AMENDMENT
#7 TO THE
VERMONT IN-LIEU FEE PROGRAM INSTRUMENT

WHEREAS, the approved Ducks Unlimited, Inc. Vermont In-lieu Fee Program instrument, was signed by Ducks Unlimited on January 6, 2011. Amendment # 1 was signed by Ducks Unlimited on March 9, 2015 and the Corps on January 30, 2015. Amendment #2 was signed by Ducks Unlimited on June 10, 2015 and the Corps of June 29, 2015. Amendment #3 was signed by Ducks Unlimited on November 11, 2016, and the Corps of October 19, 2016. Amendment #4 was signed by Ducks Unlimited on February 11, 2019, and the Corps on February 5, 2019. Amendment #5 was signed by Ducks Unlimited on March 26, 2020, and the Corps on March 5, 2020. Amendment #6 was signed by Ducks Unlimited on January 7, 2021, and the Corps on December 7, 2020.

NOW THEREFORE,
This amendment modifies the instrument to include the Willoughby Lake Road compensatory mitigation site in the St. Francois Service Area off Willoughby Lake Road in Barton, Vermont.

1. The mitigation plan includes the preservation, re-establishment and rehabilitation of wetlands and preservation of uplands to compensate for authorized impacts to waters of the United States in the St. Francois Service Area for which payments into the DU-VT-ILF program were made in lieu of the permittees doing their own mitigation. The project is located on a 243.6-acre parcel and will produce approximately 23.394 wetland credits. This mitigation plan is described in the attached plan tilted "Mitigation Plan for Willoughby Lake Road: St. Francois Service Area" and dated "March 10, 2021".

IN WITNESS WHEREOF, the undersigned have caused this amendment to be duly executed.

DocuSigned by:
Nick Wiley
020E45A8343D419...

4/12/2021
Date

Nick Wiley
COO, Program Sponsor Ducks Unlimited, Inc.

Tammy R. Turley

9 Apr 2021
Date

Tammy R. Turley
Chief, Regulatory Division

Mitigation Plan for Willoughby Lake Road:
St. Francois Service Area

File Number: NAE-2019-03250

Prepared by:
Ducks Unlimited Vermont In-Lieu Fee Program

DUCKS UNLIMITED | GREAT LAKES & ATLANTIC REGION

Photo: UVM-SAL May 31, 2019

To be considered by:
United States Army Corps of Engineers and
The Interagency Review Team

New England District
11 Lincoln Street
Room 210
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New England District
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696 Virginia Road
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Date: March 10, 2021

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1. Introduction

The Ducks Unlimited (DU) mission focuses on protecting and restoring wetland resources critical to sustaining North America's waterfowl populations. DU utilizes a scientific approach to prioritize its conservation and mitigation activities. At a high level, conservation priorities are identified by a team of international biologists made up of waterfowl and conservation experts spanning government, academia, and NGO sectors as described in the North American Waterfowl Management Plan (NAWAMP; United States Fish and Wildlife Service 1986, 2012). DU's applied version of this plan, The International Conservation Plan identifies portions of Vermont as priority landscapes for waterfowl conservation (Ducks Unlimited, 2005, 2019). Furthermore, the northeastern United States and adjacent Canada support an estimated 7.6 million breeding waterfowl, 2.7 million wintering waterfowl, and four to five million migrating waterfowl. Providing a high-quality compensatory mitigation option in New England is therefore a priority for Ducks Unlimited.

DU established the Vermont In-Lieu Fee Program (DU-VT ILF Program) to provide a third-party compensatory mitigation option for unavoidable wetland impacts in this priority landscape. DU has developed a suite of GIS-planning tools to aide in the identification of wetland restoration and protection opportunities within these Service Areas following techniques described by Hunter et al. 2012 and Raney and Leopold 2018. DU's top-down prioritization of landscapes and significant wetland features within those landscapes enables DU to identify priority areas for wetland conservation and mitigation activities on a watershed-scale. DU thoroughly evaluated wetland restoration opportunities in the St. Francois Service Area (SA) (Figure 1) prior to coordinating the selection of this Site with the IRT.

To date DU has sold 8.08 credits in the St. Francois Service Area. This plan describes the 243.60-acre Site known as the Willoughby Lake Road Site located in the Town of Barton, Orleans County, Vermont. This Site is proposed as an ILF Site for compensatory mitigation in the St. Francois Service Area (HUC 011100). The SA boundaries are shown in Figure 1.
The site supports wildlife listed as species of greatest conservation need (SGCN) by the Vermont Wildlife Action Plan (Vermont Wildlife Action Plan Team, 2015). Great blue heron, ruffed grouse, bobolink, and peregrine falcon are all medium priority SGCN identified on site. This

mitigation plan has been prepared and will be implemented by DU in accordance with the "U.S. Army Corps of Engineers New England District Compensatory Mitigation Guidance" (USACE, 2010). A Mitigation Plan is submitted for public comment followed by Interagency Review Team review for potential approval. Because of the Site's potential to satisfy far more credits than have been sold, a phased approach to credit production has been developed.

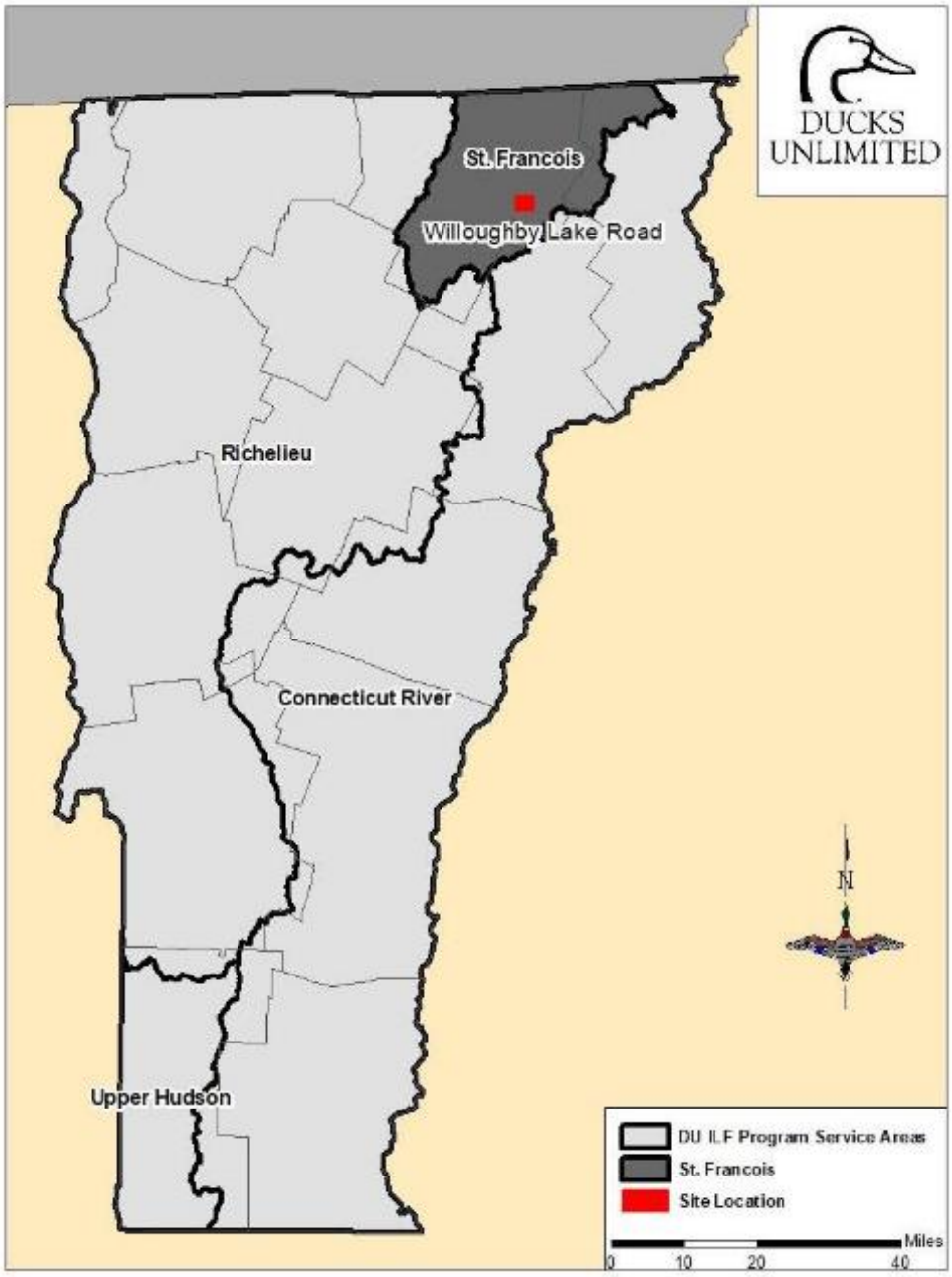


Figure 1. Site Location and Service Area.
The St. Francois ILF Service Area (HUC 011100) shown in dark gray.
Approximate coordinates Latitude: 44°47'4.16"N and Longitude: 72°6'49.82"W. The Site is accessed from Hunt Lane and Willoughby Lake Road.

1.1 Objectives

The primary goal of the Willoughby Lake Road ILF Site (hereafter: Site) is to provide wetland reestablishment, rehabilitation, and preservation to compensate for wetland loss. More specifically this Site provides an opportunity to:

- Preserve a wildlife connective corridor,
- Provide breeding habitat for waterfowl,
- Preserve and improve flood attenuation capacity,
- Preserve upland buffer on the Site to preserve water quality in the watershed, specifically to Lord Brook, and a second unnamed tributary to the nearby Willoughby River,
- Potentially provide passive recreational opportunities.

2. Site Selection

2.1 Site Description

The Site is 243.60-acres and lies within the larger 243.90-acre property protected by a deed restriction (Appendix A) and WAT for use as an ILF Site (Figure 2; Appendix B). The Site is directly to the north of Vermont Route 16 (Willoughby Lake Road) at the intersection with Hunt Lane in the town of Barton in Orleans County (Figure 2; 44°47'4.16"N, 72°6'49.82"W). Evidence of past clearing and drainage for agriculture indicate suitable conditions exist to reestablish wetlands in northern portions of the property and in the large field on the eastern portion of the property near Willoughby Lake Road. The Site has a mixture of forested wetlands and uplands with 142-acres of agricultural fields. Hydrological conditions are described further in Section 5.2, in the Wetland Delineation Report (Appendix C), and are shown in the Work Plan (Appendix D).

The Site lies within close proximity to several protected recreational areas surrounding Lake Willoughby and the Willoughby River, including Willoughby Falls Wildlife Management Area, Willoughby State Forest, and Vermont Land Trust Easements (Figure 3). The Willoughby River has the potential to be given an Outstanding Resource Waters (ORW) designation by the State of Vermont, and this site further protects the associated drainage. Willoughby River tributaries flow through the property along eastern and western boundaries (Figure 2).

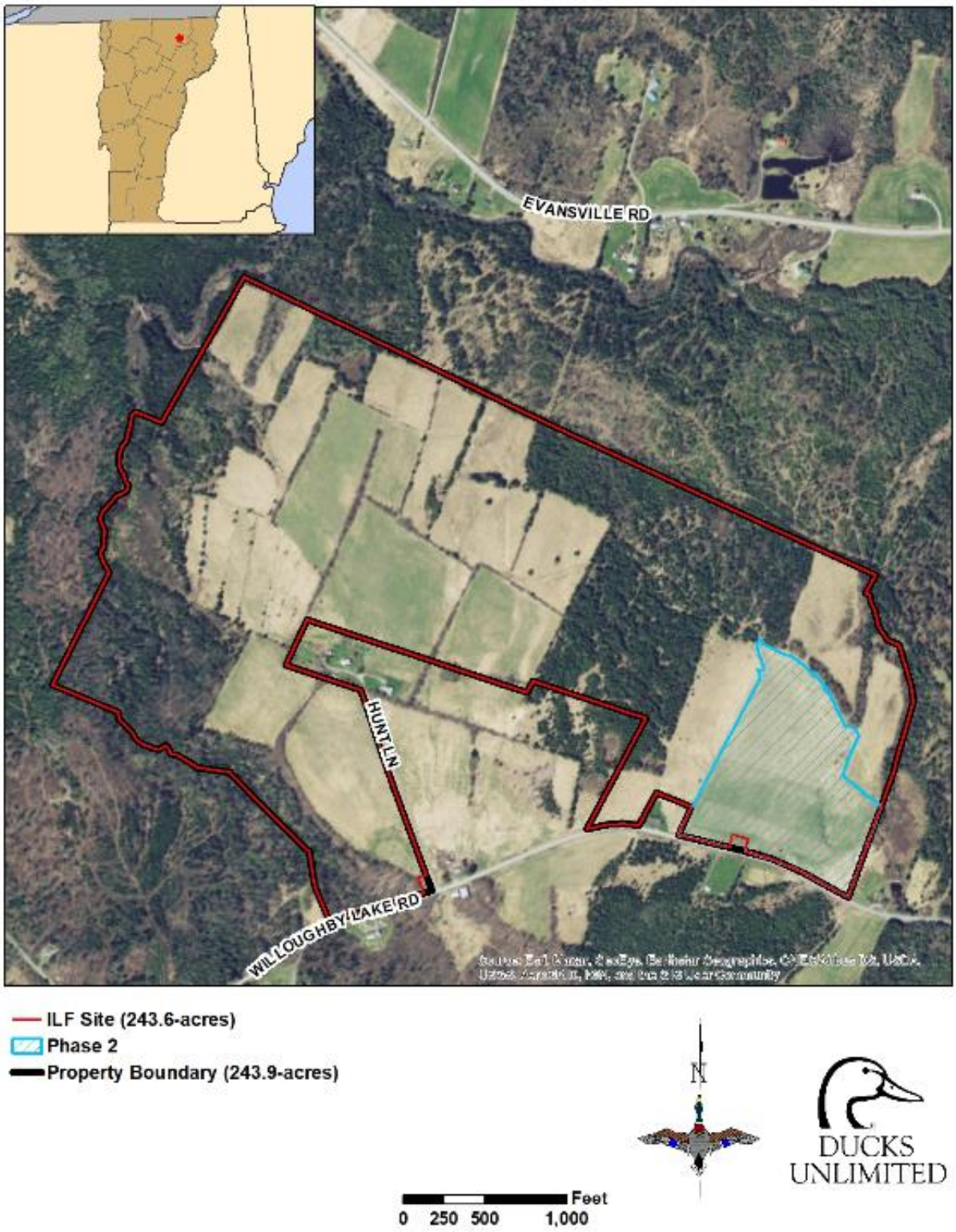


Figure 2. View of the Site.
The 243.60-acre Site (red outline; easement area) is located within a 243.90-acre property (black outline) owned by Wetlands America Trust (WAT). Two areas are excluded from the easement for parking and are accessed from Hunt Lane and Willoughby Lake Road. Phase 2 areas are shown in light blue hashing, all other areas within the red site boundary are included in Phase 1.

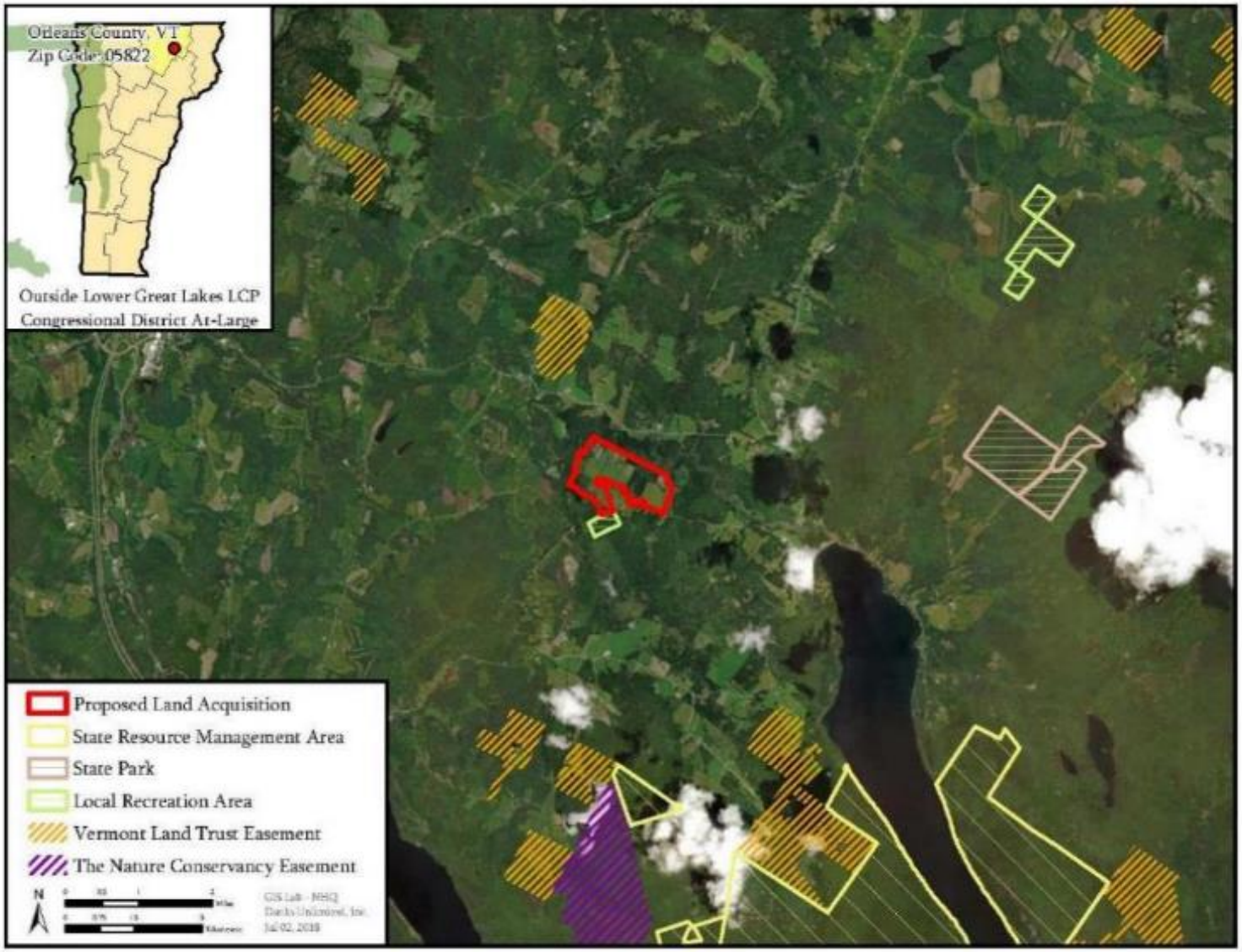


Figure 3. Site Conservation Context. The Site lies near a Vermont Land Trust easement, aa local recreation area, and other preserved lands exist near Lake Willoughby.

This Site directly preserves a large northern white cedar swamp, which is a rare community type in Vermont.

Specifically, the objectives of this plan are to:

- re-establish 3.79 acres of palustrine emergent (PEM) wetlands
- re-establish 1.08 acres of palustrine scrub-shrub (PSS) wetlands
- re-establish 5.88 acres of palustrine forested (PFO) wetlands
- re-establish 14.09 acres of PFO/upland mosaic
- rehabilitate 2.60 acres of PFO wetlands
- rehabilitate 30.44 acres of upland buffer
- rehabilitate 10.09 acres of PFO/upland buffer
- preserve 23.37 acres of PEM wetlands
- preserve 0.09 acres of PEM/upland mosaic
- preserve 0.75 acres of PSS wetlands
- preserve 66.28 acres of PFO wetlands
- preserve 84.86 acres of upland buffer

Methods utilized to achieve these objectives are described in the "Mitigation Work Plan" in Section 6 of this document.

3. Site Protection Instrument

The Site is owned by Wetlands America Trust, Inc. (WAT) a wholly owned, Accredited Land-Trust and wholly owned subsidiary of DU. Ownership of the Mitigation Site by WAT meets the site protection requirements of 332.7(a)(1).

WAT will record a U.S. Army Corps of Engineers (USACE) approved Conservation Easement (CE) in the land records of Orleans County upon transfer of the property to the Long-term Steward (Steward). Concurrent with filing the CE, a USACE-approved Long-Term Management Plan (LTMP) will be recorded to the Deed in the land records of Orleans County. As part of the LTMP and CE requirements, the property will remain perpetually as undeveloped property as a natural area for the preservation of aquatic resources on the Site; language to this effect will be recorded to the Deed. Efforts to prevent unauthorized access and Site degradation will be the main emphasis of the LTMP. The LTMP will outline anticipated Steward obligations. It is anticipated that the Site will be self-sustaining with minimal management inputs required by the Steward aside from normal fee-title monitoring to ensure the Site remains in a protected state.

DU will also set aside endowment funds for long-term management and protection as well as an endowment for Conservation Easement monitoring (Described further in Section 7).

4. Determination of Credits

Mitigation activities may be phased depending on project funding levels. The majority of the preservation acreage, as well as the re-establishment and rehabilitation activities in the north-central and northwest portions of the Site are included in Phase 1 (Figure 2; Appendix D). Phase 2 will encompass wetland re-establishment and rehabilitation and upland buffer rehabilitation in a hay field at the southern end of the Site accessed from Willoughby Lake Road. Prior to Phase 2 restoration activities, those areas will be hayed in late summer or early fall following grassland bird breeding. This project phasing approach will enable continued benefits to species of greatest conservation need (e.g., bobolink).

Based on established credit ratios used in the New England District, this Site is expected to produce 23.394 credits (Table 1, Appendix D). Ecological lift will be achieved with the restoration of hydrology, establishment, survival and healthy growth of and plant and tree species, and control of invasive plant species. Consistent with the program Instrument and New England We propose a 2:1 credit ratio for the re-established emergent, scrub-shrub, and forested wetlands, and 10:1 for the rehabilitated forested wetlands. Forested wetland rehabilitation entails reestablishing forested cover in existing degraded wet meadow areas on the Site; based on similar topographic settings in this watershed, these areas were likely to have historically been forested wetlands. The 10:1 ratios requested for PFO rehabilitation and PFO/Upland Mosaic Rehabilitation, and Upland Buffer Rehabilitation reflects underlying costs required to re-plant trees. It is anticipated that following cessation of agricultural activities, regular haying, and following reintroduction of microtopography through rough disking, that many of the areas designated as Upland Buffer and or Upland Mosaic will revert to wetlands. Historical tilling and agricultural practices have facilitated drainage. Mitigation Activities are described in Table 1, and target species planting/seeding lists provided in Table 3 is based on site and nearby reference communities Table 2 and Baseline Communities described in section 5.

The preservation of wetlands and riparian lands has been identified as a key to reducing nutrient loading in Lake Memphremagog Watershed (Memphremagog Study Advisory Group, 2019). There are two large forested wetlands on the property dominated by northern white cedar and balsam fir spanning 66.28 acres. Additionally, there are several smaller emergent and scrub-shrub wetlands. Several uncommon plant species were found in emergent wetlands including rattlebox (*Crotalaria sagittalis*), tradescant aster (*Symphyotrichum tradescantii*), hooded lady's tresses (*Spiranthes romanzoffiana*), ragged-fringed-orchid *(Platanthera lacera*), and northern green orchid (*P. aquilonis*). These wetlands do contribute to important, watershed scale functions; flood-storage value, carbon sequestration, habitat for wildlife (including species of greatest conservation need), and a role in denitrification. Specifically, wetlands at this Site provide a significant riparian buffer to the waters of Lord Brook and the Willoughby River. Due to the quality and important functions of these wetlands, we propose a credit production ratio of 20:1 to preserve existing wetlands.

The agricultural fields present have been hayed regularly and include non-native species that provide limited ecological value. A 10:1 credit-ratio is proposed for upland buffer rehabilitation A 15:1 preservation ratio is planned for upland buffer areas where planting is not proposed (Appendix D, Planting Plan) – but we note that such areas are expected to revert to forested uplands. By performing both active and passive forest recovery, the project will achieve some passive restoration, and a variety of successional stages, which should contribute to greater plant diversity and enhanced wildlife usage. Wetlands and streams without intact upland buffers typically suffer lower plant diversity, more invasive species, greater nutrient and sediment inputs, and higher near-surface temperatures. Given the importance of forested buffers to Lord Brook and the Willoughby River Floodplain, a 15:1 ratio for upland buffer preservation has been applied to the 84.86 acres of upland buffer area.

Table 1. Credit Generation The program sponsor anticipates the Site will generate 23.394 credits based on the following ratios and acreages. Credit ratios are from the DU-VT-ILF Program Instrument and follow guidance from the New England District USACE.

Mitigation Activity	Action / Description	Ratio (Acres: Credits)	Acres	Credits Generated
Pre-Construction				
PEM Preservation	Preservation, may result in succession to forested condition	20:1	23.37	1.169
PSS Preservation	Preservation	20:1	0.75	0.038
PEM/Upland Mosaic Preservation	Preservation, may result in succession to forested condition	20:1	0.09	0.005
Upland Buffer Preservation	Preservation, is expected to result in succession to forested condition	15:1	84.86	5.657
PFO Preservation	Preservation, no change in successional state anticipated	20:1	66.28	3.314
			Preservation Total	**10.183**
Phase 1				
PEM Re-establishment	Excavation and grading, basin contouring, removal and replacement of topsoil; seeding/planting	2:1	1.32	0.660
PFO/Upland Mosaic Rehabilitation	Planting trees; this area is rocky and has microtopograhy	10:1	10.09	1.009
PFO Re-establishment	Rough disking to introduce microtropgraphy, seeding, planting	2:1	5.28	2.640
Upland Buffer Rehabilitation	Rough disking to introduce microtropgraphy, seeding, planting	10:1	26.88	2.688
			Phase 1 Total	**6.997**
Phase 2				
PEM Re-establishment	Excavation and grading, basin contouring, removal and replacement of topsoil; seeding/planting	2:1	2.47	1.235
PSS Re-establishment	Excavation and grading, basin contouring, removal and replacement of topsoil; seeding/planting	2:1	1.08	0.540
PFO Re-establishment	Excavation and grading, basin contouring, removal and replacement of topsoil; seeding/planting	2:1	0.6	0.300
PFO/Upland Mosaic Re-establishment	Heavy disking to reintroduce microtopgoraphy; tile line disruption	4:1	14.09	3.523
PFO Rehabilitation	Rehabbing PEM to PFO. Heavy disking to reintroduce microtopography, tile line disruption, seeding, planting trees	10:1	2.6	0.260
Upland Buffer Rehabilitation	Rough disking to introduce microtropgraphy, seeding, planting	10:1	3.56	0.356
			Phase 2 Total	**6.214**
			Total	**23.394**

Provided performance standards are achieved, the credit release schedule will include:

- 50% of the credits associated with preservation will be released upon approval of this Instrument Amendment and execution of a USACE-approved Deed Restriction.
- 50% of the credits associated with preservation will be released upon execution of a USACE-approved Conservation Easement.
- 10% of the credits for re-establishment and rehabilitation in Phase 1 will be released at as-built production and approval by USACE.
- 20% of the credits for re-establishment and rehabilitation in Phase 1 will be released after successfully meeting the first interim performance standards;
- 20% of the credits for re-establishment and rehabilitation in Phase 1 will be released after successfully meeting the second interim performance standards;
- 20% of the credits for re-establishment and rehabilitation in Phase 1 will be released after successfully meeting the third interim performance standards;
- 30% of the credits for re-establishment and rehabilitation in Phase 1 will be released when the USACE signs off on the project, a Long Term Management Plan is executed, and all other conditions of the permit and site plan have been completed which is planned for the tenth year of monitoring.
- 10% of the credits for re-establishment and rehabilitation in Phase 2 will be released at as-built production and approval by USACE.
- 20% of the credits for re-establishment and rehabilitation in Phase 2 will be released after successfully meeting the first interim performance standards;
- 20% of the credits for re-establishment and rehabilitation in Phase 2 will be released after successfully meeting the second interim performance standards;
- 20% of the credits for re-establishment and rehabilitation in Phase 2 will be released after successfully meeting the third interim performance standards;
- 30% of the credits for re-establishment and rehabilitation in Phase 2 will be released when the USACE signs off on the project, a Long Term Management Plan is executed, and all other conditions of the permit and site plan have been completed which is planned for the tenth year of monitoring.

Actual credits may be adjusted following post-construction monitoring as-builts, and annual monitoring reports.

5. Baseline Ecological Characteristics

5.1 Historic and Existing Plant Communities, Including Wetlands

The Site has a history of use as agricultural land dating back to the earliest available aerial imagery (at least the 1960's). These practices include installation of at least one tile line, removal of microtopgraphic variation both of which enhance runoff, and haying practices that further enhance evaporation and drying. Vegetation communities were surveyed in July 2019, and are further described in the wetland delineation report in Appendix C. Here we provide a brief

summary of the plant communities and provide photographs of current Site conditions, as well as reference communities that have been used to guide restoration design and species plantings in proposed restoration and rehabilitation wetlands. Existing emergent wetlands within the agricultural fields are dominated by fox sedge (*Carex vulpinoidea*) and green bulrush (*Scirpus atrovirens*), but appear to have historically occurred as forested wetlands prior to agriculture. The upland portions of the hay fields are dominated by perennial rye grass (*Lolium perenne*) and sweet vernal grass (*Anthoxanthum odoratum*). The forested wetlands are dominated by balsam fir (*Abies balsamea*) and northern white cedar (*Thuja occidentalis*), with fringed sedge (*Carex crinita*) and sensitive fern (*Onoclea sensibilis*) in the understory.

Willoughby Lake Road Current Conditions Photos:

Drone photography by UVM, May 2019

Facing northeast with forested Wetland 13 in the center.

Facing southeast towards Lake Willoughby. The eastern hayfield is to the left.

Facing north towards the Willoughby River. Hunt Lane is on the right.

Facing east with Hunt Lane in the center.

Facing north towards the northwestern corner of the Site.

5.2 Reference Communities

On-site

Northern White Cedar Swamp – a conifer dominated wetland community of conservation concern in Vermont and the northeast serves as an on-site reference community for forested wetland reestablishment and rehabilitation areas. Characteristic species include: *Thuja occidentalis, Abies balsamea, Betula alleghaniensis, Cornus canadensis, Onoclea sensibilis, Osmunda regalis, O. claytonii, Impatiens capensis, Lysimachia quadrifolia, Coptis trifolia, Maianthemum canadense, M. stellatum.* Several of these species are commercially available, some of the more diminutive species (e.g., *Coptis trifolia, Mainthemum canadense*) are well established on site, and are likely to naturally reestablish in restored wetlands. These swamps are characterized by pronounced microtopgraphic variation, and variable water table depth and levels of peat/muck accumulation (Podniesinski and Leopold 1998, Vermont Fish and Wildlife 2016). In a study of high-quality northern white cedar swamps Raney et al. 2014 found water table depths across two growing seasons to be fairly consistent, and among 44 locations measured in three cedar swamps, average water table depth was 3.94 inches with a standard deviation of 2.47 inches. Based on field investigations, similarly wet conditions exist on site, as well as wetland areas with deeper average water-table depth. Wetland restoration and rehabilitation activities will add microtopography that has been lost due to agricultural practices. Water-levels in these wetlands are variable but are often saturated near the surface for a duration sufficient for peat or muck to accumulate.

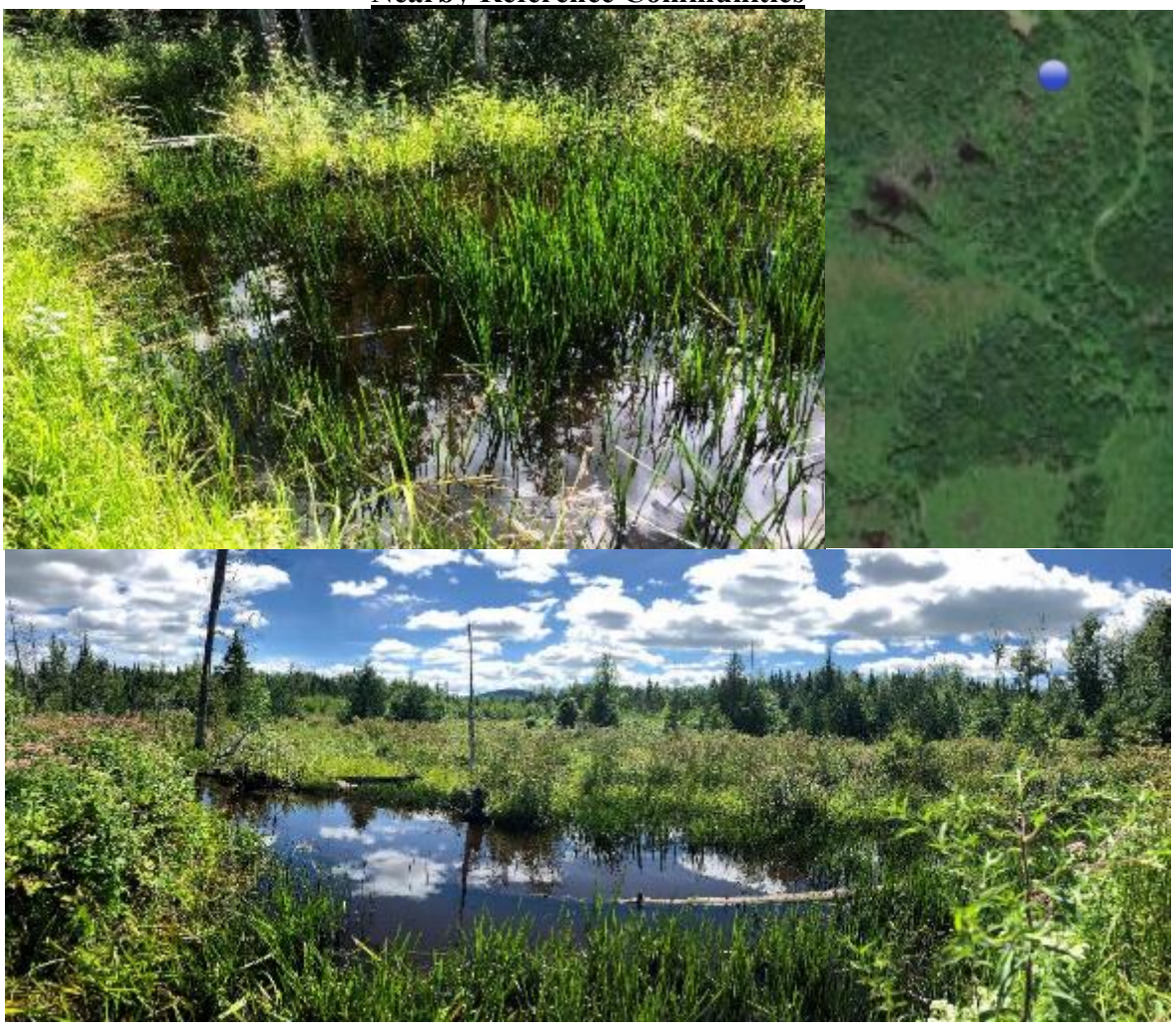
On-site

Canopy gaps within the forested Northern White Cedar Swamp.

The role of canopy gaps play in maintaining plant species diversity has long been recognized as an important factor in the persistence of rare or uncommon plant species (e.g., Anderson and Leopold 2002; Scanga 2014). Constructed basins planned as part of this project are expected to provide similar habitat conditions to canopy gaps within forested wetlands, especially early in their development. Several small canopy gaps exist within the Northern White Cedar Swamp, this example occurs on a 4% slope, and appears to be maintained as open by high water-tables. Soils in this and other openings were dominated by muck, with a water table 8" from the surface. The pictured gap was 80 ft by 20 ft wide. As planned, the Mitigation Site will incorporate areas planned as PEM which are likely to function similarly to canopy gaps. Moreover, all constructed basins will be surrounded by tree-plantings.

Plant species encountered along the margins of this gap include: *Abies balsamea, Betula alleghaniensis*, *Thuja occidentalis*. Herbaceous, emergent, and shrubs in the gap included: *Carex vulpinoidea, Onoclea sensibilis, Lysimachia ciliata, Platanthera aquilonis, Rubus pubescens, Ranunculus septriontalis, Thelypteris palustris, Osmunda claytonii, O. regalis, Spirea tomentosa, Carex crinita, Iris versicolor. Platanthera aquilonis* is an orchid species that is sporadic on the site, but is more typical in open vs. closed canopy settings.

Nearby Reference Communities



Tiered open wetlands on slopes similar to those proposed in Units 1 and 2 are encountered in wetlands across the road from the project site. The top right panel shows the "stair-step" arrangement of wetlands similar to those proposed in constructed units on site.

These tiered wetlands are the result of beaver activity, have steep side slopes >6:1, deeper pockets surrounded by shallower fully vegetated areas where hydrology is derived from surface runoff. Deeper areas are dominated by Sparganium americanum and Typha latifolia. Species composition in shallower areas included: Scirpus atrovirens, Eupatorium maculatum, Rubus pubescens, Spirea tomentosa, Carex crinita, Onoclea sensibilis, Carex stricta, Carex intumescens, Betula populifolia, Juncus effusus. Proposed constructed basins follow a similar spatial arrangement, and target hydroperiods are similar to this reference. Several of the species encountered are commercially available and are included in the planting plan in Table 3. Based on vegetation encountered, and hydroperiods observed, we anticipate in average years these reference communities maintain small areas of standing water throughout the growing season. Similar isolated pocket wetlands, were likely more prevalent historically. Based on heavy soils encountered in proposed Unit 1 and 2, DU expects some isolated pockets of standing water to occur in the constructed basins under typical growing season conditions following construction.

5.3 Cultural Resources

A request for a cultural and historic resources review was submitted to the Vermont Division for Historic Preservation and a response is pending; the results will be provided to USACE.

5.4 Site Land Use History, Including Structures

There are no structures on the property. The fields have been maintained for agriculture since at least 1964 (Figure 4). From 1999-2019 the fields were primarily used for hay production, although according to interviews with neighbors there has been some row cropping of corn. On-Site reviews in October 2018 and July 2019 provided evidence of previous hydrological modifications, including ditching and tile drainage. Many of the fields appear to have historically supported more extensive wetlands prior to drainage activities.

Figure 4. Historical Aerial Photos from Willoughby Lake Road.
The property has been pretty stable in terms of landuse since 1964. New fields had been cleared in the northeast and northwest corners of the parcel, while the forested wetland in the center of the property has grown.

5.5 Soil Descriptions

Based on the Soil Survey of Orleans County, VT (USDA Official Soil Series Descriptions) the soil series mapped on-Site include Buckland loam, Cabot silt loam, and Peru fine sandy loam (Dixifield). A soils map is provided in Figure 5. Soil conditions in the field deviate from the mapped soil series in some forested wetland areas where high water tables have promoted peat and muck accumulation. Agreement between mapped soil units are greater in agricultural fields as opposed to forested wetlands areas. Additionally, soil borings were taken throughout areas potentially suitable for restoration work. Descriptions of soil borings are provided in the work plans for the Site in Appendix D. Overall soils appear suitable for basin construction, as soils tend heavier in their clay content in the areas identified for constructed wetlands.

17B-Buckland loam, 3 to 8 percent slopes. The Buckland component makes up 84 percent of the map unit. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. This component is on hills on glaciated uplands. The parent material consists of loamy lodgment till derived from mica schist and/or loamy lodgment till derived from limestone and/or loamy lodgment till derived from phyllite. Depth to a root restrictive layer, densic material, is 20 to 40 inches.

This area corresponds to well-drained upland fields.

47B-Cabot silt loam, 3 to 8 percent slopes. The Cabot component makes up 83 percent of the map unit. The natural drainage class is poorly drained. Water movement in the most restrictive layer is low. This component is on mountains on glaciated uplands, hills on glaciated uplands. The parent material consists of loamy lodgment till derived from mica schist and/or loamy lodgment till derived from limestone. Depth to a root restrictive layer, densic material, is 6 to 20 inches.

These soils cover the majority of the property, and cover areas mapped as open agricultural fields, forested, emergent and scrub-shrub wetlands. Based on soil pits taken along with wetland delineation datapoints, many of the PFO areas identified on site as Cabot Silt Loam actually contain peat and muck soil inclusions over mineral soils.

This is the dominant soil type throughout much of the site including all areas planned for restoration. Forested wetland areas despite being mapped as Cabot silt loam consistently have developed muck and peat deposits.

15C-Peru fine sandy loam, 8 to 15 percent slopes. The Dixfield component makes up 81 percent of the map unit. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. This component is on hills, mountains. The parent material consists of loamy basal till. Depth to a root restrictive layer, densic material, is 20 to 36 inches.

This area corresponds to a well-drained hayfield in the southeast corner of the site.

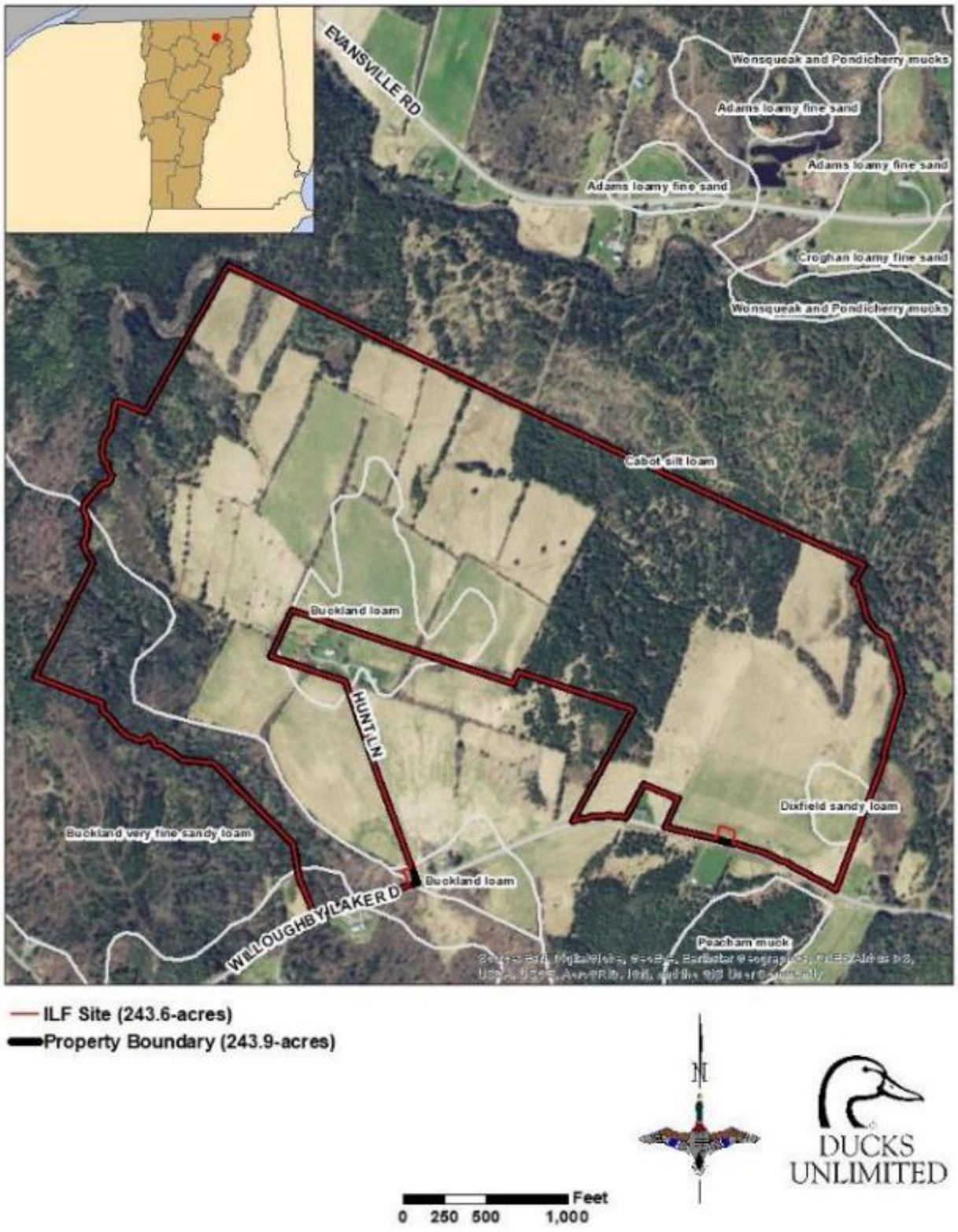


Figure 5. Soils Map.
Restoration activities will occur in Cabot silt loam. Forested areas include unmapped muck and peat inclusions.

5.6 Animal and Plant Species Including Endangered Species

While no federally listed species were observed, forested portions of the Site potentially contain roosting habitat for northern long-eared bat (*Myotis septentrionalis*) (Appendix E). DU will consult with the USFWS to ensure that this project will not negatively affect any listed species that may be present. DU does not plan to cut any trees as part of this project as it might have an adverse impact on bat species. We anticipate that the restored wetlands and upland forest will improve foraging and roosting opportunities for bat species present. Vermont species of greatest conservation need (SGCN) have been observed on the Site by DU staff during Site visits; including great blue heron, ruffed grouse, bobolink, peregrine falcon, rattlebox, and tradescant aster. A full list of species observed at the property is provided in Table 2.

Table 2. Wildlife and Plant Species Identified

Species	Common Name	Conservation Status	Notes
	Birds		
Agelaius phoeniceus	red-winged blackbird		
Ardea herodias	great blue heron	Medium Priority SGCN	
Bonasa umbellus	ruffed grouse	Medium Priority SGCN	
Cathartes aura	turkey vulture		
Colaptes auratus	northern flicker		
Corvus brachyrhynchos	American crow		
Corvus corax	common raven		
Cyanocitta cristata	blue jay		
Dolichonyx oryzivorus	bobolink	Medium Priority SGCN	
Dryocopus pileatus	pileated woodpecker		
Falco columbarius	merlin		
Falco peregrinus	peregrine falcon	Medium Priority SGCN	
Maleagris gallopavo	wild turkey		
Melospiza melodia	song sparrow		
Passerina cyanea	indigo bunting		
Poecile atricapillus	black-capped chickadee		
Sayornis phoebe	eastern phoebe		
Sialia sialis	eastern bluebird		
Sphyrapicus varius	yellow-bellied sapsucker		
Spinus tristis	American goldfinch		
Spizelloides arborea	American tree sparrow		
Turdus migratorius	American robin		
Zonotrichia albicollis	white-throated sparrow		
	Plants		
Abies balsamea	balsam fir		
Acer pensylvanicum	striped maple		
Acer rubrum	red maple		
Agrostis scabra	rough bent grass		
Alnus incana	speckled alder		
Anthoxanthum odoratum	sweet vernal grass		
Betula alleghaniensis	yellow birch		
Betula papyrifera	paper birch		
Carex comosa	bearded sedge		
Carex crinita	fringed sedge		
Carex flava	yellow-green sedge		
Carex granularis	limestone meadow sedge		
Carex lupulina	hop sedge		
Carex rostrata	swollen beaked sedge		
Carex scoparia	pointed broom sedge		
Carex vulpinoidea	fox sedge		

Species	Common Name	Conservation Status	Notes
Chelone glabra	white turtlehead		
Circaea alpina	enchanter's nightshade		
Cirsium arvense	Canada thistle		invasive
Coptis trifolia	threeleaf goldthread		
Crotalaria sagittalis	rattlebox	Medium Priority SGCN	
Dactylis glomerata	orchardgrass		
Dryopteris intermedia	evergreen wood fern		
Eleocharis palustris	common spike-rush		
Epipactis hellborine	weed orchid		invasive
Equisetum arvense	field horsetail		
Eragrostis hypnoides	teal love grass		
Euthamia graminifolia	flat-top goldentop		
Eutrochium maculatum	spotted joe pye weed		
Festuca rubra	red fescue		
Fragaria virginiana	Virginia strawberry		
Fraxinus nigra	black ash		
Galium aparine	stickywilly		
Galium mollugo	false baby's breath		
Geranium maculatum	spotted crane's-bill		
Geum rivale	purple avens		
Glyceria striata	fowl manna grass		
Impatiens capensis	jewelweed		
Juncus articulatus	joint-leaf rush		
Juncus effusus	soft rush		
Juncus tenuis	path rush		
Krigia virginica	Virginia dwarf-dandelion		
Larix laricina	tamarack		
Leucanthemum vulgare	ox-eye daisy		
Lolium perenne	perennial rye grass		
Lychnis flos-cuculi	ragged-robin		
Lycopus americanus	American water horehound		
Maianthemum canadense	false lily-of-the-valley		
Monotropa uniflora	Indianpipe		
Myosotis scorpioides	true forget-me-not		
Onoclea sensibilis	sensitive fern		
Osmunda claytoniana	interrupted fern		
Osmunda regalis	royal fern		
Phalaris arundinacea	reed canary grass		invasive
Phleum pratense	timothy		
Picea glauca	white spruce		
Picea rubens	red spruce		
Pinus strobus	eastern white pine		

Species	Common Name	Conservation Status	Notes
Plantago lanceolata	English plantain		
Plantago major	common plantain		
Platanthera aquilonis	northern green orchid		
Platanthera lacera	ragged-fringed-orchid		
Populus balsamifera	balsam poplar		
Prunella vulgaris	common selfheal		
Pteridium aquilinum	bracken fern		
Ranunculus acris	tall buttercup		
Rubus pubescens	dwarf raspberry		
Rumex crispus	curly dock		
Scirpus atrovirens	green bulrush		
Scirpus cyperinus	woolgrass		
Solidago canadensis	Canada goldenrod		
Solidago rugosa	wrinkleleaf goldenrod		
Spiraea alba	white meadowsweet		
Spiranthes romanzoffiana	hooded lady's tresses		
Stellaria media	common chickweed		
Symphyotrichum ericoides	white heath American-aster		
Symphyotrichum tradescantii	tradescant aster	Medium Priority SGCN	
Taraxacum officinale	common dandelion		
Thelypteris noveboracensis	New York fern		
Thelypteris palustris	eastern marsh fern		
Thuja occidentalis	northern white-cedar		
Tilia americana	basswood		
Tiarella cordifolia	heart-leaf foamflower		
Trientalis borealis	starflower		
Trifolium pratense	red clover		
Trifolium repens	white clover		
Typha latifolia	broad-leaf cattail		
Vicia sativa	garden vetch		

6. Mitigation Work Plan

6.1 Geographic Boundaries

The geographic boundaries of the Site correspond to the 243.60-acre area to be placed under a conservation easement (red-line) as depicted in Figure 2, and in Appendix B. Two small areas are excluded from the easement for parking. The Site lies to the north of Willoughby Lake Road (Vermont Route 16) in Barton.

6.2 Sources of Water, Connections to Existing Waters and Upland Runoff

The predominantly gently sloping terrain also includes several flat benches that remain wet due to the accumulation of surface water and groundwater inputs. Soil pits were dug in October 2018 and July 2019 for wetland delineation data points (Appendix C) and as part of the design work (Appendix D). Pits dug in the vicinity of Mitigation Units 1 and 2 (Phase 1) exhibited oxidized rhizospheres within 0”- 7” of the surface and saturated soils within 0” - 23” of the surface. Pits dug in the vicinity of Mitigation Unit 3 (Phase 2) exhibited oxidized rhizospheres within 0”- 13” of the surface and saturated soils within 0” – 32” of the surface, and is consistent with hydrology data obtained from July 2019 – August 2020 a(Figure 6). The water table was observed in Mitigation Unit 3 at data points DPW1 (3”), DPU8 (16”), and soil boring 10 (27”). These site characteristics support the plan to utilize a combination of drain tile disruption, shown in Appendix D, grading, and basin construction to restore and maintain wetland hydrology to these areas. Similar “stair-step” wetlands have been identified nearby reference communities described in Section 5. A groundwater monitoring well installed in July of 2019 shown in Appendix D, suggests the proposed shallow grading proposed will lower the surface elevation relative to groundwater position, while the basin should enable improved retention of runoff.

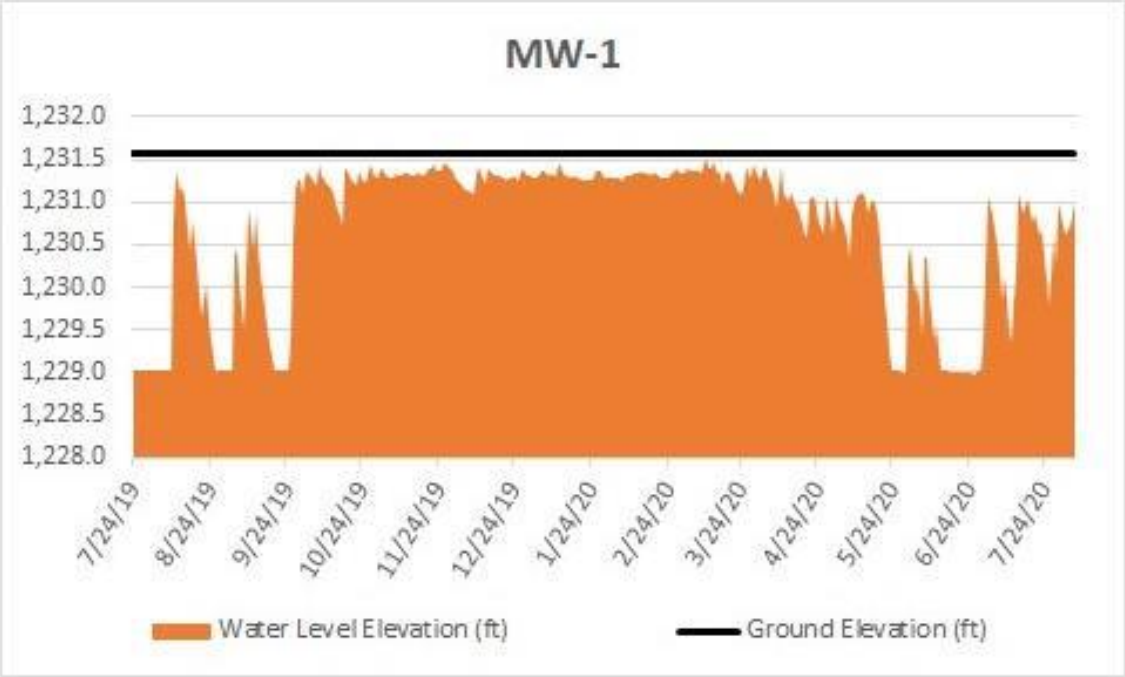


Figure 6. Monitoring Well Data.
Location is shown in Appendix D. Examining over a years' worth of hydrology data indicated the water-table was only near the surface intermittently following rainfall events during the growing season, suggesting that efforts to impede drainage, i.e., add microtopography to slow overland water-flow and hold water in depressions longer should aid in retention of hydrology.

6.3 Invasive Species

Upon acquisition, the Site had invasive plant species present that are typical in much of the St. Francois Service Area, including reed canary grass (*Phalaris arundinacea*), and a few observed purple loosestrife stems (*Lythrum salicaria*) with the latter hand pulled. Active management will be required to achieve performance standards for invasive plant and native plant diversity goals. Reed canary grass was restricted primarily to the wetter portions of the hayfields along Willoughby Lake Road and Hunt Lane corresponding to the Phase 2 Area (Wetlands 2, 3, 5, 6, 8, and 16), and also in the western portion of Wetland 9. Spot spraying of reed canary grass will be necessary in Phase 1 areas, whereas it is anticipated that broadcast spraying may be needed in conjunction with tilling in Phase 2 areas. An aquatic-safe, broad-spectrum herbicide will be applied to reed canary grass by a certified pesticide applicator in accordance with all state and federal regulations. More details on establishing the desired plant community are provided in Section 6.6.

Reed canary grass in Wetland 2 (left) and Wetland 6. Reed canary grass will be sprayed during construction activities and seeded to a native plant mix.

Following construction activities, DU staff will monitor and adaptively manage invasive species on the property through hand pulling, mechanical removal, and herbicide applications. Other appropriate methods for control will be evaluated as invasive species are encountered. Routine inspections in early spring and summer (May through mid-July) will be used to determine invasive species presence and abundance. DU will perform regular, routine monitoring of invasive plants during Site monitoring visits, typically four to six visits will occur between April and October. By visiting sites in late summer and early fall, control needs can be identified in advance of the following growing season.

6.4 Construction Methods, Timing and Sequencing

Phase 1

Construction and planting of Phase 1 will occur following approval of this mitigation plan on a timeline sufficient to satisfy credits sales. Final earthwork adjustments and planting of Phase 1 will occur no later than June 30 of the year following construction, or by an USACE-approved extension date. Phase 1 hydrological restoration plans (Appendix D) include constructing two wetland complexes (14 interconnected basins) in lower fields through grading and excavation in areas of heavier soils conducive to wetland formation.

Prior to any grading or placement of fill, topsoil will be stripped and stockpiled from the work area. Once cut and fills are completed, the stockpiled topsoil will be spread across all disturbed areas. The Phase 1 basins will encompass 1.32-acres of PEM. Maximum basin depth will be

between 1 and 3.25 feet. The side slopes of the basins will be no greater than 4:1 to 6:1 and will be constructed with more gradual slopes where possible. These slopes are consistent with other wetlands on site. Following final grading and stabilization, a total of 13 root-wads will be installed in reestablishment areas using material on site.

A tile drain is present in one of the lower field and is shown in (Appendix D). Disruption of this tile line in two locations (page 3 Appendix D) will be completed during Phase 1 to further enhance hydrology. Tile disruption, grading, and basin construction will be completed on the Site using a tracked excavator and bulldozer. PFO reestablishment of 5.28-acres will be achieved in the northernmost hayfield near Unit 1, through up-slope tile line disruption, cessation of mowing, rough disking (microtopography reintroduction), seeding and planting of hydrophytes (Table 3; shown in Appendix D, page 12, 17). This PFO reestablishment area is borderline wetland and is likely being maintained as an upland simply by upslope-drainage tile and periodic mowing associated with haying. A combination of breaking the up-slope tile, eliminating the mowing regime, and reducing runoff rate through microtopography reintroduction along with seeding is anticipated to return the site to a wetland condition. Surrounding areas in similar topographic position are already dominated by PFO wetlands. Soils will be left loose to facilitate wetland plant establishment, and this area will be planted with coniferous tree species listed in Table 3.

An exploratory tile search will also be performed in Unit 3 in the Phase 2 reestablishment areas. The field in the Phase 2 area will be mowed, roughly disked to reintroduce microtopograhy, and seeded to hydrophytes and planted to tree species indicated in Table 3. This field appears to be maintained as upland in part due to drying and evaporation facilitated by regular mowing. Planting and seeding of plant communities identified in the Planting Plan (Appendix D) corresponds with species identified in Table 3. Seeding of restored wetland areas will begin following completion of construction. Upland areas disturbed during construction activities, including all access roads, will be stabilized with an upland seed mix. Shrub and tree plantings may be delayed following construction to synchronize planting with optimum planting conditions, early spring or fall. Planting of shrubs and trees will occur no later than June 30 of the year following construction.

Phase 1 Unit 1. This unit is located in the northwest corner of the Site. Construction plans include three irregularly shaped basins in this field. Excavation of 2-3 feet

Phase 1 Unit 2. Bordered on two sides by a forested wetland, plans for this unit include the excavation of several small basins with conifers planted across the remaining area.

Phase 2

Hydrological and soils investigations suggested Phase 2 areas likely once supported a forested wetland similar to the larger northern white cedar swamp on the property. There is a large ditch present in the NE corner of the field that may present an outlet for tile line if present (no tile line has been observed). We will include a tile-search/disruption as part of Unit 3 construction activities to be performed in Phase 2. This phase will be implemented as credit needs arise or as funding levels allow, whichever comes first. Phase 2 will include the creation one wetland complex (five shallow basins) encompassing 3.14 acres in the southeastern hay field near Willoughby Lake Road. Maximum basin depth will range from 1 to 3.25 feet. Basin side slopes will be no greater than 6:1 and will be constructed with more gradual slopes where possible. Soil borings taken in these areas found loam and clay loams suitable for basin construction and retention of precipitation and runoff. Following final grading and stabilization, a total of 9 root-wads will be installed in reestablishment areas using material on site

DU anticipates approximately 40% of the PFO/Upland Mosaic Reestablishment areas to the east of Unit 3 will revert to wetlands following rough disking (microtopography reintroduction) and seeding to hydrophytes. Credit production in this zone will be dependent on acreage that reverts to wetland, credit totals may be adjusted downward to reflect upland buffer preservation if necessary.

Phase 2 Construction Area. Pictured prior to hay cutting. This is the area just to the north of Willoughby Lake Road along the eastern side of the property**.** DU plans to maintain this area as grassland habitat for species of conservation concern such as Bobolinks which were observed on site in July 2018 and 2019.

Phase 2 Construction Area. Pictured post-hay cut in October 2018. Silt loam soils appear to be suitable for wetland restoration activities. Areas of high water-table suggest this area may have contained some forested wetlands similar to those found elsewhere on the property. In addition to the excavation of basins, surrounding areas will be disked to create microtopography and encourage the establishment of hydrophytes. Wetland seed mix will be broadcast throughout graded and disked areas in this field and trees and shrubs will be planted. See Appendix D for planting plan.

6.5 Grading Plan, Including Elevations and Slopes of Substrate

Grading with finished elevations are shown in the plan and profile pages of Appendix D. These include tile drain exploration and disruption, grading, and basin construction to collect and retain groundwater and surface runoff. Slopes shall not exceed 4:1 in the basins. Final grading will leave the topsoil in a loose condition conducive to broadcast seeding. The erosion and sediment control plan in Appendix D outlines the stormwater best management practices that will be used.

6.6 Methods for Establishing Desired Plant Community

Establishing the desired plant community will be achieved by active and passive means. During the wetland delineation, some hydrophytic vegetation was observed in the agricultural fields, providing evidence of a hydrophytic seed bank that may reestablish following hydrological restoration. All reestablished and rehabilitated wetland areas will be broadcast with a wetland seed mix containing species of variable shade tolerance (Table 3). Species selection was formulated following a review of "Native Vegetation for Lakeshores, Streamsides, and Wetland Buffers" (Vermont Department of Environmental Conservation, 1994). The planting plan in

Appendix D reflects a goal to reestablish multiple wetland cover types (i.e., PEM, PSS, PFO). Disturbed upland areas will be planted to a mixture of cool season and native grasses in order to prevent erosion, while increasing the diversity of the plant community.

Table 3. Planting List

Target Area	Common Name	Scientific Name	Wetland Indicator Status	Number or % by Weight	Propagule Type	Quantity/Acre
All Disturbed Wetland Areas	mud plantain	*Alisma subcordatum*	OBL	8%	wetland seed mix % by weight	3 lbs seed mixture/acre
	swamp milkweed	*Asclepias incarnata*	OBL	5%		
	sensitive fern	*Ononclea sensibilis*	FACW	3%		
	bristly sedge	*Carex comosa*	OBL	5%		
	nodding sedge	*Carex crinita*	OBL	5%		
	hop sedge	*Carex lupulina*	OBL	5%		
	tussock sedge	*Carex stricta*	OBL	5%		
	fox sedge	*Carex vulpinoidea*	OBL	5%		
	steeplebush	*Spirea tomentosa*	FACW	10%		
	Canada wildrye	*Elymus canadensis*	FACU	12%		
	riverbank wildrye	*Elymus riparius*	FACW	5%		
	soft rush	*Juncus effusus*	OBL	2%		
	Blue flag iris	*Iris versicolor*	OBL	5%		
	Pennsylvania smartweed	*Polygonum pensylvanicum*	FACW	5%		
	joe pye weed	*Eupatorium maculatum*	OBL	5%		
	rice cutgrass	*Leersia oryzoides*	OBL	10%		
	blue vervain	*Verbena hastata*	FACW	5%		
PSS	speckled alder	*Alnus incana*	FACW	50	> 18" bare root/potted	sum to ≥300 stems/acre
	steeplebush	*Spirea tomentosa*	FACW	50		
	red osier dogwood	*Cornus sericea*	FACW	50		
	silky dogwood	*Cornus amomum*	FACW	50		
	winterberry	*Ilex verticillata*	FACW	50		
	nannyberry	*Viburnum lentago*	FAC	50		
Conifer Mix (PFO, PFO Mosaic, Upland Buffer)	gray birch	*Betula populifolia*	FAC	25	> 18" bare root/potted	sum to ≥300 stems/acre
	balsam fir	*Abies balsamea*	FAC	60		
	red maple	*Acer rubrum*	FAC	60		
	white spruce	*Picea glauca*	FACU	50		
	eastern white pine	*Pinus strobus*	FACU	25		
	northern white cedar	*Thuja occidentalis*	FACW	50		
	eastern hemlock	*Tsuga canadensis*	FACU	30		
All Disturbed Upland Areas	upland bentgrass	*Agrostis perennans*	FACU	30%	upland seed mix % by weight	36 lbs seed mixture/acre
	big bluestem	*Andropogon gerardii*	FACU	20%		
	Canada wildrye	*Elymus canadensis*	FACU	10%		
	annual ryegrass	*Lolium multiflorum*	FACU	30%		
	switchgrass	*Panicum virgatum*	FAC	10%		

**Exact species composition subject to commercial availability*. Species composition is based on wetland species assemblages observed on site and nearby reference communities. Reference communities are detailed in Appendix E.

6.7 Soil Management and Erosion Control Measures

All slopes, soils, substrates, and constructed features within and adjacent to the work Site will follow stabilization protocols described in the Willoughby Lake Road Erosion and Sediment Control Plan (Appendix D). DU will obtain all necessary permits (e.g., stormwater) prior to construction.

7. Maintenance Plan

DU will take appropriate measures after initial construction to ensure continued Site maturation. DU will be responsible for monitoring and maintenance activities. Monitoring will occur regularly throughout the growing season from approximately May through September of each year. Inspections include but are not limited to: Site hydrology, plant community development, percent cover and presence of invasive species, and functioning of basins. Maintenance activities may be triggered by:

- During yearly monitoring (Section 9), management concerns (e.g., deer herbivory, unauthorized motor vehicle use, dumping) and appropriate adaptive management strategies will be developed and implemented as necessary. These include but are not limited to erection of fencing, placement of barriers to prohibit unauthorized motor vehicle use, and contacting local authorities. Plant community management may take on the form of mechanical removal, mowing, herbicide application or another appropriate form to control invasive plant species.
- Unforeseen environmental conditions may affect the success of the project, but their effects can generally be managed through early detection. Flooding, drought, invasive species, Site degradation, erosion, and vandalism are examples of some adverse conditions that can be managed.
- Routine maintenance checks, for example, on plant, survival health, growth and vigor, number of stems surviving, unwanted plant species, trash, herbivores, and areas with chronic erosion.
- Deer herbivory will be monitored, but in general densities are not very high compared to other parts of Vermont. Supplemental plantings, fencing, etc. may be required as adaptive management techniques.

- Supplemental plantings may be added to meet performance standards, especially to overcome adverse weather conditions early within the Site establishment phases.
- Corrective measures may include adding or removing plants as conditions warrant, modifying local topography to ensure wetland hydrology, and additional mulching and seeding as needed.
- Routine basin erosion checks. Any eroded areas will be repaired and reseeded.
- Routine checks of signs and associated maintenance will be performed.
- Estimated costs for monitoring and reporting are provided in Appendix F.

8. Performance Standards

Success within the ILF Site is based on achieving perpetual site protection and meeting the USACE criteria for the three parameters described in the "Corps of Engineers Wetlands Delineation Manual" (Environmental Laboratory, 1987), with the current Corps of Engineers' Northcentral and Northeast Regional Supplement (USACE, 2012). These parameters require sufficient:

1. *wetland hydrology* to support adequate
2. *hydrophytic vegetation*, ultimately forming
3. *hydric soils*, all of which describe a functioning wetland.

Pre-construction project milestones include final site plan approval, filing of a deed restriction, and execution of a Conservation Easement. Half of the total preservation credits will be released after final site plan approval and filing of a USACE-approved Deed Restriction (Appendix A), and the other half of preservation credits will be released after executing a USACE-approved Conservation Easement (Table 4 and Appendix B).

Construction will be phased according to funding levels, and will be completed in accordance with approved plans and specifications in the permit. The soils on the Site will be stabilized and any non-biodegradable erosion controls will be removed. All areas with soil disturbance will have at least 80% vegetative cover by the end of the first full growing season following construction and at least 90% by the end of the second full growing season following construction. Four wood duck boxes will be installed (two per unit for units 1 and 2).

The performance standards criteria described below will be monitored over a ten-year term that begins following the submittal of a post-construction as-built; the monitoring term includes three interim goals, and the final success criteria. When met, each interim goal would release 20% of the total remaining credits (i.e., credits remaining following mitigation plan and as-built approval). The final 30% of remaining credits would be released after the final vegetative goals have been met, a USACE approved long-term management plan has been approved, and all other obligations and performance standards set forth in the instrument amendment and permit have been met. If areas of the ILF Site are not meeting full performance criteria at the end of the 10-year monitoring period, the project sponsor may request that the areas be evaluated for partial credit release at a lower credit ratio, a modification to the instrument amendment may be requested, and/or additional corrective action/monitoring may be required. It is important to note that the first two options will only be considered in the event that all efforts to meet standards and obligations have been exhausted (including corrective action).

8.1 Post-Construction As-Built Releases 10% of Credits When:

- USACE Approves the As-Built Report

8.2 First Interim Goal Anticipated to Coincide with Year 1 Monitoring Releases 20% of Restoration and Rehabilitation Credits When:

- PEM, PSS and PFO areas shall have at least 50% relative coverage by native perennial hydrophytes.
- PSS and PFO areas shall have at least 150 native shrubs/trees per acre, and those stems will display normal and healthy growth, free of disease and pests.
- ≥10% of the aerial coverage of the vegetation in credit producing areas will consist of the plant species identified by the USACE in the "New England District Compensatory Mitigation Guidance - Appendix K: Invasive and other Unacceptable Plant Species" (USACE, 2016).
- Upland buffer rehabilitation and mosaic areas have at least 50% relative coverage by woody species.
- Upland buffer rehabilitation and mosaic areas shall have at least 150 native shrubs/trees per acre, and those stems will display normal and healthy growth, free of disease and pests

8.3 Second Interim Goal Anticipated to Coincide with Year 3 Monitoring Releases 20% of Restoration & Rehabilitation Credits When:

- PEM, PSS and PFO areas shall have at least 60% relative coverage by native perennial hydrophytes.
- PSS and PFO areas shall have at least 200 native shrubs/trees per acre, and those stems will display normal and healthy growth, free of disease and pests.

- ≥10% of the aerial coverage of the vegetation in credit producing areas will consist of the plant species identified by the USACE in the "New England District Compensatory Mitigation Guidance - Appendix K: Invasive and other Unacceptable Plant Species" (USACE, 2016).
- Upland buffer rehabilitation and mosaic areas have at least 60% relative coverage by woody species.
- Upland buffer rehabilitation and mosaic areas shall have at least 200 native shrubs/trees per acre, and those stems will display normal and healthy growth, free of disease and pests.

8.4 Third Interim Goal Anticipated to Coincide with Year 5 Monitoring Releases 20% of Restoration & Rehabilitation Credits When:

- A wetland delineation confirmed by the USACE indicates total wetland area meets or exceeds acreages proposed.
- PEM, PSS and PFO areas shall have at least 70% relative coverage by native perennial hydrophytes.
- PSS and PFO areas shall have at least 250 native shrubs/trees per acre, and those stems will display normal and healthy growth, free of disease and pests.
- ≥10% of the aerial coverage of the vegetation in credit producing areas will consist of the plant species identified by the USACE in the "New England District Compensatory Mitigation Guidance - Appendix K: Invasive and other Unacceptable Plant Species" (USACE, 2016).
- Upland buffer rehabilitation and mosaic areas have at least 70% relative coverage by woody species.
- Upland buffer rehabilitation and mosaic areas shall have at least 250 native shrubs/trees per acre, and those stems will display normal and healthy growth, free of disease and pests.

8.5 Final Goal Releases 30% of Restoration & Rehabilitation Credits at The End of the 10-Year Monitoring Period

- A wetland delineation confirmed by the USACE indicates total wetland area meets or exceeds acreages proposed.
- PEM, PSS and PFO areas shall have at least 80% relative coverage by native perennial hydrophytes.
- PSS and PFO areas shall have at least 300 native shrubs/trees per acre, and those stems will display normal and healthy growth, free of disease and pests.
    - PSS zones will have at least half of the stems growing as shrub species.
    - PFO zones will have at least half of the stems growing as tree species. Trees shall be 7' – 10' high or > 3" DBH.
- ≥10% of the aerial coverage of the vegetation in credit producing areas will consist of the plant species identified by the USACE in the "New England District Compensatory Mitigation Guidance - Appendix K: Invasive and other Unacceptable Plant Species" (USACE, 2016).
- Upland buffer rehabilitation and mosaic areas have at least 80% relative coverage by woody species.
    - Upland buffer rehabilitation and mosaic areas 300 native shrubs/trees per acre, and those stems will display normal and healthy growth, free of disease and pests.

    - Upland buffer rehabilitation and mosaic areas have at least half of the stems growing as tree species. Trees shall be 7’ – 10’ high or > 3" DBH.
- A Corps approved Long-Term Management Plan and Conservation Easement have been executed and funded.
- All other obligations and performance standards set forth in the instrument amendment and permit have been met

Table 4. Credit Release & Reporting Schedule

Timeline	Reporting Schedule	Percentage	Type of Credit	Performance Standards	Credits
Pre-Construction	**N/A**	**50%**	**Preservation credit**	USACE approves Willoughby Lake Road Mitigation Plan ILF Amendment and USACE-approved Deed Restriction is executed	5.0917
		50%	**Preservation credit**	Conservation Easement is executed.	5.0917
				Sub-total	**10.1833**
Phase 1: Restoration and Rehabilitation of 43.57 acres of Wetlands & Uplands*					
Year 0	**N/A**	**10%**	**Restoration & Rehabilitation**	USACE approves post-construction as-built.	0.6997
Year 1 or 1st Interim Goals	**First Monitoring Report: Phase 1**	**20%**	**Restoration & Rehabilitation**	1. PEM, PSS, PFO areas have at least 50% relative cover by native perennial hydrophytes. 2. PSS and PFO areas have at least 150 native shrubs/trees per acre, and stems will be healthy, free of disease and pests. 3. <10% aerial coverage of vegetation in credit producing areas will consist of plant species identified by New England District Compensatory Mitigation Guidance Appendix K as invasive and unacceptable species. 4. Upland buffer rehabilitation and mosaic areas will have at least 50% relative cover by woody species. 5. Upland buffer rehabilitation and mosaic areas will have at least 150 native shrubs/trees per acre, and stems will be healthy, free of disease & pests.	1.3994

Timeline	Reporting Schedule	Percentage	Type of Credit	Performance Standards	Credits
Year 3 or 2nd Interim Goals	**Second Monitoring Report: Phase 1**	**20%**	**Restoration & Rehabilitation**	1. PEM, PSS, PFO areas have at least 60% relative cover by native perennial hydrophytes. 2. PSS and PFO areas have at least 200 native shrubs/trees per acre, and stems will be healthy, free of disease and pests. 3. <10% aerial coverage of vegetation in credit producing areas will consist of plant species identified by New England District Compensatory Mitigation Guidance Appendix K as invasive and unacceptable species. 4. Upland buffer rehabilitation and mosaic areas will have at least 60% relative cover by woody species. 5. Upland buffer rehabilitation and mosaic areas will have at least 200 native shrubs/trees per acre, and stems will be healthy, free of disease & pests.	1.3994
Year 5 or 3rd Interim Goals	**Third Monitoring Report: Phase 1**	**20%**	**Restoration & Rehabilitation**	1. PEM, PSS, PFO areas have at least 70% relative cover by native perennial hydrophytes. 2. PSS and PFO areas have at least 250 native shrubs/trees per acre, and stems will be healthy, free of disease and pests. 3. <10% aerial coverage of vegetation in credit producing areas will consist of plant species identified by New England District Compensatory Mitigation Guidance Appendix K as invasive and unacceptable species. 4. Upland buffer rehabilitation and mosaic areas will have at least 70% relative cover by woody species. 5. Upland buffer rehabilitation and mosaic areas will have at least 250 native shrubs/trees per acre, and stems will be healthy, free of disease & pests.	1.3994

Timeline	Reporting Schedule	Percentage	Type of Credit	Performance Standards	Credits
Year 7	**Fourth Monitoring Report: Phase 1**	**none**	**Restoration & Rehabilitation**	Note: no performance standards are associated with this monitoring event but DU will provide a summary of project performance as it relates to Year 10 standards.	0
Year 10 or Final Goals	**Final Monitoring Report: Phase 1**	**30%**	**Restoration & Rehabilitation**	1. Wetland delineation confirmed by USACE indicates total wetland area meets or exceeds acreages proposed in Phase 1. 2. PEM, PSS< and PFO areas have at least 80% relative cover by native perennial hydrophytes. 3. PSS and PFO areas have at least 300 native shrubs/trees per acre, and stems display normal growth, free of disease & pests. PSS zones have at least half of stems growing as shrub species. PFO zones have at least half of stems growing as tree species. Trees are 7'-10' high or >3" DBH. 4. Long Term Management Plan is executed, and all other conditions of permit and Mitigation Site Plan have been completed.	2.0991
				Sub-total	**6.997**

Phase 2: Restoration and Rehabilitation of 24.4 acres of wetlands & uplands*

Timeline	Reporting Schedule	Percentage	Type of Credit	Performance Standards	Credits
Year 0	**N/A**	**10%**	**Restoration & Rehabilitation**	Construction is completed and USACE approves as-built.	0.6214
Year 1 or 1st Interim Goals	**First Monitoring Report**	**20%**	**Restoration & Rehabilitation**	1. PEM, PSS, PFO areas have at least 50% relative cover by native perennial hydrophytes. 2. PSS and PFO areas have at least 150 native shrubs/trees per acre, and stems will be healthy, free of disease and pests. 3. <10% aerial coverage of vegetation in credit producing areas will consist of plant species identified by New England District Compensatory Mitigation Guidance Appendix K as invasive and unacceptable species. 4. Upland buffer rehabilitation and mosaic areas will have at least 50% relative cover by woody species. 5. Upland buffer rehabilitation and mosaic areas will have at least 150 native shrubs/trees per acre, and stems will be healthy, free of disease & pests.	1.2428
Year 3 or 2nd Interim Goals	**Second Monitoring Report**	**20%**	**Restoration & Rehabilitation**	1. PEM, PSS, PFO areas have at least 60% relative cover by native perennial hydrophytes. 2. PSS and PFO areas have at least 200 native shrubs/trees per acre, and stems will be healthy, free of disease and pests. 3. <10% aerial coverage of vegetation in credit producing areas will consist of plant species identified by New England District Compensatory Mitigation Guidance Appendix K as invasive and unacceptable species. 4. Upland buffer rehabilitation and mosaic areas will have at least 60% relative cover by woody species. 5. Upland buffer rehabilitation and mosaic areas will have at least 200 native shrubs/trees per acre, and stems will be healthy, free of disease & pests.	1.2428
Year 5 or 3rd Interim Goals	**Third Monitoring Report**	**20%**	**Restoration & Rehabilitation**	1. PEM, PSS, PFO areas have at least 70% relative cover by native perennial hydrophytes.	1.2428

Timeline	Reporting Schedule	Percentage	Type of Credit	Performance Standards	Credits
				2. PSS and PFO areas have at least 250 native shrubs/trees per acre, and stems will be healthy, free of disease and pests. 3. <10% aerial coverage of vegetation in credit producing areas will consist of plant species identified by New England District Compensatory Mitigation Guidance Appendix K as invasive and unacceptable species. 4. Upland buffer rehabilitation and mosaic areas will have at least 70% relative cover by woody species. 5. Upland buffer rehabilitation and mosaic areas will have at least 250 native shrubs/trees per acre, and stems will be healthy, free of disease & pests.	
Year 7	**Fourth Monitoring Report**	**none**	**Restoration & Rehabilitation**	Note: no performance standards are associated with this monitoring event but DU will provide a summary of project performance as it relates to Year 10 standards.	0
Year 10 or Final Goals	**Final Monitoring Report**	**30%**	**Restoration & Rehabilitation**	1. Wetland delineation confirmed by USACE indicates total wetland area meets or exceeds acreages proposed in Phase 1. 2. PEM, PSS< and PFO areas have at least 80% relative cover by native perennial hydrophytes. 3. PSS and PFO areas have at least 300 native shrubs/trees per acre, and stems display normal growth, free of disease & pests. PSS zones have at least half of stems growing as shrub species. PFO zones have at least half of stems growing as tree species. Trees are 7'-10' high or >3" DBH. 4. Long Term Management Plan is executed, and all other conditions of permit and Mitigation Site Plan have been completed.	1.8642
				Sub-total	**6.214**

**If construction is not phased, all combined Phase 1 and 2 credit will be released according to the percentages and milestones described in Phase 1.*

***Credit releases are anticipated to coincide with a given year, but they may deviate based on performance. If planting is delayed, a separate notification of complete planting will be provided to the USACE aside from the As-built; As-builts will be submitted by February of the year following construction activities.*

8.6 Wetland Hydrology and Hydric Soils

The wetland reestablishment areas have soil saturation and/or evidence of inundation water height measurements during five out of the ten growing seasons but not exceeding the hydrology appropriate for the proposed wetland type. A wetland delineation shall be performed by the fifth monitoring year. To demonstrate that the requisite wetland hydrology has been established/restored, the wetlands on the site must be inundated (flooded or ponded) or the water table is ≤12 inches below the soil surface for ≥10% of the growing season (based on Newport, Vermont, 126 days) or ≥12.6 consecutive days at a minimum frequency of 5 years in 10 (≥50% probability). Performance towards this metric will be determined using an analysis of monitoring well data recorded in five representative reestablishment areas and compared to a minimum of two on-site reference locations. Well locations will be clearly marked on monitoring plans submitted. Any combination of inundation or shallow water table is acceptable in meeting the 12.6-day minimum requirement. Short-term monitoring data may be used to address the frequency requirement if the normality of rainfall occurring prior to and during the monitoring period each year is considered.

9. Monitoring Requirements

9.1 Monitoring Report Requirements

Annual Site monitoring will begin after construction is completed and will continue for ten (10) years for each phase. Monitoring reports will be submitted as outlined in Table 4. Monitoring locations are shown in Appendix D. Monitoring reports will include:

- A survey drawing of the mitigation area, delineated wetlands. Monitoring stations and/or transect locations, vegetation communities, and planting zones will also be identified on the drawings. Drawings will include overlays to show pre-construction conditions and temporal changes in the hydrology and vegetative community.
- Color photographs corresponding to photopoint location map showing all representative areas of each cover type within the mitigation site.

- A plant species list providing Wetland Indicator Status and strata (herb, shrub, tree). Dominant plants will be highlighted, and the percent of the aerial cover noted. Plants introduced through seeding or planting will be indicated.
- Water depth and the date of measurement from fixed locations within the wetland will be recorded. These sample points and data-logger locations will be plotted on the survey drawings.
- A list of wildlife species observed using the Site.
- Methodologies used to control invasive vegetation (e.g., *Phalaris arundinacea*, *Lythrum salicaria*).
- A quantitative assessment of monitoring data and a summary of whether or not the goals of the mitigation project are being met, and if necessary, a plan with an implementation timetable to correct any deficiencies.

9.2 Reporting Schedule

Monitoring reports, including an As-Built Report will be submitted no later than February 28 and will describe conditions in the prior growing season (Table 4). The As-Built Report will be submitted following the completion of construction and planting and will include a detailed contour map and any deviations from the construction plans. Each report cover sheet shall indicate the year and report number. All reports described in this section will be submitted to the Vermont IRT, and to the New England District, 11 Lincoln Street, Room 210, Essex Junction, VT 05452 and to the New England District Regulatory Division, 696 Virginia Road, Concord, MA 01742-2751. All monitoring, reporting, requests and adaptive management implementation will be the responsibility of DU, its subcontractors, or assigns. Measures requiring additional soil manipulation or changes in hydrology will be undertaken only after written approval from the New England District Engineer has been received.

10. Long-term Management Plan, Including Financial Arrangements

Ducks Unlimited will retain Long Term Management responsibilities for the site and serve as the Long-Term Steward (LT Steward). The responsibilities of the LT Steward are outlined in Table 5 and will be further described in a LTMP subject to USACE approval. LTMP responsibilities will begin when the final performance standards outlined in Section 8 are signed off on by USACE or site closure has occurred. It is anticipated the long-term management phase will commence approximately 10 years following construction. At that time, The LT Steward shall implement the LTMP, managing and monitoring the Site to preserve its habitat and conservation values. The LTMP will be structured to enable project phasing as identified herein. At the start of the long-term management phase, the LT Steward will update the baseline Site conditions described in the LTMP to reflect current conditions. During the long-term management phase, the Site will be monitored at least annually by the LT Steward, and identification of threats to the Sites' conservation values will trigger adaptive management actions to maintain the integrity of the Site. The responsibilities of the LT Steward include prevention of unauthorized use, dumping, as well as adaptive management of invasive plant species, and maintenance of signage designating the area as a protected area.

DU will retain funds for a long-term stewardship endowment and maintain it as a non-wasting endowment to cover costs of annual monitoring, management of invasive species as needed, regular maintenance of signs, prevention of dumping, unauthorized use, and any other requirements of the LTMP. Anticipated long-term management activities for the entire Site and their costs are identified in Table 5. At a conservative 4.0% annual growth, we estimate $4,342 will be available annually for maintenance and adaptive management based on a $108,541.63 endowment. The final endowment amount is subject to approval by the USACE and shall reflect anticipated costs to carry-out the USACE-approved LTMP. The USACE will be consulted if changes to the LT Steward or the LTMP are proposed.

Table 5. Anticipated Long-term Management Needs Through all Phases.
The final endowment amount will be subject to approval by USACE and subject to approval of a Long-Term Management Plan.

Anticipated Management Activity*	Monitoring Method	Annual Monitoring Total	Action	Action Frequency	Action Cost	Annual Action Total
Invasive Species	*Visual inspection*	*$100*	*Herbicide spraying and hand pulling*	*1/year*	*$1,000*	*$1,100*
Trash Removal/Prevention of Unauthorized Access	*Visual Inspection*	*$200*	*Prevent access for dumping*	*1/year*	*$500*	*$700*
Maintaining posted signs	*Visual Inspection*	*$200*	*Replace/repair signs*	*1/year*	*$100*	*$300*
Erosion	*Visual Inspection*	*$100*	*Stabilize with appropriate materials (rock, plantings, etc.)*	*Every 3 years*	*$500*	*$267*
Animal damage	*Visual inspection*	*$75*	*Relocate/eliminate animals and repair damage*	*Every 2 years*	*$700*	*$425*
Terrafirma Insurance						*$50*
Contingency (including inflation)		*$1,500*				*$1,500*

$4,342
4.0%

$108,541.63

11. Adaptive Management Plan, Including Addressing Invasive Species Control

Every wetland site has its own unique characteristics that should be addressed with an adaptive management plan for long-term viability. Unforeseen environmental conditions can also affect a wetland's viability. Flooding, prolonged drought, invasive species, site degradation (i.e., trash dumping, illegal logging, unauthorized motor vehicle use), erosion and vandalism are examples of some adverse conditions that with early detection and proper management can be overcome. Regular monitoring of the Site will ensure adaptive management activities are implemented as new information is gathered. Completion of the regular maintenance activities outlined in

Section 7 such as invasive species control and trash removal during routine monitoring trips will reduce the need for larger intervention. DU will regularly review the status of this Site to confirm that performance standards in Section 8 are being achieved and adequate hydrology and hydrophytic plant cover has become established and is progressing along a trajectory to meet final performance standards. After construction, DU will conduct a minimum of two monitoring visits during each growing season to evaluate the progress of the Site relative to the performance standards outlined in Section 8. Additional visits may be required if remedial action is needed.

Monitoring visits include, observing water levels, evaluating the plant community development through vegetation monitoring (i.e., woody stem counts, invasive species cover), inspecting basins for erosion, evaluating herbivory, and looking for any damage to the Site. Data collected during these visits will be summarized in the monitoring reports outlined in Section 9.1 and compared against the performance standards specified in Section 8. If any repairs or maintenance items are needed, DU will utilize adaptive management to address the issue(s).

When monitoring indicates that a performance standard is not being met, the causes for failure will be evaluated to determine if simply more time is needed or whether a remedial action may be required. Remedial action to help the Site meet the performance standard shall be taken as soon as practicable once an issue has been identified. Remedial actions may include, but are not limited to, seeding or planting to replace dead plants, planting of new species better suited to the site, non-native plant control, and erosion control measures. Invasive species control methods include, but are not limited to, spraying, hand pulling, and mechanical removal. DU staff will be regularly monitoring the Site throughout the growing season to minimize the possibility for basin failure. Remedial actions requiring earth movement or changes in hydrology will not be implemented without approval from USACE.

If USACE in consultation with the IRT, determines that the site (or any portion thereof) is failing to make satisfactory progress towards meeting any performance goal within the monitoring period, DU must develop a remedial action plan to correct the deficiencies, or alternately a reduction of credits may be levied against underperforming areas. In the prior case, the remedial action plan shall be submitted to the IRT within three months of receipt of written notification of deficiencies from USACE. Remedial action plans may include suggested modifications to

improve hydrology (e.g., regrading, addition of water control structures, ditch plugs, groundwater dams), and or additional plantings. The IRT shall in a timely manner provide written acceptance of the submitted plan or a modified plan acceptable to the IRT. The IRT-accepted remedial action plan (as submitted by DU or as modified by the IRT) will then be returned to DU and DU shall implement the measures specified in the remedial action plan within six months or along a timeline as otherwise provided in the remedial action plan. Once the monitoring period is over, the completed wetland will be managed by the long-term steward and managed only as needed and specified in a USACE approved Long-Term Management Plan.

12. Financial Assurances

If required by USACE, financial assurances for the construction and performance of the Site will be provided by DU in the form of a performance bond. The financial assurances will extend sufficient financial resources to completely cover the cost of construction and replanting of the project if necessary, to achieve success. In the project budget (Appendix F) we estimate construction, planting and associated staffing costs for Phase 1 at $372,929.46. Financial assurances shall be phased out once determined the USACE determines construction was successful. The financial assurances will not be called upon unless DU has exhausted the existing project budget, including all money set aside for contingency, wetland maintenance, or other available funding resources for correction.

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Appendix A. Deed Restriction (Notice of Mitigation Requirements)

RECORD AND RETURN TO:
WETLANDS AMERICA TRUST, INC.
ONE WATERFOWL WAY
MEMPHIS, TENNESSEE 38120

NOTICE OF MITIGATION REQUIREMENTS

1.1 Fee-Title Ownership. By [Warranty Deed], recorded on [date], in the land records of [County] County, [State], at [Book] [###], [Page] [###], **WETLANDS AMERICA TRUST, INC.**, a supporting organization of Ducks Unlimited, Inc., and a non-profit corporation organized under the laws of the District of Columbia, with an address of One Waterfowl Way, Memphis, Tennessee 38120 ("**Land Trust**"), acquired in fee simple approximately [Acres (###)] acres, more or less, of real property ("**Property**") located in [County] County, [State], and more particularly described in **Exhibit A**.

1.2 In-Lieu Fee Program. **DUCKS UNLIMITED, INC.**, a non-profit corporation organized under the laws of the District of Columbia, with an address of One Waterfowl Way, Memphis, Tennessee 38120, operates a Vermont In-Lieu Fee Program ("**Program**") to provide a third-party, compensatory mitigation option for unavoidable impacts to waters of the United States (including both wetlands, streams, and other aquatic resources). The Program instrument was approved on January 6, 2011, by the Army Corps of Engineers under authority established by Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act (New England District).

1.3 Restoration Project. Ducks Unlimited, Inc., has developed and implemented a wetland restoration plan ("**Project**") to restore and protect the wetland and associated upland habitat located on the Property in order to provide wetland mitigation credits under the Program. The Program instrument was amended on [Date] to incorporate the Project, and activities onsite will be limited to those described therein.

1.4 Long-Term Protection. In accordance with requirements of the Program, Ducks Unlimited, Inc., shall establish long-term protection of the Project through the Land Trust's transfer of title to, or through real-estate instruments such as conservation easements held by, entities such as non-profit conservation organizations or federal, tribal, state, or local resource agencies.

1.5 Notice Requirements. The Land Trust agrees to notify the **NEW ENGLAND DISTRICT ENGINEER OF THE U.S. ARMY CORPS OF ENGINEERS**, with an address of 11 Lincoln Street Room 201, Essex Junction, VT 05452 ("**District Engineer**"), at least sixty

(60) days in advance of transferring ownership of the Property. The Land Trust, and its successors and assigns, hereby agrees to be bound by the requirements of the Program to ensure the long-term protection of the Project as described in Section 1.4. In the event title to the Property is transferred to an entity other than those described in Section 1.4, the Land Trust hereby agrees that its transfer of ownership shall be contingent upon recording at or prior to the transfer of ownership of the Property a conservation easement or other protection instrument that is approved by the District Engineer to ensure long-term protection of the Project.

1.6 Termination. The requirements of this Notice must be satisfied at or prior to the time of transfer of title from the Land Trust to another entity. This Notice shall automatically expire upon such transfer.

In witness whereof Wetlands America Trust, Inc., has set its hand and seal this ___ day of _____ , 20___.

By: _____ Witness: _____

Printed Name: _____ Witness: _____

Title: _____

State of TENNESSEE
County of SHELBY

On this _____ day of _____, 20___, _____ _____ personally appeared before me and voluntarily executed the foregoing **Notice of Mitigation Requirements**, which he acknowledged he is authorized to sign as the _____ _____ of **WETLANDS AMERICA TRUST, INC**.

In witness whereof I hereunto set my hand and official seal.

_____
Notary Public
(Seal) Printed Name: _____
My Commission Expires: _____

EXHIBIT A
LEGAL DESCRIPTION

{*to be inserted prior to execution*}

Appendix B. Conservation Easement Boundary

Town of Barton, VT Received for Record
_____ A.D. _____
at _____ o'clock _____ minutes _____M
and recorded at _____
attest: _____
Town Clerk

CONSERVATION EASEMENT AREA = 243.60 ACRES

P/O TAX MAP #5 PARCEL #0014027
REFER TO BK. 87, PG. 411 & BK. 97, PG. 504

– ZONING INFORMATION –

LOW DENSITY – "LD"

MINIMUM LOT SIZE:	2 ACRES		
MINIMUM LOT FRONTAGE:	150 FT.		
MINIMUM LOT DEPTH:	150 FT.		
MINIMUM SETBACKS:	FRONT	SIDE	REAR
	50	20	20
HEIGHT REGULATIONS:	ALL STRUCTURES:	35 FT.	

* BASED ON THE ZONING BY–LAWS FOR THE TOWN OF BARTON EFFECTIVE AUGUST 21, 2018.

– NOTES –

1. THIS PLAT IS PREPARED FOR THE EXCLUSIVE USE OF WETLANDS AMERICA TRUST, INC. AND NO REPRESENTATIONS ARE MADE TO, OR ANY RELIANCE JUSTIFIED BY, ANY OTHER INDIVIDUAL OR ENTITY.
2. THE BEARINGS SHOWN ARE BASED ON VERMONT GRID NORTH, NAD83 (2011). THE COORDINATES SHOWN ARE BASED ON VERMONT GRID NAD83 (2011), FEET.
3. THE METES AND BOUNDS SHOWN ARE BASED ON A CLOSED TRAVERSE OF AN ELECTRONIC MEASURMENT SYSTEM SURVEY WITH A DEGREE OF PRECISION OF 1 IN 15,000.
4. ALL EXISTING MONUMENTS AND SET MONUMENTS SHOWN ARE STABLE AND PLUMB UNLESS OTHERWISE NOTED.

BROWNINGTON
BARTON

S 31°13'34" W 18.22'
"E" 5/8" ø, UP 13" W/ PLAS. CAP (BLAIS)

R. & J. POIRIER
TAX MAP #7 PARCEL #3581806
REFER TO BK. 33, PG. 445

SEE NOTE #7

N 62°27'23" W 2058.97'

G. & L. KEENAN
TAX MAP #7 PARCEL #3581806
REFER TO BK. 33, PG. 445

"E" 5/8" ø, UP 18" W/ PLAS. CAP (BLAIS)

D. H. & D. NOBLE
TAX MAP #7 PARCEL #3584011
REFER TO BK. 38, PG. 120

REFER TO A PLAN BY BLAIS SURVEYING FOR "VINCENT D'ORAZIO & RICCARDO D'ORAZIO" DATED MAR. 1998 W/ MAP #266–97 (MAP SLIDE 44)

N 63°17'34" W 1458.20'

"E" 5/8" ø, UP 8" W/ PLAS. CAP (ROUND)

SEE NOTE #7

N 63°43'56" W 749.71'

"E" 5/8" ø, UP 24" (LOOSE)

"E" 5/8" ø, UP 8" W/ PLAS. CAP (ROUND)

BROWNINGTON
BARTON

A. DORRIAN
TAX MAP #5 PARCEL #0180401
REFER TO BK. 127, PG. 568

REFER TO A PLAN BY BLAIS SURVEYING FOR "ANTHONY DORRIAN" DATED APR. 2008 W/ MAP #119–08 (MAP SLIDE 367)

S 31°13'34" W 1007.30'

"E" 5/8" ø, UP 10" W/ PLAS. CAP (BLAIS)

N 66°00'32" W 72.96'

"E" 5/8" x 48", UP 10" W/ PLAS. CAP

N 66°00'32" W 96.95'

1308'± ALONG FENCE REMNANTS

TIE DISTANCE = N 04°08'12" W 1161.51'

D. H. & D. NOBLE
TAX MAP #5 PARCEL #0014547
REFER TO BK. 108, PG. 501

REFER TO A PLAN BY BLAIS SURVEYING FOR "PASQUALE SERRENTINO" DATED AUG. 1983 W/ MAP #214–83A (MAP SLIDE 64)

"E" 5/8" ø, UP 13" W/ PLAS. CAP (BLAIS)

MAG NORTH
NAD83 (2011)
GRID NORTH (VT)

F. R. & R. B. KELLEY
TAX MAP #5 PARCEL #0014547
REFER TO BK. 135, PG. 419

N 21°42'59" E 845.07'

"E" 5/8" ø, FLUSH W/ PLAS. CAP (ROUND)

TIE DIST. = S 11°01'20" W 698.98'

1110'± ALONG LORD BROOK

BEAVER POND

R. E. & B. J. McLAY
TAX MAP #5 PARCEL #0220445
REFER TO BK. 89, PG. 25

REFER TO A PLAN BY BROW SURVEYING INC. FOR "LEIGH H. & BEATRICE KITTREDGE ESTATE" DATED JUL. 1992 (MAP SLIDE 152)

25 FT. WIDE RIGHT–OF–WAY TO LOT #1 OVER "FARM ROAD" REFER TO BK. 97, PG. 504

N 27°53'57" E 80.00'

"E" 2" O.D. UP 20"

S 69°55'46" E 1414.71'

"E" 2" O.D. UP 30"

5/8" x 48", UP 12" W/ PLAS. CAP

S 69°55'46" E 729.52'

5/8" x 48", UP 12" W/ PLAS. CAP

T. PAQUETTE
TAX MAP #5 PARCEL #0014255
REFER TO BK. 112, PG. 334

S 74°17'41" E 22.43'

CURVE #5
DELTA = 14°41'13"
RADIUS = 1487.60'
LENGTH = 381.33'
CHORD = S 66°57'04" E 380.28'

S 66°12'44" E 231.79'

S 27°11'18" W 188.88'

"E" 1–1/2" O.D. UP 2"

S 74°17'41" E 100.00'

N 15°42'19" E 80.00'

S 15°42'19" W 80.00'

S 59°36'27" E 231.80'

"E" WOOD POST

N 29°54'29" E 227.19'

M. J. & K. A. HUNT
TAX MAP #5 PARCEL #0230265
REFER TO BK. 130, PG. 172

A. C. HUNT
TAX MAP #5 PARCEL #0230260
REFER TO BK. 172, PG. 288

"E" 2" O.D. UP 24"

N 26°38'49" E 304.52'

"E" 2" O.D. UP 12"

N 69°57'20" W 480.03'

TIE DIST. = S 69°57'20" E 61.43'

S 20°54'29" W 767.51'

5/8" x 48", UP 12" W/ PLAS. CAP

S 74°17'41" E 318.38'

"S" 5/8" ø, FLUSH W/ PLAS. CAP

"E" 1/2" ø, UP 7" W/ PLAS. CAP (BROW)

"E" 1–1/2" O.D., DN. 6" (DISTURBED)

"E" 5/8" ø, FLUSH W/ PLAS. CAP (ROUND)

"E" 3/4" O.D. UP 30"

T. H. #1

CURVE #6
DELTA = 01°39'05"
RADIUS = 2050.60'
LENGTH = 59.10'
CHORD = S 60°26'00" E 59.10'

L. M. & F. A. WILLEY
P/O TAX MAP #5 PARCEL #0014027
REFER TO BK. 87, PG. 411 & BK. 97, PG. 504
(REVISED LOT #3)

BARTON VILLAGE, INC. EASEMENT TO REPLACE POLES ON HUNT LN. & WILLOUGHBY LAKE RD. REFER TO BK. 134, PG. 188

CURVE #3
DELTA = 02°48'34"
RADIUS = 24464.03'
LENGTH = 1199.53'
CHORD = N 17°37'46" W 1199.41'

T. H. #23

HUNT LANE

CURVE #4
DELTA = 26°36'10"
RADIUS = 693.10'
LENGTH = 322.21'
CHORD = N 87°28'03" E 319.32'

5/8" x 48", UP 12" W/ PLAS. CAP

R. E. & B. L. MAGOON
TAX MAP #5 PARCEL #0014348
REFER TO BK. 146, PG. 187

REFER TO A PLAN BY BROW SURVEYING INC. FOR "LAURENCE M. FAYE A. WILLEY" DATED FEB. 2007 (MAP SLIDE 366)

N 72°26'47" E 50.00'

BARN

GARAGES

WILLOUGHBY LAKE ROAD

L. M. & F. A. WILLEY
P/O TAX MAP #5 PARCEL #0014027
REFER TO BK. 87, PG. 411
(CURRENT LOT #4)

CURVE #2
DELTA = 02°33'43"
RADIUS = 3146.69'
LENGTH = 140.71'
CHORD = N 74°10'57" E 140.70'

N 19°09'04" W 100.00'

"E" 1–1/4" O.D. UP 8"

5/8" ø, FLUSH W/ PLAS. CAP

N 75°27'49" E 310.74'

VT #16

R. KERR & E. LAVIGNE
TAX MAP #5 PARCEL #0014030
REFER TO BK. 151, PG. 513

L. M. & F. A. WILLEY
P/O TAX MAP #5 PARCEL #0014027
REFER TO BK. 87, PG. 411
(CURRENT LOT #2)

REFER TO A PLAN BY BLAIS SURVEYING FOR "PASQUALE SERRENTINO" DATED AUG. 1983 W/ MAP #214–83B (MAP SLIDE 63)

REFER TO A PLAN BY D. R. TAPLIN FOR "GARY EVANS" DATED JUN. 1992 W/ MAP #9215 (MAP SLIDE 145)

R. & C. BOUTIN
TAX MAP #5 PARCEL #0013922
REFER TO BK. 113, PG. 143

REFER TO A PLAN BY BROW SURVEYING INC. FOR "LEO VANASSE" DATED JUNE1990 (MAP SLIDE 284)

"E" 5/8" ø, UP 15" (LOOSE)

S 21°18'41" E 244.81'

"E" 5/8" ø, UP 8" W/ PLAS. CAP (TAPLIN)

S 07°05'14" E 207.93'

"E" 5/8" ø, UP 8" W/ PLAS. CAP (TAPLIN)

S 43°45'56" E 380.80'

"E" 5/8" ø, UP 28" W/ PLAS. CAP (TAPLIN)

S 41°37'55" E 307.00'

"E" 5/8" ø, UP 28" W/ PLAS. CAP (TAPLIN)

W. J. & C. J. SELLERS
TAX MAP #5 PARCEL #0013995
REFER TO BK. 95, PG. 430

S 81°07'56" E 207.61'

TIE DIST. = S 52°40'20" E 584.07'

"E" 5/8" ø, UP 7" W/ PLAS. CAP (TAPLIN)

"E" 5/8" ø, UP 21" W/ PLAS. CAP (TAPLIN)

S 66°14'06" E 415.15'

S 66°14'06" E 22.13'

20 FT. WIDE RIGHT–OF–WAY TO LOT #1 OVER "WOODS ROAD" REFER TO BK. 87, PG. 382

645'± ALONG LORD BROOK

WOODS ROAD

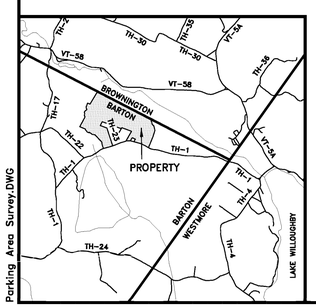
S 28°38'26" W 773.30'

– LEGEND –

- CAIRN
- IRON PIPE
- REINFORCING ROD
- UNMARKED/ANGLE POINT
- UTILITY POLE
- SEPTIC TANK ±
- SEPTIC FIELD ±
- ARTISIAN WELL
- SPRING ±
- "E" EXISTING MONUMENT
- "S" SET MONUMENT
- PROPERTY LINE
- RIGHT–OF–WAY LIMITS
- EDGE OF GRAVEL ±
- BARBED WIRE FENCE
- EXISTING BLAZED LINE
- STONE WALL
- EDGE OF WOODS/BRUSH ±

– LOCUS –

SCALE: 1" = 5000'±



– NOTES –

5. THE AREA SHOWN HAS BEEN CALCULATED TO THE LIMITS OF VERMONT ROUTE #16 AND TOWN HIGHWAY #23 WHICH ARE ASSUMED TO BE 24.75 FEET (1½ RODS) FROM THE EXISTING CENTERLINE.
6. NO ATTEMPT WAS MADE TO IDENTIFY OR LOCATE ANY UNRECORDED OR OBSCURED EASEMENTS AND/OR RIGHTS, OTHER THAN SHOWN, DURING THE COURSE OF THIS SURVEY.
7. THIS IS A CERTIFIED PLAT WHEN ACCOMPANIED BY AN ORIGINAL SIGNATURE, DATE AND REGISTERED SURVEYOR'S STAMP OF A TRULINE REPRESENTATIVE.

– REVISIONS –

02/05/2020 REVISED PARKING AREA LOCATIONS AND SIZE; SET PARKING AREA MONUMENTS.

– CERTIFICATION –

I HEREBY CERTIFY THAT THE PROPERTY LINES SHOWN ARE BASED ON AND ARE CONSISTENT WITH THE DEED REFERENCES LISTED (EXCEPT WHERE NOTED) AND/OR OTHER DOCUMENTS REFERRED TO HEREON AS WELL AS EXISTING MONUMENTATION AND OTHER EVIDENCE OBSERVED ON THE PROPERTY, AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AS OF FEBRUARY 05, 2020. THIS PLAT CONFORMS WITH THE REQUIREMENTS OF V.S.A. TITLE 27 §1403. (SEE NOTES.)

SIGNATURE

02/05/2020
DATE

0' 200' 400' 600' 800' 1000' FEET
0 50 100 200 300 METERS

PARKING AREA PLAN PREPARED FOR

WETLANDS AMERICA TRUST, INC.

4027 WILLOUGHBY LAKE ROAD / HUNT LANE
(VT #16 / T.H. #23) – BARTON, VT

SHANE B. CLARK, LS
STATE OF VERMONT
SHANE B. CLARK No.703
LICENSED LAND SURVEYOR

LAND SURVEYORS LAND PLANNERS

Truline Land Surveyors, Inc.
448 SUMMER ST., STE. 102
ST. JOHNSBURY, VT. 05819
Phone/Fax : (802) 748–3946
truline448@gmail.com

SCALE :	1" = 200'
SURVEY DATE :	FEBRUARY 2020
SURVEYED BY :	C.W.W. / C.J.J.
DRAFTED BY :	S.B.C.
CHECKED BY :	S.B.C.
PLOT DATE :	02/05/2020
FILE NO. :	18D–1–1493A

Parking Area Survey.DWG

Appendix C. Wetland Delineation Report

1.0 INTRODUCTION

Ducks Unlimited, Inc. (DU) investigated Site conditions at the Willoughby Lake Road Site in October 2018 and July 2019. The Site is located at Latitude: 44°47'4.16"N and Longitude: 72°6'49.82"W, off of Vermont Route 16 (Willoughby Lake Road) and Hunt Lane in the Town of Barton, Orleans County, Vermont. The Site is located in DU's St. Francois Service Area, which lies within the St. Francois River Basin 6-digit HUC (HUC 011100).

2.0 METHODS

On-site data collection and wetland boundary delineation of the 243.90-acre property was performed by DU between October 10, 2018 and July 23 and 24 of 2019. The boundaries were delineated following the protocols outlined in the United States Army Corps of Engineers' (USACE) 1987 "Wetland Delineation Manual" and data were collected on the "Regional Supplement to the Corps of Engineers Wetland Delineations Manual: Northcentral and Northeast Region (Version 2.0)" (Regional Supplement). A routine on-site determination was performed as specified in Section D of Chapter IV of the 1987 Delineation Manual. Prior to the delineation survey, the property was walked to identify general topography, drainage patterns, major plant communities, and potential areas of disturbance. Climatic/hydrologic conditions were typical for the time of year.

3.0 RESULTS

Normal circumstances were present at the times of data collection. The most prevalent type of wetland delineated at the Mitigation Site was palustrine forested (PFO, 66.28 acres) wetlands.

Wetland Delineation Map and Datasheets:

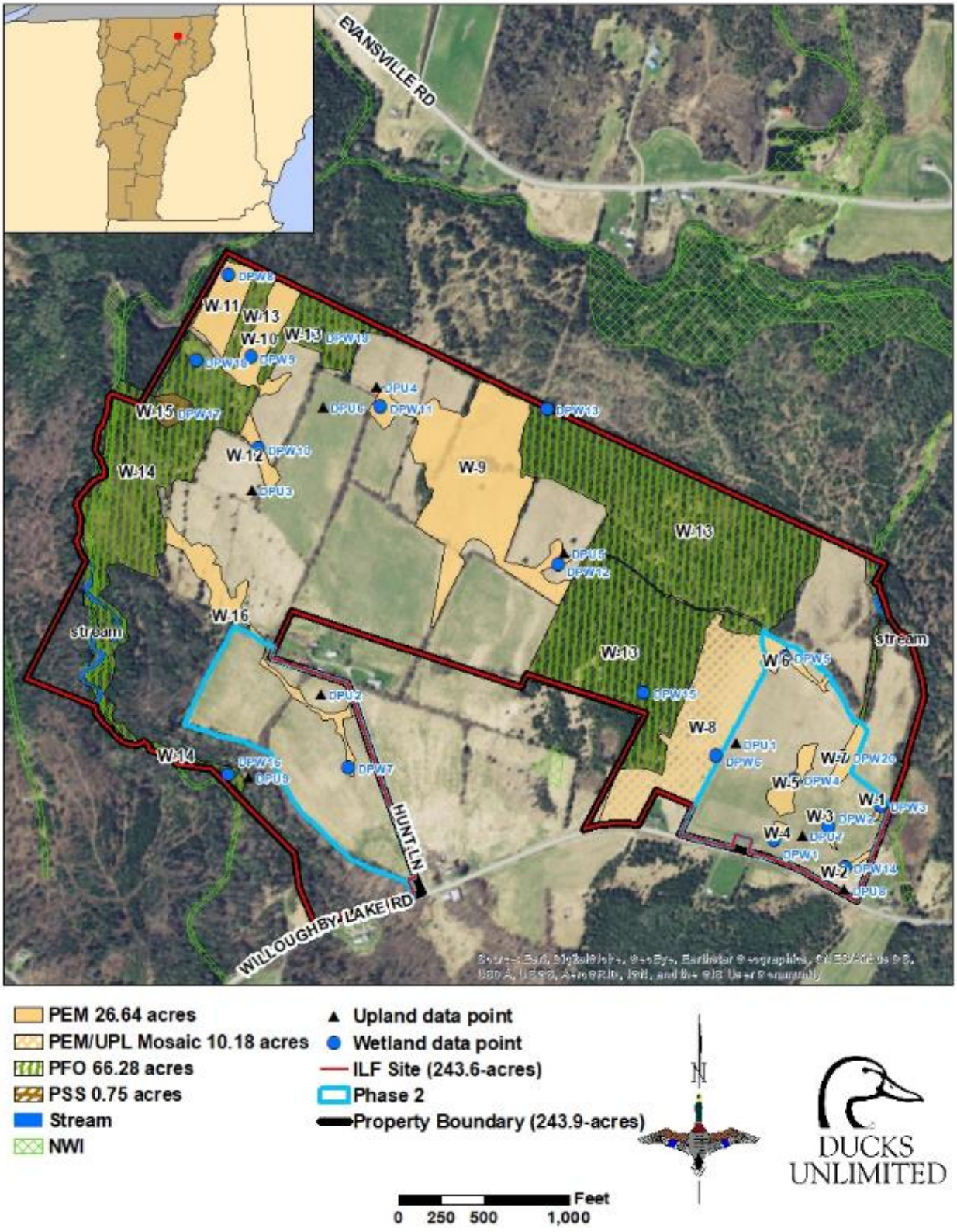


Table 1. Delineated Wetlands at the Mitigation Site

Wetland Name	Wetland Type	Wetland Acres	Datapoints	Latitude (N)	Longitude (W)
W-1	PEM	0.09	DPW3	44°47'8.219"	72°6'12.195"
W-2	PEM	0.23	DPW14	44°47'4.754"	72°6'15.375"
W-3	PEM	0.14	DPW2	44°47'7.086"	72°6'16.552"
W-4	PEM	0.15	DPW1	44°47'6.486"	72°6'21.044"
W-5	PEM	0.96	DPW4	44°47'9.963"	72°6'19.189"
W-6	PEM	0.79	DPW5	44°47'17.02"	72°6'19.612"
W-7	PEM	0.67	DPW20	44°47'11.104"	72°6'15.154"
W-8	PEM/UPL Mosaic	10.18	DPW6	44°47'11.457"	72°6'25.452"
W-9	PEM	14.81	DPW11	44°47'32.246"	72°6'51.728"
			DPW12	44°47'22.865"	72°6'37.801"
W-10	PEM	2.65	DPW9	44°47'35.405"	72°7'2.121"
W-11	PEM	2.62	DPW8	44°47'40.219"	72°7'3.66"
W-12	PEM	0.75	DPW10	44°47'30.102"	72°7'1.781"
W-13	PFO	47.29	DPW13	44°47'31.836"	72°6'38.211"
			DPW15	44°47'15.261"	72°6'31.153"
			DPW19	44°47'36.528"	72°6'56.753"
W-14	PFO	18.99	DPW16	44°47'11.319"	72°7'5.103"
			DPW18	44°47'35.267"	72°7'6.513"
W-15	PSS	0.75	DPW17	44°47'32.389"	72°7'9.04"
W-16	PEM	2.78	DPW7	44°47'11.503"	72°6'55.36"

Wetland 1

DPW3 Wetland 1 is a small, emergent wetland along the eastern edge of the parcel. Common spike-rush (*Eleocharis palustris*), pointed broom sedge (*Carex scoparia*), and green bulrush (*Scirpus atrovirens*) are dominant. Pictured July 23, 2019.

Wetland 2

DPW14 Wetland 2 is a linear wetland dominated by *Typha latifolia* and reed canary grass (*Phalaris arundiancea*). Due to it's proximity to a road culvert, hydrological modifications are not planned for this area. Pictured Otober 10, 2018.

Wetland 3

DPW2 Wetland 3 is an emergent wetland dominated by rough bent (*Agrostis scabra*), soft rush (*Juncus effusus*), and woolgrass (*Scirpus cyperinus*). Pictured July 23, 2019.

Wetland 4

DPW1 Wetland 4 is found in a large hay field to the south of Willougby Lake Rd. There is a high-water table that has created hydric soil conditions, and some hydrophytes. It is likely this field once contained a large forested wetland similar to Wetland 13 prior to clearing for agriculture. Photograph is from October 2018.

Wetland 5

DPW4 Wetland 5 is an emergent wetland dominated by fox sedge (*Carex vulpinoidea*), red clover (*Trifolium pratense*), and tall buttercup (*Ranunculus acris*). Several of the small, emergent wetlands in this eastern hay field will be planted to native hydrophytes. Pictured July 23, 2019.

Wetland 6

DPW5 Wetland 6 is an emergent wetland dominated by reed canary grass (*Phalaris arundinacea*) and fox sedge (*Carex vulpinoidea*). Pictured July 23, 2019.

Wetland 7

DPW20 A PEM wetland has formed in a drainage area, it is dominated by reed canary grass. This area is slated to be overplanted with a conifer tree mix to shade out the reed canary grass.

Wetland 8

DPW6 View looking south through wetland 8. Wetland 8 was a mosaic of upland and emergent wetland habtiat, with 60% as wetlands.

Wetland 9

DPW11 Wetland 9 is the largest emergent wetland, spreading across the lower fields in the north-central portion of the property. Fox sedge (*Carex vulpinoidea*) and reed canary grass (*Phalaris arundinacea*) are dominant in this area. Pictured July 23, 2019.

DPW12 Work plans incude basin construction adjacent to this area that's dominated by hop sedge (*Carex lupulina*) and bearded sedge (*Carex comosa*). Pictured July 14, 2018.

Wetland 10

DPW9 Work plans incude basin construction adjacent to this emergent wetland that's dominated by fox sedge (*Carex vulpinoidea*). Pictured July 23, 2019.

Wetland 11

DPW8 Located in the northeast corner of the property, PEM Wetland 11 is dominated by fox sedge (*Carex vulpinoidea*) and false baby's breath (*Galium mollugo*). Pictured October 10, 2018.

Wetland 12

DPW10 Wetland 12 is a linear wetland dominated by jewelweed (*Impatiens capensis*) and broadleaf cattail (*Typha latifolia*). Pictured July 23, 2019.

Wetland 13

DPW13 Wetland 13 is a large conifer dominated wetland with dense areas of northern white cedar (*Thuja occidentalis*), balsam fir (*Abies balsamea*) as dominants.

DPW15 Understory was dominated by sensitive fern (*Onoclea sensiblis*) beech fern (*Phegopteris connectilis*).

DPW19 Northern white cedar swamp with fern-dominated understory. Sensitive fern and interrupted fern (*Osmunda claytoniana*) were among the dominant species. Balsam fir (*Abies balsamea*) was among the domintant trees.

Wetland 14

DPW16 Wetland 14 was diverse with sedges and fern species. Fringed sedged (*Carex crinita*) composed close to 30% cover, sensitive fern was again a dominant species.

DPW18 Black ash (*Fraxinus nigra*) and ostrich fern (*Matteuccia struthiopteris*) dominated this portin of this forested wetland.

Wetland 15

DPW17 Was a diverse scrub-shrub fen habitat. Calciphiles were indentified including *Geum rivale, Carex flava.*

Wetland 16

DPW7 Wetland 16 is linear, flowing westward from Hunt Lane to PFO Wetland 14. Fox sedge (*Carex vulpinoidea*), green bulrush (*Scirpus atrovirens*), rattlebox (*Crotalaria sagittalis*), and timothy (*Phleum pratense*) are dominant. Pictured July 14, 2018.

Streams and Linear Aquatic Resource Features

Lord Brook, a tributary to the Willoughby River along the Western property boundary. Beaver had recently dammed up this channel.

A small rocky stream on the Eastern property border is a tributary to the Willoughby River.

Upland Datapoints

DPU1 This portion of the eastern hay field is dominated by red clover (*Trifolium pretense*), ragged robin (*Lychnis flos-cuculi*), sweet vernal grass (*Anthoxanthum odoratum*), and garden vetch (*Vicia sativa*). Hydrology will be restored to this area through basin construction.

DPU2 The hay field along Hunt Lane is dominated by sweet vernal grass (*Anthoxanthum odoratum*) and English plantain (*Plantago lanceolata*). This area will be planted to northern hardwood species.

DPU3 This area is dominated by timothy (*Phleum pratense*) and sweet vernal grass (*Anthoxanthum odoratum*). This field will be planted to a conifer mix.

DPU4 This area is dominated by tall buttercup (*Ranunculus acris*). This field will be planted to a conifer mix.

DPU5 This area is dominated by sweet vernal grass (*Anthoxanthum odoratum*). Basin construction will restore hydrology in this field.

DPU6 Perennial rye grass (*Lolium perenne*) is the dominant species. This area will be planted to a conifer mix.

DPU7 Perennial rye grass (*Lolium perenne*) is the dominant species. This area will be tilled and seeded with a wetland mix, then planted with a conifer mix.

DPU8 Perennial rye grass (*Lolium perenne*) and reed canary grass (*Phalaris arundinacea*) are the dominant species. This area is slated to be overplanted with a conifer tree mix to shade out the reed canary grass.

DPU9 Well-drained upland area dominated by fern species.

Datasheets:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Willoughby Lake Road City/County: Orleans County Sampling Date: 7/23/19

Applicant/Owner: Ducks Unlimited State: VT Sampling Point: DPU1

Investigator(s): J. Fraser, E. Farley Section, Township, Range: Town of Barton

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope %: 3

Subregion (LRR or MLRA): LRR R Lat: 44°47'12.104"N Long: 72°6'23.819"W Datum: WGS84

Soil Map Unit Name: Cabot silt loam (72) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)
Field has been cut for hay.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: DPU1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Trifolium pratense*	30	Yes	FACU
2. *Lychnis flos-cuculi*	25	Yes	FACU
3. *Anthoxanthum odoratum*	20	Yes	FACU
4. *Vicia sativa*	20	Yes	FACU
5. *Ranunculus acris*	5	No	FAC
6. *Lolium perenne*	4	No	FACU
7. *Phleum pratense*	4	No	FACU
8. *Crotalaria sagittalis*	3	No	UPL
9. *Krigia virginica*	2	No	UPL
10.			
11.			
12.			
	113 =Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	103	x 4 =	412
UPL species	5	x 5 =	25
Column Totals:	113 (A)		452 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DPU1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 2/2	99	10YR 5/8	1	C	M	Loamy/Clayey	Prominent redox concentrations
7-18	10YR 4/1	97	10YR 5/8	3	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Willoughby Lake Road City/County: Orleans County Sampling Date: 7/23/19

Applicant/Owner: Ducks Unlimited State: VT Sampling Point: DPU2

Investigator(s): J. Fraser, E. Farley Section, Township, Range: Town of Barton

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope %: 3

Subregion (LRR or MLRA): LRR R Lat: 44°47'15.786"N Long: 72°6'57.359"W Datum: WGS84

Soil Map Unit Name: Buckland loam (57) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)
Field has been cut for hay.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: DPU2

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Anthoxanthum odoratum*	40	Yes	FACU
2. *Plantago lanceolata*	30	Yes	FACU
3. *Crotalaria sagittalis*	15	No	UPL
4. *Ranunculus acris*	10	No	FAC
5. *Vicia sativa*	6	No	FACU
6. *Trifolium pratense*	5	No	FACU
7. *Taraxacum officinale*	1	No	FACU
8.			
9.			
10.			
11.			
12.			
	107 =Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	10	x 3 =	30
FACU species	82	x 4 =	328
UPL species	15	x 5 =	75
Column Totals:	107 (A)		433 (B)

Prevalence Index = B/A = 4.05

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DPU2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-21	10YR 4/3	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Willoughby Lake Road City/County: Orleans County Sampling Date: 7/24/19

Applicant/Owner: Ducks Unlimited State: VT Sampling Point: DPU3

Investigator(s): J. Fraser, E. Farley Section, Township, Range: Town of Barton

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope %: 4.5

Subregion (LRR or MLRA): LRR R Lat: 44°47'27.724"N Long: 72°7'2.327"W Datum: WGS84

Soil Map Unit Name: Cabot silt loam (72) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)
Field has been cut for hay.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: DPU3

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Phleum pratense*	40	Yes	FACU
2. *Anthoxanthum odoratum*	20	Yes	FACU
3. *Carex vulpinoidea*	15	No	OBL
4. *Cirsium arvense*	6	No	FACU
5. *Solidago canadensis*	6	No	FACU
6. *Vicia sativa*	6	No	FACU
7. *Ranunculus acris*	3	No	FAC
8. *Solidago rugosa*	3	No	FAC
9. *Carex scoparia*	2	No	FACW
10. *Festuca rubra*	2	No	FACU
11.			
12.			
	103 =Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	2	x 2 =	4
FAC species	6	x 3 =	18
FACU species	80	x 4 =	320
UPL species	0	x 5 =	0
Column Totals:	103 (A)		357 (B)

Prevalence Index = B/A = 3.47

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DPU3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/3	100					Loamy/Clayey	
12-21	10YR 4/2	96	10YR 4/6	4	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Willoughby Lake Road City/County: Orleans County Sampling Date: 7/24/19

Applicant/Owner: Ducks Unlimited State: VT Sampling Point: DPU4

Investigator(s): P Raney, E. Farley Section, Township, Range: Town of Barton

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope %: 3

Subregion (LRR or MLRA): LRR R Lat: 44°47'33.453"N Long: 72°6'51.956"W Datum: WGS84

Soil Map Unit Name: Cabot silt loam (72) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DPU4

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Ranunculus acris*	60	Yes	FAC
2. *Vicia sativa*	20	No	FACU
3. *Solidago canadensis*	10	No	FACU
4. *Euthamia graminifolia*	5	No	FAC
5. *Phleum pratense*	5	No	FACU
6. *Carex vulpinoidea*	2	No	OBL
7. *Stellaria media*	2	No	FACU
8.			
9.			
10.			
11.			
12.			
	104 =Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	2	x 1 =	2
FACW species	0	x 2 =	0
FAC species	65	x 3 =	195
FACU species	37	x 4 =	148
UPL species	0	x 5 =	0
Column Totals:	104 (A)		345 (B)

Prevalence Index = B/A = 3.32

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DPU4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/2	100					Loamy/Clayey	
12-20	10YR 5/1	97	10YR 4/6	3	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Willoughby Lake Road City/County: Orleans County Sampling Date: 7/24/19

Applicant/Owner: Ducks Unlimited State: VT Sampling Point: DPU5

Investigator(s): P Raney, E. Farley Section, Township, Range: Town of Barton

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope %: 3

Subregion (LRR or MLRA): LRR R Lat: 44°47'23.492"N Long: 72°6'37.16"W Datum: WGS84

Soil Map Unit Name: Cabot silt loam (72) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)
Field has been cut for hay.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- x Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: DPU5

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Anthoxanthum odoratum*	70	Yes	FACU
2. *Phleum pratense*	15	No	FACU
3. *Carex vulpinoidea*	10	No	OBL
4. *Trifolium pratense*	10	No	FACU
5. *Ranunculus acris*	8	No	FAC
6. *Scirpus atrovirens*	5	No	OBL
7. *Rumex crispus*	3	No	FAC
8. *Galium mollugo*	2	No	FACU
9. *Prunella vulgaris*	2	No	FAC
10. *Stellaria media*	2	No	FACU
11.			
12.			
	127 =Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	0	x 2 =	0
FAC species	13	x 3 =	39
FACU species	99	x 4 =	396
UPL species	0	x 5 =	0
Column Totals:	127 (A)		450 (B)

Prevalence Index = B/A = 3.54

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DPU5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-11	10YR 2/2	97	5YR 4/4	3	C	PL	Loamy/Clayey	Prominent redox concentrations
11-20	10YR 5/2	95	5YR 5/8	5	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Willoughby Lake Road City/County: Orleans County Sampling Date: 10/10/18

Applicant/Owner: Ducks Unlimited State: VT Sampling Point: DPU6

Investigator(s): J. Fraser, P. Raney Section, Township, Range: Town of Barton

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope %: 2.5-3.0

Subregion (LRR or MLRA): LRR R Lat: 44°47'32.462"N Long: 72°6'56.326"W Datum: WGS84

Soil Map Unit Name: Cabot silt loam (72) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)
Field has been cut for hay.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DPU6

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Lolium perenne*	50	Yes	FACU
2. *Geranium maculatum*	15	No	FACU
3. *Taraxacum officinale*	10	No	FACU
4. *Krigia virginica*	10	No	UPL
5. *Vicia sativa*	8	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	93 =Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	83	x 4 =	332
UPL species	10	x 5 =	50
Column Totals:	93 (A)		382 (B)

Prevalence Index = B/A = 4.11

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DPU6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-17	10YR 4/3	97	10YR 3/6	3	C	PL	Loamy/Clayey	Distinct redox concentrations
17-23	5YR 4/1	85	7.5YR 4/6	15	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Willoughby Lake Road City/County: Orleans County Sampling Date: 10/10/18

Applicant/Owner: Ducks Unlimited State: VT Sampling Point: DPU7

Investigator(s): J. Fraser, P. Raney Section, Township, Range: Town of Barton

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope %: 3.0

Subregion (LRR or MLRA): LRR R Lat: 44°47'6.688"N Long: 72°6'18.698"W Datum: WGS84

Soil Map Unit Name: Cabot silt loam (72) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)
Field has been cut for hay.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ? Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 16
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 12

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DPU7

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Lolium perenne*	85	Yes	FACU
2. *Geranium maculatum*	5	No	FACU
3. *Krigia virginica*	5	No	UPL
4. *Plantago major*	5	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	95	x 4 =	380
UPL species	5	x 5 =	25
Column Totals:	100 (A)		405 (B)

Prevalence Index = B/A = 4.05

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DPU7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-13	10YR 3/2	98	10YR 3/6	2	C	PL	Loamy/Clayey	Prominent redox concentrations
13-20	7.5YR 4/2	97	7.5YR 4/4	3	C	M	Loamy/Clayey	Distinct redox concentrations
20-39	7.5YR 3/2	98	7.5YR 4/4	2	C	M	Loamy/Clayey	Distinct redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Willoughby Lake Road City/County: Orleans County Sampling Date: 10/10/18

Applicant/Owner: Ducks Unlimited State: VT Sampling Point: DPU8

Investigator(s): J. Fraser, P. Raney Section, Township, Range: Town of Barton

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope %: 3.0

Subregion (LRR or MLRA): LRR R Lat: 44°47'3.492"N Long: 72°6'15.438"W Datum: WGS84

Soil Map Unit Name: Cabot silt loam (72) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)
Field has been cut for hay.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DPU8

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Lolium perenne*	60	Yes	FACU
2. *Phalaris arundinacea*	25	Yes	FACW
3. *Taraxacum officinale*	3	No	FACU
4. *Vicia sativa*	2	No	FACU
5. *Geranium maculatum*	1	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	91 =Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	25	x 2 =	50
FAC species	0	x 3 =	0
FACU species	66	x 4 =	264
UPL species	0	x 5 =	0
Column Totals:	91 (A)		314 (B)

Prevalence Index = B/A = 3.45

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DPU8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-13	10YR 2/2	100					Loamy/Clayey	
13-23	10YR 2/1	98	7.5YR 3/4	2	C	PL	Loamy/Clayey	Prominent redox concentrations
23-27	5YR 4/1	99	5YR 4/4	1	C	M	Loamy/Clayey	Distinct redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Willoughby Lake Road City/County: Orleans County Sampling Date: 7-23-2019

Applicant/Owner: Ducks Unlimited State: VT Sampling Point: DPU9

Investigator(s): Patrick Raney Section, Township, Range: Town of Barton

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope %: 2.0

Subregion (LRR or MLRA): LRR R Lat: 44°47'08.79" Long: 72°06'58.29 Datum: WGS84

Soil Map Unit Name: Buckland very fine sandy loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)
Well-drained forested upland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Upland datapoint.

VEGETATION – Use scientific names of plants.

Sampling Point: DPU9

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus balsamifera*	5	No	FACW
2. *Abies balsamea*	60	Yes	FAC
3. *Acer rubrum*	5	No	FAC
4.			
5.			
6.			
7.			
	70	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Abies balsamea*	5	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	5	=Total Cover	
Herb Stratum (Plot size: 5)			
1. *Dennstaedtia punctilobula*	55	Yes	UPL
2. *Thelypteris noveboracens*	10	No	FAC
3. *Abies balsamea*	5	No	FAC
4. *Equisetum arvense*	4	No	FAC
5. *Onoclea sensibilis*	2	No	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	76	=Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	7	x 2 =	14
FAC species	89	x 3 =	267
FACU species	0	x 4 =	0
UPL species	55	x 5 =	275
Column Totals:	151 (A)		556 (B)

Prevalence Index = B/A = 3.68

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DPU9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	7.5YR 5/6	100					Loamy/Clayey	hit restrictive layer at 18"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

VEGETATION – Use scientific names of plants. Sampling Point: DPW10

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Impatiens capensis*	25	Yes	FACW
2. *Typha latifolia*	25	Yes	OBL
3. *Ranunculus acris*	15	No	FAC
4. *Euthamia graminifolia*	3	No	FAC
5. *Rumex crispus*	3	No	FAC
6. *Phleum pratense*	2	No	FACU
7. *Solidago canadensis*	2	No	FACU
8. *Symphyotrichum ericoides*	2	No	FACU
9.			
10.			
11.			
12.			
	77 =Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	25	x 1 =	25
FACW species	25	x 2 =	50
FAC species	21	x 3 =	63
FACU species	6	x 4 =	24
UPL species	0	x 5 =	0
Column Totals:	77 (A)		162 (B)

Prevalence Index = B/A = 2.10

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Willoughby Lake Road City/County: Orleans County Sampling Date: 7-23-2019

Applicant/Owner: Ducks Unlimited State: VT Sampling Point: DPW15

Investigator(s): Patrick Raney Section, Township, Range: Town of Barton

Landform (hillside, terrace, etc.): Flat Local relief (concave, convex, none): None Slope %: 1

Subregion (LRR or MLRA): LRR R Lat: 44°47'15.261" Long: 72°6'31.153" Datum: WGS84

Soil Map Unit Name: Buckland very fine sandy loam NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID: Wetland 13

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 8
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: DPW15

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Picea rubens*	5	No	FACU
2. *Abies balsamea*	5	No	FAC
3. *Thuja occidentalis*	80	Yes	FACW
4.			
5.			
6.			
7.			
	90	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Thuja occidentalis*	40	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	40	=Total Cover	
Herb Stratum (Plot size: 5)			
1. *Onoclea sensibilis*	45	Yes	FACW
2. *Phegopteris connectilis*	12	No	FACU
3. *Myosotis scorpioides*	5	No	OBL
4. *Equisetum fluviatile*	8	No	OBL
5. *Ranunculus hispidus*	10	No	FAC
6. *Carex exilis*	2	No	OBL
7.			
8.			
9.			
10.			
11.			
12.			
	82	=Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	165	x 2 =	330
FAC species	15	x 3 =	45
FACU species	17	x 4 =	68
UPL species	0	x 5 =	0
Column Totals:	212 (A)		458 (B)

Prevalence Index = B/A = 2.16

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DPW15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 2/1	100					Mucky Peat	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- x Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Willoughby Lake Road City/County: Orleans County Sampling Date: 7-23-2019

Applicant/Owner: Ducks Unlimited State: VT Sampling Point: DPW16

Investigator(s): Patrick Raney Section, Township, Range: Town of Barton

Landform (hillside, terrace, etc.): Flat Local relief (concave, convex, none): None Slope %: 1

Subregion (LRR or MLRA): LRR R Lat: 44°47'11.319" Long: 72°7'5.103" Datum: WGS84

Soil Map Unit Name: Buckland very fine sandy loam NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID: Wetland 14

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 7
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DPW16

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Alnus incana*	5	No	FACW
2. *Abies balsamea*	60	Yes	FAC
3. *Thuja occidentalis*	10	No	FACW
4.			
5.			
6.			
7.			
	75	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Alnus incana*	25	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	25	=Total Cover	
Herb Stratum (Plot size: 5)			
1. *Onoclea sensibilis*	30	Yes	FACW
2. *Impatiens capensis*	5	No	FACW
3. *Carex crinita*	28	Yes	OBL
4. *Galium boreale*	7	No	FAC
5. *Carex grayi*	5	No	FACW
6. *Circaea alpina*	4	No	FACW
7. *Acer pensylvanicum*	3	No	FACU
8. *Alnus incana*	4	No	FACW
9. *Maianthemum canadense*	7	No	FACU
10. *Trientalis borealis*	5	No	FAC
11.			
12.			
	98	=Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	28	x 1 =	28
FACW species	88	x 2 =	176
FAC species	72	x 3 =	216
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	198 (A)		460 (B)

Prevalence Index = B/A = 2.32

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DPW16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 5/6	100					Mucky Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- x Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- X Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Willoughby Lake Road City/County: Orleans County Sampling Date: 7-23-2019

Applicant/Owner: Ducks Unlimited State: VT Sampling Point: DPW17

Investigator(s): Patrick Raney Section, Township, Range: Town of Barton

Landform (hillside, terrace, etc.): Flat Local relief (concave, convex, none): None Slope %: 1

Subregion (LRR or MLRA): LRR R Lat: 44°47'32.389" Long: 72°6'31.153" Datum: WGS84

Soil Map Unit Name: Buckland very fine sandy loam NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID: Wetland 15

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 8
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DPW17

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Picea rubens*	5	No	FACU
2. *Abies balsamea*	5	No	FAC
3. *Thuja occidentalis*	80	Yes	FACW
4.			
5.			
6.			
7.			
	90	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Thuja occidentalis*	40	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	40	=Total Cover	
Herb Stratum (Plot size: 5)			
1. *Onoclea sensibilis*	45	Yes	FACW
2. *Phegopteris connectilis*	12	No	FACU
3. *Myosotis scorpioides*	5	No	OBL
4. *Equisetum fluviatile*	8	No	OBL
5. *Ranunculus hispidus*	10	No	FAC
6. *Carex exilis*	2	No	OBL
7.			
8.			
9.			
10.			
11.			
12.			
	82	=Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	165	x 2 =	330
FAC species	15	x 3 =	45
FACU species	17	x 4 =	68
UPL species	0	x 5 =	0
Column Totals:	212 (A)		458 (B)

Prevalence Index = B/A = 2.16

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DPW17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 2/1	100					Mucky Peat	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- x Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Willoughby Lake Road City/County: Orleans County Sampling Date: 7-23-2019

Applicant/Owner: Ducks Unlimited State: VT Sampling Point: DPW18

Investigator(s): Patrick Raney Section, Township, Range: Town of Barton

Landform (hillside, terrace, etc.): Flat Local relief (concave, convex, none): None Slope %: 1

Subregion (LRR or MLRA): LRR R Lat: 44°47'35.267" Long: 72°7'6.513" Datum: WGS84

Soil Map Unit Name: Cabot Silt Loam NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID: Wetland 14

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ? Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 16
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 10

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: DPW18

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus nigra*	60	Yes	FACW
2. *Populus tremuloides*	10	No	FACU
3. *Abies balsamea*	5	No	FAC
4.			
5.			
6.			
7.			
	75	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Herb Stratum (Plot size: 5)			
1. *Impatiens capensis*	18	Yes	FACW
2. *Chelone glabra*	10	No	OBL
3. *Eutrochium maculatum*	20	Yes	OBL
4. *Matteuccia struthiopteris*	30	Yes	FAC
5. *Equisetum arvense*	5	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	83	=Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30
FACW species	78	x 2 =	156
FAC species	40	x 3 =	120
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	158 (A)		346 (B)

Prevalence Index = B/A = 2.19

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DPW18

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 2/1	100					Mucky Peat	
14-20	10YR 6/1	90	7.5YR 6/8	10	C	M		Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- x Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Willoughby Lake Road City/County: Orleans County Sampling Date: 7-23-2019

Applicant/Owner: Ducks Unlimited State: VT Sampling Point: DPW19

Investigator(s): Patrick Raney Section, Township, Range: Town of Barton

Landform (hillside, terrace, etc.): Flat Local relief (concave, convex, none): None Slope %: 1

Subregion (LRR or MLRA): LRR R Lat: 44°47'36.528" Long: 72°6'56.753" Datum: WGS84

Soil Map Unit Name: Cabot Silt Loam NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID: Wetland 13

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ? Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 20
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 12

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DPW19

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Thuja occidentalis*	20	Yes	FACW
2. *Abies balsamea*	35	Yes	FAC
3. *Populus balsamifera*	15	Yes	FACW
4.			
5.			
6.			
7.			
	70	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Populus tremuloides*	20	Yes	FACU
2. *Abies balsamea*	32	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	52	=Total Cover	
Herb Stratum (Plot size: 5)			
1. *Osmunda claytoniana*	20	Yes	FAC
2. *Pteridium aquilinum*	5	No	FACU
3. *Circaea alpina*	5	No	FACW
4. *Onoclea sensibilis*	28	Yes	FACW
5. *Rubus pubescens*	20	Yes	FACW
6. *Abies balsamea*	2	No	FAC
7. *Populus tremuloides*	3	No	FACU
8. *Thuja occidentalis*	1	No	FACW
9.			
10.			
11.			
12.			
	84	=Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 87.5% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	89	x 2 =	178
FAC species	89	x 3 =	267
FACU species	28	x 4 =	112
UPL species	0	x 5 =	0
Column Totals:	206 (A)		557 (B)

Prevalence Index = B/A = 2.70

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DPW19

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	7.5YR 4/2	85	5YR 5/8	15	C	M	Mucky Peat	
10-18	5YR 5/1	90	5YR 6/4	10	C	M	Mucky Loam/Clay	Distinct redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- x Histosol (A1)
- X Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ? Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Willoughby Lake Road City/County: Orleans County Sampling Date: 7-24-2019

Applicant/Owner: Ducks Unlimited State: VT Sampling Point: DPW20

Investigator(s): Patrick Raney Section, Township, Range: Town of Barton

Landform (hillside, terrace, etc.): Flat Local relief (concave, convex, none): concave Slope %: 3

Subregion (LRR or MLRA): LRR R Lat: 44°47'11.104" Long: 72°6'15.154" Datum: WGS84

Soil Map Unit Name: Cabot Silt Loam NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID: Wetland 7

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ? Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 18
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 2

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: DPW20

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Onoclea sensibilis*	25	Yes	FACW
2. *Carex crinita*	15	Yes	OBL
3. *Juncus effusus*	10	No	OBL
4. *Euthamia graminifolia*	8	No	FAC
5. *Ranunculus acris*	5	No	FAC
6. *Phalaris arundinacea*	12	No	FACW
7. *Solidago altissima*	15	Yes	FACU
8. *Carex flava*	5	No	OBL
9.			
10.			
11.			
12.			
	95 =Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30
FACW species	37	x 2 =	74
FAC species	13	x 3 =	39
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals:	95 (A)		203 (B)

Prevalence Index = B/A = 2.14

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DPW20

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	90	5YR 5/6	10	C	m	Mucky Loam/Clay	
12-18	10YR 5/1	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ? Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ? Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

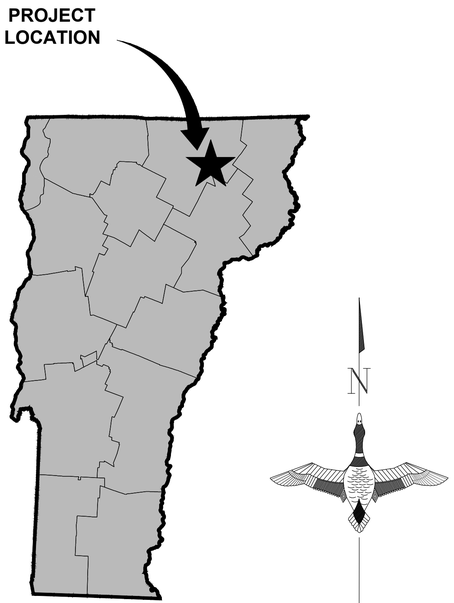
DUCKS UNLIMITED

DUCKS UNLIMITED

PROJECT

WILLOUGHBY LAKE ROAD MITIGATION SITE

BARTON, ORLEANS COUNTY, VERMONT



PROJECT LOCATION

(LAT: 44°47'17.10"N, LON: 72° 6'30.17"W)

2000 0 1000 2000 4000

1 inch = 2000 feet

SHEET INDEX

1. COVER SHEET
2. ESTIMATED QUANTITIES, SPECIFICATIONS, & NOTES
3. SITE PLAN
4. WETLAND DELINEATION - OVERALL
5. WETLAND MITIGATION UNIT 1 PLAN AND CROSS SECTION
6. WETLAND MITIGATION UNIT 2 PLAN
7. WETLAND MITIGATION UNIT 3 PLAN
8. CROSS SECTIONS AND DETAILS
9. EROSION AND SEDIMENT CONTROL PLAN - 1
10. EROSION AND SEDIMENT CONTROL PLAN - 2
11. EROSION AND SEDIMENT CONTROL DETAILS AND NOTES
12. PLANTING PLAN - OVERALL
13. PLANTING PLAN - UNIT 1
14. PLANTING PLAN - UNIT 2
15. PLANTING PLAN - UNIT 3
16. PLANTING DETAILS AND NOTES
17. CREDIT GENERATION - OVERALL
18. CREDIT GENERATION - UNIT 1
19. CREDIT GENERATION - UNIT 2
20. CREDIT GENERATION - UNIT 3
21. MONITORING PLAN - 1
22. MONITORING PLAN - 2

811 Know what's **below.** **Call** before you dig.

- CALL BEFORE YOU DIG (811 OR 1-888-344-7233)
- WAIT THE REQUIRED TIME
- CONFIRM UTILITY RESPONSE
- RESPECT THE MARKS
- DIG WITH CARE

FOR PERMIT

Signed: 08/13/2020

STATE OF VERMONT MICHAEL HIGGINS NO. 018.0103039 CIVIL LICENSED PROFESSIONAL ENGINEER

Professional Engineer's Name: **MICHAEL HIGGINS**

Professional Engineer's No.: 018.0103039 State: VT

ARCADIS Design & Consultancy for natural and built assets

ARCADIS U.S., INC.

ARCADIS Project No. 30003337

ARCADIS
One Lincoln Center
110 West Fayette Street, Suite 300
Syracuse NY 13202
Tel: 315.446.9120

GREAT LAKES/ATLANTIC REGIONAL OFFICE
7322 NEWMAN BOULEVARD,BLDG. 1
DEXTER, MICHIGAN 48130
(734) 623-2000 www.ducks.org

DUCKS UNLIMITED

COVER SHEET
WILLOUGHBY LAKE ROAD MITIGATION SITE
BARTON, ORLEANS COUNTY, VT

Revision	Sheet	Revisions	Date	By
0	ALL	ISSUED FOR PERMIT REVIEW	08/13/20	ERT

CAD FILE: 30003337-DU-FIG 01-COVER SHEET.dwg

DESIGNED BY: NWF

DRAWN BY: KD

SURVEYED BY: JT

BIOLOGIST: JF (DU)

DATE: JUNE 2020

PROJECT NUMBER: US-VT-47-2

GLARO-VT1-004-1

CONSTRUCTION NOTES:

1. BID ITEMS INCLUDED IN THE TABLE BELOW ARE DESCRIBED IN DETAIL IN THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WETLAND RESTORATION, PROVIDED WITH THE BID DOCUMENTS. CONSTRUCTION NOTES HEREIN ARE NOT ALL INCLUSIVE; REFER TO THE STANDARD CONSTRUCTION SPECIFICATIONS.
2. ELEVATIONS PROVIDED IN THESE PLANS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), FEET.
3. HORIZONTAL COORDINATES PROVIDED IN THESE PLANS ARE REFERENCED TO THE VERMONT STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM OF 1983 (NAD83), U.S. SURVEY FEET.
4. CONTRACTOR SHALL UTILIZE SAME VERTICAL AND HORIZONTAL COORDINATE SYSTEMS AS REFERENCED IN THE PLANS.
5. BID ITEM FOR MOBILIZATION SHALL INCLUDE THE SUPPLY OF ALL LABOR, MATERIAL AND EQUIPMENT TO TRANSPORT ALL NEEDED LABOR, MATERIAL AND EQUIPMENT TO AND FROM A PROJECT SITE TO SUCCESSFULLY COMPLETE THAT PROJECT AS SHOWN ON THE PLANS OR DESCRIBED BY THE ENGINEER. REFER TO MOBILIZATION SPECIFICATION 201.
6. SITE PREPARATION BID ITEM SHALL INCLUDE STRIPPING BENEATH CONSTRUCTED TOPOGRAPHY. TOPSOIL SHALL BE STOCKPILED AND REPLACED OVER COMPLETED CONSTRUCTED TOPOGRAPHY. BID ITEM SHALL INCLUDE LEVELING AND DRAGGING OR DISK PRIOR TO PLACEMENT OF SEED MIX. BID ITEM SHALL ALSO INCLUDE ANY TREE/BRUSH CLEARING WITHIN CONSTRUCTION AREA. REFER TO SITE PREPARATION SPECIFICATION 202.
7. BID ITEM FOR CONSTRUCTED TOPOGRAPHY SHALL INCLUDE ALL WORK REQUIRED TO EXCAVATE THE CONSTRUCTED TOPOGRAPHY AREAS, HAULING AND SPREADING MATERIALS, AND SHAPING OF SLOPES TO THE LINES AND GRADES AS SHOWN ON THE PLANS. THE ESTIMATED QUANTITY FOR CONSTRUCTED TOPOGRAPHY IS THE IN-PLACE BORROW QUANTITY FROM THE SCRAPE AREAS BASED ON PRE- AND POST- EXCAVATION SURVEYS AND DOES NOT ACCOUNT FOR SHRINKAGE DUE TO COMPACTION. PLACEMENT AND COMPACTION OF EXCAVATED MATERIALS CONSIDERED INCIDENTAL TO THE CONSTRUCTED TOPOGRAPHY ITEM. ALL FILL MATERIAL SHALL BE PLACED IN LOOSE LIFTS NOT MORE THAN APPROXIMATELY TWELVE (12) INCHES IN THICKNESS AND COMPACTED TO A FIRM NON-YIELDING CONDITION. REFER TO CONSTRUCTED TOPOGRAPHY SPECIFICATION 205 FOR ADDITIONAL INFORMATION.
8. THE TILE DRAIN LOCATION BID ITEM IS FOR THE EXPLORATION OF EXISTING TILES (SPECIFICATION 312). EXCAVATION SHALL BE PERFORMED AS SHOWN ON THE PLANS, AND ALL TILES FOUND SHALL BE REPORTED TO THE ENGINEER BY THE CONTRACTOR. THE PAYMENT FOR THIS LINE ITEM IS BASED ON LINEAR FEET OF EXPLORATION AS NOTED ON THE PLANS. EXPLORATION EXCAVATIONS SHALL BE BACKFILLED WITH ORIGINAL SOILS AND TAMPED FIRM AFTER EXPLORATION.
9. THE TILE REMOVAL BID ITEM IS FOR THE REMOVAL OF EXISTING TILES (SPECIFICATION 312). REMOVAL OF TILE SHALL BE PERFORMED AS SHOWN ON THE PLANS AND SHALL ABIDE BY SPECIFICATION 312.23. ALL TILE MATERIAL SHALL BE REMOVED FROM THE SITE. THE PAYMENT FOR THIS LINE ITEM IS BASED ON LINEAR FEET OF TILE REMOVED; DUCKS UNLIMITED WILL PAY FOR ACTUAL LINEAR FEET OF TILE REMOVED.
10. THE BID ITEM FOR SOIL EROSION AND POLLUTION CONTROL SHALL INCLUDE THE SUPPLY, INSTALLATION AND MAINTENANCE OF THE EROSION AND SEDIMENT CONTROLS SHOWN AND DESCRIBED ON THE DESIGN DRAWINGS AND ANY ADDITIONAL CONTROLS (E.G., TEMPORARY SEEDING) NEEDED TO MAINTAIN COMPLIANCE WITH VERMONT STATE REGULATIONS UNTIL VEGETATION IS FULLY ESTABLISHED, REPAIR OF ANY DAMAGES RESULTING FROM EROSION OR SEDIMENTATION DURING THIS TIME PERIOD, AND REMOVAL OF TEMPORARY EROSION AND SEDIMENT CONTROLS IMMEDIATELY FOLLOWING FULL VEGETATIVE ESTABLISHMENT. EXACT LOCATION AND QUANTITY MAY VARY DEPENDING UPON ACTUAL SITE CONDITIONS. EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE START OF WORK AND WILL BE MAINTAINED UNTIL FINAL STABILIZATION OF THE SITE. THE CONTRACTOR SHALL BID A LUMP SUM FOR SOIL EROSION AND POLLUTION CONTROL. IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSTALL, INSPECT AND MAINTAIN ALL BEST MANAGEMENT PRACTICES REQUIRED TO PREVENT SILT AND POLLUTION RUNOFF FROM THE WORK AREA. THE CONTRACTOR SHALL PREPARE AND MAINTAIN ON-SITE ALL REQUIRED INSPECTION FORMS AND UP-TO-DATE DOCUMENTATION ACCORDING TO THE PERMIT REGULATIONS.
11. BID ITEM SEEDING AND MULCHING - "UPLAND SEED MIX" SHALL INCLUDE THE EQUIPMENT AND LABOR REQUIRED TO APPLY SEED, MULCH, AND FERTILIZER, AS REQUIRED BY THE DESIGN DOCUMENTS; AND ESTABLISHMENT OF A UNIFORM, PERENNIAL VEGETATIVE COVER WITH A DENSITY OF SEVENTY (70) PERCENT, INCLUDING RESEEDING, REMULCHING, AND/OR REFERTILIZING OF BARE AREAS, AS NEEDED. CONTRACTOR SHALL ALSO SUPPLY THE MULCH AND FERTILIZER ONLY; DU WILL SUPPLY THE UPLAND SEED MIX. APPROVED MULCH SHALL BE APPLIED TO ALL AREAS SEEDED AS DIRECTED BY THE DU FIELD ENGINEER. REFER TO SHEETS 12-16 AND DU SPECIFICATION 402 FOR ADDITIONAL NOTES AND REQUIREMENTS. PAYMENT WILL BE BASED ON PLANNED ACRES.
12. BID ITEM SEEDING AND MULCHING THE PEM, PSS & PFO WETLAND AREAS SHALL INCLUDE THE EQUIPMENT AND LABOR REQUIRED TO APPLY SEED AND MULCH, AS REQUIRED BY THE DESIGN DOCUMENTS; AND ESTABLISHMENT OF A UNIFORM, PERENNIAL VEGETATIVE COVER, INCLUDING RESEEDING, AND/OR REMULCHING OF BARE AREAS, AS NEEDED. CONTRACTOR SHALL ALSO SUPPLY THE MULCH AND ANNUAL OR WINTER RYEGRASS COVER CROP (SEE NOTE 1 ON SHEET 16). DU TO PROVIDE THE PEM, PSS AND PFO WETLAND SEED MIXES. REFER TO SHEETS 12-16 AND DU SPECIFICATION 402 FOR ADDITIONAL NOTES AND REQUIREMENTS. PAYMENT WILL BE BASED ON PLANNED ACRES.
13. BID ITEM FOR PLANTING PREPARATION - HEAVY DISKING SHALL INCLUDE THE MATERIAL, EQUIPMENT, AND LABOR REQUIRED TO TILL THE AREAS INDICATED ON THE PLANS. REFER TO THE PLANTING PLANS (DRAWINGS 12-16) FOR ADDITIONAL NOTES, REQUIREMENTS, AND SPECIFIED AREAS. PAYMENT WILL BE BASED ON PLANNED ACRES.
14. BID ITEM FOR WOODY DEBRIS SHALL INCLUDE THE EQUIPMENT AND LABOR REQUIRED TO CUT NATIVE TREES, REMOVE ROOTWADS, AND PLACEMENT OF COARSE WOOD AND ROOTWADS WITHIN THE WETLAND MITIGATION UNITS AT THE DIRECTION OF THE ENGINEER. PAYMENT FOR THIS LINE ITEM WILL BE BASED ON THE PAY QUANTITY LISTED ON THIS SHEET.

ESTIMATED QUANTITIES

SPEC. #	ITEM	UNIT	QUANTITY (PHASE 1)	QUANTITY (PHASE 2)
201	MOBILIZATION	LS	1	1
202	SITE PREPARATION	CY-P	3,130	6,160
205	CONSTRUCTED TOPOGRAPHY	CY-P	4,640	8,350
312	TILE DRAIN LOCATION	LF-EXP	200	1,100
312	TILE DRAIN REMOVAL	LF	40	-
401	SOIL EROSION AND POLLUTION CONTROL	LS	1	1
402	SEEDING AND MULCHING - UPLAND SEED MIX	AC-P	2.0	3.8
402	SEEDING AND MULCHING - WETLAND SEED MIX: PEM, PSS & PFO	AC-P	6.6	16.4
403	PLANTING PREPARATION - HEAVY DISKING	AC-P	4.7	12.2
-	WOODY DEBRIS	EACH	13	9

BENCHMARK	NORTHING (FT)	EASTING (FT)	ELEVATION (FT)
TBM 1	833121.57	1742786.41	1259.44
TBM 2	834617.78	1740153.18	1239.90
TBM 3	835768.39	1740602.61	1185.89

SPECIFICATIONS

101 GENERAL CONDITIONS
102 SUPPLEMENTAL CONDITIONS
201 MOBILIZATION
202 SITE PREPARATION
203 EXCAVATION
205 CONSTRUCTED TOPOGRAPHY
312 TILE DRAIN LOCATION AND REMOVAL
401 SOIL EROSION AND POLLUTION CONTROL
402 SEEDING AND MULCHING
403 PLANTING PREPARATION - HEAVY DISKING
404 TRAFFIC MAINTENANCE AND CONTROL

SEQUENCE OF CONSTRUCTION:

1. HOLD PRE-CONSTRUCTION MEETING.
2. NOTIFY SEDIMENT CONTROL INSPECTOR 24 HOURS PRIOR TO START OF CONSTRUCTION.
3. COMPLETE MOWING IN ALL WORK AREAS.
4. INSTALL STABILIZED CONSTRUCTION ACCESS.
5. PERFORM GRUBBING REQUIRED FOR INSTALLATION OF PERIMETER CONTROLS.
6. INSTALL PERIMETER CONTROLS, NOTIFY SEDIMENT CONTROL INSPECTOR, AND OBTAIN APPROVAL BEFORE PROCEEDING FURTHER.
7. COMPLETE TILE EXPLORATION AND REMOVE DRAINAGE TILES.
8. PERFORM SITE PREPARATION WORK AND CLEARING, STOCKPILE TOPSOIL TO BE USED LATER. CLEAR TOPSOIL ONLY FROM IMMEDIATE WORK AREA (UNIT) TO BE GRADED TO MINIMIZE TOTAL DISTURBED AREAS AT ANY GIVEN TIME.
9. COMPLETE REGRADING OF CONSTRUCTED TOPOGRAPHY AREAS.
10. INSTALL ROOTWADS, SPREAD TOPSOIL BACK ACROSS ALL DISTURBED AREAS AND PLACE COARSE WOOD.
11. COMPLETE SEEDING AND STABILIZATION AS ALLOWED BY SITE CONDITIONS AND TIME OF YEAR.
12. NOTIFY SEDIMENT CONTROL INSPECTOR AFTER COMPLETION OF PLANTING AND STABILIZATION. OBTAIN APPROVAL TO REMOVE TEMPORARY SEDIMENT AND EROSION CONTROL FOR PROJECT AFTER ESTABLISHMENT OF AT LEAST 70% UNIFORM DENSITY OF PERMANENT VEGETATION.
13. CONTRACTOR WILL REMOVE EROSION CONTROL MEASURES UPON APPROVAL FROM DESIGNATED INSPECTOR.

NOTE: NOTIFY THE ENGINEER IMMEDIATELY OF ANY SEDIMENT AND EROSION CONTROL CONCERNS THAT ARISE (E.G., INADEQUATE MEASURES, DAMAGED MEASURES, MAJOR STORM EVENTS, OFF-SITE EROSION OR SEDIMENTATION POTENTIALLY ASSOCIATED WITH SITE ACTIVITIES).

FOR PERMIT

Signed: 08/13/2020

STATE OF VERMONT MICHAEL HIGGINS NO. 018.0103039 CIVIL LICENSED PROFESSIONAL ENGINEER

Professional Engineer's Name: **MICHAEL HIGGINS**
Professional Engineer's No.: 018.0103039
State: VT

ARCADIS U.S., INC.
Design & Consultancy for natural and built assets

ARCADIS Project No.: 30003337

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ESTIMATED QUANTITIES, SPECIFICATIONS, & NOTES

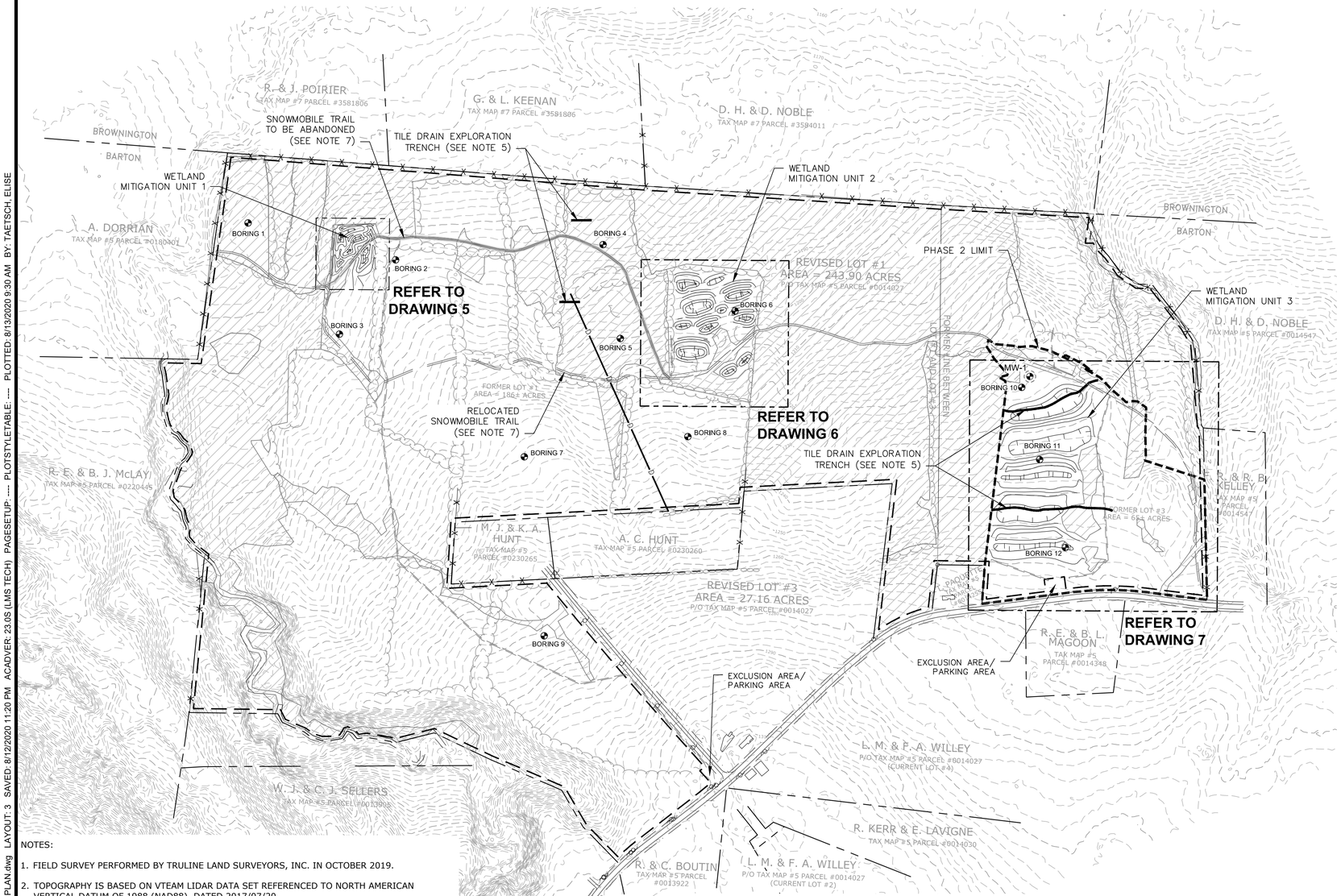
WILLOUGHBY LAKE ROAD MITIGATION SITE

BARTON, ORLEANS COUNTY, VT

Revision	Sheet	Revisions	Date	By
0	ALL	ISSUED FOR PERMIT REVIEW	08/13/20	ERT

CAD FILE: 30003337-DU-Fig 02 - ESTIMATED QUANTITIES, SPECIFICATIONS, & NOTES.dwg
DESIGNED BY: NWF
DRAWN BY: KD
SURVEYED BY: JT
BIOLOGIST: JF (DU)
DATE: JUNE 2020
PROJECT NUMBER: US-VT-47-2
GLARO-VT1-004-2

MONITORING WELLS (EXISTING)			
WELL NO.	NORTHING (FT)	EASTING (FT)	ELEVATION (FT) (EXISTING GRADE)
MW-1	834166.33	1742853.27	1231.48



NOTES:

1. FIELD SURVEY PERFORMED BY TRULINE LAND SURVEYORS, INC. IN OCTOBER 2019.
2. TOPOGRAPHY IS BASED ON VTEAM LIDAR DATA SET REFERENCED TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAD88), DATED 2017/07/20.
3. WETLAND DELINEATIONS WERE PERFORMED AND PROVIDED BY DUCKS UNLIMITED IN JULY 2019.
4. WHEN ESTABLISHING TEMPORARY ACCESS AND STAGING AREAS, CONTRACTOR SHALL PROTECT NEARBY WETLANDS FOR THE DURATION OF CONSTRUCTION ACTIVITIES. REFER TO DRAWINGS 9 AND 10 FOR TEMPORARY ACCESS ROUTES AND SOIL STOCKPILE AREAS.
5. IF TILE IS ENCOUNTERED IN THE TILE EXPLORATION TRENCH, A MINIMUM OF 20 LINEAR FEET OF TILE SHALL BE REMOVED FROM THE POINT WHERE IT WAS ENCOUNTERED.
6. PHASE 2 LIMIT IS APPROXIMATE. ACTUAL LIMIT IS COINCIDENT WITH PROPERTY LINE ALONG THE PERIMETER OF THE PROPERTY. ALL OTHER AREAS WITHIN THE PROPERTY LIMITS WILL BE CONSIDERED PHASE 1.
7. CONTRACTOR SHALL INSTALL SIGNAGE (E.G. "NEW TRAIL ROUTE AHEAD" AND REFLECTIVE ARROWS AT NEW BENDS) AS DIRECTED BY ENGINEER TO ENCOURAGE RECREATIONALISTS TO UTILIZE THE RELOCATED TRAIL.

LEGEND

- EXISTING GRADE MAJOR CONTOUR (10.0' INTERVAL)
- EXISTING GRADE MINOR CONTOUR (2.0' INTERVAL)
- EXISTING STONE WALL
- EXISTING FENCE LINE
- EXISTING TREE LINE
- PROPERTY BOUNDARY
- CONSERVATION EASEMENT BOUNDARY (COINCIDENT WITH PROPERTY LINE EXCEPT AT EXCLUSION AREAS)
- PHASE 2 LIMIT (SEE NOTE 6)
- RIGHT OF WAY
- EDGE OF GRAVEL
- EDGE OF WATER
- PROPOSED FINAL GRADE CONTOUR (2.0' INTERVAL)
- EXISTING SOIL BORING
- EXISTING UTILITY POLE
- EXISTING MONITORING WELL
- EXISTING DELINEATED WETLAND
- EXISTING BUILDING
- EXISTING DRAINAGE TILE
- TILE DRAIN EXPLORATION TRENCH (SEE DETAIL 1 ON SHEET 8) (SEE NOTE 5)
- SNOWMOBILE TRAIL
- MONITORING ACCESS PATH
- SNOWMOBILE TRAIL TO BE ABANDONED

SOIL BORINGS

SOIL BORING #1 ELEV. 1167.76
0"-5" CLAY LOAM (10YR 3/1) [TOPSOIL]
5"-18" CLAY LOAM (10YR 4/4; REDOX ~5% 10 YR 5/6)
18"-26" CLAY LOAM (10 YR 4/2; REDOX ~5% 10 YR 4/6)
26"-36" SILTY CLAY LOAM (2.5YR 4/1; REDOX ~10% 10YR 4/4 ~10% 10YR 3/2)
36" HAND AUGER REFUSAL
DEPTH TO WATER: 32 INCHES.

SOIL BORING #2 ELEV. 1185.34
0"-7" SILT LOAM (10YR 3/2; REDOX ~5% 7.5YR 4/4) [TOPSOIL]
7"-23" LOAM (2.5YR 5/1; REDOX ~20% 2.5 YR 4/5)
23" HAND AUGER REFUSAL
DEPTH TO WATER: SATURATION OBSERVED AT 23 INCHES.

SOIL BORING #3 ELEV. 1183.04
0"-7" SILTY CLAY LOAM (10YR 2/1) [TOPSOIL]
7"-33" LOAM (10YR 4/1; REDOX ~20% 10YR 4/6)
33"-34" LOAM (10YR 4/1)
34" HAND AUGER REFUSAL
DEPTH TO WATER: SATURATION OBSERVED AT 33 INCHES.

SOIL BORING #4 ELEV. 1178.71
0"-3" SILTY CLAY LOAM (10YR 2/1) [TOPSOIL]
3"-14" CLAY LOAM (10YR 4/3; REDOX ~2% 10YR 5/6)
14"-30" CLAY LOAM (10YR 4/1; REDOX ~30% 10YR 4/3)
30" HAND AUGER REFUSAL
DEPTH TO WATER: WATER IN HOLE AT 22 INCHES.

SOIL BORING #5 ELEV. 1199.55
1"-10" CLAY LOAM (10YR 2/2)
10"-24" SANDY CLAY LOAM (5Y 5/1; REDOX ~25% 10YR 3/6)
24" HAND AUGER REFUSAL

SOIL BORING #6 ELEV. 1198.12
0"-7" SILTY CLAY LOAM (10YR 2/2) [TOPSOIL]
7"-16" LOAM (2.5YR 5/2; REDOX ~2% 10YR 4/6)
16"-32" SANDY CLAY LOAM (5Y 5/1; REDOX ~20% 10YR 3/4)
32" HAND AUGER REFUSAL
DEPTH TO WATER: SATURATION OBSERVED AT 18 INCHES.

SOIL BORING #7 ELEV. 1229.55
0"-8" SILTY CLAY LOAM (10YR 3/1) [TOPSOIL]
8"-26" LOAM (10YR 5/1; REDOX ~25% 10YR 3/6)
26"-34" CLAY LOAM (2.5YR 5/1; REDOX ~25% 75YR 4/4 ~25% GLAY 1 4/N)
34" HAND AUGER REFUSAL
DEPTH TO WATER: SOIL MOIST BUT NOT SATURATED AT 34 INCHES.

SOIL BORING #8 ELEV. 1225.79
0"-10" LOAM (10YR 4/1; REDOX ~10% 5YR 3/4) [TOPSOIL]
10"-26" SANDY CLAY LOAM (10YR 5/2; REDOX ~20% 10YR 3/6)
26"-28" SANDY CLAY LOAM (5Y 5/1; REDOX ~40% 10YR 4/4)
28" HAND AUGER REFUSAL

SOIL BORING #9 ELEV. 1260.88
0"-8" CLAY LOAM (10YR 3/2; REDOX ~5% 5YR 4/6) [TOPSOIL]
8"-17" SANDY LOAM (GRAY 1 4/N; REDOX ~10% 10YR 4/6)
17"-32" SANDY LOAM (~30% 10YR 4/4 ~30% 10YR 5/2 ~30% 5YR 5/2 ~10% 10YR 2/2)
32"-33" WHITE COARSE SAND
33"-36" SANDY LOAM (~30% 10YR 4/4 ~30% 10YR 5/2 ~30% 5YR 5/2 ~10% 10YR 2/2)
36" HAND AUGER REFUSAL
DEPTH TO WATER: SATURATION OBSERVED AT 33 INCHES.

SOIL BORING #10ELEV. 1231.29
0"-8" SILTY CLAY LOAM (10YR 3/1) [TOPSOIL]
8"-22" CLAY LOAM (5Y 4/1; REDOX ~5% 10YR 4/6)
22"-24" WHITE COARSE SAND
24"-33" CLAY LOAM (2.5YR 4/1; REDOX ~20% 2.5YR 3/6)
33"-34" WHITE COARSE SAND
34"-36" CLAY LOAM (2.5YR 4/1; REDOX ~20% 2.5YR 3/6)
36" HAND AUGER REFUSAL
DEPTH TO WATER: SATURATION OBSERVED AT 26 INCHES. GROUNDWATER OBSERVED AT 27 INCHES.

SOIL BORING #11ELEV. 1244.57
0"-8" SILTY CLAY LOAM (10YR 2/1) [TOPSOIL]
8"-14" SANDY CLAY LOAM (2.5YR 5/1; REDOX ~5% 2.5YR 4/4)
14"-36" CLAY LOAM (2.5YR 4/1; REDOX ~15% 2.5YR 4/4)
36" HAND AUGER REFUSAL
DEPTH TO WATER: SATURATION OBSERVED AT 32 INCHES.

SOIL BORING #12ELEV. 1256.88
0"-7" SILTY CLAY LOAM (10YR 3/2) [TOPSOIL]
7"-9" SILTY CLAY LOAM (10YR 3/2; REDOX ~2% 7.5YR 3/4)
9"-24" LOAM (2.5YR 5/1; REDOX ~20% 2.5YR 4/4)
24"-30" SILT LOAM (2.5YR 5/2; REDOX ~20% 2.5YR 4/4)
30"-36" CLAY LOAM (7.5YR 4/1; REDOX ~25% 7.5YR 3/4)
36" HAND AUGER REFUSAL
DEPTH TO WATER: SATURATION OBSERVED AT 30 INCHES.

BORINGS WERE PROGRESSED WITH A HAND AUGER. MATERIAL CLASSIFICATIONS AND OBSERVATIONS WERE MADE DURING THE SUBSURFACE EXPLORATION AT THE SITE AND ARE NOT BASED ON LABORATORY TEST DATA. CONDITIONS BETWEEN LOCATIONS EXPLORED MAY DIFFER FROM THE CONDITIONS DESCRIBED ON THESE PLANS.

GRAPHIC SCALE
300 0 150 300 600 1200
1 inch = 300 feet

FOR PERMIT

Signed: 08/13/2020

STATE OF VERMONT MICHAEL HIGGINS NO. 018.0103039 LICENSED PROFESSIONAL ENGINEER

Professional Engineer's Name: MICHAEL HIGGINS
Professional Engineer's No.: 018.0103039
State: VT

ARCADIS U.S., INC.
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SITE PLAN

WILLOUGHBY LAKE ROAD
MITIGATION SITE
BARTON, ORLEANS COUNTY, VT

Revision	Sheet	Revisions	Date	By
0	ALL	ISSUED FOR PERMIT REVIEW	08/13/20	ERT

CAD FILE: 30003337-DU-Fig 03 - SITE PLAN.dwg
DESIGNED BY: NWF
DRAWN BY: KD
SURVEYED BY: JT
BIOLOGIST: JF (DU)
DATE: JUNE 2020
PROJECT NUMBER: US-VT-47-2
GLARO-VT1-004-3

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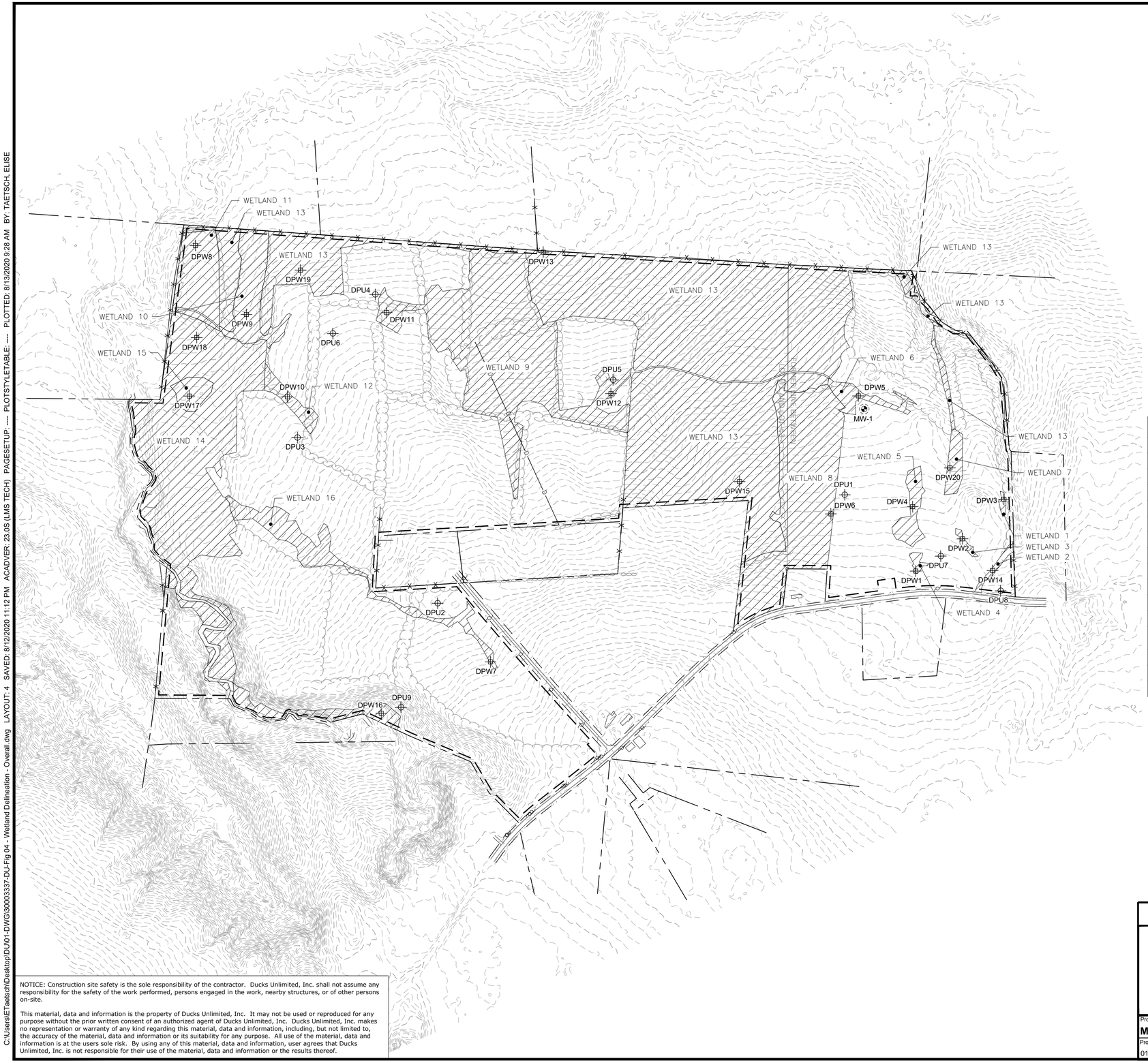

LEGEND

- EXISTING GRADE MAJOR CONTOUR (10.0' INTERVAL)
- EXISTING GRADE MINOR CONTOUR (2.0' INTERVAL)
- EXISTING STONE WALL
- EXISTING FENCE LINE
- PROPERTY LINE
- CONSERVATION EASEMENT BOUNDARY (COINCIDENT WITH PROPERTY LINE EXCEPT AT EXCLUSION AREAS)
- RIGHT OF WAY
- EDGE OF GRAVEL
- EDGE OF WATER
- EXISTING UTILITY POLE
- EXISTING BUILDING
- MW-1 EXISTING MONITORING WELL
- DPU8 UPLAND DATA POINT
- DPW11 WETLAND DELINEATION DATA POINT
- EXISTING DELINEATED WETLAND
- EXISTING TREE LINE
- D EXISTING DRAINAGE TILE

WETLAND ID	CLASSIFICATION	ACREAGE (AC)	DATA POINT
WETLAND 1	PEM	0.09	DPW3
WETLAND 2	PEM	0.23	DPW14
WETLAND 3	PEM	0.14	DPW2
WETLAND 4	PEM	0.15	DPW1
WETLAND 5	PEM	0.96	DPW4
WETLAND 6	PEM	0.79	DPW5
WETLAND 7	PEM	0.67	DPW20
WETLAND 8	PEM/UPL MOSIAC	10.18	DPW6
WETLAND 9	PEM	14.81	DPW11, DPW12
WETLAND 10	PEM	2.65	DPW9
WETLAND 11	PEM	2.62	DPW8
WETLAND 12	PEM	0.75	DPW10
WETLAND 13	PFO	47.29	DPW13, DPW15, DPW19
WETLAND 14	PFO	18.99	DPW16, DPW18
WETLAND 15	PSS	0.75	DPW17
WETLAND 16	PEM	2.78	DPW7

WETLANDS EXTENDING OFF OF THE PROPERTY:

WETLANDS 10, 11, AND 13 CONTINUE OFF OF THE PROPERTY ACROSS THE NORTHERN BORDER.

WETLANDS 11 AND 14 CONTINUE OFF OF THE PROPERTY ACROSS THE WESTERN BORDER.

WETLAND 8 CONTINUES OFF OF THE PROPERTY ACROSS THE SOUTHERN BORDER.

WETLAND 13 CONTINUES OFF OF THE PROPERTY ACROSS THE EASTERN BORDER.

GRAPHIC SCALE

300 0 150 300 600 1200

1 inch = 300 feet

FOR PERMIT

Signed: 08/13/2020

STATE OF VERMONT MICHAEL HIGGINS NO. 018.0103039 LICENSED PROFESSIONAL ENGINEER

Professional Engineer's Name: MICHAEL HIGGINS

Professional Engineer's No.: 018.0103039 State: VT

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WETLAND DELINEATION - OVERALL

WILLOUGHBY LAKE ROAD MITIGATION SITE
BARTON, ORLEANS COUNTY, VT

Revision	Sheet	Revisions	Date	By
0	ALL	ISSUED FOR PERMIT REVIEW	08/13/20	ERT

CAD FILE: 30003337-DU-Fig 04 - Wetland Delineation - Overall.dwg

DESIGNED BY: NWF

DRAWN BY: KD

SURVEYED BY: JT

BIOLOGIST: JF (DU)

DATE: JUNE 2020

PROJECT NUMBER: US-VT-47-2

GLARO-VT1-004-4

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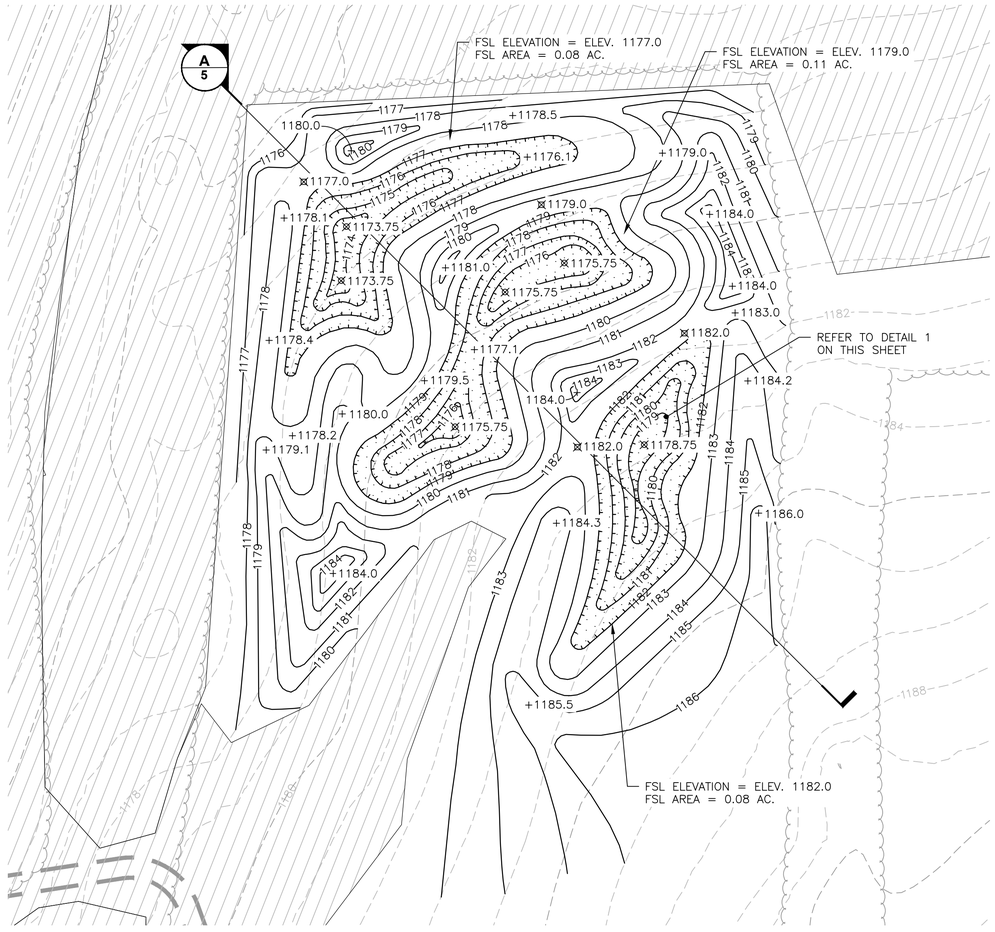
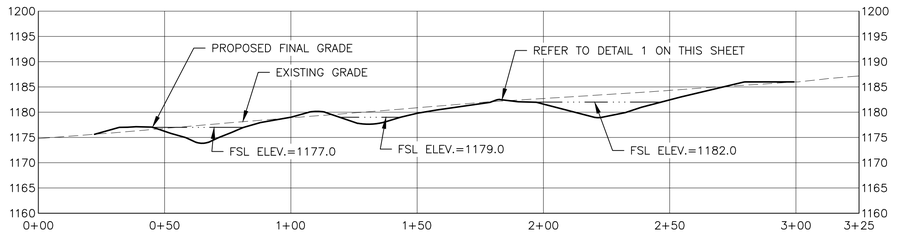


WETLAND MITIGATION UNIT 1 PLAN (PHASE 1)



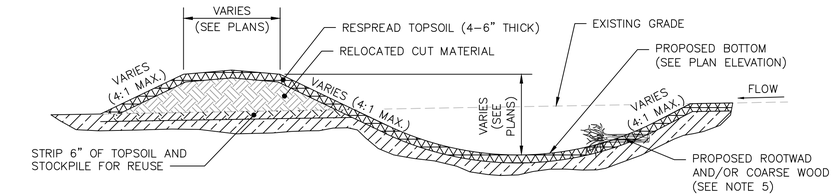
SECTION A

SCALE: 1" = 30' HORIZONTAL
2X VERTICAL EXAGERATION

LEGEND

- EXISTING GRADE MAJOR CONTOUR (5.0' INTERVAL)
- EXISTING GRADE MINOR CONTOUR (1.0' INTERVAL)
- EXISTING DELINEATED WETLAND
- EXISTING TREE LINE
- PROPOSED FINAL GRADE CONTOUR (1.0' INTERVAL)
- +1175.5 PROPOSED SPOT ELEVATION (SEE NOTE 1)
- ⊠1175.5 PROPOSED SPILLOVER ELEVATION (SEE NOTE 1)
- ⊠1175.5 PROPOSED LOW POINT ELEVATION (SEE NOTE 1)
- FULL SERVICE LEVEL (FSL)
- SNOWMOBILE TRAIL

HABITAT STRUCTURE	WETLAND MITIGATION UNIT 1
COARSE WOOD (LOG)	2
ROOTWAD	2
TOTAL	4



TYPICAL WETLAND MITIGATION UNIT 1 GRADING DETAIL (1)

NOT TO SCALE

NOTES:

1. CONTRACTOR SHALL ACHIEVE DESIGNATED SPILLOVER AND LOW POINT ELEVATIONS TO WITHIN +/- 0.15 FT AND ALL OTHER SPOT ELEVATIONS TO WITHIN +/- 0.5 FT, EXCEPT THAT THE INDICATED FULL-SERVICE LEVEL AREAS SHALL BE ACHIEVED TO WITHIN +/- 0.01 AC OF DESIGN WITHIN +0 FT TO -0.15 FT OF THE SPECIFIED ELEVATIONS, CREATING SMOOTH TRANSITION GRADING BETWEEN LOW AND HIGH POINTS, WITH SLOPES GENERALLY NOT EXCEEDING 4H:1V. ACTUAL LANDFORM SHAPES WILL BE ALLOWED TO VARY FROM THOSE SHOWN, BUT THE SUM TOTAL FULL-SERVICE LEVEL AREA SHALL NOT VARY BY MORE THAN +/- 0.01 ACRE FROM THE DESIGN AND THE AVERAGE MAXIMUM DEPTH OF FULL-SERVICE LEVEL AREAS BY NO MORE THAN +/- 0.15 FT.
2. WORK SHALL BE PERFORMED UNDER OVERSIGHT OF ENGINEER, AND SIZE AND SHAPE COULD CHANGE TO ACCOUNT FOR CONDITIONS OBSERVED IN THE FIELD.
3. CAD FILES WILL BE PROVIDED TO THE CONTRACTOR FOR CONSTRUCTION STAKING AND LAYOUT PURPOSES.
4. ALL AREAS REQUIRING GRADING SHALL BE FINISHED TO THE GRADES SHOWN ON THE PLANS WITH TOPSOIL AS SPECIFIED, AND A MINIMUM OF 6 INCHES OF SURFACE SOIL SHALL BE IN LOOSE CONDITION.
5. COARSE WOOD (I.E., CUT NATIVE TREES) AND ROOTWADS (I.E., REMOVED NATIVE ROOTWADS) SHALL HAVE A MINIMUM 12" DBH (DIAMETER AT BREAST HEIGHT) AND WILL BE PLACED RANDOMLY THROUGHOUT THE WETLAND MITIGATION UNIT AT THE DIRECTION OF THE ENGINEER. ROOTWADS SHALL BE INSTALLED BY BURYING TWO-THIRDS OF THE LOG; COARSE WOOD SHALL BE PLACED ON FINAL RESTORED GRADE.

GRAPHIC SCALE

30 0 15 30 60 120

1 inch = 30 feet

FOR PERMIT

Signed: 08/13/2020

STATE OF VERMONT MICHAEL HIGGINS NO. 018.0103039 CIVIL LICENSED PROFESSIONAL ENGINEER

ARCADIS Design & Consultancy for natural and built assets

ARCADIS U.S., INC.

Professional Engineer's Name	
MICHAEL HIGGINS	
Professional Engineer's No.	State
018.0103039	VT

ARCADIS Project No.
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Tel: 315.446.9120

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DEXTER, MICHIGAN 48130
(734) 623-2000 www.ducks.org

WETLAND MITIGATION UNIT 1
PLAN AND CROSS SECTION
WILLOUGHBY LAKE ROAD
MITIGATION SITE
BARTON, ORLEANS COUNTY, VT

Revision	Sheet	Revisions	Date	By
0	ALL	ISSUED FOR PERMIT REVIEW	08/13/20	ERT

CAD FILE:
30003337-DU-Fig 05 -Wetland Mitigation Unit Plan and Cross Sections.dwg

DESIGNED BY: NWF
DRAWN BY: KD
SURVEYED BY: JT
BIOLOGIST: JF (DU)
DATE: JUNE 2020
PROJECT NUMBER: US-VT-47-2

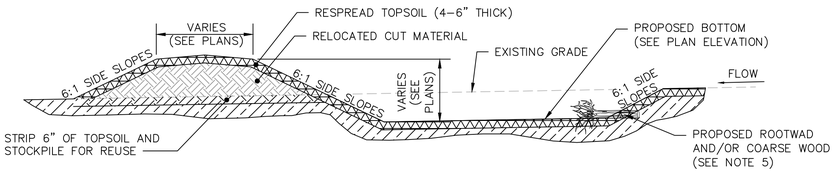
GLARO-VT1-004-5

WETLAND MITIGATION UNIT 2 PLAN (PHASE 1)

LEGEND

- EXISTING GRADE MAJOR CONTOUR (5.0' INTERVAL) — 1160
- EXISTING GRADE MINOR CONTOUR (1.0' INTERVAL)
- EXISTING DELINEATED WETLAND
- EXISTING TREE LINE
- PROPOSED FINAL GRADE CONTOUR (1.0' INTERVAL) — 1160
- +1191.25 PROPOSED SPOT ELEVATION (SEE NOTE 1)
- ⊠1191.25 PROPOSED SPILLOVER ELEVATION (SEE NOTE 1)
- ⊠1191.25 PROPOSED LOW POINT ELEVATION (SEE NOTE 1)
- FULL SERVICE LEVEL (FSL)
- SNOWMOBILE TRAIL

HABITAT STRUCTURE	WETLAND MITIGATION UNIT 2
COARSE WOOD (LOG)	6
ROOTWAD	3
TOTAL	9



TYPICAL WETLAND MITIGATION UNIT 2 GRADING DETAIL (1)

NOT TO SCALE

NOTES:

1. CONTRACTOR SHALL ACHIEVE DESIGNATED SPILLOVER AND LOW POINT ELEVATIONS TO WITHIN +/- 0.15 FT AND ALL OTHER SPOT ELEVATIONS TO WITHIN +/- 0.5 FT, EXCEPT THAT THE INDICATED FULL-SERVICE LEVEL AREAS SHALL BE ACHIEVED TO WITHIN +/- 0.01 AC OF DESIGN WITHIN +0 FT TO -0.15 FT OF THE SPECIFIED ELEVATIONS, CREATING SMOOTH TRANSITION GRADING BETWEEN LOW AND HIGH POINTS, WITH SLOPES GENERALLY NOT EXCEEDING 6H:1V. ACTUAL LANDFORM SHAPES WILL BE ALLOWED TO VARY FROM THOSE SHOWN, BUT THE SUM TOTAL FULL-SERVICE LEVEL AREA SHALL NOT VARY BY MORE THAN +/- 0.01 ACRE FROM THE DESIGN AND THE AVERAGE MAXIMUM DEPTH OF FULL-SERVICE LEVEL AREAS BY NO MORE THAN +/- 0.15 FT.
2. WORK SHALL BE PERFORMED UNDER OVERSIGHT OF ENGINEER, AND SIZE AND SHAPE COULD CHANGE TO ACCOUNT FOR CONDITIONS OBSERVED IN THE FIELD.
3. CAD FILES WILL BE PROVIDED TO THE CONTRACTOR FOR CONSTRUCTION STAKING AND LAYOUT PURPOSES.
4. ALL AREAS REQUIRING GRADING SHALL BE FINISHED TO THE GRADES SHOWN ON THE PLANS WITH TOPSOIL AS SPECIFIED, AND A MINIMUM OF 6 INCHES OF SURFACE SOIL SHALL BE IN A LOOSE CONDITION.
5. COARSE WOOD (I.E., CUT NATIVE TREES) AND ROOTWADS (I.E., REMOVED NATIVE ROOTWADS) SHALL HAVE A MINIMUM 12" DBH (DIAMETER AT BREAST HEIGHT) AND WILL BE PLACED RANDOMLY THROUGHOUT THE WETLAND MITIGATION UNIT AT THE DIRECTION OF THE ENGINEER. ROOTWADS SHALL BE INSTALLED BY BURYING TWO-THIRDS OF THE LOG; COARSE WOOD SHALL BE PLACED ON THE FINAL RESTORED GRADE.

GRAPHIC SCALE

50 0 25 50 100 100

1 inch = 50 feet

FOR PERMIT

Signed: 08/13/2020

STATE OF VERMONT MICHAEL HIGGINS NO. 018.0103039 LICENSED PROFESSIONAL ENGINEER

ARCADIS Design & Consultancy for natural and built assets

ARCADIS U.S., INC.

Professional Engineer's Name	
MICHAEL HIGGINS	
Professional Engineer's No.	State
018.0103039	VT

ARCADIS Project No. 30003337

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(734) 623-2000 www.ducks.org

WETLAND MITIGATION UNIT 2 PLAN

WILLOUGHBY LAKE ROAD MITIGATION SITE
BARTON, ORLEANS COUNTY, VT

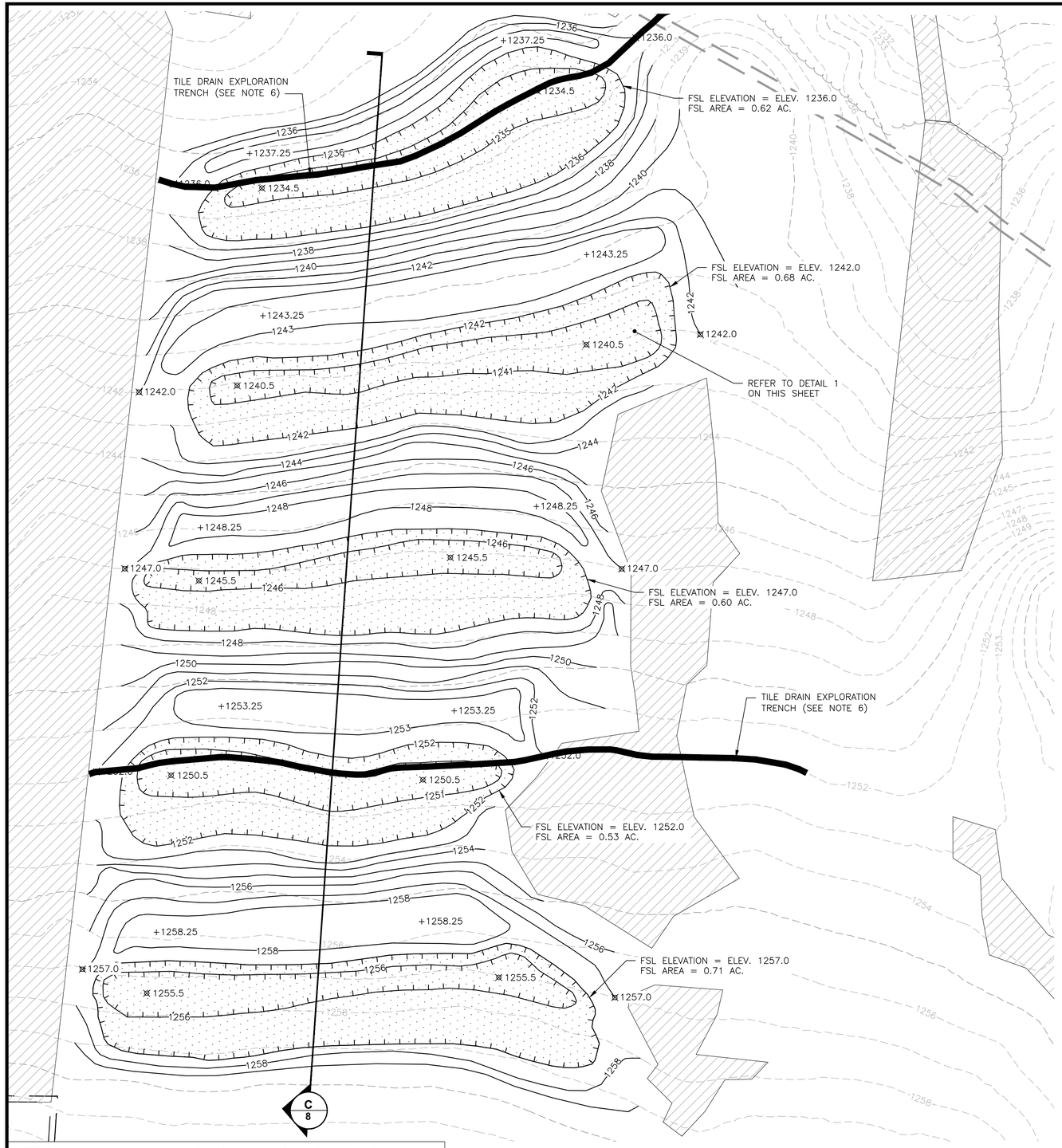
Revision	Sheet	Revisions	Date	By
0	ALL	ISSUED FOR PERMIT REVIEW	08/13/20	ERT

CAD FILE: 30003337-DU-Fig 06 - Wetland Mitigation Unit Plan and Cross Sections.dwg

DESIGNED BY: NWF
DRAWN BY: KD
SURVEYED BY: JT
BIOLOGIST: JF (DU)
DATE: JUNE 2020
PROJECT NUMBER: US-VT-47-2

GLARO-VT1-004-6

C:\Users\ETaetsch\Desktop\DU\01-DWG\30003337-DU-Fig 06 - Wetland Mitigation Unit Plan and Cross Sections.dwg LAYOUT: 6 SAVED: 8/12/2020 11:06 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 8/13/2020 9:35 AM BY: TAETSCH, ELISE

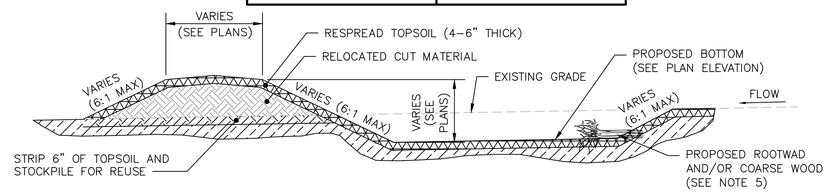


WETLAND MITIGATION UNIT 3 PLAN (PHASE 2)

LEGEND

- EXISTING GRADE MAJOR CONTOUR (5.0' INTERVAL) (1160)
- EXISTING GRADE MINOR CONTOUR (1.0' INTERVAL)
- EXISTING FENCE LINE
- PROPERTY LINE
- CONSERVATION EASEMENT BOUNDARY (COINCIDENT WITH PROPERTY LINE EXCEPT AT EXCLUSION AREAS)
- EXISTING DELINEATED WETLAND
- EXISTING TREE LINE
- PROPOSED FINAL GRADE CONTOUR (1.0' INTERVAL) (1160)
- PROPOSED SPOT ELEVATION (SEE NOTE 1) (+1258.25)
- PROPOSED SPILLOVER ELEVATION (SEE NOTE 1) (⊠1258.25)
- PROPOSED LOW POINT ELEVATION (SEE NOTE 1) (⊠1258.25)
- FULL SERVICE LEVEL (FSL)
- SNOWMOBILE TRAIL
- TILE DRAIN EXPLORATION TRENCH (SEE DETAIL 1 ON SHEET 8) (SEE NOTE 6)

HABITAT STRUCTURE	WETLAND MITIGATION UNIT 3
COARSE WOOD (LOG)	6
ROOTWAD	3
TOTAL	9



TYPICAL WETLAND MITIGATION UNIT 3 GRADING DETAIL (1)

NOT TO SCALE

NOTES:

1. CONTRACTOR SHALL ACHIEVE DESIGNATED SPILLOVER AND LOW POINT ELEVATIONS TO WITHIN +/- 0.15 FT AND ALL OTHER SPOT ELEVATIONS TO WITHIN +/- 0.5 FT, EXCEPT THAT THE INDICATED FULL-SERVICE LEVEL AREAS SHALL BE ACHIEVED TO WITHIN +/- 0.01 AC OF DESIGN WITHIN +0 FT TO -0.15 FT OF THE SPECIFIED ELEVATIONS, CREATING SMOOTH TRANSITION GRADING BETWEEN LOW AND HIGH POINTS, WITH SLOPES GENERALLY NOT EXCEEDING 6H:1V. ACTUAL LANDFORM SHAPES WILL BE ALLOWED TO VARY FROM THOSE SHOWN, BUT THE SUM TOTAL FULL-SERVICE LEVEL AREA SHALL NOT VARY BY MORE THAN +/- 0.01 ACRE FROM THE DESIGN AND THE AVERAGE MAXIMUM DEPTH OF FULL-SERVICE LEVEL AREAS BY NO MORE THAN +/- 0.15 FT.
2. WORK SHALL BE PERFORMED UNDER OVERSIGHT OF ENGINEER, AND SIZE AND SHAPE COULD CHANGE TO ACCOUNT FOR CONDITIONS OBSERVED IN THE FIELD.
3. CAD FILES WILL BE PROVIDED TO THE CONTRACTOR FOR CONSTRUCTION STAKING AND LAYOUT PURPOSES.
4. ALL AREAS REQUIRING GRADING SHALL BE FINISHED TO THE GRADES SHOWN ON THE PLANS WITH TOPSOIL AS SPECIFIED, AND A MINIMUM OF 6 INCHES OF SURFACE SOIL SHALL BE IN A LOOSE CONDITION.
5. COARSE WOOD (I.E., CUT NATIVE TREES) AND ROOTWADS (I.E., REMOVED NATIVE ROOTWADS) SHALL HAVE A MINIMUM 12" DBH (DIAMETER AT BREAST HEIGHT) AND WILL BE PLACED RANDOMLY THROUGHOUT THE WETLAND MITIGATION UNIT AT THE DIRECTION OF THE ENGINEER. ROOTWADS SHALL BE INSTALLED BY BURYING TWO-THIRDS OF THE LOG; COARSE WOOD SHALL BE PLACED ON FINAL RESTORED GRADE.
6. IF TILE IS ENCOUNTERED IN THE TILE EXPLORATION TRENCH, A MINIMUM OF 20 LINEAR FEET OF TILE SHALL BE REMOVED FROM THE POINT WHERE IT WAS ENCOUNTERED.

GRAPHIC SCALE

50 0 25 50 100 200

1 inch = 50 feet

FOR PERMIT

Signed: 08/13/2020

STATE OF VERMONT MICHAEL HIGGINS NO. 018.0103039 CIVIL LICENSED PROFESSIONAL ENGINEER

Professional Engineer's Name: MICHAEL HIGGINS
Professional Engineer's No.: 018.0103039
State: VT

ARCADIS Design & Consultancy for natural and built assets
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ARCADIS Project No.: 30003337

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WETLAND MITIGATION UNIT 3 PLAN
WILLOUGHBY LAKE ROAD MITIGATION SITE
BARTON, ORLEANS COUNTY, VT

Revision	Date	By
0	08/13/20	ERT

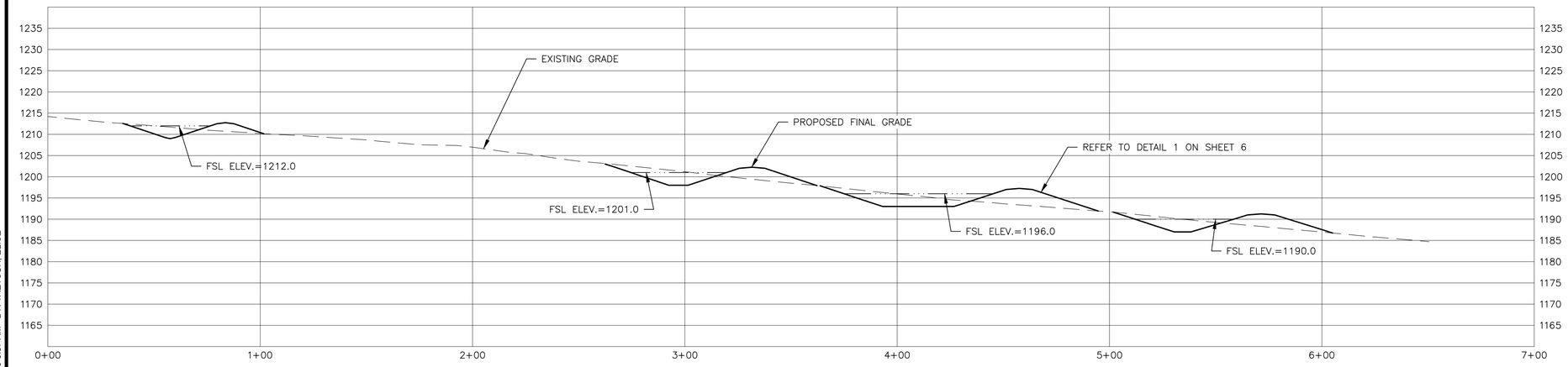
Revisions: ISSUED FOR PERMIT REVIEW
Sheet: ALL

CAD FILE: 30003337-DU-Fig 07 - Wetland Mitigation Unit Plan and Cross Sections.dwg

DESIGNED BY: NWF
DRAWN BY: KD
SURVEYED BY: JT
BIOLOGIST: JF (DU)
DATE: JUNE 2020
PROJECT NUMBER: US-VT-47-2

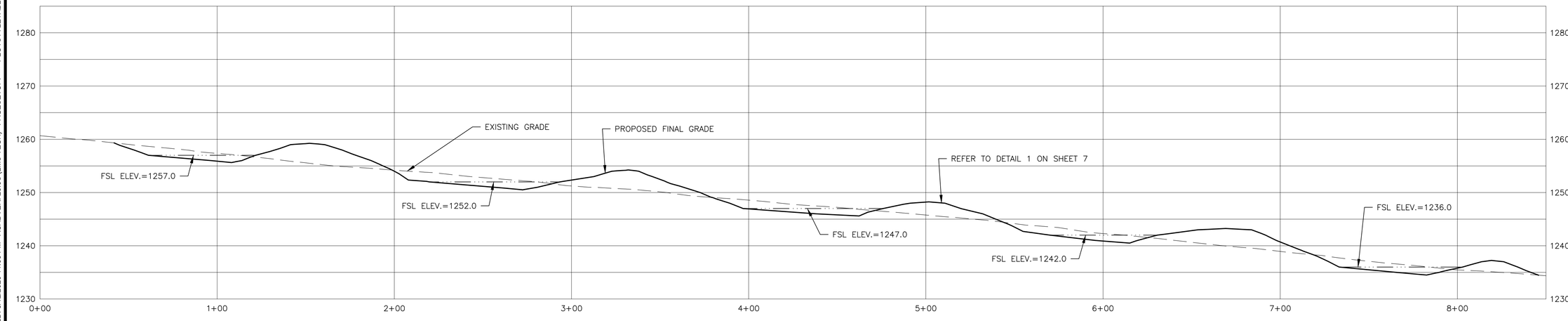
GLARO-VT1-004-7

C:\Users\ETaetsch\Desktop\DU101-DWG\30003337-DU-Fig 07 - Wetland Mitigation Unit Plan and Cross Sections.dwg LAYOUT: 7 SAVED: 8/12/2020 11:05 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 8/13/2020 9:36 AM BY: TAETSCH, ELISE



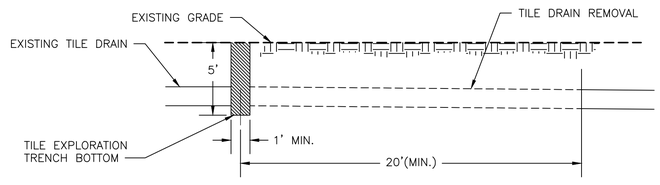
SECTION B

SCALE: 1" = 30' HORIZONTAL
2X VERTICAL EXAGGERATION



SECTION C

SCALE: 1" = 30' HORIZONTAL
3X VERTICAL EXAGGERATION



TILE DRAIN EXPLORATION DETAIL 1

NOT TO SCALE

Signed: 08/13/2020

FOR PERMIT

STATE OF VERMONT MICHAEL HIGGINS NO. 018.0103039 CIVIL LICENSED PROFESSIONAL ENGINEER

ARCADIS Design & Consultancy for natural and built assets

ARCADIS U.S., INC.

Professional Engineer's Name	
MICHAEL HIGGINS	
Professional Engineer's No.	State
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ARCADIS Project No.
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DEXTER, MICHIGAN 48130
(734) 623-2000 www.ducks.org

CROSS SECTIONS AND DETAILS

WILLOUGHBY LAKE ROAD
MITIGATION SITE
BARTON, ORLEANS COUNTY, VT

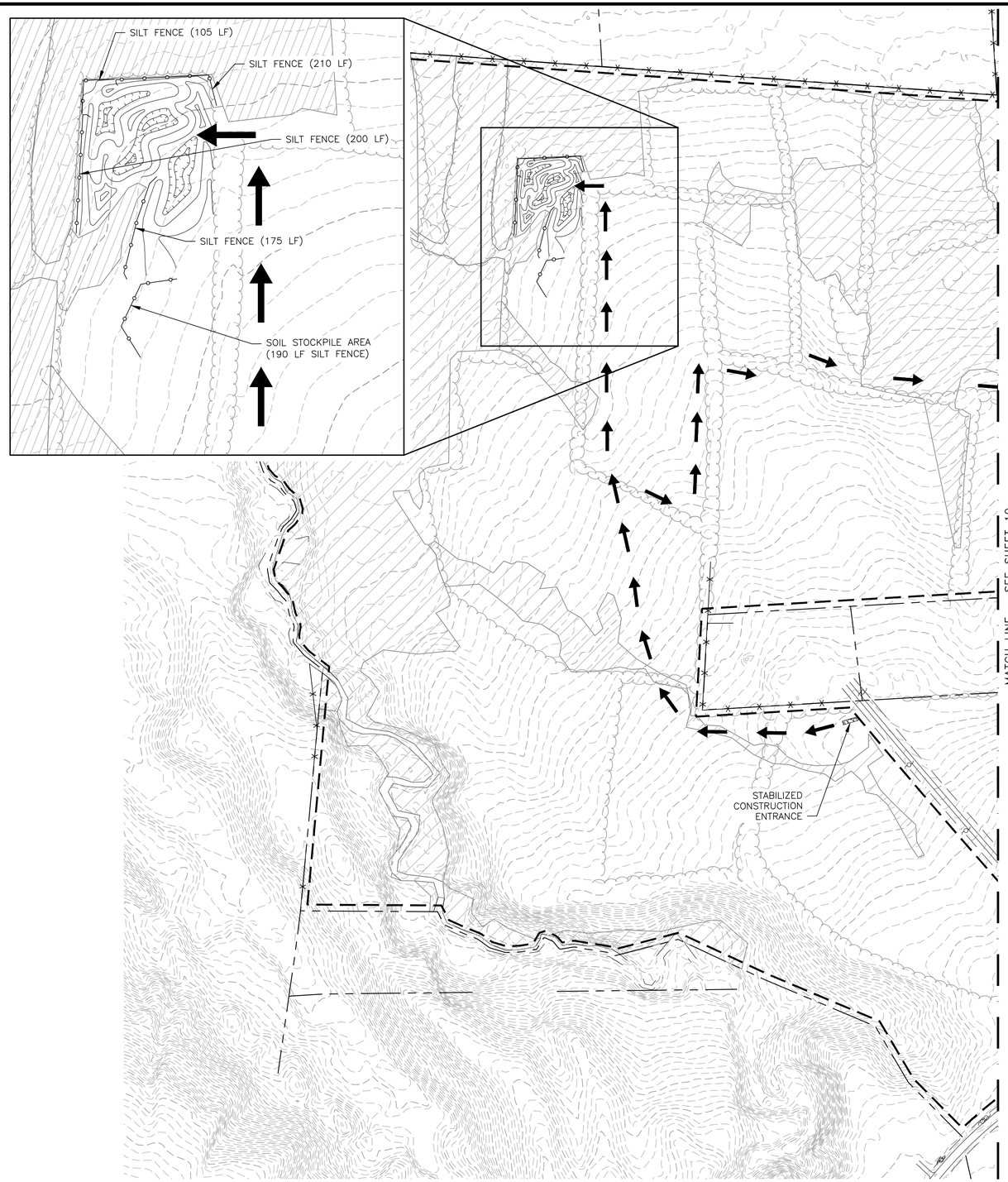
Revision	Sheet	Revisions	Date	By
0	ALL	ISSUED FOR PERMIT REVIEW	08/13/20	ERT

CAD FILE:
30003337-DU-Fig 08 - DETAILS.dwg

DESIGNED BY: NWF
DRAWN BY: KD
SURVEYED BY: JT
BIOLOGIST: JF (DU)
DATE:
JUNE 2020
PROJECT NUMBER:
US-VT-47-2

GLARO-VT1-004-8

C:\Users\ETaetsch\Desktop\DU\01-DWG\30003337-DU-Fig 08 - DETAILS.dwg LAYOUT: 8 SAVED: 8/12/2020 11:03 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 8/13/2020 9:37 AM BY: TAETSCH, ELISE



LEGEND

- EXISTING GRADE MAJOR CONTOUR (10.0' INTERVAL)
- EXISTING GRADE MINOR CONTOUR (2.0' INTERVAL)
- EXISTING STONE WALL
- EXISTING FENCE LINE
- PROPERTY LINE
- CONSERVATION EASEMENT BOUNDARY (COINCIDENT WITH PROPERTY LINE EXCEPT AT EXCLUSION AREAS)
- RIGHT OF WAY
- EDGE OF GRAVEL
- EDGE OF WATER
- EXISTING UTILITY POLE
- EXISTING BUILDING
- EXISTING DELINEATED WETLAND
- EXISTING TREE LINE
- PROPOSED FINAL GRADE CONTOUR (2.0' INTERVAL)
- STABILIZED CONSTRUCTION ENTRANCE (SEE DETAIL 2 ON SHEET 11)
- SILT FENCE (SEE DETAIL 1 ON SHEET 11)
- PROPOSED ACCESS ROUTE

EROSION AND SEDIMENT CONTROL MATERIAL QUANTITIES	
PHASE 1 SILT FENCE	TOTAL LENGTH = 1,740 LF
PHASE 2 SILT FENCE	TOTAL LENGTH = 635 LF

NOTE:

1. ANY AREAS DISTURBED BY THE CONTRACTOR THAT ARE NOT DENOTED ON THE PLANS (SUCH AS FOR STAGING OR ACCESS) SHALL BE LOOSENED TO A DEPTH OF AT LEAST 6-INCHES AND STABILIZED WITH SEED AND MULCH AT END OF USE, AT NO ADDITIONAL COST.

GRAPHIC SCALE

200 0 100 200 400 800

1 inch = 200 feet

FOR PERMIT

Signed: 08/13/2020

STATE OF VERMONT MICHAEL HIGGINS NO. 018.0103039 CIVIL LICENSED PROFESSIONAL ENGINEER

ARCADIS Design & Consultancy for natural and built assets

ARCADIS U.S., INC.

Professional Engineer's Name	
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Professional Engineer's No.	State
018.0103039	VT

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DEXTER, MICHIGAN 48130
(734) 623-2000 www.ducks.org

EROSION AND SEDIMENT CONTROL PLAN - 1

WILLOUGHBY LAKE ROAD
MITIGATION SITE
BARTON, ORLEANS COUNTY, VT

Revision	Sheet	Revisions	Date	By
0	ALL	ISSUED FOR PERMIT REVIEW	08/13/20	ERT

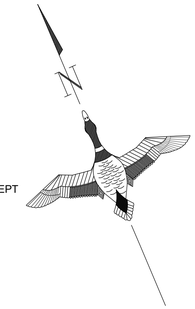
CAD FILE:
30003337-DU-Fig 09 - Erosion and Sediment Control Plan - 1.dwg

DESIGNED BY: NWF
DRAWN BY: KD
SURVEYED BY: JT
BIOLOGIST: JF (DU)
DATE: JUNE 2020
PROJECT NUMBER: US-VT-47-2

GLARO-VT1-004-9

LEGEND

- EXISTING GRADE MAJOR CONTOUR (10.0' INTERVAL)
- EXISTING GRADE MINOR CONTOUR (2.0' INTERVAL)
- EXISTING STONE WALL
- EXISTING FENCE LINE
- PROPERTY LINE
- CONSERVATION EASEMENT BOUNDARY (COINCIDENT WITH PROPERTY LINE EXCEPT AT EXCLUSION AREAS)
- RIGHT OF WAY
- EDGE OF GRAVEL
- EXISTING UTILITY POLE
- EXISTING BUILDING
- EXISTING DELINEATED WETLAND
- EXISTING TREE LINE
- PROPOSED FINAL GRADE CONTOUR (2.0' INTERVAL)
- STABILIZED CONSTRUCTION ENTRANCE (SEE DETAIL 2 ON SHEET 11)
- SILT FENCE (SEE DETAIL 1 ON SHEET 11)
- PROPOSED ACCESS ROUTE



EROSION AND SEDIMENT CONTROL MATERIAL QUANTITIES	
PHASE 1 SILT FENCE	TOTAL LENGTH = 1,740 LF
PHASE 2 SILT FENCE	TOTAL LENGTH = 635 LF

NOTE:

1. ANY AREAS DISTURBED BY THE CONTRACTOR THAT ARE NOT DENOTED ON THE PLANS (SUCH AS FOR STAGING OR ACCESS) SHALL BE LOOSENED TO A DEPTH OF AT LEAST 6-INCHES AND STABILIZED WITH SEED AND MULCH AT END OF USE, AT NO ADDITIONAL COST.

GRAPHIC SCALE

200 0 100 200 400 800

1 inch = 200 feet

Signed: 08/13/2020

FOR PERMIT

STATE OF VERMONT MICHAEL HIGGINS NO. 018.0103039 CIVIL LICENSED PROFESSIONAL ENGINEER

ARCADIS Design & Consultancy for natural and built assets

ARCADIS U.S., INC.

Professional Engineer's Name	
MICHAEL HIGGINS	
Professional Engineer's No.	State
018.0103039	VT

ARCADIS Project No.
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EROSION AND SEDIMENT CONTROL PLAN - 2

WILLOUGHBY LAKE ROAD
MITIGATION SITE
BARTON, ORLEANS COUNTY, VT

Revision	Sheet	Revisions	Date	By
0	ALL	ISSUED FOR PERMIT REVIEW	08/13/20	ERT

CAD FILE:
30003337-DU-Fig 10 - Erosion and Sediment Control Plan - 2.dwg

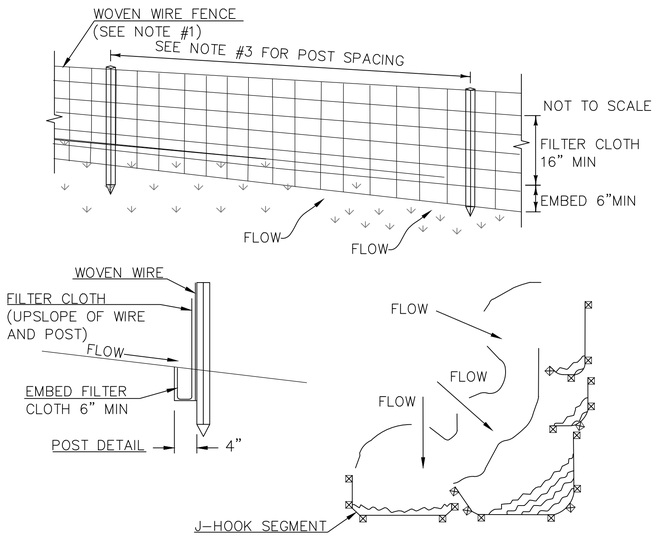
DESIGNED BY: NWF
DRAWN BY: KD
SURVEYED BY: JT
BIOLOGIST: JF (DU)

DATE:
JUNE 2020

PROJECT NUMBER:
US-VT-47-2

GLARO-VT1-004-10

C:\Users\ETaetsch\Desktop\DU\01-DWG\30003337-DU-Fig 10 - Erosion and Sediment Control Plan - 2.dwg LAYOUT: 10 SAVED: 8/12/2020 10:55 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 8/13/2020 9:43 AM BY: TAETSCH, ELISE



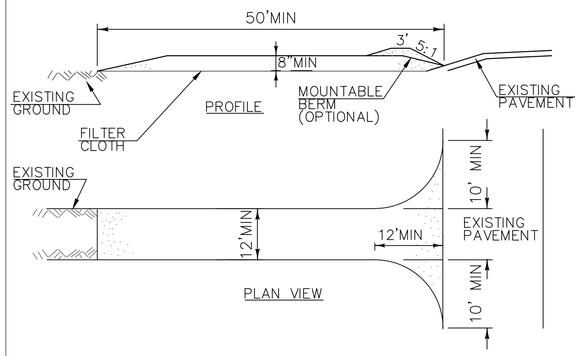
CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE REINFORCED FENCE IS REQUIRED WITHIN 100' UPSLOPE OF RECEIVING WATERS WHEN THE PROJECT FALLS UNDER A CONSTRUCTION STORMWATER PERMIT. WOVEN WIRE SHALL BE A MIN. 14 GAUGE WITH A 6" MAX. MESH OPENING.
2. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAF1100X, STABILINKA T140N OR APPROVED EQUIVALENT.
3. POST SPACING FOR WIRE-BACKED FENCE SHALL BE 10' MAXIMUM. FOR FILTER-CLOTH FENCE, WHEN ELONGATION IS >50%, POST SPACING SHALL NOT EXCEED 4' AND WHEN ELONGATION IS <50%, POST SPACING SHALL NOT EXCEED 6'.
4. WOVEN WIRE FENCE IS TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES. FILTER CLOTH IS TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
5. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY 6" AND FOLDED.
6. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN SEDIMENT REACHES HALF OF FABRIC HEIGHT.
7. J-HOOK SILT FENCE SEGMENTS SHALL BE USED WHEN SILT FENCE CANNOT BE INSTALLED ALONG THE CONTOUR. J-HOOKS SHALL ANGLE UP-SLOPE AT LEAST 20 FEET AND SHALL BE INSTALLED AT NO GREATER THAN APPROXIMATELY 100-FOOT SPACING. J-HOOKS SHALL BE A MINIMUM OF 10' LONG.

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC ORIGINALLY DEVELOPED BY USDA-NRCS VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION	SILT FENCE

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

SILT FENCE (1)
NOT TO SCALE



CONSTRUCTION SPECIFICATIONS

1. STONE SIZE- USE 1-4" STONE, RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH- NOT LESS THAN 50' (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30' MINIMUM LENGTH APPLIES).
3. THICKNESS- NOT LESS THAN 8".
4. WIDTH- 12' MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. 24' IF SINGLE ENTRANCE TO SITE.
5. GEOTEXTILE MUST BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.
6. SURFACE WATER- ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE- THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED ACCORDING TO PERMIT REQUIREMENTS.

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC ORIGINALLY DEVELOPED BY USDA-NRCS VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION	STABILIZED CONSTRUCTION ENTRANCE

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

STABILIZED CONSTRUCTION ENTRANCE (2)
NOT TO SCALE

SEDIMENT EROSION AND CONTROL NOTES:

1. REFER TO SHEET 2 FOR SEQUENCE OF CONSTRUCTION. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL COMPLY WITH VERMONT REGULATIONS AND THE VERMONT STANDARDS AND SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL. PLACEMENT AND INSTALLATION TECHNIQUES TO BE APPROVED BY THE DUCKS UNLIMITED ENGINEER PRIOR TO INSTALLATION.

DUCKS UNLIMITED
GREAT LAKES/ATLANTIC REGIONAL OFFICE
7322 NEWMAN BOULEVARD,BLDG. 1
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EROSION AND SEDIMENT CONTROL DETAILS AND NOTES

WILLOUGHBY LAKE ROAD MITIGATION SITE
BARTON, ORLEANS COUNTY, VT

Revision	Sheet	Revisions	Date	By
0	ALL	ISSUED FOR PERMIT REVIEW	08/13/20	ERT

CAD FILE:
30003337-DU-Fig 11 - Erosion and Sediment Control Details and Notes.dwg

DESIGNED BY: NWF
DRAWN BY: KD
SURVEYED BY: JT
BIOLOGIST: JF (DU)
DATE: JUNE 2020
PROJECT NUMBER: US-VT-47-2
GLARO-VT1-004-11

FOR PERMIT
Signed: 08/13/2020

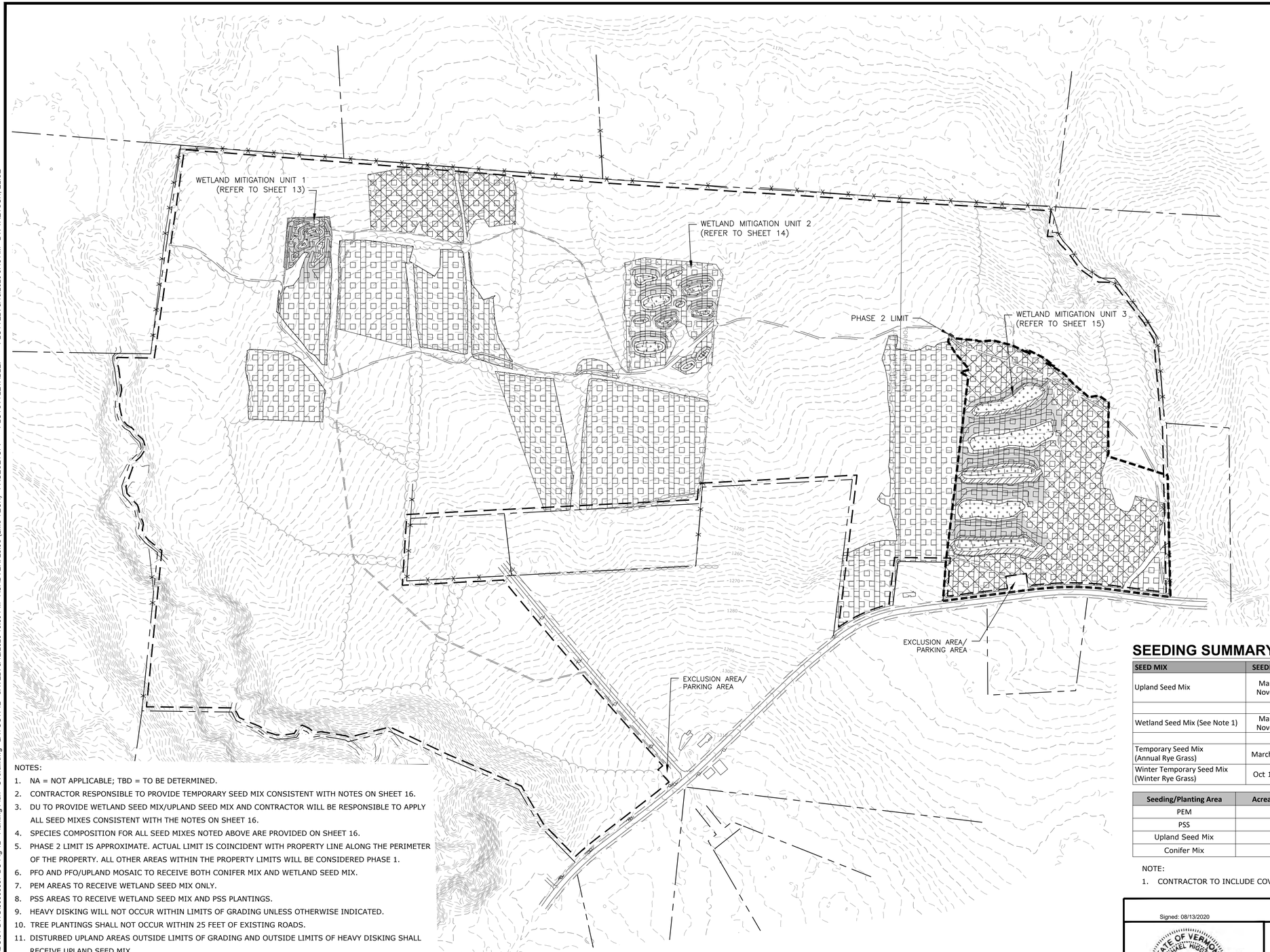
STATE OF VERMONT MICHAEL HIGGINS NO. 018.0103039 CIVIL LICENSED PROFESSIONAL ENGINEER

Professional Engineer's Name: MICHAEL HIGGINS
Professional Engineer's No.: 018.0103039
State: VT

ARCADIS Design & Consultancy for natural and built assets
ARCADIS U.S., INC.

ARCADIS Project No.: 30003337

ARCADIS
One Lincoln Center
110 West Fayette Street, Suite 300
Syracuse NY 13202
Tel: 315.446.9120



NOTES:

1. NA = NOT APPLICABLE; TBD = TO BE DETERMINED.
2. CONTRACTOR RESPONSIBLE TO PROVIDE TEMPORARY SEED MIX CONSISTENT WITH NOTES ON SHEET 16.
3. DU TO PROVIDE WETLAND SEED MIX/UPLAND SEED MIX AND CONTRACTOR WILL BE RESPONSIBLE TO APPLY ALL SEED MIXES CONSISTENT WITH THE NOTES ON SHEET 16.
4. SPECIES COMPOSITION FOR ALL SEED MIXES NOTED ABOVE ARE PROVIDED ON SHEET 16.
5. PHASE 2 LIMIT IS APPROXIMATE. ACTUAL LIMIT IS COINCIDENT WITH PROPERTY LINE ALONG THE PERIMETER OF THE PROPERTY. ALL OTHER AREAS WITHIN THE PROPERTY LIMITS WILL BE CONSIDERED PHASE 1.
6. PFO AND PFO/UPLAND MOSAIC TO RECEIVE BOTH CONIFER MIX AND WETLAND SEED MIX.
7. PEM AREAS TO RECEIVE WETLAND SEED MIX ONLY.
8. PSS AREAS TO RECEIVE WETLAND SEED MIX AND PSS PLANTINGS.
9. HEAVY DISKING WILL NOT OCCUR WITHIN LIMITS OF GRADING UNLESS OTHERWISE INDICATED.
10. TREE PLANTINGS SHALL NOT OCCUR WITHIN 25 FEET OF EXISTING ROADS.
11. DISTURBED UPLAND AREAS OUTSIDE LIMITS OF GRADING AND OUTSIDE LIMITS OF HEAVY DISKING SHALL RECEIVE UPLAND SEED MIX.
12. WETLANDS WITHIN THE VICINITY OF WORK SHALL BE FLAGGED AND PROTECTED PRIOR TO CONSTRUCTION.

GRAPHIC SCALE

250 0 125 250 500 1000

1 inch = 250 feet

LEGEND

- EXISTING GRADE MAJOR CONTOUR (10.0' INTERVAL)
- EXISTING GRADE MINOR CONTOUR (2.0' INTERVAL)
- EXISTING STONE WALL
- EXISTING FENCE LINE
- PROPERTY LINE
- CONSERVATION EASEMENT BOUNDARY (COINCIDENT WITH PROPERTY LINE EXCEPT AT EXCLUSION AREAS)
- PHASE 2 LIMIT (SEE NOTE 5)
- RIGHT OF WAY
- EDGE OF GRAVEL
- EDGE OF WATER
- EXISTING UTILITY POLE
- EXISTING BUILDING
- EXISTING TREE LINE
- PROPOSED FINAL GRADE CONTOUR (2.0' INTERVAL)
- PEM
- PSS
- UPLAND SEED MIX
- CONIFER MIX
- HEAVY DISKING
- SNOWMOBILE TRAIL
- MONITORING ACCESS PATH

SEEDING SUMMARY

SEED MIX	SEEDING DATE	SEEDING RATE	FERTILIZER	LIME	MULCH
Upland Seed Mix	March 1 to November 1	36 lbs / acre	TBD	TBD	straw (2 tons / acre)
Wetland Seed Mix (See Note 1)	March 1 to November 1	3 lbs / acre	NA	NA	NA
Temporary Seed Mix (Annual Rye Grass)	March 1 - Oct 1	30 lbs / acre	NA	NA	straw (2 tons / acre)
Winter Temporary Seed Mix (Winter Rye Grass)	Oct 1 - Nov 1	100 lbs / acre	NA	NA	straw (2 tons / acre)

Seeding/Planting Area	Acreage (Phase 1)	Acreage (Phase 2)
PEM	1.32	2.47
PSS	0	1.08
Upland Seed Mix	2.02	3.84
Conifer Mix	42.25	17.29

NOTE:

1. CONTRACTOR TO INCLUDE COVER CROP OR INERT FILLER PER NOTE 1 ON SHEET 16.

FOR PERMIT

Signed: 08/13/2020

STATE OF VERMONT MICHAEL HIGGINS NO. 018.0103039 CIVIL LICENSED PROFESSIONAL ENGINEER

Professional Engineer's Name: MICHAEL HIGGINS
Professional Engineer's No.: 018.0103039
State: VT

ARCADIS Design & Consultancy for natural and built assets
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ARCADIS Project No.: 30003337

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DUCKS UNLIMITED
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PLANTING PLAN - OVERALL

WILLOUGHBY LAKE ROAD
MITIGATION SITE
BARTON, ORLEANS COUNTY, VT

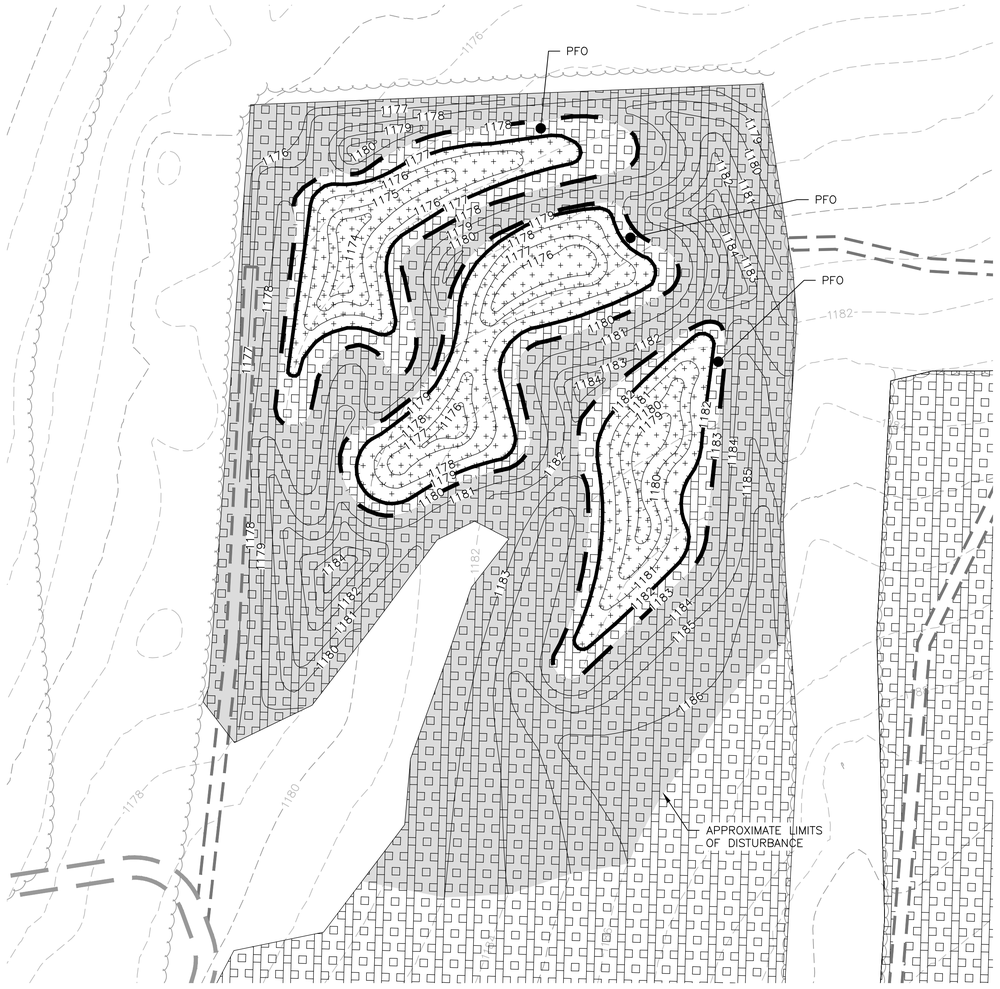
Revision	Sheet	Revisions	Date	By
0	ALL	ISSUED FOR PERMIT REVIEW	08/13/20	ERT

CAD FILE: 30003337-DU-Fig 12 - Planting Plan - Overall.dwg

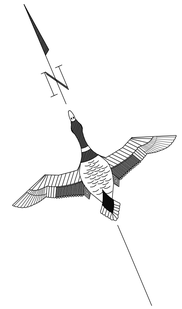
DESIGNED BY: NWF
DRAWN BY: KD
SURVEYED BY: JT
BIOLOGIST: JF (DU)
DATE: JUNE 2020
PROJECT NUMBER: US-VT-47-2

GLARO-VT1-004-12

C:\Users\ETaetsch\Desktop\DU\01-DWG\30003337-DU-Fig 12 - Planting Plan - Overall.dwg LAYOUT: 12 SAVED: 8/12/2020 10:50 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 8/13/2020 9:48 AM BY: TAETSCH, ELISE



WETLAND MITIGATION UNIT 1 (PHASE 1)



LEGEND

- EXISTING GRADE MAJOR CONTOUR (5.0' INTERVAL)
- EXISTING GRADE MINOR CONTOUR (1.0' INTERVAL)
- EXISTING TREE LINE
- PROPOSED FINAL GRADE CONTOUR (1.0' INTERVAL)
- PEM (SEE NOTE 2)
- UPLAND SEED MIX
- CONIFER MIX
- LIMITS OF WETLAND SEED MIX (SEE NOTES 1 & 2)
- SNOWMOBILE TRAIL
- MONITORING ACCESS PATH

NOTES:

1. PFO AREAS TO RECEIVE BOTH CONIFER MIX AND WETLAND SEED MIX.
2. PEM AREAS TO RECEIVE WETLAND SEED MIX ONLY.

GRAPHIC SCALE

30 0 15 30 60 120

1 inch = 30 feet

Signed: 08/13/2020

FOR PERMIT

STATE OF VERMONT MICHAEL HIGGINS NO. 018.0103039 CIVIL LICENSED PROFESSIONAL ENGINEER

ARCADIS Design & Consultancy for natural and built assets

ARCADIS U.S., INC.

Professional Engineer's Name	
MICHAEL HIGGINS	
Professional Engineer's No.	State
018.0103039	VT

ARCADIS Project No. 30003337

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PLANTING PLAN - UNIT 1

WILLOUGHBY LAKE ROAD
MITIGATION SITE
BARTON, ORLEANS COUNTY, VT

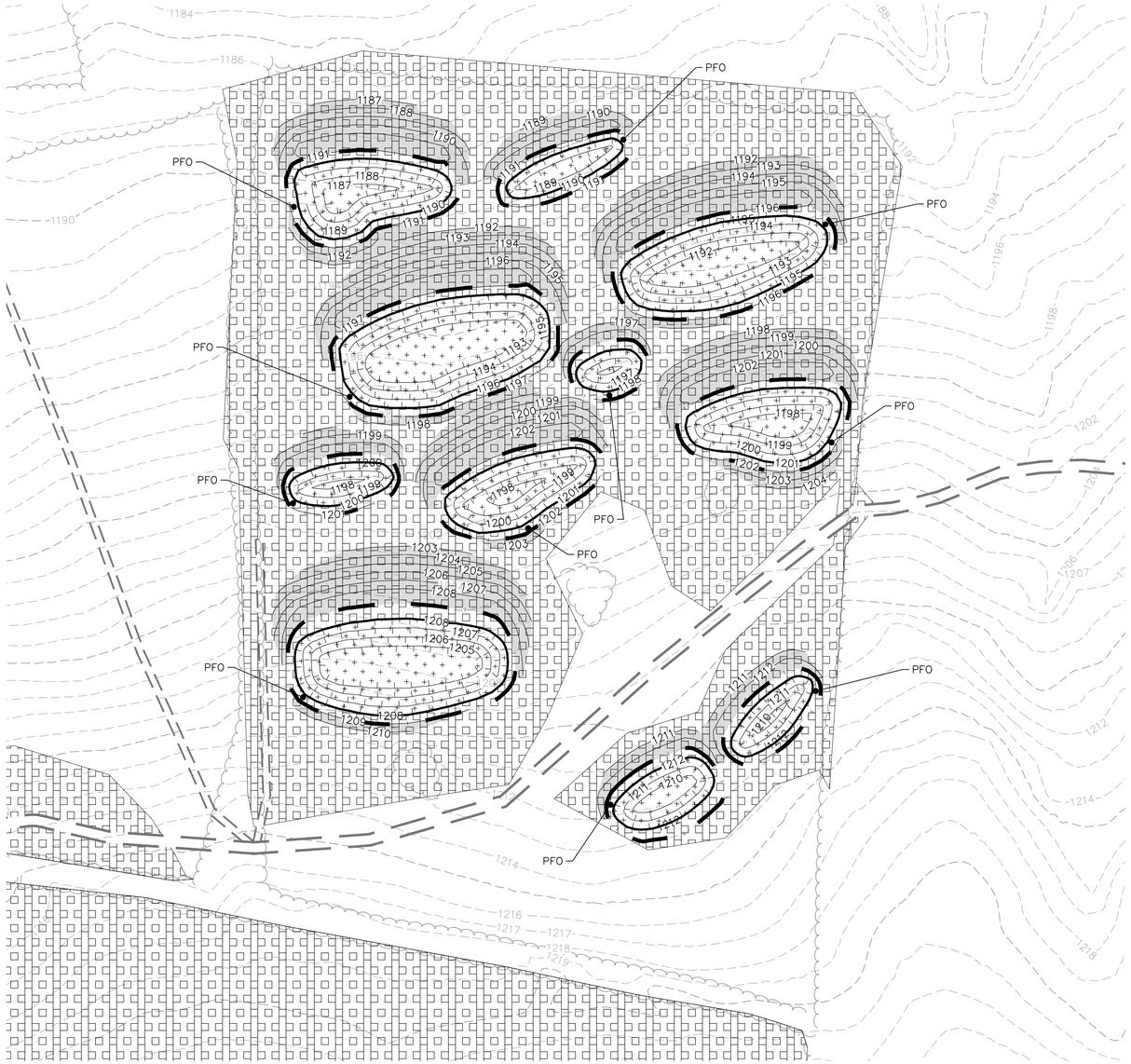
Revision	Sheet	Revisions	Date	By
0	ALL	ISSUED FOR PERMIT REVIEW	08/13/20	ERT

CAD FILE: 30003337-DU-Fig 13 - Planting Plan - Unit 1.dwg

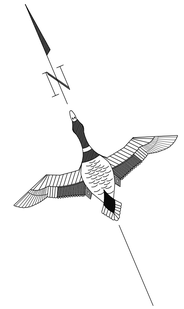
DESIGNED BY: NWF
DRAWN BY: KD
SURVEYED BY: JT
BIOLOGIST: JF (DU)
DATE: JUNE 2020
PROJECT NUMBER: US-VT-47-2

GLARO-VT1-004-13

C:\Users\ETaetsch\Desktop\DU\01-DWG\30003337-DU-Fig 13 - Planting Plan - Unit 1.dwg LAYOUT: 13 SAVED: 8/12/2020 10:45 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 8/13/2020 9:50 AM BY: TAETSCH, ELISE



WETLAND MITIGATION UNIT 2 (PHASE 1)



LEGEND

- EXISTING GRADE MAJOR CONTOUR (5.0' INTERVAL) (1160)
- EXISTING GRADE MINOR CONTOUR (1.0' INTERVAL)
- EXISTING TREE LINE
- PROPOSED FINAL GRADE CONTOUR (1.0' INTERVAL) (1160)
- PEM (SEE NOTE 2)
- UPLAND SEED MIX
- CONIFER MIX
- LIMITS OF WETLAND SEED MIX (SEE NOTES 1 & 2)
- SNOWMOBILE TRAIL
- MONITORING ACCESS PATH

NOTES:

1. PFO AREAS TO RECEIVE BOTH CONIFER MIX AND WETLAND SEED MIX.
2. PEM AREAS TO RECEIVE WETLAND SEED MIX ONLY.

GRAPHIC SCALE

50 0 25 50 100 200

1 inch = 50 feet

FOR PERMIT

Signed: 08/13/2020

STATE OF VERMONT MICHAEL HIGGINS NO. 018.0103039 CIVIL LICENSED PROFESSIONAL ENGINEER

Professional Engineer's Name: MICHAEL HIGGINS
Professional Engineer's No.: 018.0103039
State: VT

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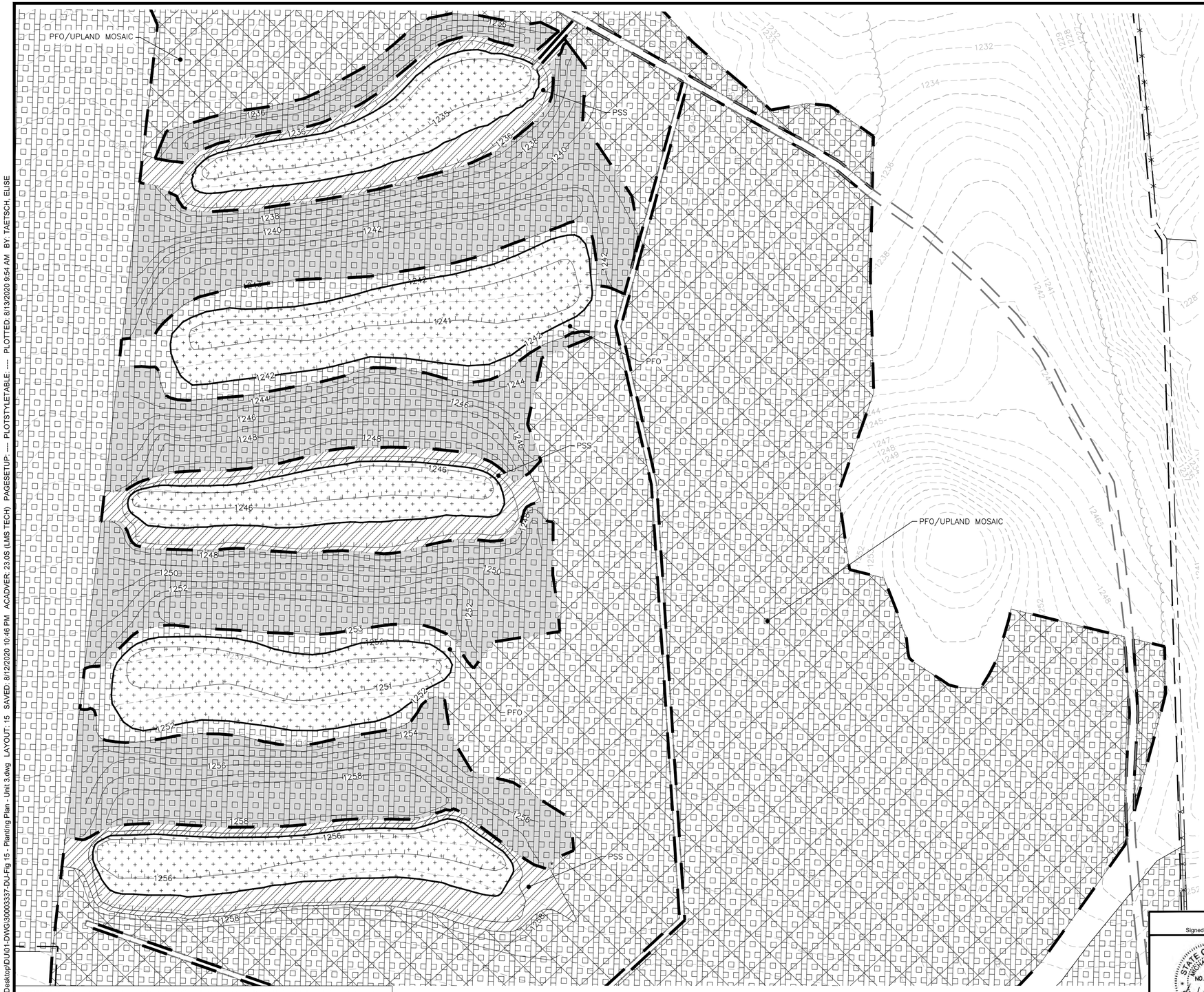
PLANTING PLAN - UNIT 2

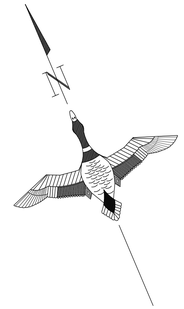
WILLOUGHBY LAKE ROAD
MITIGATION SITE
BARTON, ORLEANS COUNTY, VT

Revision	Sheet	Revisions	Date	By
0	ALL	ISSUED FOR PERMIT REVIEW	08/13/20	ERT

CAD FILE: 30003337-DU-Fig 14 - Planting Plan - Unit 2.dwg

DESIGNED BY: NWF
DRAWN BY: KD
SURVEYED BY: JT
BIOLOGIST: JF (DU)
DATE: JUNE 2020
PROJECT NUMBER: US-VT-47-2
GLARO-VT1-004-14





LEGEND

- EXISTING GRADE MAJOR CONTOUR (5.0' INTERVAL)
- EXISTING GRADE MINOR CONTOUR (1.0' INTERVAL)
- EXISTING FENCE LINE
- PROPERTY LINE
- CONSERVATION EASEMENT BOUNDARY (COINCIDENT WITH PROPERTY LINE EXCEPT AT EXCLUSION AREAS)
- EXISTING TREE LINE
- PROPOSED GRADE FINAL CONTOUR (1.0' INTERVAL)
- PEM (SEE NOTE 2)
- PSS (SEE NOTE 3)
- UPLAND SEED MIX
- CONIFER MIX
- LIMITS OF WETLAND SEED MIX (SEE NOTES 1, 2 & 3)
- HEAVY DISKING (SEE NOTE 4)
- SNOWMOBILE TRAIL
- MONITORING ACCESS PATH

NOTES:

1. PFO AND PFO/UPLAND MOSAIC TO RECEIVE BOTH CONIFER MIX AND WETLAND SEED MIX.
2. PEM AREAS TO RECEIVE WETLAND SEED MIX ONLY.
3. PSS AREAS TO RECEIVE WETLAND SEED MIX AND PSS PLANTINGS.
4. HEAVY DISKING WILL NOT OCCUR WITHIN LIMITS OF GRADING UNLESS OTHERWISE INDICATED.

GRAPHIC SCALE

50 0 25 50 100 200

1 inch = 50 feet

WETLAND MITIGATION UNIT 3 (PHASE 2)

Signed: 08/13/2020

FOR PERMIT

STATE OF VERMONT MICHAEL HIGGINS NO. 018.0103039 CIVIL LICENSED PROFESSIONAL ENGINEER

ARCADIS Design & Consultancy for natural and built assets

ARCADIS U.S., INC.

Professional Engineer's Name	
MICHAEL HIGGINS	
Professional Engineer's No.	State
018.0103039	VT

ARCADIS Project No.
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DUCKS UNLIMITED

PLANTING PLAN - UNIT 3

WILLOUGHBY LAKE ROAD
MITIGATION SITE
BARTON, ORLEANS COUNTY, VT

Revision	Sheet	Revisions	Date	By
0	ALL	ISSUED FOR PERMIT REVIEW	08/13/20	ERT

CAD FILE:
30003337-DU-Fig 15 - Planting Plan - Unit 3.dwg

DESIGNED BY: NWF
DRAWN BY: KD
SURVEYED BY: JT
BIOLOGIST: JF (DU)
DATE:
JUNE 2020
PROJECT NUMBER:
US-VT-47-2

GLARO-VT1-004-15

C:\Users\ETaetsch\Desktop\DU\01-DWG\30003337-DU-Fig 15 - Planting Plan - Unit 3.dwg LAYOUT: 15 SAVED: 8/12/2020 10:46 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 8/13/2020 9:54 AM BY: TAETSCH, ELISE

NOTES: WETLAND SEEDING (PEM, PSS, & PFO)

1. DUCKS UNLIMITED WILL PROVIDE THE WETLAND SEED MIX (MATERIAL SEED) FOR THE THE PEM, PSS, AND PFO AREAS TO BE SEEDED. THE APPLICATION RATE IS 3 LB/AC. IN DISTURBED AREAS (AREAS REQUIRING GRADING), THE SEED MIX PROVIDED BY DU SHALL BE MIXED WITH ANNUAL RYE GRASS SEED AT A RATE OF 30 LB/AC. IN UNDISTURBED AREAS, THE SEED MIX MAY BE MIXED WITH SAWDUST OR OTHER INERT FILLER APPROVED BY THE ENGINEER FOR EASE OF APPLICATION. DU WILL NOT PROVIDE THE RYE GRASS SEED OR INERT FILLER.

2. UNDISTURBED CONIFER MIX AREAS, WHERE SHOWN ON SHEET 12, SHALL BE PREPARED BY HEAVY DISKING. A MINIMUM OF 6 INCHES OF SURFACE SOIL SHALL BE IN A LOOSE CONDITION. A MINIMUM OF TWO PASSES (PERPENDICULAR TO EACH OTHER) WITH A CHISEL PLOW, HEAVY OFFSET DISK, OR OTHER APPROVED TILLAGE EQUIPMENT IS REQUIRED; ADDITIONAL PASSES MAY BE NECESSARY TO ACHIEVE THE DESIRED SURFACE ROUGHNESS. ANY EQUIPMENT MOVEMENT OVER SEEDED AREAS SHOULD BE MINIMIZED TO THE EXTENT PRACTICABLE. MULCH WILL NOT BE REQUIRED FOR AREAS RECEIVING ONLY DISKING UNLESS ORDERED BY THE ENGINEER. REFER TO CONSTRUCTION NOTES ON SHEET 2.

3. UNDER ITEM 402 FOR PEM, PSS, PFO AND PFO MOSAIC AREAS, THE CONTRACTOR IS RESPONSIBLE FOR PREPARING THE SOIL SURFACE, PROVIDING THE ANNUAL RYE GRASS SEED, BROADCASTING ALL SEED MATERIAL, AND STABILIZING DISTURBED SURFACES WITH MULCH (MULCH 2 TONS PER ACRE). REFER TO DU SPECIFICATION 402 FOR ADDITIONAL REQUIREMENTS. MULCH WILL NOT BE REQUIRED FOR AREAS RECEIVING ONLY HEAVY DISKING UNLESS ORDERED BY THE ENGINEER. WETLAND SEED MIX MUST BE BROADCAST; A NO-TILL DRILL WILL NOT BE ALLOWED FOR APPLICATION OF WETLAND SEED MIX.

4. ALSO REFER TO SEEDING SUMMARY ON SHEET 12 AND CONSTRUCTION NOTES ON SHEET 2 FOR ADDITIONAL SEEDING INFORMATION.

5. ALL AREAS REQUIRING GRADING SHALL BE FINISHED TO THE GRADES SHOWN ON THE PLANS WITH TOPSOIL AS SPECIFIED, AND A MINIMUM OF 6 INCHES OF SURFACE SOIL SHALL BE IN A LOOSE CONDITION.

SEED MIXES/TREE PLANTINGS

Target Area	Common Name	Scientific Name	Wetland Indicator Status	Number or % by Weight	Propagule Type	Quantity/Acre
All Disturbed Wetland Areas	mud plantain	*Alisma subcordatum*	OBL	8%	wetland seed mix % by weight	3 lbs seed mixture/acre
	swamp milkweed	*Asclepias incarnata*	OBL	5%		
	sensitive fern	*Ononcle sensibilis*	FACW	3%		
	bristly sedge	*Carex comosa*	OBL	5%		
	nodding sedge	*Carex crinita*	OBL	5%		
	hop sedge	*Carex lupulina*	OBL	5%		
	tussock sedge	*Carex stricta*	OBL	5%		
	fox sedge	*Carex vulpinoidea*	OBL	5%		
	steeplebush	*Spirea tomentosa*	FACW	10%		
	Canada wildrye	*Elymus canadensis*	FACU	12%		
	riverbank wildrye	*Elymus riparius*	FACW	5%		
	soft rush	*Juncus effusus*	OBL	2%		
	Blue flag iris	*Iris versicolor*	OBL	5%		
	Pennsylvania smartweed	*Polygonum pensylvanicum*	FACW	5%		
	joe pye weed	*Eupatorium maculatum*	OBL	5%		
	rice cutgrass	*Leersia oryzoides*	OBL	10%		
	blue vervain	*Verbena hastata*	FACW	5%		
PSS	speckled alder	*Alnus incana*	FACW	50	> 18" bare root/potted	sum to ≥300 stems/acre
	steeplebush	*Spirea tomentosa*	FACW	50		
	red osier dogwood	*Cornus sericea*	FACW	50		
	silky dogwood	*Cornus amomum*	FACW	50		
	winterberry	*Ilex verticillata*	FACW	50		
	nannyberry	*Viburnum lentago*	FAC	50		
Conifer Mix (PFO, PFO Mosaic, Upland Buffer)	gray birch	*Betula populifolia*	FAC	25	> 18" bare root/potted	sum to ≥300 stems/acre
	balsam fir	*Abies balsamea*	FAC	60		
	red maple	*Acer rubrum*	FAC	60		
	white spruce	*Picea glauca*	FACU	50		
	eastern white pine	*Pinus strobus*	FACU	25		
	northern white cedar	*Thuja occidentalis*	FACW	50		
	eastern hemlock	*Tsuga canadensis*	FACU	30		
All Disturbed Upland Areas	upland bentgrass	*Agrostis perennans*	FACU	30%	upland seed mix % by weight	36 lbs seed mixture/acre
	big bluestem	*Andropogon gerardii*	FACU	20%		
	Canada wildrye	*Elymus canadensis*	FACU	10%		
	annual ryegrass	*Lolium multiflorum*	FACU	30%		
	switchgrass	*Panicum virgatum*	FAC	10%		

NOTES:

1. ALL WOODY PLANTINGS WILL BE AT LEAST 18 INCHES IN HEIGHT. SEEDLINGS WILL BE A MIXTURE OF BARE ROOT PLANTS (75%) AND POTTED (25%).
2. PLANTING OF WETLAND AND UPLAND TREES AND SHRUBS WILL BE INCLUDED IN A SEPARATE CONTRACT. TREE PLANTINGS SHALL NOT BE PLACED WITHIN THE LIMITS OF THE SNOWMOBILE TRAIL AND MONITORING PATH.
3. WETLAND SEED MIXES PROVIDED SHALL BE MIXED WITH ANNUAL RYE SEED AT A RATE OF 30 LB/AC.

FOR PERMIT

Signed: 08/13/2020

STATE OF VERMONT MICHAEL HIGGINS NO. 018.0103039 CIVIL LICENSED PROFESSIONAL ENGINEER

Professional Engineer's Name: MICHAEL HIGGINS
Professional Engineer's No.: 018.0103039
State: VT

ARCADIS U.S., INC.
Design & Consultancy for natural and built assets

ARCADIS Project No.: 30003337

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DUCKS UNLIMITED

PLANTING DETAILS AND NOTES

WILLOUGHBY LAKE ROAD
MITIGATION SITE
BARTON, ORLEANS COUNTY, VT

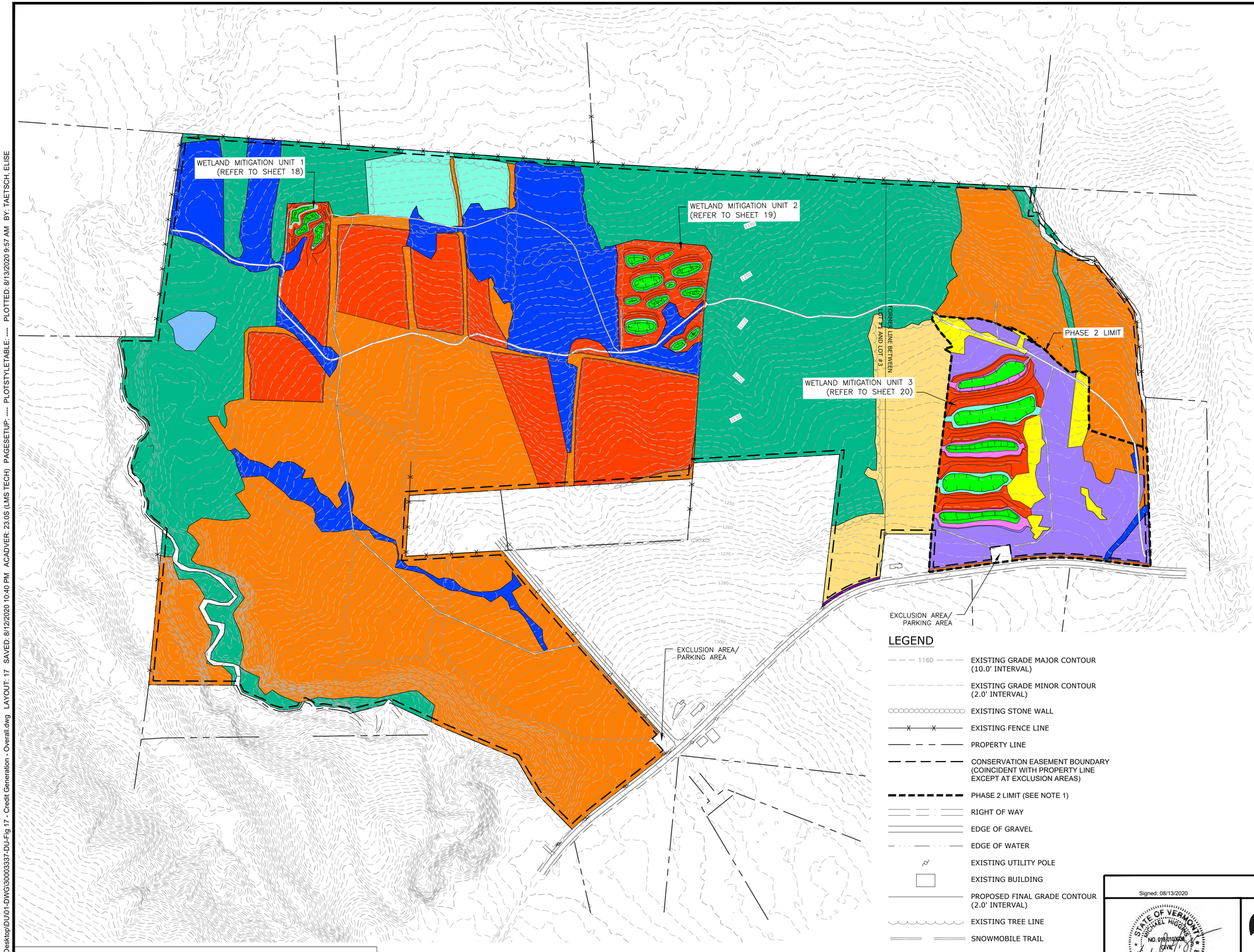
Revision	Sheet	Revisions	Date	By
0	ALL	ISSUED FOR PERMIT REVIEW	08/13/20	ERT

CAD FILE: 30003337-DU-Fig 16 - Planting Details and Notes.dwg

DESIGNED BY: NWF
DRAWN BY: KD
SURVEYED BY: JT
BIOLOGIST: JF (DU)
DATE: JUNE 2020
PROJECT NUMBER: US-VT-47-2

GLARO-VT1-004-16

C:\Users\ETaetsch\Desktop\DU\01-DWG\30003337-DU-Fig 16 - Planting Details and Notes.dwg LAYOUT: 16 SAVED: 8/13/2020 10:26 AM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 8/13/2020 11:20 AM BY: TAETSCH, ELISE



CREDIT GENERATION

- PEM REESTABLISHMENT AREA
  PHASE 1 AREA - 1.32 AC
  PHASE 2 AREA - 2.47 AC
- PEM PRESERVATION AREA
  PHASE 1 AREA - 23.27 AC
  PHASE 2 AREA - 0.29 AC
- PEM/UPLAND MOSAIC PRESERVATION AREA
  PHASE 1 AREA - 0.09 AC
  PHASE 2 AREA - 0.00 AC
- PSS REESTABLISHMENT AREA
  PHASE 1 AREA - 0.00 AC
  PHASE 2 AREA - 1.08 AC
- PSS PRESERVATION AREA
  PHASE 1 AREA - 0.75 AC
  PHASE 2 AREA - 0.00 AC
- PFO REESTABLISHMENT AREA
  PHASE 1 AREA - 5.28 AC
  PHASE 2 AREA - 0.60 AC
- PFO PRESERVATION AREA
  PHASE 1 AREA - 66.28 AC
  PHASE 2 AREA - 0.00 AC
- PFO/UPLAND MOSAIC REESTABLISHMENT AREA
  PHASE 1 AREA - 0.00 AC
  PHASE 2 AREA - 10.23 AC
- PFO/UPLAND MOSAIC REHABILITATION AREA
  PHASE 1 AREA - 10.09 AC
  PHASE 2 AREA - 0.00 AC
- PFO REHABILITATION AREA
  PHASE 1 AREA - 0.00 AC
  PHASE 2 AREA - 2.60 AC
- UPLAND BUFFER REHABILITATION AREA
  PHASE 1 AREA - 26.88 AC
  PHASE 2 AREA- 3.86 AC
- UPLAND BUFFER PRESERVATION AREA
  PHASE 1 AREA - 83.33 AC
  PHASE 2 AREA - 1.53 AC

LEGEND

- EXISTING GRADE MAJOR CONTOUR (10.0' INTERVAL)
- EXISTING GRADE MINOR CONTOUR (2.0' INTERVAL)
- EXISTING STONE WALL
- EXISTING FENCE LINE
- PROPERTY LINE
- CONSERVATION EASEMENT BOUNDARY (COINCIDENT WITH PROPERTY LINE EXCEPT AT EXCLUSION AREAS)
- PHASE 2 LIMIT (SEE NOTE 1)
- RIGHT OF WAY
- EDGE OF GRAVEL
- EDGE OF WATER
- EXISTING UTILITY POLE
- EXISTING BUILDING
- PROPOSED FINAL GRADE CONTOUR (2.0' INTERVAL)
- EXISTING TREE LINE
- SNOWMOBILE TRAIL
- MONITORING ACCESS PATH

NOTE:

1. PHASE 2 LIMIT IS APPROXIMATE. ACTUAL LIMIT IS COINCIDENT WITH PROPERTY LINE ALONG THE PERIMETER OF THE PROPERTY. ALL OTHER AREAS WITHIN THE PROPERTY LIMITS WILL BE CONSIDERED PHASE 1.

FOR PERMIT

Signed: 08/13/2020

STATE OF VERMONT
MICHAEL HIGGINS
NO. 018.0103039
CIVIL
LICENSED
PROFESSIONAL ENGINEER

Professional Engineer's Name
MICHAEL HIGGINS
Professional Engineer's No. 018.0103039
State VT

ARCADIS Design & Consultancy for natural and built assets
ARCADIS U.S., INC.

ARCADIS Project No.
30003337

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One Lincoln Center
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Tel: 315.446.9120

DUCKS UNLIMITED
GREAT LAKES/ATLANTIC REGIONAL OFFICE
7322 NEWMAN BOULEVARD,BLDG. 1
DEXTER, MICHIGAN 48130
(734) 623-2000 www.ducks.org

CREDIT GENERATION - OVERALL

WILLOUGHBY LAKE ROAD MITIGATION SITE

BARTON, ORLEANS COUNTY, VT

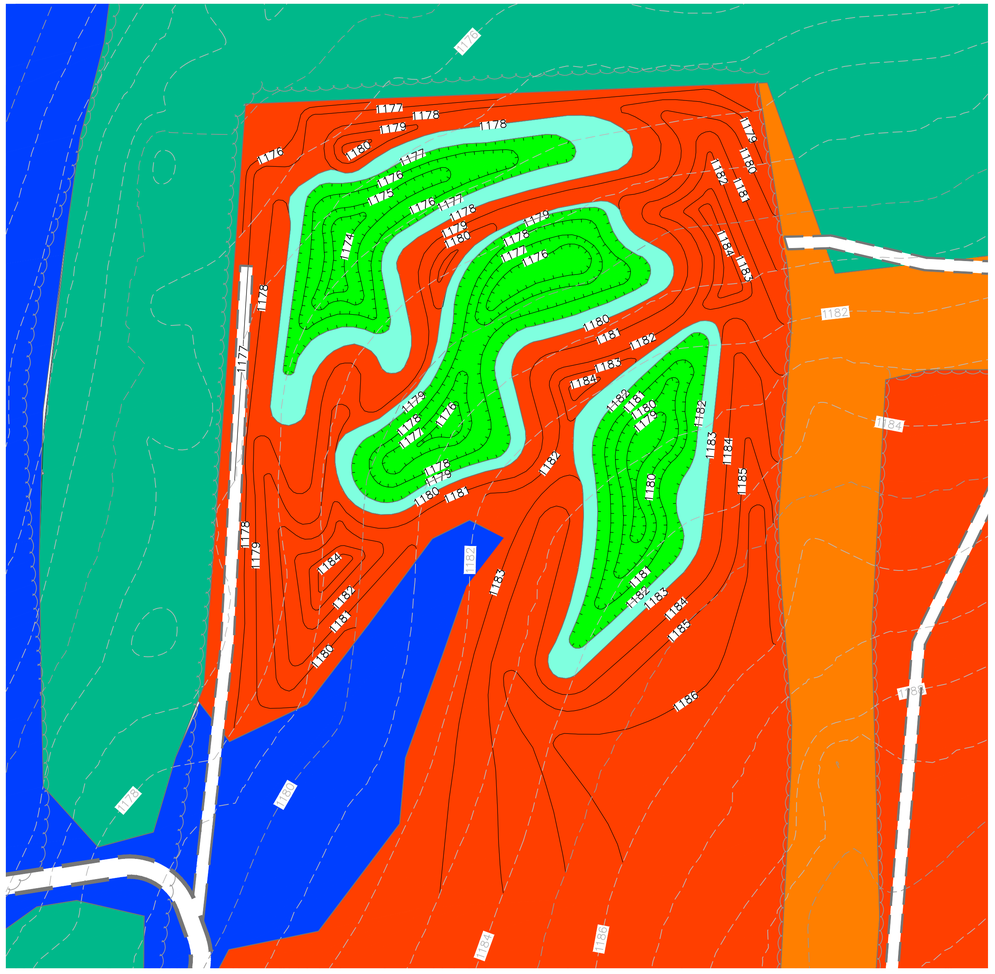
Revision	Sheet	Revisions	Date	By
0	ALL	ISSUED FOR PERMIT REVIEW	08/13/20	ERT

CAD FILE:
30003337-DU-Fig 17 - Credit Generation - Overall.dwg

DESIGNED BY: NWF
DRAWN BY: KD
SURVEYED BY: JT
BIOLOGIST: JF (DU)
DATE: JUNE 2020
PROJECT NUMBER: US-VT-47-2

GLARO-VT1-004-17

C:\Users\ETaetsch\Desktop\DU01-DWG\30003337-DU-Fig 17 - Credit Generation - Overall.dwg LAYOUT: 17 SAVED: 8/12/2020 10:40 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 8/13/2020 9:57 AM BY: TAETSCH, ELISE



WETLAND MITIGATION UNIT 1 (PHASE 1)

LEGEND

- EXISTING GRADE MAJOR CONTOUR (5.0' INTERVAL) — 1160
- EXISTING GRADE MINOR CONTOUR (1.0' INTERVAL)
- PROPOSED FINAL GRADE CONTOUR (1.0' INTERVAL) — 1175
- EXISTING TREE LINE
- SNOWMOBILE TRAIL
- MONITORING ACCESS PATH

CREDIT GENERATION

- PEM REESTABLISHMENT AREA
- PEM PRESERVATION AREA
- PFO REESTABLISHMENT AREA
- PFO PRESERVATION AREA
- UPLAND BUFFER REHABILITATION AREA
- UPLAND BUFFER PRESERVATION AREA

NOTE:

1. REFER TO CREDIT GENERATION - OVERALL DRAWING (SHEET 17) FOR CREDIT GENERATION AREAS.

GRAPHIC SCALE

30 0 15 30 60 120

1 inch = 30 feet

FOR PERMIT

Signed: 08/13/2020

STATE OF VERMONT MICHAEL HIGGINS NO. 018.0103039 LICENSED PROFESSIONAL ENGINEER

ARCADIS Design & Consultancy for natural and built assets

ARCADIS U.S., INC.

Professional Engineer's Name		ARCADIS Project No.	ARCADIS One Lincoln Center 110 West Fayette Street, Suite 300 Syracuse NY 13202 Tel: 315.446.9120
MICHAEL HIGGINS		30003337	
Professional Engineer's No.	State		
018.0103039	VT		

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7322 NEWMAN BOULEVARD,BLDG. 1
DEXTER, MICHIGAN 48130
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CREDIT GENERATION - OVERALL UNIT 1

WILLOUGHBY LAKE ROAD MITIGATION SITE
BARTON, ORLEANS COUNTY, VT

Revision	Sheet	Revisions	Date	By
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CAD FILE: 30003337-DU-Fig 18 - Credit Generation - Unit 1.dwg

DESIGNED BY: NWF

DRAWN BY: KD

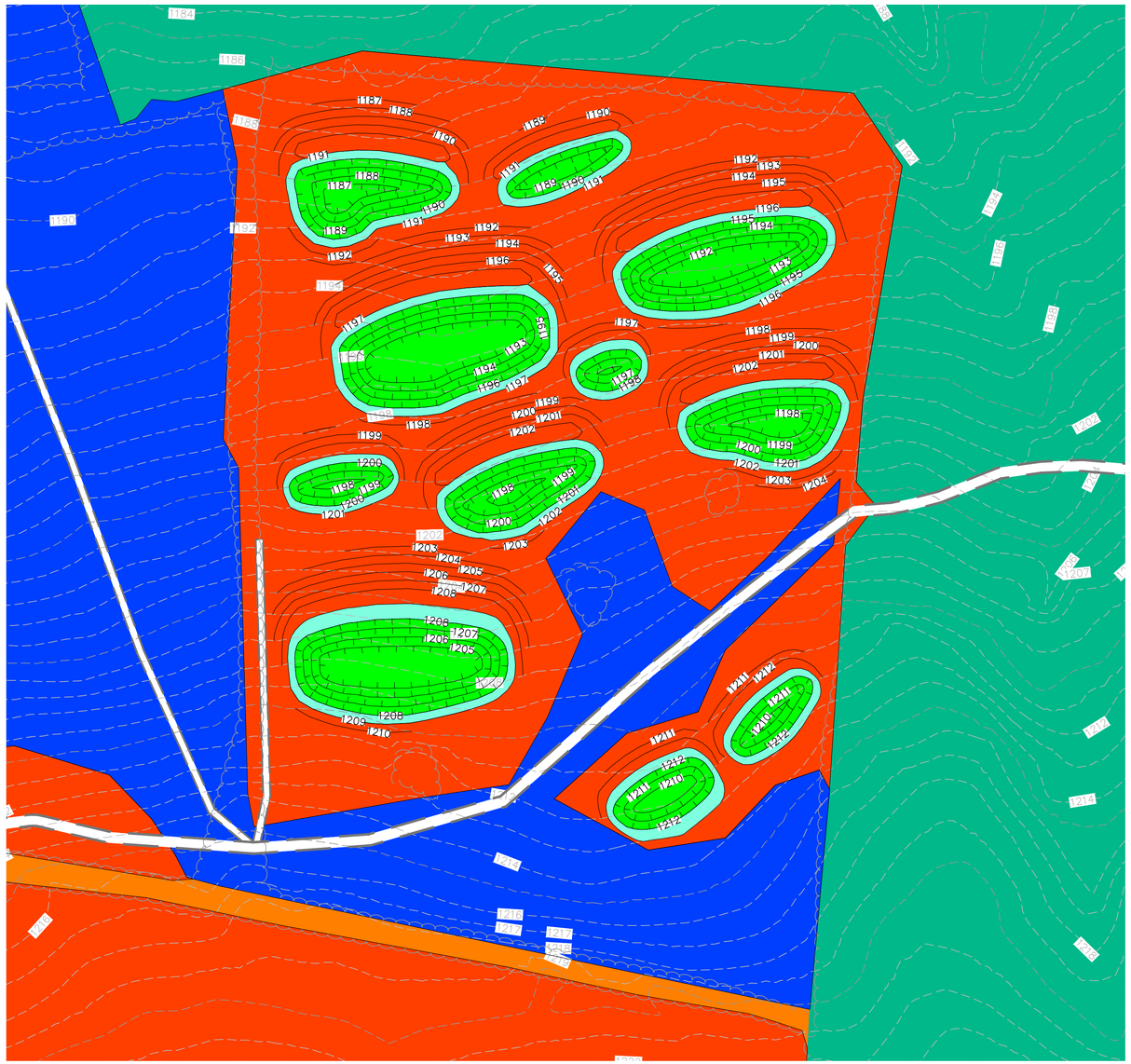
SURVEYED BY: JT

BIOLOGIST: JF (DU)

DATE: JUNE 2020

PROJECT NUMBER: US-VT-47-2

GLARO-VT1-004-18



WETLAND MITIGATION UNIT 2 (PHASE 1)

LEGEND

- EXISTING GRADE MAJOR CONTOUR (5.0' INTERVAL) — 1160
- EXISTING GRADE MINOR CONTOUR (1.0' INTERVAL)
- PROPOSED FINAL GRADE CONTOUR (1.0' INTERVAL) — 1160
- EXISTING TREE LINE
- SNOWMOBILE TRAIL
- MONITORING ACCESS PATH

CREDIT GENERATION

- PEM REESTABLISHMENT AREA
- PEM PRESERVATION AREA
- PFO REESTABLISHMENT AREA
- PFO PRESERVATION AREA
- UPLAND BUFFER REHABILITATION AREA
- UPLAND BUFFER PRESERVATION AREA

NOTE:

1. REFER TO CREDIT GENERATION - OVERALL DRAWING (SHEET 17) FOR CREDIT GENERATION AREAS.

GRAPHIC SCALE

50 0 25 50 100 200

1 inch = 50 feet

FOR PERMIT

Signed: 08/13/2020

STATE OF VERMONT MICHAEL HIGGINS NO. 018.0103039 CIVIL LICENSED PROFESSIONAL ENGINEER

Professional Engineer's Name: MICHAEL HIGGINS
Professional Engineer's No.: 018.0103039
State: VT

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ARCADIS Project No.: 30003337

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CREDIT GENERATION - UNIT 2

WILLOUGHBY LAKE ROAD MITIGATION SITE
BARTON, ORLEANS COUNTY, VT

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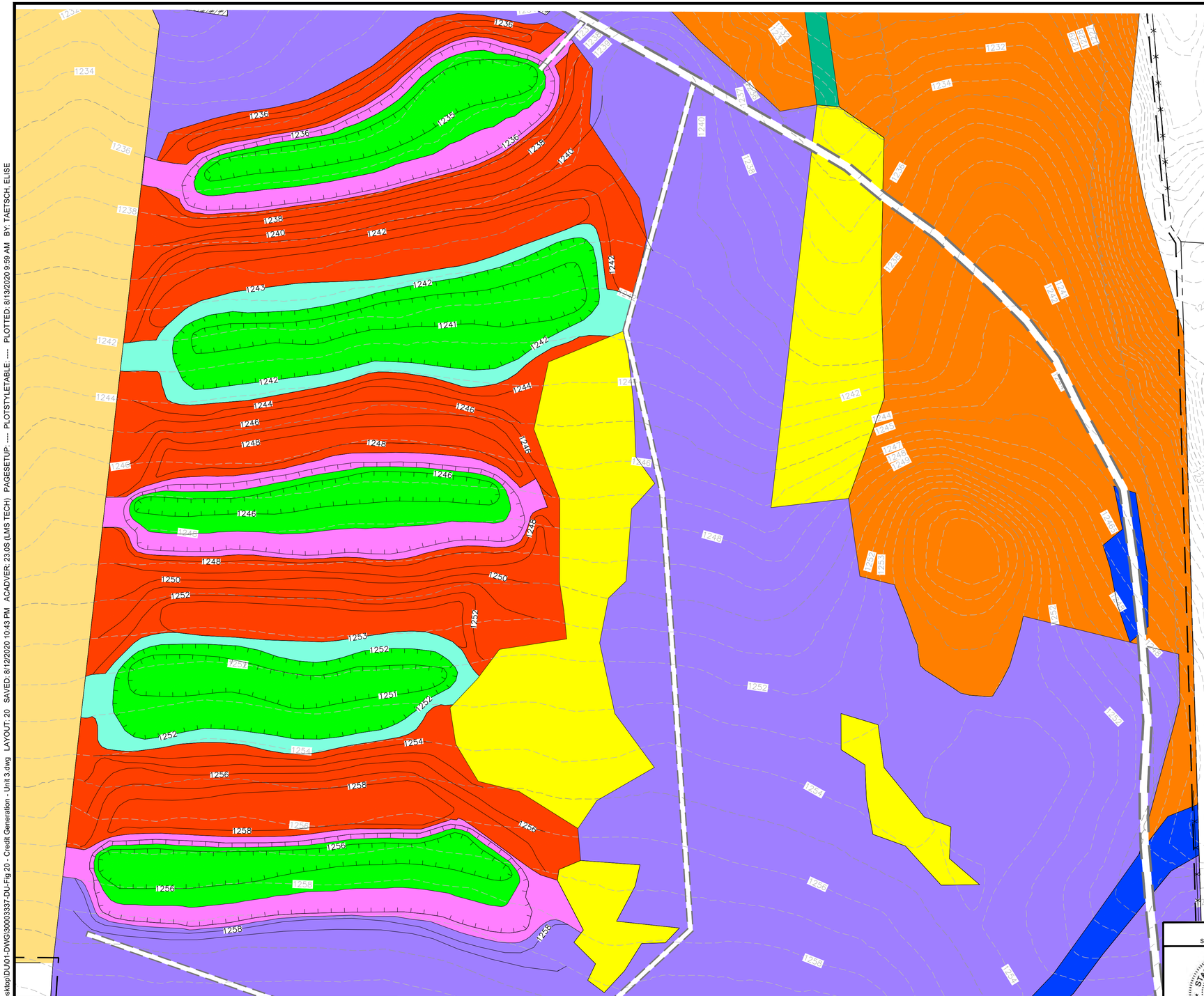
CAD FILE: 30003337-DU-Fig 19 - Credit Generation - Unit 2.dwg

DESIGNED BY: NWF
DRAWN BY: KD
SURVEYED BY: JT
BIOLOGIST: JF (DU)
DATE: JUNE 2020
PROJECT NUMBER: US-VT-47-2

GLARO-VT1-004-19

C:\Users\ETaetsch\Desktop\DU\01-DWG\30003337-DU-Fig 19 - Credit Generation - Unit 2.dwg LAYOUT: 19 SAVED: 8/12/2020 10:41 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 8/13/2020 10:00 AM BY: TAETSCH, ELISE



LEGEND

- 1160 — EXISTING GRADE MAJOR CONTOUR (5.0' INTERVAL)
- EXISTING GRADE MINOR CONTOUR (1.0' INTERVAL)
- EXISTING FENCE LINE
- PROPERTY LINE
- CONSERVATION EASEMENT BOUNDARY (COINCIDENT WITH PROPERTY LINE EXCEPT AT EXCLUSION AREAS)
- 1160 — PROPOSED FINAL GRADE CONTOUR (1.0' INTERVAL)
- EXISTING TREE LINE
- SNOWMOBILE TRAIL
- MONITORING ACCESS PATH

CREDIT GENERATION

- PEM REESTABLISHMENT AREA
- PEM PRESERVATION AREA
- PSS REESTABLISHMENT AREA
- PFO REESTABLISHMENT AREA
- PFO PRESERVATION AREA
- PFO/UPLAND MOSAIC REESTABLISHMENT AREA
- PFO/UPLAND MOSAIC REHABILITATION AREA
- PFO REHABILITATION AREA
- UPLAND BUFFER REHABILITATION AREA
- UPLAND BUFFER PRESERVATION AREA

NOTE:

1. REFER TO CREDIT GENERATION - OVERALL DRAWING (SHEET 17) FOR CREDIT GENERATION AREAS.

GRAPHIC SCALE

50 0 25 50 100 200

1 inch = 50 feet

WETLAND MITIGATION UNIT 3 (PHASE 2)

FOR PERMIT

Signed: 08/13/2020

STATE OF VERMONT MICHAEL HIGGINS NO. 018.0103039 LICENSED PROFESSIONAL ENGINEER

ARCADIS Design & Consultancy for natural and built assets

ARCADIS U.S., INC.

Professional Engineer's Name	
MICHAEL HIGGINS	
Professional Engineer's No.	State
018.0103039	VT

ARCADIS Project No.
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(734) 623-2000 www.ducks.org

CREDIT GENERATION - OVERALL
UNIT 3
WILLOUGHBY LAKE ROAD
MITIGATION SITE
BARTON, ORLEANS COUNTY, VT

Revision	Sheet	Revisions	Date	By
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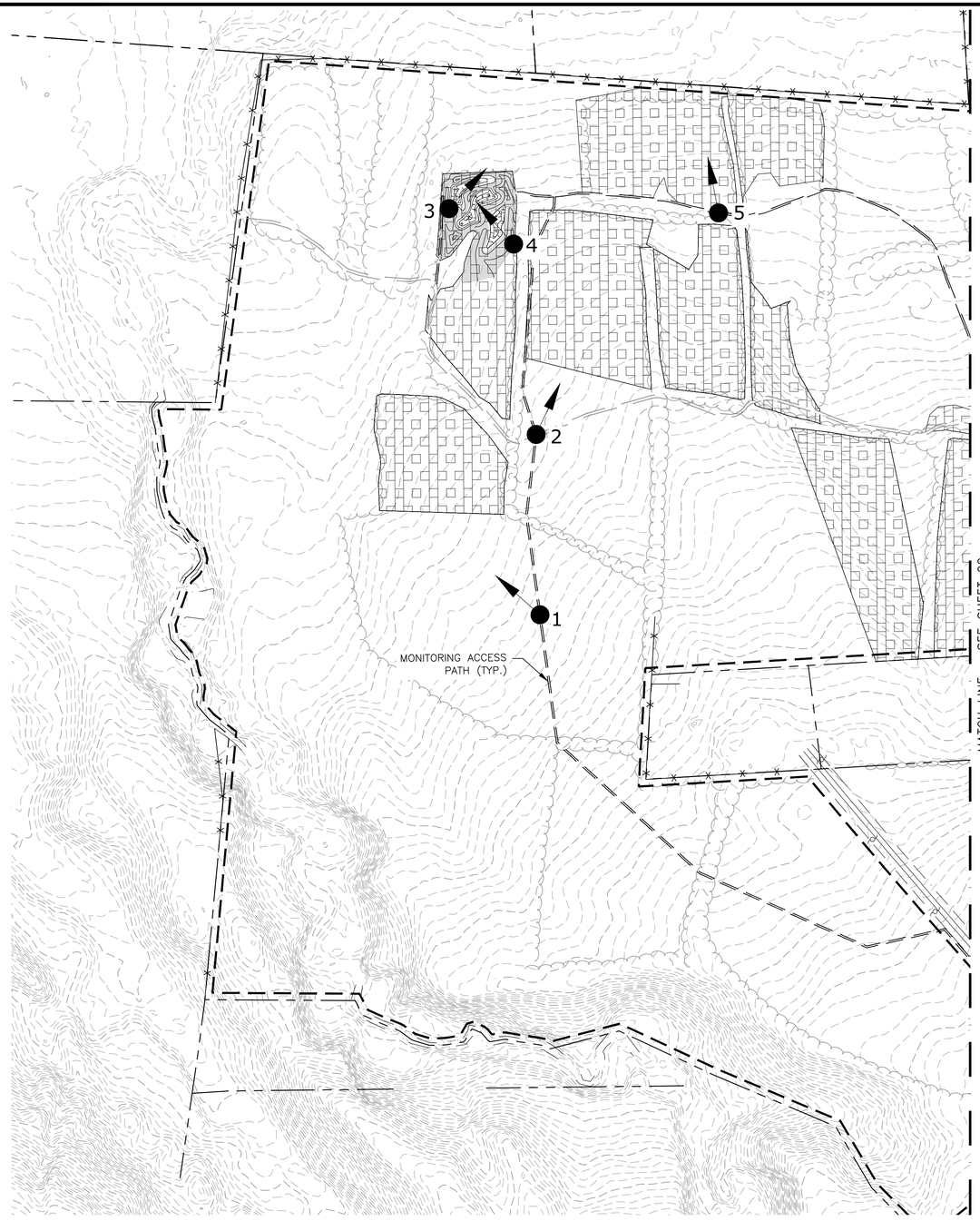
CAD FILE: 30003337-DU-Fig 20 - Credit Generation - Unit 3.dwg

DESIGNED BY: NWF
DRAWN BY: KD
SURVEYED BY: JT
BIOLOGIST: JF (DU)
DATE: JUNE 2020
PROJECT NUMBER: US-VT-47-2

GLARO-VT1-004-20



LEGEND

- EXISTING GRADE MAJOR CONTOUR (10.0' INTERVAL) (1160)
- EXISTING GRADE MINOR CONTOUR (2.0' INTERVAL)
- EXISTING STONE WALL
- EXISTING FENCE LINE
- PROPERTY LINE
- CONSERVATION EASEMENT BOUNDARY (COINCIDENT WITH PROPERTY LINE EXCEPT AT EXCLUSION AREAS)
- RIGHT OF WAY
- EDGE OF GRAVEL
- EDGE OF WATER
- EXISTING UTILITY POLE
- EXISTING BUILDING
- PEM
- UPLAND SEED MIX
- CONIFER MIX
- 1 FUTURE PHOTO POINT LOCATION
- PROPOSED FINAL GRADE CONTOUR (2.0' INTERVAL)
- EXISTING TREE LINE
- SNOWMOBILE TRAIL
- MONITORING ACCESS PATH

N

GRAPHIC SCALE

200 0 100 200 400 800

1 inch = 200 feet

FOR PERMIT

Signed: 08/13/2020

STATE OF VERMONT MICHAEL HIGGINS NO. 018.0103039 LICENSED PROFESSIONAL ENGINEER

ARCADIS Design & Consultancy for natural and built assets

ARCADIS U.S., INC.

Professional Engineer's Name: **MICHAEL HIGGINS**

Professional Engineer's No.: 018.0103039 State: VT

ARCADIS Project No. 30003337

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Syracuse NY 13202
Tel: 315.446.9120

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DEXTER, MICHIGAN 48130
(734) 623-2000 www.ducks.org

MONITORING PLAN - 1

WILLOUGHBY LAKE ROAD MITIGATION SITE

BARTON, ORLEANS COUNTY, VT

Revision	Sheet	Revisions	Date	By
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CAD FILE: 30003337-DU-Fig 21 - Monitoring Plan - 1.dwg

DESIGNED BY: NWF

DRAWN BY: KD

SURVEYED BY: JT

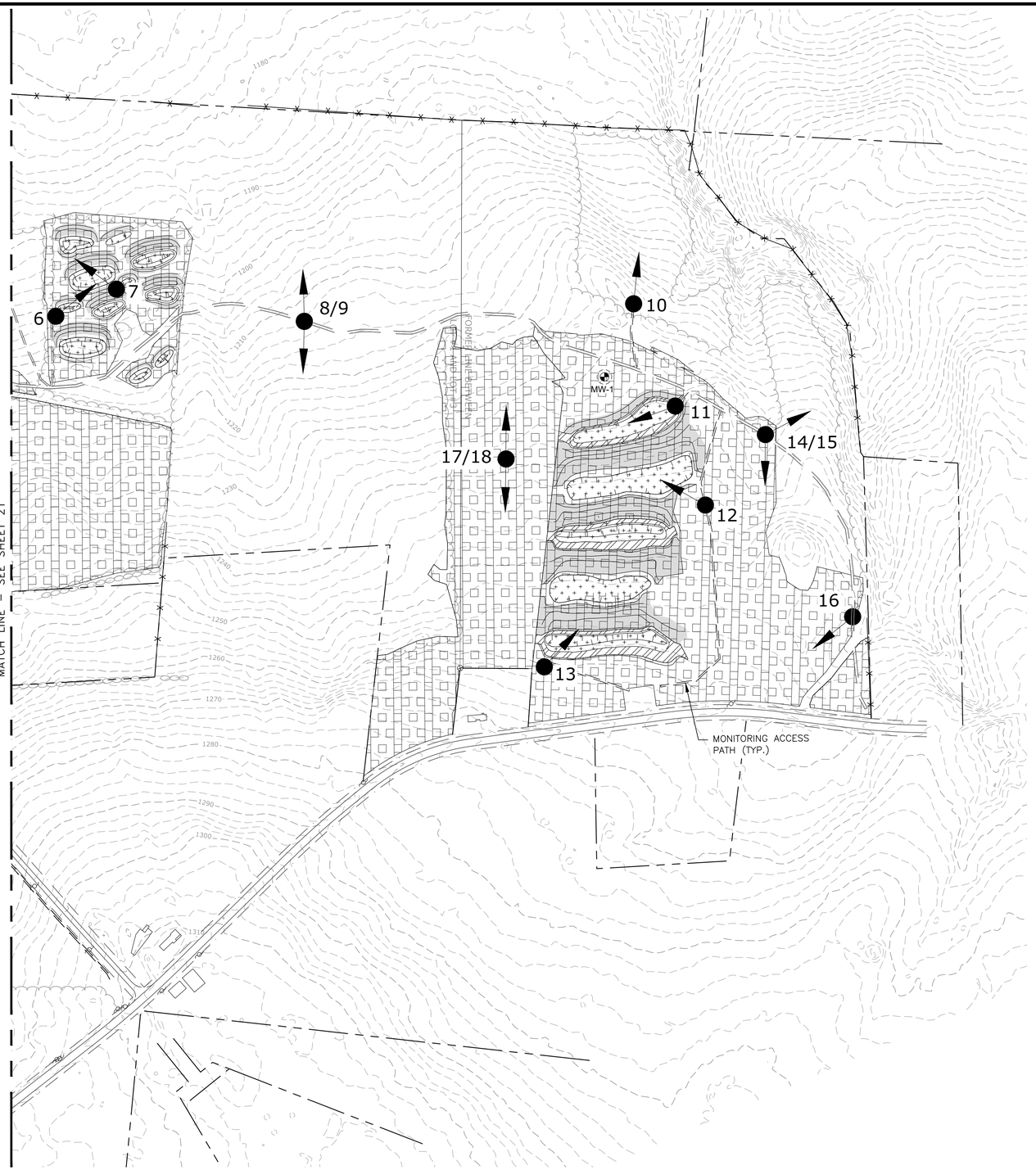
BIOLOGIST: JF (DU)

DATE: JUNE 2020

PROJECT NUMBER: US-VT-47-2

GLARO-VT1-004-21

C:\Users\ETaelsch\Desktop\DU01-DWG\30003337-DU-Fig 21 - Monitoring Plan - 1.dwg LAYOUT: 21 SAVED: 8/12/2020 10:34 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 8/13/2020 10:06 AM BY: TAETSCH, ELISE



LEGEND

- EXISTING GRADE MAJOR CONTOUR (10.0' INTERVAL) (1160)
- EXISTING GRADE MINOR CONTOUR (2.0' INTERVAL)
- EXISTING STONE WALL
- EXISTING FENCE LINE
- PROPERTY LINE
- CONSERVATION EASEMENT BOUNDARY (COINCIDENT WITH PROPERTY LINE EXCEPT AT EXCLUSION AREAS)
- RIGHT OF WAY
- EDGE OF GRAVEL
- EXISTING UTILITY POLE
- EXISTING BUILDING
- PEM
- PSS
- UPLAND SEED MIX
- CONIFER MIX
- 7 FUTURE PHOTO POINT LOCATION
- PROPOSED FINAL GRADE CONTOUR (2.0' INTERVAL)
- EXISTING TREE LINE
- MW-1 EXISTING MONITORING WELL
- SNOWMOBILE TRAIL
- MONITORING ACCESS PATH

GRAPHIC SCALE

200 0 100 200 400 800

1 inch = 200 feet

FOR PERMIT

Signed: 08/13/2020

STATE OF VERMONT MICHAEL HIGGINS NO. 018.0103039 CIVIL LICENSED PROFESSIONAL ENGINEER

Professional Engineer's Name: MICHAEL HIGGINS
Professional Engineer's No.: 018.0103039
State: VT

ARCADIS Design & Consultancy for natural and built assets
ARCADIS U.S., INC.

ARCADIS Project No.: 30003337

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MONITORING PLAN - 2

WILLOUGHBY LAKE ROAD
MITIGATION SITE
BARTON, ORLEANS COUNTY, VT

Revision	Sheet	Revisions	Date	By
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CAD FILE: 30003337-DU-Fig 22 - Monitoring Plan - 2.dwg

DESIGNED BY: NWF
DRAWN BY: KD
SURVEYED BY: JT
BIOLOGIST: JF (DU)
DATE: JUNE 2020
PROJECT NUMBER: US-VT-47-2

GLARO-VT1-004-22

C:\Users\ETaetsch\Desktop\DU01-DWG\30003337-DU-Fig 22 - Monitoring Plan - 2.dwg LAYOUT: 22 SAVED: 8/12/2020 10:35 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 8/13/2020 10:12 AM BY: TAETSCH, ELISE

Appendix E. Threatened and Endangered Species Review

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104
http://www.fws.gov/newengland

In Reply Refer To: February 14, 2020
Consultation Code: 05E1NE00-2020-SLI-1413
Event Code: 05E1NE00-2020-E-04054
Project Name: Willoughby Lake Road Mitigation Site

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Consultation Code: 05E1NE00-2020-SLI-1413

Event Code: 05E1NE00-2020-E-04054

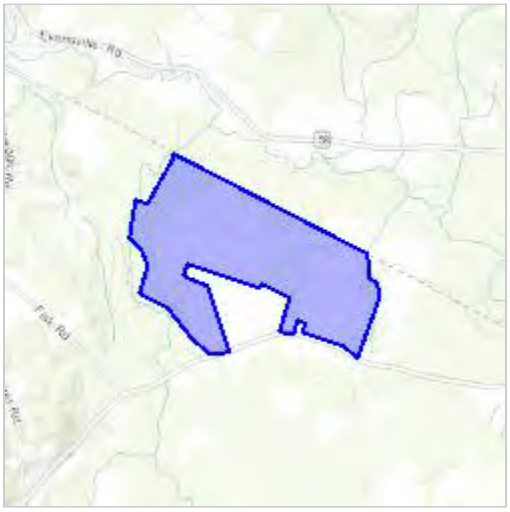
Project Name: Willoughby Lake Road Mitigation Site

Project Type: LAND - RESTORATION / ENHANCEMENT

Project Description: Excavating 19 shallow potholes (~4 acres total) and planting 82 acres of trees and shrubs to restore and enhance wetlands and adjacent upland communities. All work will be done in existing hay fields. No tree cutting is planned for this project.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/44.78951808149607N72.11174285061043W



Counties: Orleans, VT

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Appendix F. Budget

Shaded items would be Includes Phase 1 construction and Site-wide land acquisition and protection costs. Light Gray are actuals.

Activity	Unit Cost	Quantity (Years)	Total Cost	Notes
Land Purchase	$320,606.00	1	$320,606	243.9-acres
Land Purchase Acquisition repayment to WAT for access to unencumbered acquisition capital			$13,360	(6.5 % annually) Actual
Taxes (Years)	$6,534.86	3	$19,605	Annually; will apply for tax exempt status
Closing Cost per Transaction	$37,504.00	1	$37,504	Includes survey, title search and other closing costs
Site Identification & Land Acquisition	$64,307.36	1	$64,307	Costs to identify and secure the site
Mitigation Plan (Site visit IRT, DEC, permitting)	$246,963.00	1	$246,963	Includes delineation, topographic surveys, engineering design, associated travel, plan development and revisions.
Phase 1 Construction and Planting Staff Cost	$81,033.46	1	$81,033	Includes Construction Management and well logger install
Phase 1 Construction and Planting Costs	$301,390.50	1	$301,391	Coarse woody debris added as bid item
Monitoring	$16,544.78	10	$165,448	Assuming an as-built, and 6 monitoring reports.
Adaptive Management	$10,146.88	10	$101,469	
Long Term Protection Endowment (CE)	$65,000.00	1	$65,000	
Long Term Stewardship Endowment (SE)	$108,541.61	1	$108,542	Amount subject to Long-term steward approval
Financial Assurances	$18,547.56	1	$18,548	*If required by USACE*
Phase 1 Subtotal			**$1,543,775**	
Contingency (10%)			$154,377	
Total Through Phase 1			**$1,698,152**	