them on a separate sheet)

Medium to large (> 6"), flat rocks within a stream (cover for stream salamanders and nesting habitat for spring & two-lined salamanders)

☐ Present ☒ Absent

Flat rocks and logs on banks or within exposed portions of streambeds (cover for stream salamanders and nesting habitat for dusky salamanders)

☐ Present ☒ Absent

Underwater banks of fine silt and/or clay (beaver, muskrat, otter)

☐ Present ☒ Absent

Undercut or overhanging banks (small mammals, mink, weasels)

☐ Present ☒ Absent

Vertical sandy banks (bank swallow, kingfisher)

☐ Present ☒ Absent

Areas of ice-free open water in winter

☐ Present ☒ Absent

Mud flats

☐ Present ☒ Absent

Exposed areas of well-drained, sandy soil suitable for turtle nesting

☐ Present ☒ Absent

Wildlife dens/nests (if present, describe & quantify them on the back of this sheet)

Turtle nesting sites

☐ Present ☒ Absent

Bank swallow colony

☐ Present ☒ Absent

Nest(s) present of ☐ Bald Eagle ☐ Osprey ☐ Great Blue Heron

Den(s) present of ☐ Otter ☐ Mink ☐ Beaver

Part 2. Field Data Form (continued)

Project area is within:

☐ 100' of beaver, mink or otter den, bank swallow colony or turtle nesting area

☐ 200' of Great Blue Heron or osprey nest(s)

☐ 1400' of a Bald Eagle nest[1]

Emergent Wetlands (if present, describe & quantify them on a separate sheet)

Emergent wetland vegetation at least seasonally flooded during the growing season (wood duck, green heron, black-crowned night heron, king rail, Virginia rail, coot, etc.)

Flooded > 5 cm	☒ Present	☐ Absent
Flooded > 25 cm (pied-billed grebe)	☐ Present	☒ Absent

Persistent emergent wetland vegetation at least seasonally flooded during the growing season (mallard, American bittern, sora, common snipe, red-winged blackbird, swamp sparrow, marsh wren)

Flooded > 5 cm	☐ Present	☒ Absent
Flooded > 25 cm (least bittern, common moorhen)	☐ Present	☒ Absent

Cattail emergent wetland vegetation at least seasonally flooded during the growing season

Flooded > 5 cm (marsh wren)	☐ Present	☒ Absent
Flooded > 25 cm (least bittern, common moorhen)	☐ Present	☒ Absent

Fine-leafed emergent vegetation (grasses and sedges) at least seasonally flooded during the growing season (common snipe, spotted sandpiper, sedge wren)

Flooded > 5 cm	☐ Present	☒ Absent
Flooded > 25 cm (least bittern, common moorhen)	☐ Present	☒ Absent

IV. Landscape Context

A. **Habitat Continuity** (if present, describe the landscape context on a separate sheet and its importance for area-sensitive species)

Is the impact area part of an emergent marsh at least	1.0 acre in size?	☐ Yes	☒ No
(marsh and waterbirds)	2.0 acres in size?	☐ Yes	☒ No
	5.0 acres in size?	☐ Yes	☒ No
	10.0 acres in size?	☐ Yes	☒ No

[1] 1400 feet is the distance used by NHESP for evaluating potential disturbance impacts on eagle nests under MESA. Keep in mind, however, that this doesn't give jurisdiction within 1400' of an eagle's nest; it only identifies it on the checklist so that adverse effects can be avoided if work in a resource area is within 1400 feet.

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Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

Is the impact area part of a wetland complex at least	2.5 acres in size?	☐ Yes	☒ No
(turtles, frogs, waterfowl, mammals)	5.0 acres in size?	☐ Yes	☒ No
	10.0 acres in size?	☐ Yes	☒ No
	25.0 acres in size?	☐ Yes	☒ No

For upland resource areas is the impact area part of contiguous forested habitat at least

(forest interior nesting birds)	50 acres in size?	☒ Yes	☐ No
	100 acres in size?	☒ Yes	☐ No
	250 acres in size?	☒ Yes	☐ No
	500 acres in size?	☒ Yes	☐ No
(grassland nesting birds)	> 1.0 acre in size?	☐ Yes	☒ No
(special habitat such as gallery floodplain forest, alder thicket, etc.)	> 1.0 acre in size?	☐ Yes	☒ No

B. **Connectivity with adjoining natural habitats**

- ☐ No direct connections to adjacent areas of wildlife habitat (little connectivity function)
- ☒ Connectors numerous or impact area is embedded in a large area of natural habitat (limited connectivity function)
- ☐ Impact area contributes to a limited number of connectors to adjacent areas of habitat (somewhat important for connectivity function)
- ☐ Impact area serves as *part of* a sole connector to adjacent areas of habitat (important for connectivity function)
- ☐ Impact area serves as *only* connector to adjacent areas of habitat (very important for connectivity function)

V. Habitat Degradation (describe degradation and wildlife impacts on the back of the sheet)

- ☐ Evidence of significant chemical contamination
- ☐ Evidence of significant levels of dumping
- ☐ Evidence of significant erosion or sedimentation problems
- ☐ Significant invasion of exotic plants (e.g., purple loosestrife, *Phragmites*, glossy buckthorn)
- ☐ Disturbance from roads or highways ☐ Other human disturbance
- ☐ Is the site the only resource area in the vicinity of an otherwise developed area

Note: These are not the only important habitat features that may be observed on a site. If the wildlife specialist identifies other features they should be noted in the application.

Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

VI. Quantification Table for Important Habitat Characteristics

Habitat Characteristic	Amount Impacted in Impact Area	Current (entire site)	Post-Construction (entire site)
Example: standing dead trees 6-12” dbh	4	12	8
Standing dead trees 6-12"	19	34	15
Standing dead trees 12-18"	15	35	20
Standing dead trees 18-24"	4	11	7
Standing dead trees >24"	0	1	1
Woody debris piles	9	18	9