



# Wetlands Delineation And Rare Species Planning Level Survey

Westfield Armory  
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**Acronyms**

- BCC – Bird of Conservation Concern
- B1, B2, B3... – Borehole Number
- DMAVA – Department of Military and Veterans Affairs
- EMB – Environmental Management Bureau
- FACU – Facultative Uplands Species
- FACW – Facultative Wetlands Species
- FMIDW – 1989 Federal Manual for Identifying and Delineating Wetlands

IPaC – Information for Planning and Consultation  
NAMS – School of Natural Science and Mathematics  
NHP – Natural Heritage Program  
NJ – New Jersey  
NJDEP – New Jersey Department of Environmental Protection  
NJAC – New Jersey Administrative Code  
NRCS – Soil Conservation Service  
OBL – Obligate Wetland Species  
PLS – Planning Level Survey  
SUEIP – Stockton University Environmental Internship Program  
UPL – Upland Species  
USACE – United States Army Corp of Engineers  
USDA – United States Department of Agriculture  
USEPA – United States Environmental Protection Agency  
USFWS – United States Fish and Wildlife Service

## 1.0 Executive Summary

Wetlands are unique ecosystems that provide essential breeding, spawning, and nesting habitat for many of New Jersey's native wildlife species, including many state and/or federally threatened or endangered species. Freshwater wetlands also protect and preserve drinking water supplies and provide a natural means of flood and storm damage protection. These valuable habitats are protected under the Freshwater Wetlands Protection Act, which defines all environmental regulations and permitting requirements associated with projects that may impact wetlands. Many New Jersey Department of Military and Veterans Affairs (NJDMAVA) managed properties contain wetlands, some of which are host to protected species. Wetland protections, such as buffer areas, change due to the classification of each wetland, therefore, it is critical that project planners know the locations and classifications of all wetlands in their project areas.

Several wetland delineation and rare species surveys have been conducted at NJDMAVA managed properties in the past, however the forested area located on the Westfield Armory site was not included in these previous survey efforts. The goal of this project was to survey the entire forested area at this site in an attempt to locate and delineate any wetlands present, and identify any regulatory protections associated with these wetlands. NJDMAVA EMB (Environmental Management Bureau) staff, in collaboration with SUEIP (Stockton University Environmental Internship Program), surveyed approximately 3 acres of forested area over a 2-day period in June and July, 2019, and located, characterized, and delineated 2 wetlands on-site. A review of the Natural Heritage Program database, Information for Planning and Consulting (IPaC) letter, and Cornell University's eBird data identified several protected wildlife species with the potential to occur on or near the property. Although none of the migratory birds identified during this review are expected to affect the status of these wetlands, the potential presence of two protected bat species could classify the wetlands as exceptional resource value. If neither of these bat species are determined to be present, the on-site wetlands will be assigned an ordinary resource value, and will not receive any regulatory protections. However, if either of these bat species are confirmed present on-site, the on-site wetlands will be assigned exceptional resource value, imposing a 150 ft protective buffer. This report includes detailed methods and justifications for the delineation and classifications of both on-site wetlands and provides recommended action plans and project planning implications which should be addressed and incorporated into all construction and project planning at this facility.

## **2.0 Introduction**

Wetlands are an important part of New Jersey's ecosystems and are protected under Federal and state environmental regulations. The Freshwater Wetlands Protection Act (NJDEP-N.J.A.C. 7:7A) sets guidelines for what can and cannot be done on or near wetlands. The goal of this project was to locate and delineate wetlands at the Westfield Armory site, and to identify any state or federal protections these habitats may be granted. Following the standardized protocols set by the 1989 Federal Manual for Identifying and Delineating Jurisdictional Wetlands (FMIDW), SUEIP and the DMAVA EMB collaborated to accurately define the wetlands at the Westfield armory. The area under investigation was a small forested area along the Southeast and Southwest boundary of the Westfield National Guard facility. This facility is in the middle of a residential district and was not included in the most recent Threatened and Endangered Species Planning Level Survey (PLS) nor was this facility included in the 2016 Wetland PLS. Results from this survey will be included in a comprehensive landscape and wetland database encompassing all NJDMAVA properties. This information will include not only the area of the delineated wetlands, but also any regulations and restrictions associated with it. This report will also identify any state or federally threatened or endangered species that may be present or utilize the site.

Methods for this survey are described below, and follow a standardized three-parameter approach set by the 1989 FMIDW, which was developed by the United States Fish and Wildlife Service (USFWS), the United States Environmental Protection Agency (USEPA), the Soil Conservation Service (NRCS), and the United States Army Corps of Engineers (USACE).

## **3.0 Methods**

The 1989 FMIDW uses vegetation, soils, and hydrology to describe and define wetlands. More specifically, this process determines if the area being delineated has hydrophytic vegetation, hydric soils, or wetland hydrology. Under the guidelines of the 1989 FMIDW, a habitat is required to have at least two out of three of these three characteristics to be considered a federal wetland in the state of NJ. This is atypical of New Jersey, as standard requirements for other states require wetlands to have all three characteristics. Habitats considered wetlands are subject to federal wetland use and permitting requirements. Detailed methods for characterizing the vegetation, soils, and hydrology of a suspected wetland are included below.

### **3.1 Hydrophytic Vegetation**

The first, and possibly most easily identifiable criteria is hydrophytic vegetation. For an area to be considered hydrophytic, fifty percent of its vegetation must be found more often in wetlands than in uplands. The United States Department of Agriculture (USDA) has assigned a wetland indicator status to most native and some non-native plants in the United States. A list of all plant species, along with their indicator status, and at which sites they occurred can be found in Appendix A. A plant that is Obligate Wetland (OBL) almost always occurs in wetlands, at least 99% of the time. Facilitative Wetlands (FACW) plants occur with a probability of 67% to 98% to be in wetlands, while Facilitative (FAC) plants have a probability of 33% to 66% to occur in wetlands. If the probability of being in wetlands is 1% to 33% the plant is considered a Facilitative Uplands (FACU) plant and if the probability is less than 1%, the plant is an Uplands

(UPL) plant. Only the OBL, FACW, and FAC plants are considered hydrophytic. If at least 50% of the dominant plant species in the area being delineated are OBL, FACW, or FAC, that area has satisfied the hydrophytic vegetation criteria (Federal Interagency, 1989). This was accomplished at the Westfield Armory site by identifying and documenting the dominant plant species within both upland and wetland areas and reviewing the USDA's plant list to determine each plant's wetland indicator status.

### 3.2 Hydric Soils

The second characteristic surveyed is the presence of hydric soils. Hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil (Federal Interagency, 1989). To discover hydric soils, this project looked at two types of soil borings. One was taken in the suspected wetland area being delineated and one in an area that was confirmed as an upland habitat. A hand auger was used to bore into the soil at least 18 inches. Below 18 inches, meaningful habitat for wetlands plant species ceases (Federal Interagency, 1989). If refusal (meaning the auger cannot go any deeper) occurred before 18 inches of depth, a new bore hole was dug near the original. Bedrock is close to the surface at the site and was encountered occasionally during the boring effort. Every attempt was made to collect at least 18 inches of soil. The depth at which the previous borehole refused was recorded. Two major characteristics of hydric soils are their low chroma (ones and twos) and abundance of mottles (Federal Interagency, 1989). Chroma is defined as the intensity or purity of a color. Each time a layer of the soil, or horizon, changed to a different color, that change in color was recorded, as was the depth at which the color change occurred. A Munsell Soil Color Chart that included the gley colors was used to determine soil chroma by examining and recording the color of each soil horizons color. Each sample was also inspected for the presence of mottles. Mottles are redoximorphic features that look like spots in the soil, which indicate if an area has been sufficiently saturated with water long enough to develop anaerobic conditions. Soil texture and moisture was estimated by hand in the field. One soil sample was dried to determine exact moisture content. The USDA Web Soil Survey was also used as a reference to determine if hydric soils were present.

### 3.3 Hydrology

The final characteristic observed is hydrology. Wetland hydrology is present when an area is saturated, or the surface is inundated with water at some point in time during an average rainfall year. There are certain attributes that can be examined that indicate if an area has wetland hydrology. Apparent indicators are inundation or tree adaptations such as buttressed trunks, shallow rooting, and multiple stems. When an area has been inundated for a long period of time, the leaf litter in that area may become blackened or drift lines may start to form. If an area has many of these hydrologic indicators it is considered to have wetland hydrology (Federal Interagency, 1989).

## **4.0 Results**

Approximately three acres of the forested area were surveyed at the Westfield Armory site on 26 June and 31 July 2019 by SUEIP and EMB staff. In total, five suspected wetland areas were examined using the methods described above. A borehole sample was taken at each of the five

suspected wetland areas to identify if wetlands soils were present. The vegetation in the surrounding area were examined to determine if hydrophytic vegetation was present. Two wetland sample points (1 and 5) were intentionally located in upland forested areas to be used as comparisons for the lowland locations. Of the five suspected wetland areas surveyed, only two were determined to be wetlands (Wetlands A and B). The locations of the wetlands and wetland sample points are shown on Figure WD1. Results from each wetland area are discussed below.

#### 4.1 Wetlands

##### 4.1a Wetland A

Wetland Sample Point 3 was located within this wetland. Wetland A (0.05 acres) is the larger of the two wetlands on this site.

Dominant Vegetation: Shallow sedge (*Carex lurida wahlen sedge*, OBL), water smartweed (*Persicaria amphibia*, OBL), and soft rush (*Juncus effusus*, OBL). This satisfies the hydrophytic vegetation criteria.

Soil Characterization: The matrix colors of this area's borehole were 10YR 2/2 (0-3in)(Clay-silt), 5YR 3/4 (3-20in)(Clay-silt) with mottles of 5YR 5/3, and 10YR 3/1 (20-24.5in)(Clay) with mottles of 10YR 6/1. This does not satisfy the hydric soils criteria.

Hydrologic Indicators: Inundation, drift lines, water stained leaves, shallow rooting of trees and drainage patterns. This satisfied the wetland hydrology criteria.

This area satisfies 2 of the 3 wetland criteria, therefore, in the State of New Jersey it is considered a wetland. This is a palustrine forested broad-leaved deciduous wetland (PFO1). This area had runoff water from the nearby parking lot, allowing it to sustain hydrophytic vegetation. The data for this location can be found in Appendix A, B3. Photos for this location can be found in Appendix B, PhotologB3.

##### 4.1b Wetland B

Sample Point 4 was located within this wetland. Wetland B (0.01 acres) is the smaller of the two wetlands.

Dominant Vegetation: Shallow sedge, soft rush, jewel weed (*Impatiens capensis*, FACW). This satisfied the hydrophytic vegetation criteria.

Soil Characterization: The soil's matrix colors of this area's borehole were 7.5YR 3/1 (0-8in)(Clay-silt), 10YR 3/2 (8-12in)(Clay-silt) with 10YR 5/4 mottles 10YR 6/8 (12-20in)(Clay-silt) with a 10YR 6/1 mottled and 5YR 2.5/1 mottled, and 7.5YR 6/1 (20-26)(Clay-silt) with mottles of 7.5 4/6. This satisfied the hydric soils criteria.

Hydrologic Indicators: Drift lines, drainage patterns, water stained leaves and low topographic elevation. This satisfied the wetlands hydrology criteria.

This area satisfies all 3 wetland criteria, therefore, in the State of New Jersey it is considered a wetland. This is a palustrine forested broad-leaved deciduous wetland (PFO1). The data for this wetland can be found in Appendix A, B4. Photos for this site can be found in Appendix B, PhotologB4. A soil sample was collected from this wetland and analyzed for moisture content. The average moisture content for all subsamples was 24.32%. The data can be found in Appendix A. Lab analysis showed that the soil here was a Silt Loam, similar to what was determined in the field. Atterberg Limit tests were also done on this soil. The plastic limit for this soil was 12.4%, the liquid limit was 27.9 %. The plasticity index for this soil was 15.5%, making this a clay with a low plasticity. The clays found here are lean clays (CL), they have low plasticity and are plotted above the "A-Line". The graph showing the soil plasticity plotted against the liquid limit can be found in Appendix A.

#### 4.2 Uplands Areas

The following areas were surveyed, but did not meet at least 2 of the 3 wetland indicating criteria, and were therefore determined to be upland areas. Detailed results from each sample point in these upland areas are discussed below.

##### Sample Point 1

This sample point was used as a comparison sample for sample points 2 and 3. Dominant plant species identified were sweetgum (*Liquidambar styraciflua*, FAC) and Virginia creeper (*Parthenocissus quinquefolia*, FACU). These plants, along with no signs of inundation, darkened leaves, or water stained trees indicated that this area was an upland. The soil matrix colors and textures were as follows, 5YR 2.5/2 (0-1in)(Clay-silt), 7.5YR 3/3 (1-3in)(Clay-silt), and 7.5YR 4/4 (3-19in)(Clay-Silt/Course Sand) with 10YR 2/1 and 10YR 5/6 mottles. The data for this location can be found in Appendix A, B1.

##### Sample Point 2

Sample point two was the first sample taken in a suspected wetland habitat. While FAC and FACU plant species like black cherry (*Prunus serotina*, FACU), Japanese barberry (*Berberis thunbergii*, FACU), and poison ivy (*Toxicodendron radicans*, FAC) were abundant, there were no FACW or OBL species in the area. This area had many wetlands hydrology field indicators including inundation, drift lines, water-stained leaves, buttressed trunks and low topographic elevation. This borehole's soil matrix colors were 10YR 3/6 (0-18in) (Clay-silt / coarse sand) and 7.5YR 5/6 (18-26in) (Silt-clay) with mottles of 7.5YR 3/4 and 10YR 3/2. While this area did have wetlands hydrology, it did not have hydrophytic vegetation or hydric soils therefore it was not a wetland. It was hypothesized that the standing water in the area was caused by runoff from the nearby parking lot, but the area did not have enough inundation to support hydrophytic vegetation or hydric soils. The data for this location can be found in Appendix A, B2. Photos for this location can be found in Appendix B, PhotologB2.

##### Sample Point 5



This sample point was used as a comparison borehole for sample points 4, 6, and 7. The vegetation in the area was not diverse, consisting of only poison ivy, Virginia creeper, sweetgum and red oak (*Quercus Rubra*, FACU). There were no indicators of wetland hydrology. The soil matrix colors were 5YR 2.5/1(0-2in) (Clay-silt), 5YR 4/2 (2-14in) (Clay-silt) and 5YR 4/4 (14-17in) (Clay-silt / coarse sand) with mottles of 7.5YR 3/2. There were also iron concretions in the final horizon of the soil. This soil was notably dry. The data for this location can be found in Appendix A, B5. Photos for this location can be found in Appendix B, PhotologB5.

#### Sample Point 6

This site had a diverse series of vegetation, but not as diverse as sample points 7 and 8. Plant species in this location included common fleabane (*Erigeron philadelphicus*, FAC), mimosa (*Mimosa pudica*, FACU), wild lettuce (*Lactuca virosa*, FACU), and soft rush to name a few. Although this area had a few OBL species such as soft rush and shallow sedge, the majority (over 50%) consisted of FACU species. It did not meet the hydrophytic vegetation criteria, nor did it have any wetland hydrology indicators. The soil matrix colors here were, 7.5YR 3/2 (0-6in)(Silt-loam), 5YR 4/4 (6-12in)(Silt-loam / Coarse sand w/ fine gravel), and 5YR 4/6 (12-18in) (Silt-loam / Coarse sand w/ fine gravel). This soil was notably dry. The first attempt to dig a borehole in this area failed, as there was refusal at 10 to 12 inches down. Only the successful 18inch hole was recorded. This area failed to meet any wetlands criteria and is therefore not classified as a wetland. The data for this location can be found in Appendix A, B6.

#### Sample Point 8

Vegetation at this site was the most diverse area in the surveyed forested area. Species of vegetation here were soft rush, poison ivy, Virginia creeper, red maple, yellow woodsorrel. Species at this site that were not at previous sites included, Indian tobacco (*Lobelia inflata*, FACU), wild rose (*Rosa multiflora*, FACU), and rice cut grass (*Leersia oryzoides*, OBL). There were no hydrologic indicators at this site. Horizon colors for the borehole were 10YR 2/2 (0-2in) (Silt-loam), 10YR 4/4 (2-6in) (Silt-loam) with mottles of 10YR 6/1, 10YR 7/1 (6-12in) (Silt-loam) with mottles of 10YR 6/6, and 10YR 5/2 (12-18in) (Silt-loam) with mottles of 7.5YR 5/8. While this site satisfied the criteria for hydrophytic vegetation, it could not satisfy one of the other two wetland criteria and is therefore not classified as a wetland. The data for this location can be found in Appendix A, B7 & B8.

#### 4.10 Desktop Review

The USGS soil survey was used as a desktop review prior to conducting the field survey. The scale of this project was very small; therefore, the USGS soil survey data may not be extremely accurate. This survey gives detailed information on soils that were surveyed by the USGS previously and may be present in the area. The soil series recorded by the USGS soil survey for the first five borehole sites was BovB – Boonton-Urban land-Haledon complex with 0 to 8 percent slopes. For the final two sites, the soil series recorded by the soil survey was HatB – Haledon-Urban land-Hasbrouck complex with slopes of 0 to 8 percent. These soils are broken into percentiles. BovB consists of 50 percent Boonton & similar soils, 30 percent urban land, and 20 percent Haledon & similar soils. None of these soils are considered hydric by the USGS. HatB consists of 45 percent Haledon & similar soils, 25 percent urban land, and 15% Hasbrouck

& similar soils. It also has minor miscellaneous components that make up 15% of its composition. While Hasbrouck soils are considered hydric, none of HatB's other components are considered hydric by the USGS. Detailed descriptions of BovB and HatB's soil characteristics can be found in Appendix D. It is possible that ground disturbance has caused these soils to be disrupted, altering their natural state since the soils survey was done. After review, the soils identified during this survey effort are consistent with those described in the USGS survey data. Textures estimated by hand in the field closely resemble the USGS soil survey data, as do the color profiles.

The USFWS National Wetlands Inventory was used to examine the area for previously identified wetlands and historic wetland data. No historic or current wetlands were documented in the area.

The NJDEP wetland line shapefile was also reviewed to identify any wetlands that were previously located. There were no wetlands recorded on site, the closest recorded wetland was approximately 1.1 miles away.

State and Federal resources were reviewed to identify any protected species that may be located onsite, which may designate the wetland areas as exceptional or intermediate resource value. If an area around the delineated wetland is considered an area of exceptional resource value, a buffer of 150 feet may be applied, or a buffer of 50 feet for areas of intermediate resource value. This buffer area will also be under the jurisdiction of the Department of Environmental Protection (NJDEP-N.J.A.C. 7:7A).

#### 4.11 Designating Resource Value

Depending on the size of a wetland, potential and/or actual presences of threatened and/or endangered species in the wetland, and/or the presence of special water habitats, wetland transitional areas (wetland buffers) maybe present. The NJDEP assigns wetlands with either ordinary (no buffer), intermediate (50 feet), or exceptional (150 feet) resource value using the classification criteria from N.J.S.A. 13:9B-7:

Exceptional Resource Value - Freshwater wetlands of exceptional resource value shall be freshwater wetlands which exhibit any of the following characteristics: Wetlands that discharge into FW-1 waters and FW-2 trout production waters and their tributaries or those which are present habitats for threatened or endangered species. This includes wetlands that are documented habitats for threatened or endangered species which remain suitable for breeding, resting, or feeding by these species during the normal period these species would use the habitat.

Ordinary Resource Value - Freshwater wetlands of ordinary value are wetlands which do not exhibit the characteristics in the previous section, are isolated wetlands that are smaller than 5,000 square feet and has a gravel or stoned parking lot, storage area, or road within 50 feet of the wetland, or are man-made drainage ditches, swales, or detention facilities.

Intermediate Resource Value - If a wetland does not contain threatened or endangered species, does not contain suitable rare species habitat, does not discharge into FW-1 waters and FW-2 trout production waters, and does not fit into the category of ordinary resource value, it will be given an intermediate resource value.

A habitat shall be considered a documented habitat if the NJDEP makes a finding that the habitat remains suitable for use by the specific documented threatened and endangered species, based upon information available to it, including information submitted by an applicant for a freshwater wetlands permit. An applicant shall have the opportunity to request the department that a documented habitat not result in the classification of a freshwater wetland as a freshwater wetland of exceptional value if the applicant can demonstrate the loss of requirements of the specific documented threatened or endangered species, including, wetlands or overall habitat size, water quality, or vegetation density or diversity.

### **5.0 Threatened and Endangered Species Review**

An Information for Planning and Consultation (IPaC) letter was requested from the USFWS to determine if there were any federally listed threatened or endangered species on the site. The IPaC letter can be found in full in Appendix D. This letter identified the Indiana Bat (federally endangered *Myotis sodalis*) and Northern Long-eared Bat (federally threatened *Myotis septentrionalis*) as potentially present at the site. Additionally, 6 birds of conservation concern (BCC) were included in the iPaC letter.

A Natural Heritage Program (NHP) database review was requested through the DEP to determine if there were any state listed threatened or endangered species on the site. This database review also included a search for rare plant species, ecological communities, Natural Heritage Priority sites, rare wildlife species or habitat based on the Search of Landscape Project 3.3 Species Based Patches, and vernal pool habitats on the site. The NHP review is in Appendix D. Only the long dash (*Polites mystic* state species of concern) was identified on the NHP review. No other special features or species were identified.

The following information about these species was gathered from the USFWS and the Threatened and Endangered Species PLS DMAVA Rare Species Report.

#### **5.1 Mammals**

Indiana Bat - This species is listed as federally and state endangered. Indiana bats require cool, humid caves or mineshafts during the winter months for hibernation. After hibernation the bats migrate to forested areas to roost under live or dead tree bark. The females roost under the bark of dying trees in maternity groups of 100 or more bats. Each female has only one pup per year. They feed on flying insects commonly found near rivers, lakes, and in uplands. Indiana bat and northern long-eared bad hibernaculum location data was requested from the USFWS in January 2020. A USFWS biologist confirmed that there were no known hibernacula within 5 miles of the Westfield property (Protus, 2020) (Appendix D). However, it was stated that surveys across the state are patchy and that because of the lack of observation, this does not mean that either species is not present. This letter can be found in Appendix D, pg. 77, DMAVA – Indiana Bat Survey Question.

Northern Long-eared Bat - This species is listed as federally, and state threatened. These bats hibernate in cool humid caves or mineshafts. After hibernation, these bats roost under tree bark or in dead trees/stumps. Males and non-reproductive females may also roost in caves and mineshafts. Reproductive females form maternity colonies of 30 to 60 bats. Each female has only one pup per year. These bats feed on insects like moths, flies, and beetles.

A review of NJDEP's historical abandoned mine data identified 2 abandoned mines located within 5 miles of the Westfield Armory site. The Feltsville copper mine located 4.2 miles NW of the property was in operation from 1733 – 1865. The Stony Brook copper mine located 4.8 miles W of the property became operational in 1800 and was abandoned at an unknown date. The spatial data for this abandoned mine layer has known inaccuracies, although a review of current and historic USGS maps, as well as historical 1930's aerial photographs suggest that the locations of these mines may be accurate. However, an apartment building currently exists where the Stony Brook mine was located. Therefore, openings and access to the mine for use as roosting habitat is considered unlikely. Quarries located in the vicinity of these mines may also provide undocumented roosting habitat.

Common tree species utilized by the Indiana bat are oaks (*Quercus* spp.), hickories (*Carya* spp.), ashes (*Fraxinus* spp.), elms (*Ulmus* spp.), and maples (*Acer* spp.) (Luensmann, 2005). Norway maple, red oak, sugar maple, and green ash were all species found on the site which also had sufficient diameter and possessed cavities for roosting.

## 5.2 Insects

Long Dash (state species of concern) - This species usually does not require any conservation efforts, as their population is secure globally. However, the species might be rare in parts of its range in New Jersey. Preferred habitat is lush, moist, flowery meadows including old fields, pastures and hayfields. Bluegrass is important for the long dash, as the females prefer to deposit eggs on these plants. No bluegrass was identified at this site, nor were any flowery meadows. Therefore, we can conclude that suitable habitat does not exist onsite for this species.

## 5.3 Migratory Birds

The Information for Planning and Consultation letter lists six migratory birds with the potential to exist on-site. The six bird species listed are the Bald Eagle (*Haliaeetus leucocephalus*), Blue-winged Warbler (*Vermivora pinus*, or *Vermivora chrysoptera*), Kentucky Warbler (*Oporornis formosus*, or *Geothlypis formosa*), Prairie Warbler (*Dendroica discolor*, or *Setophaga discolor*), Rusty Blackbird (*Euphagus carolinus*), and the Wood Thrush (*Hylocichla mustelina*). None of these species are federally or state listed as endangered or threatened. All are classified as birds of conservation concern (BCC). The following habitat information was gathered from the Audubon Guide to North American Birds.

Bald Eagle (federal BCC) – These birds have been delisted from the endangered species list but are still protected under the Bald and Golden Eagle Protection Act. Bald Eagles prefer living near bodies of water and can possibly be found in wetlands or near lakes and rivers. Tree species commonly used for nesting by eagles are sycamore (*Platanus occidentalis*), shagbark hickory (*Carya ovata*), and loblolly pine (*Pinus taeda*) (Division of Land Use Regulation et. al,

2013). None of these trees were identified at the Westfield property. There were also no large bodies of water near the site, therefore we can conclude that onsite habitat is not suitable for this species.

Blue-winged Warbler (federal BCC) - The blue winged warbler likes to live in woodland edges and overgrown pastures. This bird is often found in neglected fields or on the forest edge. The thin forested area, edge habitat, and overgrown vehicle yard could provide suitable habitat for this species.

Kentucky Warbler (federal BCC) - This bird prefers deep shaded, humid woods during the summer. It is also found in ravines in upland deciduous forests and on the edges of swamps. It migrates to more tropical regions during the winter. The area is a deciduous forest but lacks ravine habitat and is therefore considered not suitable for this species.

Prairie Warbler (federal BCC) – This bird prefers more bush-like vegetation and migrates south during the winter months. This bird likes to breed in dry old clearings and is present in New Jersey during its breeding season. The forested area, overgrown vehicle yard, or tree clearings could potentially provide suitable habitat for this species.

Rusty Blackbird (federal BCC) – The rusty blackbird spends its winter months on the US East Coast/Midwest. The bird's breeding season is spent in Canada. Rusty Blackbirds can be found in river grooves and wooded swamps. This bird prefers to live close to water but likes to hunt for food in open fields. The forested area onsite is not characteristic of typical rusty blackbird habitat, however the overgrown vehicle yard may provide suitable foraging habitat.

Wood Thrush (federal BCC) – Wood Thrushes mostly live in deciduous forests and are more numerous in more humid forests near streams. Since there are no streams and the forest area is dry, it is unlikely that the wood thrush would be present in the area

Bird sighting data was requested from The Cornell Lab of Ornithology through eBird. After examining this data, it was discovered that none of the birds identified in the IPaC letter were documented within a one-mile radius of the site. However, all of these migratory birds except for the wood thrush were found within a five-mile radius of the site. Figure WD2 in Appendix B contains the locations of historical, traveling, and incidental observations of these species. In total, 80 birds of the species listed above were observed in 12 different locations, including 1 Bald Eagle, 39 Blue-winged Warblers, 2 Kentucky Warblers, 7 Prairie Warblers, 31 Rusty Blackbirds, and 0 Wood Thrush sightings. The closest sighting was 1.2 miles away from the Westfield site.

According to the Protocols for the Establishment of Exception Resource Value Wetlands Pursuant to the Freshwater Wetlands Protection Act, the only one of these birds that could apply an exceptional resource value to this wetland is the bald eagle. These wetlands are under 1 acre in size; therefore, they will be judged on a case-by-case basis. It was determined that this area is unlikely to be considered suitable for bald eagles, therefore, it will most likely not be considered exceptional resource value due to the lack of potential migratory bird habitat.

## 6.0 Recommendations

1. Conduct an acoustic bat survey in accordance with the 2019 Range-Wide Indiana Bat Survey Guidelines to determine the presence and/or absence of Indiana and northern long eared bats. If either bat is present, the NJDEP will likely designate the wetlands as exceptional resource value and mandate a 150 ft transitional area. If neither bat is present, this area will receive an ordinary resource value and no buffer will be applied.
2. Conduct passive surveys for the blue-winged warbler. It was determined that this species has a high probability of occurring at the site. While this species will not affect the resource value of the identified wetlands because it is a BCC, it will be included in the rare species report.
3. Consult with the USFWS NJ field office following the “Step by Step Instructions for Project Review” project screening chart for any construction or development projects at this site, including tree clearing operations.

### 6.1 Bird Survey Protocol

According to the iPAC letter we received, the best time to survey for blue-winged warbler would be at the very end of April into May. This survey would likely also include surveying for the golden-winged warbler, as it commonly hybridizes with the blue-winged warbler (Cornell Lab of Ornithology). The three species, blue-winged warbler, golden-winged warbler, and the hybrid between them are commonly surveyed for at the same time. The survey guidelines, provided by the Cornell Lab of Ornithology, state that survey should be started from 5:15 am to 7:00 am, and end by 11:00 AM before May 20, by 10:30 AM between May 21 and May 31 and by 10:00 AM between May 31 and June 15. The following information about acoustic bird surveys was taken from the article Bird Bioacoustics Surveys – Developing a Standard Protocol, written by Carlos Abrahams. Recorder placement should aim to cover multiple habitats where the species could be found. Average recorders have a range of about 50 meters. They should be placed at approximately 100 meters apart. A non-compressed digital file format is optimal, WAV is preferred over the compressed formats MP3 or MP4. Metadata including location, date and time, weather, habitat and equipment identifiers should be recorded. The recordings can be analyzed by simply listening to them, or by using acoustic analysis software. Some examples of automatic recognition software are Songscope, Kaleidoscope, Raven, Audacity, Luscinia, and some R packages. The full guidelines can be found in Appendix D.

## 7.0 References

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