



**VOLUME THREE to:**

**Petition of BNE Energy Inc.**

**for a Declaratory Ruling for the Location, Construction and Operation**

**of a 4.8 MW Wind Renewable Generating Project on Winsted-Norfolk Road in Colebrook,  
Connecticut ("Wind Colebrook North")**

**December 13, 2010**

## **EXHIBITS**

Terrestrial Habitat and Wetland Impact Analysis.....	Exhibit I
Visual Resource Evaluation.....	Exhibit J
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Noise Study.....	Exhibit M

# EXHIBIT I

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**Terrestrial Wildlife Habitat & Wetland  
Impact Analysis**

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## *Wind Colebrook North*

Winsted-Norfolk Road and Rock Hall Road  
Colebrook, Connecticut

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Prepared for



Prepared by

**VHB/Vanasse Hangen Brustlin, Inc.  
54 Tuttle Place  
Middletown, Connecticut 06457  
(860) 632-1500**

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# 1

## Introduction

BNE Energy Inc. (“BNE”) is proposing to construct and operate a commercial wind generation project on property located at Winsted-Norfolk Road (Route 44) and Rock Hall Road in Colebrook, Connecticut (the “Property”). The 124.9-acre Property is located approximately 1,050 feet from the Norfolk town line and approximately 3,900 feet from the Winsted/Winchester town line. BNE proposes to install three GE 1.6 MW wind turbines at the Property. The hub height of the turbines will be 100 meters, which is the equivalent of 328 feet. The blade diameter of the turbines will be 82 meters (269 feet) up to a maximum of 100 meters (328 feet). In addition to the three turbines, Wind Colebrook North will include associated ground equipment including an electrical collector yard and associated utility infrastructure so that the turbines can be interconnected to the electrical grid (collectively the “Project”). BNE proposes to construct two new access roads originating from Rock Hall Road to facilitate access during construction and operation of Wind Colebrook North. The *Property Location Map, USGS*, provided as Figure 1 depicts the approximate Property boundary location.

The overall goal of this study is to identify and document the vegetative and wetland communities existing on the Property and to determine potential impacts of the proposed wind development on terrestrial wildlife and wetlands.

# Property Description

The Property is generally characterized by second growth upland forest, forested wetlands and a golf driving range. Mill Brook, a perennial watercourse, flows south-southeast through the Property, and into a large shrub swamp along the southern Property boundary.

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## Topography and Drainage Basins

The topography is characterized by moderately sloping hillsides climbing easterly and westerly from the central portion of the Property. A riparian corridor associated with Mill Brook transects the central portion of the Property. The highest elevations occur at approximately 1470 feet at the northeast corner of the Property. The lowest elevations are approximately 1210 feet within the riparian corridor along the southern Property boundary.

The Property is located in the Mad River drainage basin. This drainage basin is located within the Farmington Subregional Basin, which is within the Connecticut Major Basin.

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## Geology

According to the Bedrock Geological Map of Connecticut (Connecticut Geological and Natural History Survey, 1985), the bedrock underlying the Property is characterized as rusty mica schist (Ygs) and gneiss as well as pink granitic gneiss (Ygr). Schist is a coarse to very coarse grained, strongly to very strongly layered metamorphic rock whose layering is typically defined by parallel alignment of micas. It is primarily composed of mica, quartz, and feldspar and occasionally spotted with conspicuous garnets. Gneiss is medium to coarse grained metamorphic rock characterized by compositional banding of light and dark minerals, typically composed of quartz, feldspar, and various amounts of dark minerals. It occurs with a variety of compositions and is a characteristic rock of the uplands.

The Surficial Materials Map of Connecticut indicates that most of the Property is underlain by thin till. Thin till is characterized by areas where till is less than 10-15 feet thick and including areas of bedrock outcrop where till is absent.



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## Mapped Soil Types

Digitally available updated soil survey information was obtained from the Natural Resources Conservation Service (NRCS). Soil classifications present on the Property are as follows:

Glacial Till (unstratified sand, silt & rock) deposited upland soils:

- Bice-Millsite complex (413)
- Bice fine sandy loam (417)
- Schroon fine sandy loam (418)
- Shelburne fine sandy loam (425)
- Ashfield fine sandy loam (427)

Glacial Till (unstratified sand, silt & rock) deposited wetland soils:

- Brayton-Loonmeadow complex (443)

Organic (peat & muck) derived wetland soils:

- Wonsqueak mucky peat (437)

These soil types were generally field confirmed during a wetland investigation and delineation conducted by Vanasse Hangen Brustlin, Inc. (VHB) Registered Soil Scientist, Matthew Davison. Details of the wetland delineation as well as detailed published soils information including a soil map and soil description report are contained within the *Wetlands Delineation Report* provided in Attachment A.

# Habitat Study Methodology

The wildlife habitat evaluation was divided into three parts: 1) Vegetation Assessment, 2) Habitat Structure Assessment and 3) Wildlife Analysis. All three components of the wildlife habitat evaluation were completed for the entire Property. The following sections discuss the methodology used to perform the wildlife habitat study.

## Vegetation Assessment

The Property was segmented into six identified habitat types, which were delineated using upland and wetland boundaries and dominant vegetative cover types. The boundaries of each habitat type are outlined in the *Habitat Type Map*, which is provided as Figure 2. The six major habitat types are identified as second growth Northern Hardwood forest, second growth Northern Hardwoods-Hemlock-White Pine forest, early successional Northern Hardwood forest, Palustrine forested wetlands (which include Mill Brook, a perennial watercourse), Palustrine scrub-shrub-emergent wetlands, and maintained lawn (golf driving range). The dominant tree, shrub, and herbaceous layers of each habitat type were identified and documented by VHB personnel experienced in plant identification. Representative photographs of the dominant habitat types are included in the *Photographic Documentation* provided in Attachment B.

## Habitat Structure Assessment

Various habitat structural features were identified and documented for each habitat type. Forested areas were evaluated for canopy cover, perch height, and mid-story composition. All habitat areas were assessed to determine soil and substrate type, depth to bedrock, slash piles, depth of leaf litter, topography and groundwater elevation. The locations of dirt paths, structures and stone walls were also documented. VHB personnel searched for and documented the occurrence of burrows, tree cavities, snags and vernal pools (no vernal pool habitat was identified on the Property).

## Wildlife Analysis

VHB environmental scientists used DeGraaf and Yamasaki's *New England Wildlife: Habitat, Natural History, and Distribution* (2001) as a reference and general predictive tool

to identify potential fauna that may be occupying the Property. This reference book provides a compendium of natural history, distribution, and habitat relationships for 338 terrestrial and aquatic wildlife species that breed, winter, or reside in New England. The 2001 edition of the book is a revision of DeGraaf and Rudis' *New England Wildlife* (1986). This reference provides a set of matrices based on dominant cover type that determine which avian, amphibian, reptile, and mammal species may occupy an area based on general and specific habitat requirements. The habitat types found on the Property were correlated with cover types used in the matrices, and a list of potential species was identified. Based on this methodology, the list of potential wildlife species is typically quite extensive due to the general associations made between habitat types and typical species anticipated to use these habitat types. State-specific information about the distribution and habitat requirements of amphibians, reptiles, and some mammals was used to help narrow the list of potential species anticipated to utilize the habitats found on the Property. Klemens' *Amphibians and Reptiles of Connecticut and Adjacent Regions* (1993), and *Amphibians and Reptiles in Connecticut* by the same author (2000) provide distribution information and specific habitat comments pertinent to Connecticut's physiography that provide a more localized view of potential amphibian and reptiles species. Wildlife fact sheets from the Connecticut Department of Environmental Protection (CTDEP) Wildlife Division, and articles from the Wildlife Division's bimonthly magazine, *Connecticut Wildlife*, were also used to identify potential locations of species within the state. Potential species that may be utilizing the Property are described in narrative and tabular (Table 1) format in the Mammal and Herpetofauna Evaluation section of this report.

## Habitat Descriptions

The six major habitat types are identified as second growth Northern Hardwood forest, second growth Northern Hardwoods-Hemlock-White Pine forest, early successional Northern Hardwood forest, Palustrine forested wetlands (which include Mill Brook, a perennial watercourse), Palustrine scrub-shrub-emergent wetlands, and maintained lawn (golf driving range). These areas are depicted on Figure 2, *Habitat Type Map*. The majority of the Property is comprised of variations of a Northern Hardwood forest type.

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### Second Growth Northern Hardwood Forest Type

This habitat is the dominant type on the Property. It is generally characterized by hardwood sawtimber (trees 12 inches diameter at breast height [DBH] and greater) and poletimber (trees 4 to 12 inches DBH and greater). Dominant species are typical of this forest type and include sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), American beech (*Fagus grandifolia*), black cherry (*Prunus serotina*), yellow birch (*Betula allegheniensis*) and white ash (*Fraxinus Americana*). At higher elevations, further east on the Property the forest is dominated by American beech. Beech trees on the Property have suffered from substantial and widespread infestation of beech bark disease. Beech bark disease results when trees are attacked by beech scale (*Cryptococcus fagisuga*) which causes wounding to the bark and ultimately infection from fungi in the genus *Nectria*. Mortality rates due to secondary infection are high. Infested areas of the Property contain numerous beech snags. This area has been subject to selective timber harvesting as evidenced by decayed stumps and widespread logging roads. The western portion of the Property is dominated by sugar maple, black cherry and yellow birch. This area contains a larger abundance of sawtimber and has likely been subject to less intensive timber harvesting activities.

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### Second Growth Northern Hardwoods-Hemlock-White Pine Forest Type

Forested uplands at lower elevations on the Property, adjacent to the Mill Brook wetland complex are generally characterized by this variation of a Northern Hardwood forest type. It contains a large softwood component, dominated by eastern hemlock (*Tsuga Canadensis*) and including scattered eastern white pine (*Pinus strobus*). Hardwood tree species are consistent with a Northern Hardwood forest type and include sugar maple, red maple, American beech, black cherry and yellow birch. Sawtimber sized trees are

more abundant with softwood species, while hardwood trees are comprised predominantly of poletimber sized trees. This is indicative of timber harvesting activities and consistent with log markets over the past decade.

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### Early Successional Northern Hardwood Forest Type

Areas adjacent to and immediately east of the golf driving range are characterized as an early successional forest type which is indicative of historic disturbance which has occurred within this area. Dominant species include gray birch (*Betula populifolia*), black birch (*betula lenta*), quaking aspen (*Populus tremuloides*), bigtooth aspen (*Populus grandidentata*), black cherry, bush honeysuckle (*Lonicera sp.*), and *Rubus sp.*

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### Palustrine Forested Wetlands

Four wetland areas were delineated on the Property. These wetlands are depicted on the attached Habitat Type Map. Wetland 1, the dominant resource on the Property, consists of a broad bordering forested wetland associated with Mill Brook. This bordering system is dominated by eastern hemlock and characterized by hummock-hollow topography and numerous small upland inclusions which are commonly associated with this type of wetland. Several larger upland inclusions were delineated (designated WF 1-361 to 368, WF 1-378 to 1-383, and WF 1-393 to 434). Mill Brook, a perennial watercourse, originates at a corrugated metal culvert on the south side of Rock Hall Road and flows southeast through the center of the Property. The stream is characterized as having a well defined bank with decreasing gradient from the culvert flowing south. The streambed is characterized as a large particle sand bottom with mixed cobble/gravel and a few bedrock outcrops. As Mill Brook flows south to the southern Property boundary it opens into a large emergent marsh and scrub/shrub wetland. Several hillside seep wetlands and associated intermittent watercourses were identified and delineated on the Property. These seeps convey storm water runoff during high water events, spring melt, and sheet flow from the open field upslope to the west into Wetland 1 (Mill Brook system). The most significant seepage area includes an intermittent watercourse which flows into Wetland 1 from the north Property boundary. This watercourse flows within a deeply scoured channel at its upper extent before discharging into Wetland 1 within a shallow braided channel. Species composition varies widely throughout this wetland system, but the dominant species include eastern hemlock, red maple and yellow birch. A more comprehensive species list is provided in the attached Wetlands Delineation Report.

Wetland 2 is a small forested wetland pocket located at the base of a western facing slope. Several surface indicators of hydrology were observed, such as water stained leaves and detritus, which indicate this area may be subject to shallow seasonal inundation. It does not contain a depth sufficient to support amphibian breeding habitat. Dominant species include eastern hemlock, red maple and yellow birch and American beech. A more comprehensive species list is provided in the attached Wetlands Delineation Report.

Wetland 3 is a small linear shaped forested hillside seep wetland draining easterly towards Wetland 1. No surface water or wetland connections were identified between this wetland and Wetland 1. Dominant species include sugar maple, spicebush (*Lindera benzoin*), cinnamon fern (*Osmunda cinnamomea*) and sensitive fern (*Onoclea sensibilis*).

Wetland 4 is a series of small forested hillside seep wetlands located along an eastern facing slope. They are generally interconnected via subsurface groundwater flows or shallow surface water flows. No surface water or wetland connections were identified between this wetland and Wetland 1. Dominant species include sugar maple, yellow birch and spicebush.

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### Palustrine Scrub-Shrub and Emergent Wetland

The northern tip of a larger shrub swamp extends into the Property along the southern Property boundary. Mill Brook flows into this wetland area, which includes the 100-year floodplain of this watercourse. Dominant species include winterberry (*Ilex verticillata*), common elderberry (*Sambucus canadensis*), *Solidago sp.*, reed canary grass (*Phalaris arundinacea*), and tussock sedge (*Carex stricta*).

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### Maintained Lawn (Golf Driving Range)

This area is characterized by a maintained lawn area that is utilized for a golf driving range. This area is a portion of the Property; however, it is excluded from the Project area.

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## Fauna

This section describes the results of the field investigation conducted by VHB biologists in October 2010, as well as a subsequent wildlife evaluation based on collected field data and scientific literature references.

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### Mammal and Herpetofauna Evaluation

A mammal and herpetofauna evaluation was conducted to determine possible amphibian, reptile, and mammal species that may be using the habitats found on the Property. In addition to field investigations in which direct signs of wildlife were recorded, potential species were identified using the habitat matrices provided in *New England Wildlife*. The matrices featured in *New England Wildlife* include 11 forested cover types and 27 non-forested cover types. Species are listed taxonomically, and habitat use for each species associated with each cover type is identified in terms of seasonal use (breeding season or winter season), activity (feeding or shelter), and preference (preferred habitat or utilized habitat). Special habitat features unique to each species and generally required for occupancy are also briefly described.

To identify potential wildlife species occurring in the forested portions of the Property, the Northern Hardwoods column of the *New England Wildlife* matrix was used as it most closely resembles the forested habitat occupying the Property. This type of forest is described by DeGraaf and Yamasaki as including cover types dominated by sugar maple/ash, sugar maple/beech/yellow birch, and beech/red maple. These forest cover types accurately describe the dominant tree species identified throughout much of the forested portion of the Property. Forest stand sizes used in the *New England Wildlife* analysis included Sp (sapling through poletimber) and St (sawtimber).

Wildlife species associated with the shrub swamp were correlated using the Shrub Swamp column of the Nonforested Habitat matrix in *New England Wildlife*. The authors describe shrub swamp as being dominated by woody vegetation less than 20 feet tall with soil seasonally or permanently flooded to a depth of one foot. The swamp also contains persistent emergent vegetation, but shrubs are sufficiently dominant in the portion of the wetland that occurs within the Property to characterize it as a shrub swamp.

For the purposes of identifying wildlife species that might use Mill Brook, the Stream column of the Nonforested Habitat matrix was used. Because Mill Brook has such a well-defined bank throughout most of its length on the property, typical riparian floodplain habitat does not really occur, and thus the Riparian column was not used in the wildlife analysis.

Table 1 lists all potential mammal, reptile and amphibian species identified through the *New England Wildlife* matrices and state-specific literature as potentially occurring on the Property based on existing cover types. Special habitat features required by each species are also described. Species that appear in bold print were directly observed during on-site investigations. A narrative description of the most likely species to occur on the Property is also provided below. This description includes any direct or indirect observations of the species and identifies how the species might use habitat within the Property.

### **Ungulates**

Evidence of wild ungulate, or hooved animal, use of the Property was relatively scarce. Observations of white-tailed deer (*Odocoileus virginianus*) use was limited to a single scat pile, a bedding area in Wetland 1, and a buck rub on an eastern hemlock sapling. Beechnuts, which are produced when trees are approximately 40 years old, can be an important fall food source for deer, but good beechnut crops are not produced annually, and beech bark disease can reduce the production of beechnut mast. Large quantities of beechnuts were not observed on the Property, and the area may not currently provide significant foraging opportunities for deer and other animals either due to disease or irregular crop cycle. During winter months the Property may provide shelter for deer, as areas dominated by eastern hemlock may provide some cover and reduce snow cover on the forest floor. Wetland seeps such as occur on the Property can provide deer with a

regular water source. Herbaceous and woody plants associated with wetlands on the Property, particularly Wetland 1, may be browsed by white-tailed deer year round.

The CTDEP Wildlife Division has reported that Connecticut's moose (*Alces alces*) population is growing, and sightings have particularly increased in recent years in northern Litchfield County, including Colebrook. Although it is not an extensive wetland system on the Property, the portion of Wetland 1 characterized as a shrub swamp could be sufficiently large enough to attract individuals or cows with calves during summer months, while fall and winter use of the Property would likely mirror that of white-tailed deer. No evidence of moose use of the Property was found.

#### **Large to Medium-sized Mammals**

Tracks of raccoon (*Procyon lotor*) were observed on the sandy deposits that occasionally occur at the edge of Mill Brook. Crayfish exoskeletons and detritus were also observed adjacent to raccoon tracks, suggesting that Mill Brook and its adjacent wetland habitat serve as a food source for this species, although raccoons are opportunistic and will eat a range of food from seeds to garbage. Raccoon is a well-known resident throughout Connecticut and populations are considered abundant.

Historic use of the Property by beaver (*Castor canadensis*) was evident through dead and dying beaver-cut trees around the edges of the swamp. Although extirpated from the state by the mid-1800s due to extensive trapping, beaver populations have been thriving in Connecticut since the 1960s. Fresh gnawing around the base of an eastern hemlock near the edge of the marsh may be that of a beaver or porcupine (*Erethizon dorsatum*). Porcupines favor northern hardwood forests, and eastern hemlock is a major food source in the Northeast, particularly in winter months. A pile of porcupine scat was observed within an old, dilapidated cabin located on the northeast side of the Property. The cabin likely served as a den site, but porcupines will also nest in cavities of trees approximately 18 inches or larger in diameter. Trees of this size occurred occasionally throughout the Property, and beech has a tendency to form cavities more so than other species, increasing the likelihood of being used as den trees.

Other medium-sized woodland mammals likely to occur within the Property include Virginia opossum (*Didelphis virginiana*), which is often found in wet woods along streams, and fisher (*Martes pennanti*), which favors coniferous or mixed forests with continuous canopy. Opossum was not known to occur in Connecticut or New England prior to the early 1900s, but is now relatively abundant and has the potential to nest within tree cavities found on the Site. Fisher was extirpated from Connecticut by the 1900s due to loss of forested habitat from logging and clearing for agriculture, but was reintroduced by the CTDEP Wildlife Division in 1988 and has expanded its population so successfully that a trapping season has now been instituted. Fishers will den in vacant porcupine dens, and are one of the few predators of porcupines.

The largest mammal with the potential to occur on the Property is black bear (*Ursus americanus*). The population of black bears in Connecticut is fairly well established in the northern reaches of the state, and appears to be growing and expanding south.



Home ranges for female black bears in Connecticut are approximately five to seven square miles, while home ranges for males can extend from 12 to 60 square miles. It is possible that the Property is incorporated into the home range of an individual, although there was no evidence of use by black bear. Beechnuts can be an important fall staple for black bears, and if there is sufficient mast production, the Property could serve as a foraging ground for bears seeking to fatten up for the winter. However the occurrence of beech bark disease at the Property may have reduced the quantity of mast produced such that it may not be significantly attractive to bears.

### **Small Mammals**

The Property contains plenty of leaf litter, woody debris, and food sources to attract several small mammals. Eastern chipmunk (*Tamias striatus*) and gray squirrel (*Sciurus carolinensis*) were both observed in wooded uplands. These species are abundant and widespread throughout Connecticut, and will feed on red maple seeds, beechnuts, and black cherry fruits among other things. Stone walls and fallen logs offer shelter and provide lookout stations from which to watch for predators. Northern flying squirrel (*Glaucomys sabrinus*), which favors forests of hemlock, sugar maple, and beech above 1,000 feet, also has the potential to occur on the Property. Northern flying squirrels feed on a variety of nuts, seeds, mushrooms, and berries, and nest in hollow trees and tree cavities. This species is difficult to document due to nocturnal feeding habits, and its status in Connecticut is not well known.

Mink (*Mustela vison*) tracks were observed along the edge of Mill Brook. Minks inhabit a variety of wetland habitats, including rivers and freshwater marshes such as occur on the Property. This species will consume a variety of terrestrial and aquatic prey, including frogs, fish, crayfish, voles, and mice. Denning sites include hollow logs and cavities under tree roots, a number of which were observed in the vicinity of Mill Brook. White-footed mouse (*Peromyscus leucopus*) and southern red-backed vole (*Clethrionomys gapperi*), potential prey for mink and other larger predators, are also likely residents on the Property. These small rodents will forage on seeds from white pine and maples, berries and seeds from wetland shrubs and grasses, and vegetative shoots. The natural cavities in tree root systems and abundance of logs and stumps provide ample shelter and nesting sites for these species.

### **Reptiles, Amphibians, and Fish**

Mill Brook, a perennial stream system, occurs at a relatively high gradient throughout most of the Property, and flows too swiftly to allow for significant accumulation of sediment and organic debris that is attractive to many species of reptiles, although it may be suitable for some species of salamanders and frogs. Mill Brook drops in gradient just before the woodland opens into the swamp, and the slower water speed allows for greater accumulation of sediment and debris. Mill Brook flows into a shrub swamp in the vicinity of the southern Property boundary. This wetland has features of an emergent marsh including tussock sedge and cattails. Open water occurs along the stream corridor as well as two areas where the stream opens and forms large ponds.

No vernal pools were identified on the Property, and the swamp contains permanent water due to the perennial stream, as well as fish populations. As a result, vernal pool obligate species such as wood frog and spotted salamander are not expected to occur in wetlands or wooded uplands.

### **Turtles**

Many turtles in Connecticut do not commonly occur at elevations above 900 feet (Klemens 1993), and are unlikely to occur on the Property either due to the high elevation or because of a lack of suitable habitat. Snapping turtles (*Chelydra s. serpentina*) occur in a range of elevations and a variety of wetland habitats, including swift-flowing streams and beaver impoundments, and as a result is perhaps the most likely resident turtle species. This species is widespread throughout the state.

### **Snakes**

The Project area appears to hold limited potential for snake species due to its predominately forested habitat, high elevation, and unsuitable soil. Wooded uplands may be suitable for northern redbelly (*Storeria occipitomaculata*), a species that is widespread in Litchfield County and occurs at higher elevations. Wetland 1 could host northern water snake (*Nerodia sipedon*), a widespread aquatic species, while the northern Garter snake (*Thamnophis sirtalis*) is an abundant species can be found in virtually every kind of ecological environment in Connecticut, including forests and shrub swamp/marsh complexes.

CTDEP, in a response to a Natural Diversity Data Base (NDDDB) request, indicated that there are records for smooth green snake (*Ophoedrys vernalis*) in the vicinity of the Property. See the Natural Diversity Data Base Species section below for a more detailed analysis of this species on the Property.

### **Salamanders**

The Property's perennial stream has a good base flow and is relatively high gradient throughout most of the Property, as evidenced by the high banks and scour. Stream salamanders could conceivably occur in some areas or the occasional small side channel. Northern two-lined salamander (*Eurycea bislineata*), Connecticut's most common stream salamander, has been found in swift-flowing, high gradient streams within the state (Klemens 1993), although preferred habitat appears to be streams high in organic detritus and mud (Klemens 2000). This species is also found in springs and seepage areas, and could potentially be found in association with one of these areas within the Property. Northern dusky salamander (*Desmognathus fuscus*), another stream salamander, is considered common statewide, and has also been collected in scoured, swift-flowing brooks and seepage areas (Klemens 1993).

Northern redback salamander (*Plethodon cinereus*), perhaps the most widely distributed and abundant salamander in Connecticut, likely occurs in the woodland portion of the Property. This species is terrestrial and not dependent on standing water, and can be found in a variety of forested habitats. An all red-phase of northern redback salamander occurs in upland areas of northern Litchfield County, most frequently in the towns of Colebrook, Norfolk, and Winchester (Klemens 2000). Red-spotted newts (*Notophthalmus*

*viridescens*) are abundant in the highlands of Litchfield County and likely occur on the Property. The adult stage of red-spotted newt can be found in a wide variety of aquatic habitats, including slow-moving, weedy waters such as occur in the marsh at the southern border of the Property. The juvenile stage of the red-spotted newt, known as a red eft, is terrestrial and occurs in woodlands.

### **Frogs and Toads**

A green frog (*Rana clamitans*) was observed in the marsh portion of Wetland 1 during field investigations. Green frogs can use a wide variety of aquatic habitats with permanent water, and are widely distributed in southern New England from sea level to elevations of nearly 2,000 feet. American bullfrog (*Rana catesbiana*), which also occupies a variety of permanent aquatic habitats including those at higher elevations, is another potential resident. This species is common statewide. American toad (*Bufo a. americanus*) is largely a terrestrial species that is commonly found in woodlands throughout Connecticut, although they favor sites with gravelly, well-drained soil. Breeding occurs in a variety of aquatic habitats, including the backwaters of rivers and streams, such as occurs on-Site. Shrub swamps are a favorite breeding habitat for gray tree frog (*Hyla versicolor*), which could also potentially occur on the Property. Spring peeper (*Pseudacris c. crucifer*), another possible resident species, is considered widespread in southern New England and occurs as high 2,000 feet, usually in or near moist deciduous woods (Klemens 1993).

### **Fish**

Finfish were observed in Mill Brook during the investigations, but not identified to species. The CTDEP Fish Distribution Report for 2009 identifies Atlantic salmon fry as being stocked in Mill Brook, although the associated town is listed as Winchester, suggesting that stocking takes place further south than the Project area.

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## **Natural Diversity Data Base Species**

VHB personnel reviewed the CTDEP's Natural Diversity Database (NDDB) which identifies general areas of concern with regards to state and federally listed Endangered, Threatened, and Special Concern species and significant natural communities. A NDDB area of concern with regard to threatened or endangered species and/or significant natural communities was identified approximately 150 feet south of the southern Property boundary (see Figure 3, *Environmental Resources Screen*). As such, VHB completed and submitted a NDDB Review Request Form and supporting materials to the CTDEP for confirmation. CTDEP responded that smooth green snake (*Liochlorophis [Opheodrys] vernalis*), a state species of special concern, occurs in the vicinity of the Property. As a result, VHB prepared and submitted a smooth green snake habitat survey to CTDEP which details the likelihood this species may occur on the Property. Provided below is a summary of the smooth green snake habitat survey.

The smooth green snake favors open, unforested habitats including meadows, pastures, fens, coastal grasslands, mountaintop "balds", but is also found in transitional and

lightly forested habitats such as grassy old fields with scattered shrubs and trees, as well as oak-pitchpine woodland<sup>1</sup>. While a large maintained lawn area exists on the Property, it is associated with a golf driving range and will not be subject to disturbance as a result of the proposed development activities. Additionally, this area is subject to regular mowing and would not provide favorable habitat for the smooth green snake. The areas that will be subject to disturbance activities are characterized as upland forest (more specifically, variations of a northern hardwood forest type). Therefore, the proposed development will not adversely affect smooth green snakes or their preferred habitat. VHB is awaiting concurrence from CTDEP regarding these findings. The *Smooth Green Snake Habitat Survey*, which was submitted to the CTDEP is provided in Attachment C.

<sup>1</sup> Klemens, M. W. (1993). Amphibians and Reptiles of Connecticut and Adjacent Regions. State Geological and Natural History Survey of Connecticut, Bulletin 112.

**Table 1: New England Wildlife Database Search of Possible Amphibians, Reptiles and Mammals Anticipated To Use the Property**

Common Name	Scientific Name	Habitat			Special Habitat features
<b>AMPHIBIANS</b>					
Northern Redback Salamander	<i>Plethodon cinereus</i>	Forest			Logs, stumps, rocks, etc.
Northern Two-lined Salamander	<i>Eurycea bislineata</i>	Forest	Stream		
Northern Dusky Salamander	<i>Desmognathus fuscus</i>	Forest	Stream		
Red-spotted Newt	<i>Notophthalmus v. viridescens</i>	Forest		Swamp	Waterbodies with aquatic vegetation for adult newts; juveniles (efts) are terrestrial.
American Bullfrog	<i>Rana catesbiana</i>			Swamp	Deep permanent water with floating or emergent vegetation.
Eastern American Toad	<i>Bufo a. americanus</i>	Forest		Swamp	Shallow, still water for breeding.
Gray Treefrog	<i>Hyla versicolor</i>	Forest		Swamp	Seeps or shallow water adjacent to upland forests for breeding; hibernates under leaves, logs.
<b>Green Frog</b>	<b><i>Rana clamitans melanota</i></b>			<b>Swamp</b>	<b>Margins of riverine or lacustrine habitats for breeding.</b>
Northern Spring Peeper	<i>Pseudacris c. crucifer</i>	Forest		Swamp	Pools for breeding adjacent to forested or shrub habitat.
Pickerel Frog	<i>Rana palustris</i>	Forest		Swamp	Shallow, clear water of bogs, woodland streams, and lake margins.
<b>REPTILES</b>					
Common Snapping Turtle	<i>Chelydra s. serpentina</i>		Stream	Swamp	Wetlands within 10 km of well-drained, sandy, gravelly, or loamy areas for nesting.
Common Garter Snake	<i>Thamnophis sirtalis</i>	Forest	Stream	Swamp	None listed.
Eastern Milk Snake	<i>Lampropeltis t. triangulum</i>	Forest			Slash, wood piles, debris or loose soils for egg laying.
Northern Redbelly Snake	<i>Storeria o. occipitamaculata</i>	Forest		Swamp	Woodland debris – bark and rotting wood.
Northern Ringneck Snake	<i>Diadophis punctuatus edwardsii</i>	Forest			Mesic areas with abundant cover.
Northern Water Snake	<i>Nerodia s. sipedon</i>		Stream	Swamp	Branches, logs overhanging water.
<b>MAMMALS</b>					
<b>Beaver</b>	<b><i>Castor canadensis</i></b>	<b>Forest</b>	<b>Stream</b>	<b>Swamp</b>	<b>Low gradient woodland streams with adjacent young hardwoods.</b>
Black Bear	<i>Ursus americanus</i>	Forest	Stream	Swamp	Dens in semi-protected areas; seeps and wet areas in early spring; mast.
<b>Coyote</b>	<b><i>Canis latrans</i></b>	<b>Forest</b>			<b>Well-drained secluded den sites.</b>

Common Name	Scientific Name	Habitat			Special Habitat features
Deer Mouse	<i>Peromyscus maniculatus</i>	Forest			Down logs, rotting stumps.
<b>Eastern Chipmunk</b>	<i>Tamias striatus</i>	<b>Forest</b>			<b>Tree or shrub cover; elevated perches, decaying stumps and logs, stone walls.</b>
Fisher	<i>Martes pennanti</i>	Forest		Swamp	Hollow trees, logs; dense regenerating softwoods.
Gray Fox	<i>Urocyon cinereoargenteus</i>	Forest		Swamp	Hollow logs, tree cavities, rock crevices; tends to hunt forest edges.
<b>Gray Squirrel</b>	<i>Sciurus carolinensis</i>	<b>Forest</b>			<b>Mast-producing trees; tall trees for dens and leaf nests.</b>
House Mouse	<i>Mus musculus</i>				Buildings in winter; around human habitation.
Long-tailed Weasel	<i>Mustela frenata</i>	Forest		Swamp	Areas of abundant prey; previously excavated den sites; areas of abundant prey.
Masked Shrew	<i>Sorex cinereus</i>	Forest		Swamp	High humidity, ground cover especially leaves, rotten logs, herbaceous vegetation.
<b>Mink</b>	<i>Mustela vison</i>	<b>Forest</b>	<b>Stream</b>	<b>Swamp</b>	<b>Hollow logs, natural cavities, under tree roots; forest-wetland edges.</b>
Moose	<i>Alces alces</i>	Forest		Swamp	Wetlands (in summer).
Northern Flying Squirrel	<i>Glaucomys sabrinus</i>	Forest			Mature trees, cavities for winter dens; arboreal lichens.
Northern Short-tailed Shrew	<i>Blarina brevicauda</i>	Forest		Swamp	Low vegetation, loose leaf litter, high humidity.
<b>Porcupine</b>	<i>Erethizon dorsatum</i>	<b>Forest</b>			<b>Rock ledges or den trees.</b>
<b>Raccoon</b>	<i>Procyon lotor</i>	<b>Forest</b>	<b>Stream</b>	<b>Swamp</b>	<b>Hollow trees, dens usually &gt;10 feet above ground.</b>
Red Fox	<i>Vulpes vulpes</i>	Forest		Swamp	Well-drained den sites; tends to hunt more open or semi-open habitats.
Red Squirrel	<i>Tamiasciurus hudsonicus</i>	Forest			Woodlands with mature trees; conifers preferred.
Short-tailed Weasel	<i>Mustela erminea</i>	Forest		Swamp	Dense brushy cover, slash; areas of abundant prey.
Smoky Shrew	<i>Sorex fumeus</i>	Forest		Swamp	Loose, damp leaf litter.
Southern Flying Squirrel	<i>Glaucomys volans</i>	Forest			Mature woodland with cavity trees; favors cavities with entrance diameters of 1.6-2 inches.
Southern Red-backed Vole	<i>Clethrionomys gapperi</i>	Forest		Swamp	Springs, brooks, seeps, bogs; debris or slash cover.
Striped Skunk	<i>Mephitis mephitis</i>	Forest		Swamp	Well-drained soils for burrows/den sites; open uplands; around human habitation.
Virginia Opossum	<i>Didelphis virginiana</i>	Forest		Swamp	Hollow log or tree cavity.

Common Name	Scientific Name	Habitat		Special Habitat features
White-footed Mouse	<i>Peromyscus leucopus</i>	Forest	Swamp	Down logs rotting stumps, tree cavities, exposed rocks (stone walls, boulders and ledge).
<b>White-tailed Deer</b>	<b><i>Odocoileus virginianus</i></b>	Forest	Swamp	Dense cover for winter shelter, adequate browse.
Woodland Vole	<i>Microtus pinetorum</i>	Forest		Uses variable depths of leaf litter, duff or grass; moist well-drained soils

**Species in bold were observed on the Property**

## 5

## Terrestrial Wildlife Habitat Impact Analysis

The results of the field inventories and assessment of the habitat quality, available food sources, and availability of snags, cavities, and woody debris indicate that most of the Property contributes moderate to high value wildlife habitat.

Overall, the Property contains good interspersions (intermixing) of habitat types, including upland and wetland forest of varying age classes, intermittent watercourses, a perennial stream, and shrub swamp. Good habitat interspersions generally attract a greater diversity of wildlife species than a single cover type or habitat feature. The Property has the potential to support several dozen species of wildlife ranging from amphibians and reptiles to large mammals. Several potentially occurring species are typical of the Northern Hardwood forest habitat that dominates the Property. The Property occurs at a high elevation (approximately 1,330 to 1,450 feet), which precludes the presence of some species, but likely encourages the presence of others that prefer more montane habitat.

In order to determine whether any state-listed species were known to occur on the Property or in the area, VHB completed and submitted a CTDEP Natural Diversity Database Review Request Form and supporting materials to CTDEP. VHB received written confirmation that smooth green snake (*Liochlorophis [Opheodrys] vernalis*), a State Species of Special Concern, occurs in the vicinity of the Property. Smooth green snake favors meadows and grassy fields along the forest edge. This habitat type does not occur on the Property. VHB submitted a smooth green snake habitat survey to CTDEP and is awaiting concurrence from CTDEP regarding these findings.

Generally speaking, many tree species associated with the Northern Hardwood forest type are known to provide good sources of food for wildlife. American beech produces mast crops in the fall and can be an important source of winter food during good mast years. The seeds, foliage, and twigs of eastern hemlock not only provide valuable winter food sources, but cover for wildlife as well. Yellow birch catkins and other components of the tree are considered moderately good winter food, and the fruits and buds of black cherry and sugar maple range from good to excellent sources of summer foods. The



abundance and diversity of these fruit-, nut-, and seed-bearing species on the Property is high. At higher elevations, further east on the Property the forest is dominated by American beech. Beech trees in this area have suffered from substantial and widespread infestation of beech bark disease which may reduce the value of the forest as a food source in this area. Where the tree canopy is closed or an eastern hemlock component exists, the understory is less developed and does not offer significant foraging opportunities or cover for many species. Within these areas, the understory and mid-canopy are often dominated by shade tolerant tree species such as American beech and eastern hemlock. Herbaceous species are limited and predominately consist of various ferns such as woodfern (*Dryopteris* sp.) and Christmas fern (*Polystichum acrostichoides*), which are of little value as a food source for terrestrial wildlife. The understory in the forested wetlands, however, is far more complex and includes fruiting shrubs such as spicebush (*Lindera benzoin*) and winterberry (*Ilex verticillata*), and a more diverse herbaceous layer. Winterberry in particular is an extremely valuable food source as its berries persist through winter, when many other food sources are gone.

There is plenty of woody debris, leaf litter, and slash on the forest floor to provide cover and nesting habitat for many small and medium-sized mammals. Trees larger than 18 inches DBH are present, particularly on the western side of the Property. Cavities in trees of this size exist, although they are not overly abundant.

The shrub swamp/marsh likely provides some of the best foraging opportunities for wildlife species of all sizes occurring on the Property. Aquatic and wetland vegetation and macroinvertebrates provide food for reptiles and amphibians, which in turn serve as prey for many mammal species. Buds, seeds, fruits, and catkins from the thick shrub layer provide food for both small and large mammals alike. The vertical complexity of the shrub swamp vegetation also provides excellent cover for wildlife, particularly small and medium-sized animals.

Streams on the Property, particularly Mill Brook, provide an important water source for wildlife. Mill Brook is also critical as the primary source of water feeding the shrub swamp. Crayfish and amphibians that may occur in the stream can be good prey species for medium-sized mammals. Because of the relatively steep banks and lack of riparian habitat associated with the upper portions of Mill Brook, the species diversity associated with the stream may be greatest at its lower position on the landscape, where the stream flows into the swamp.

It is expected that noise and human presence associated with construction activities will result in temporary displacement of the more mobile species of terrestrial wildlife, particularly mammals. The proximity of similar forest habitats adjacent to the Property will allow for natural relocation of these individuals from the development zone. This impact is expected to be short-term, and it is expected that many of these individuals and species will return to the Property and occupy suitable habitats once again. Slow-moving amphibians and reptiles may experience some mortality during construction activities. Earthwork activities associated with grading have the potential to cause mortality of burrowing mammals.

Long-term impacts to wildlife resulting from operation of the proposed Project are expected to be minimal. The site will be unmanned, resulting in minimal human presence throughout the year. Of the 124.9-acre Property, approximately 9.45-acres of forested habitat would be disturbed as a result of the proposed Project. This disturbance is primarily related to tree clearing to accommodate the turbine facilities and an access road. While a total of approximately 9.45-acres of forest will be disturbed, the proposed Project will result in only 1.75 acres of permanent disturbance primarily related to the proposed gravel access roads. Disturbance activities associated with the proposed Project do not encroach on the shrub swamp along the southern Property boundary, which provides some of the richest wildlife habitat on the Property. Rather, construction activities would primarily affect areas characterized as a Northern Hardwood forest, which is the most common forest type throughout northern Connecticut. Locally this cover type is abundant throughout Colebrook and the surrounding towns of northern Litchfield County. The loss and/or conversion of this amount of forested habitat is not significant on a landscape scale as there are several large areas of similar forested habitat adjacent to and in the vicinity of the Property. On a site scale, the loss of large-diameter trees (>18 inches DBH) could be detrimental to nesting wildlife. Where possible, trees greater than 18 inches DBH should be avoided and protected during construction.

Following development activities, disturbed areas with the exception of the access roads, will be planted using a native herbaceous seed mixture. Areas in proximity to the proposed turbines will be maintained as meadow habitat. The introduction of meadow habitat and roads into the forested portions of the Property may benefit some species, but may be detrimental to others. Habitat edges such as occur between two cover types or between vegetation and a road have been identified in some wildlife studies as leading to higher rates of predation for some species. The greatest expanse of road will occur on the northeast side of the Property, leading to Locations Two and Three, where a logging road already exists.

One of the most important values of the Property is the role it plays as undeveloped, open space in the northwest Connecticut landscape. The Property is within a mile of Algonquin State Forest, and although Colebrook is still a relatively rural outpost of Connecticut, the proposed Project will help maintain a habitat corridor for wildlife as development pressures increase. The elimination of suburban development will also contribute to a healthy watershed, as Mill Brook outlets to the Mad River, which is tributary to the Rugg Brook Reservoir.

# 6

## Proposed Activities Relative to Wetlands and Impact Analysis

Due to the need to locate turbines in a manner that effectively captures wind and maximizes electrical generation efficiency and the location and proximity of the wetland resources on the Property, direct wetland impacts associated with access road construction are required. Where wetland impacts are unavoidable, measures have been taken to both minimize these impacts and mitigate for wetland functions and values adversely affected as a result.

The proposed Project would require permanent direct wetland impacts associated with the construction of a gravel access road over a forested wetland (Wetland 1) totaling approximately 3,194 square feet. This wetland crossing, which requires the crossing of two intermittent watercourses, is necessary in order to access Turbine Locations Two and Three. In addition, approximately 1,785 square feet of temporary direct impacts are necessary. These impacts are associated with tree clearing necessary to construct this crossing as well as the Blade Laydown and Assembly Area associated with Turbine Location One.

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### Wetland Evaluation

This subsection discusses the functions and values associated with Wetland 1 in proximity to the proposed permanent direct wetland impacts. It should be noted that while the functions and values evaluation was specific to areas of Wetland 1 subject to permanent impacts, the evaluation of Wildlife Habitat, Uniqueness/Heritage and Visual Quality/Aesthetics considered the attributes of Wetland 1 in its entirety. Impacts to Wetland 1 have the potential to alter these functions and values irrespective of their location within the wetland system.

This study uses *The Highway Methodology Workbook Supplement, Wetland Functions and Values: A Descriptive Approach* issued by the U.S. Army Corps of Engineers New England District (ACOE NE), September 1999. This evaluation provides a qualitative approach in which wetland functions can be considered primary, secondary, or unlikely to be provided at a significant level. Functions and values can be principal if they are an

important physical component of a wetland ecosystem (function only), and/or are considered of special value to society, from a local, regional, and/or national perspective. The ACOE NE recommends that wetland functions and be determined through “best professional judgment” based on a qualitative description of the physical attributes of wetlands and the functions and values exhibited. (See summary of *The Highway Methodology Workbook Supplement, Wetland Functions and Values: A Descriptive Approach & Wetland Functions and Values Field Forms* in Attachment D.) Photographs of Wetland 1 are included in Attachment B.

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## Wetland 1

Wetland 1, the dominant resource on the Property, consists of a broad bordering forested wetland associated with Mill Brook. This bordering system, which is dominated by eastern hemlock, is characterized by hummock-hollow topography and numerous small upland inclusions which are commonly associated with this type of wetland. The portion of this wetland that would be subject to disturbance is characterized as a forested wetland. Two intermittent watercourse features flow south within this area towards Mill Brook within narrow bordering wetlands. The westernmost of these two features is characterized by a narrow (2 to 3 feet wide) channel that lacks a continuous flow path. The channel disappears to the south of the crossing; however, subsurface flows were apparent within an extremely stony substrate. This area drains towards a small depressional area within Wetland 1. The easternmost of these two watercourse features is more significant. It originates at the northern Property boundary and is characterized by a scoured channel approximately 4 feet wide. It is likely subject to periodic high gradient flows as evidenced by scour, incised stream banks and a general lack of detritus. It continues to the south, where the topographical gradient subsides before flowing into Mill Brook. An old woods road exists immediately north of the proposed wetland crossing.

### Biological Functions

The portion of Wetland 1 that would be subject to disturbance contains two intermittent watercourse features. The larger of the two watercourses contains some base flow and is subject to periodic flashy flows resulting from storm events and spring snow melt. This feature has the potential to contain fish and shellfish habitat and thus provides this function at a secondary level.

This wetland provides wildlife habitat at a principal level. It is part of a larger wetland corridor that includes a perennial watercourse which flows into a large shrub swamp. It contains a variety of cover types and is surrounded by large areas of undeveloped land. The portion of wetland that would be subject to disturbance may provide habitat for small finfish and herpetofauna.

The portion of this wetland that would be subject to disturbance is not effective at providing significant production export. This portion of the wetland generally provides

conveyance of ground and surface water and does not support a large diversity of vegetation, wildlife food sources or commercially used products.

#### Hydrologic Functions

The portion of this wetland that would be subject to disturbance does not provide flood flow alteration at a principal or secondary level. This area is characterized by two intermittent watercourse features with narrow bordering wetlands. It is limited in its opportunity to provide this function by a general lack of impervious cover and development in proximity. The effectiveness of this wetland to provide this function is limited by its topographical gradient and lack of a bordering wetland in this location capable of attenuating flows.

This wetland does not provide groundwater recharge or discharge functions at a principal or secondary level. It is not characterized by seepage areas where groundwater exfiltration is occurring. This wetland area is underlain by till which generally impedes groundwater recharge.

#### Water Quality

The portion of this wetland that would be subject to disturbance does not provide sediment, toxicant or pathogen retention, nutrient removal, nutrient retention or nutrient transformation at a principal level or secondary level. It is limited by its topographical gradient, limited retention times and lack of dense vegetation. It is limited in its opportunity to provide this function as it is primarily surrounded by undeveloped land.

This wetland provides sediment/shoreline stabilizations functions at a principal level. This wetland area contains two intermittent watercourses. The easternmost watercourse feature contains a well defined bank and channel and is subject to periodic erosive flows. While the bordering wetland in this location is narrow, the banks are generally well vegetated with trees that provide bank stabilization.

#### Societal Values

Wetland 1 occurs on privately-owned property and as such does not have the opportunity to provide significant value to society with regard to recreation, education/scientific study, visual quality or aesthetics.

This wetland provides uniqueness and heritage values at a secondary level. The dominant feature is Mill Brook, a perennial watercourse which flows into a large shrub swamp at the southern Property boundary. It is limited by the fact that it is located on private property.

No threatened or endangered species are known to exist in this wetland area.

### Wetland Function-Value Evaluation Summary

Total area of wetland unknown Human Made? no Is wetland part of a wildlife corridor? yes or a "habitat Island"? no

Adjacent land use undeveloped land Distance to nearest roadway or other development adjacent

Dominant wetland systems present Palustrine Forested (PFO) Contiguous undeveloped buffer zone present yes

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Impacted area is headwater system

How many Tributaries contribute to the wetland? Impacted area is a tributary to larger wetland area Wildlife & vegetation diversity/abundance (see wetland description)

Wetland ID Wetland 1

Latitude \_\_\_\_\_ Longitude \_\_\_\_\_

Prepared by MD Date 11-18-10

Proposed wetland activities  
Type: Filling/clearing Area 3,959 sq ft

Corps manual wetland delineation  
Completed? Y \_\_\_\_\_ N X

Function/Value	Suitability		Rationale (Reference #) *	Principal Function(s)/Values(s)	Comments
	Y	N			
Fish and Shellfish Habitat (freshwater)	X		1, 4, 7, 8, 10, 15, 16, 17		Two intermittent watercourses are within area of disturbance.
Fish and Shellfish Habitat (marine)		X			This habitat does not exist in the wetland.
Wildlife Habitat	X		1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 14, 19, 20, 21, 22	X	Area of disturbance is part of larger system that provides this function at a principal level.
Production Export		X	1, 4, 5, 6, 10		Wetland does not provide this function in proximity to disturbance
Flood-flow Alteration		X	1, 2, 3, 5, 13		Wetland does not provide this function in proximity to disturbance
Groundwater Recharge/Discharge		X	1, 2, 6, 7, 12, 15		Wetland does not provide this function in proximity to disturbance
Sediment/Toxicant/Pathogen Retention		X	4, 7, 8, 10		Wetland does not provide this function in proximity to disturbance
Nutrient Removal/Retention/Transformation		X	1, 7		Wetland does not provide this function in proximity to disturbance
Sediment/Shoreline Stabilization	X		1, 2, 5, 6, 8, 9, 14	X	Wetland provides this function at a principal level.
Recreation		X	5, 6, 7		No recreation opportunities available in proximity to disturbance.
Educational/Scientific Value		X	5		Wetland does not provide educational/scientific opportunities at a principal or secondary level in proximity to disturbance.
Uniqueness/Heritage	X		3, 4, 5, 7, 16, 18, 19, 22, 27		Provided at a secondary level. Wetland is on private property.
Visual Quality/Aesthetics		X	5, 7, 8, 9, 10, 11		Wetland does not provide visual quality/aesthetic values at a principal or secondary level. No primary viewing locations.
Threatened or Endangered Species Habitat		X			No wetland dependent species known to use wetland.

\* Refer to Attachment D for rationale descriptions

## Preliminary Impact Analysis

The following preliminary wetland impact analysis has been conducted at the proposed wetland crossing location.<sup>2</sup> The impact numbers provided and design specifications referenced should be considered preliminary in nature. However, provided the ecologically-sensitive design measures described below are incorporated into the design, permanent wetland impacts will not result in a likely significant adverse impact to the principal functions and values associated with this wetland resource area.

The proposed Project would require permanent direct wetland impacts associated with the construction of a gravel access road over a forested wetland (Wetland 1) totaling approximately 3,194 square feet. The location of the proposed gravel access road was chosen carefully to minimize square footage of permanent wetland impacts. This wetland crossing, which requires the crossing of two intermittent watercourses, is necessary in order to access Turbine Locations Two and Three. Three-sided box culverts will be utilized to span each of the two watercourse crossings. As stated on plan sheet C-503, these crossings will be constructed in accordance with CTDEP Inland Fisheries Division Stream Crossing Guidelines, dated February 26, 2008. These guidelines have been established to minimize impacts to resident fish and wildlife. As required by CTDEP, unconfined in-stream work associated with the culvert installation will occur between June 1 and September 30. If possible, impacts associated with the installation of the box culvert should be located outside of the stream channel. Erosion and sedimentation controls will be installed as outlined in the *2002 Connecticut Guidelines for Erosion and Sediment Control* prior to construction in order to decrease the likelihood of sediment inputs into the streams. Following construction activities, cleared or disturbed streambanks will be planted as shown on plan sheet C-316, and detailed in the Streambank Stabilization Area Construction Sequence and Planting Schedule. Wildlife Habitat and Sediment/Shoreline Stabilization have been identified as the principal functions associated with the wetland area at the proposed access road crossing. Effective installation of the three-sided box culvert and stabilization of the streambanks as described will adequately protect these functions.

In addition, approximately 1,785 square feet of temporary direct impacts related to tree clearing are necessary. Temporary wetland impacts are associated with tree clearing are required to construct the gravel access road, as well as the Blade Laydown and Assembly Area associated with Turbine Location One. These impacts have been minimized to the greatest extent possible. Following construction activities, areas that are subject to temporary disturbance related to tree clearing will be restored with native wetland plants as detailed on plan sheets C-313 and C-316, Wetland Restoration Area Construction Sequence and Planting Schedule (refer to Attachment E). Additional temporary disturbance activities in proximity to Wetland 1, including clearing and grading, are required in order to construct the Blade Laydown and Assembly Areas associated

<sup>2</sup> This analysis is preliminary in nature due to the absence of topographic survey of the wetlands crossing. The information relied on for this preliminary analysis is based on site plans prepared by Zapata, Inc. dated November, 2010 and is based on publically available LiDAR topographic data. When the topographical survey is completed, this wetlands impact analysis will be supplemented with the updated information.

Turbine One. Best Management Practices will be utilized in accordance with the *2002 Connecticut Guidelines for Erosion and Sediment Control* throughout the course of construction activities on the Property and maintained until disturbed areas have been permanently stabilized. Silt fencing and hay bales will generally be installed around the perimeter of construction activities protecting nearby resources, including the nearby wetlands. A Wildlife/Conservation seed mix containing native grasses and forbs will be used to stabilize exposed areas post construction. Following establishment of these plantings and permanent stabilization of exposed soils, erosion control measures will be removed so as not to impede migration of wildlife utilizing the Property.



# 7

## Summary

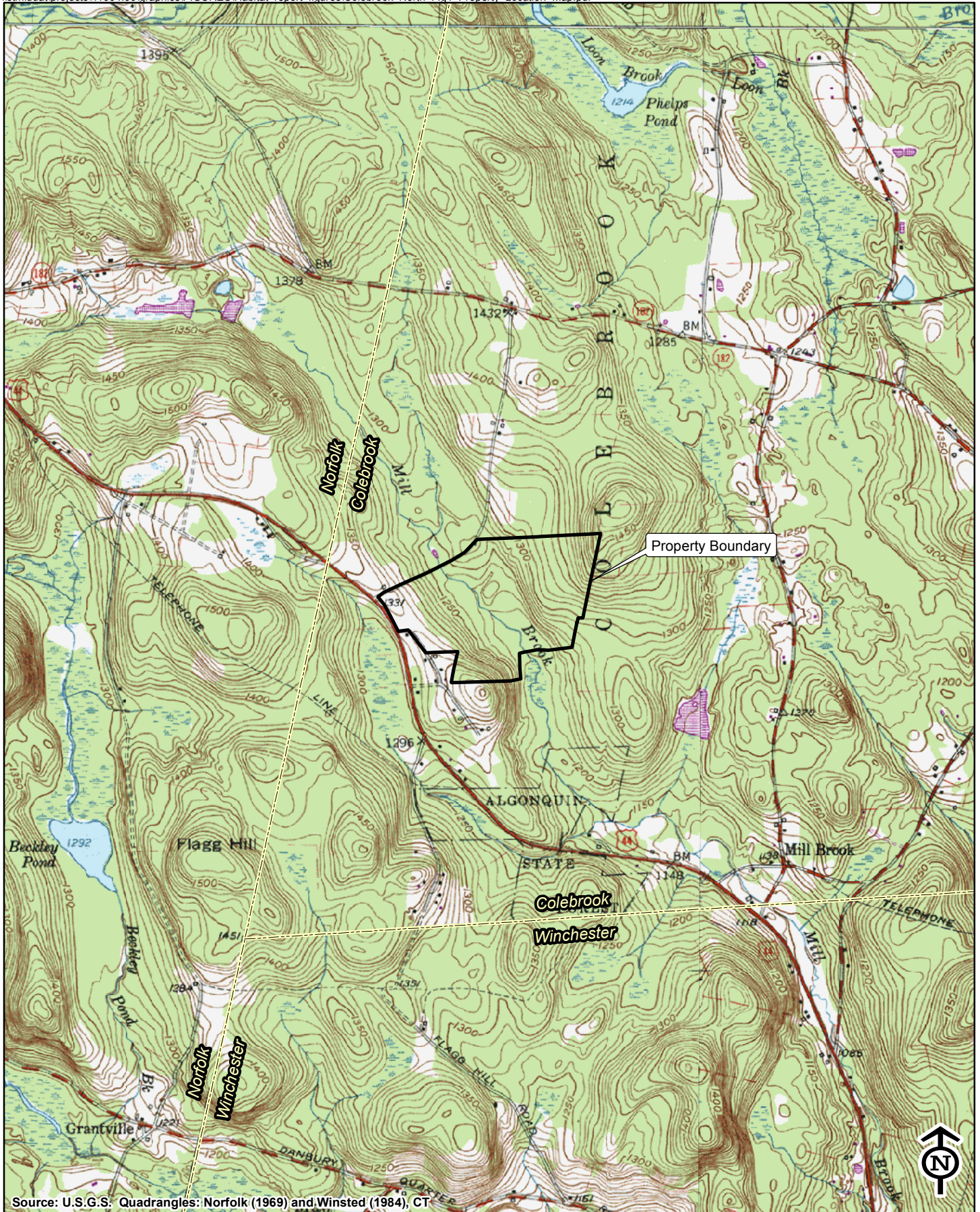
The proposed Project would require permanent direct wetland impacts associated with the construction of a gravel access road and intermittent watercourse crossings totaling approximately 3,194 square feet as well as approximately 1,785 square feet of temporary direct impacts related to tree clearing. The wetland area that will be subject to permanent impacts provides Wildlife Habitat and Sediment/Shoreline Stabilization functions at a principal level. By incorporating stream crossing measures as recommended by CTDEP as well as adequately stabilizing the streambanks as described, the proposed gravel access road will not result in a likely significant adverse impact on these functions. Following construction activities, wetland areas subject to temporary disturbance related to clearing will be restored with a variety of native trees, shrubs and herbaceous vegetation.

Overall the Property provides moderate to high wildlife habitat, and has the potential to be used by several dozen species, including some that are limited in their distribution in Connecticut. The proposed Project would temporarily disturb some species of wildlife during construction activities, and would permanently convert approximately 1.75 acres of forested habitat to gravel access road. It is not anticipated that the loss of this small amount of forested habitat will have a significant or long-term negative impact on most local terrestrial wildlife populations. The proposed Project may actually help local wildlife populations by preserving open space and protecting existing habitat from suburban development.

Overall the proposed development is not anticipated to have a significant, long-term impact on terrestrial wildlife or wetlands.

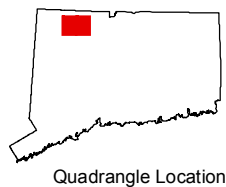
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# Figures



Vanasse Hangen Brustlin, Inc.





**Figure 1**  
**Property Location Map**  
**Wind Colebrook North**  
**BNE Energy, Inc.**  
**Winsted-Norfolk Road and**  
**Rock Hall Road**  
**Colebrook, Connecticut**



# Figure 2 Habitat Type Map

Wind Colebrook North  
BNE Energy, Inc.  
Winsted-Norfolk Road &  
Rock Hall Road  
Colebrook, Connecticut

### Legend

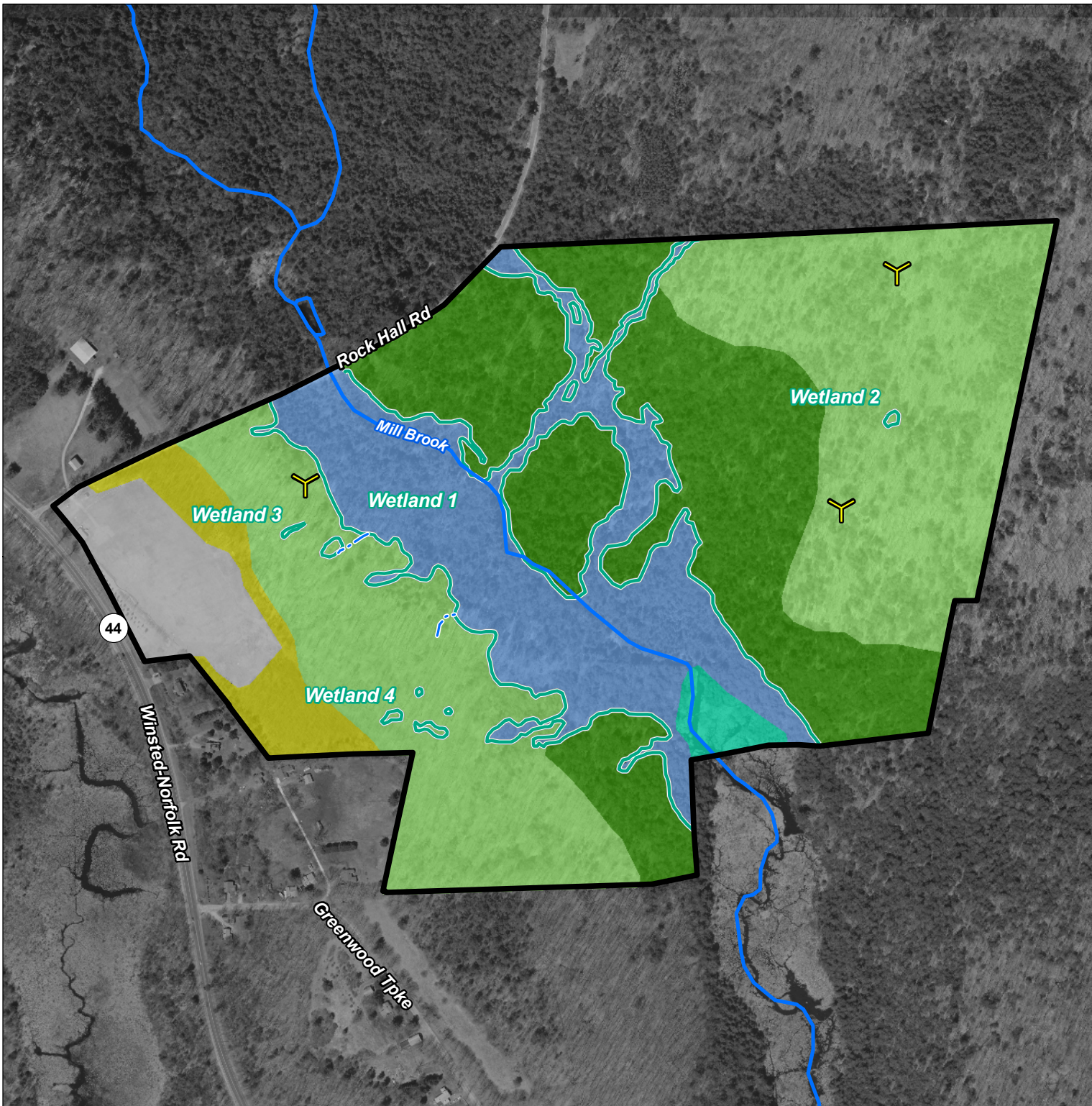
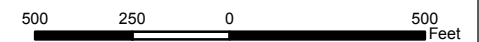
-  Proposed Wind Turbine Location
-  Property Boundary
-  Intermittent Watercourse
-  Delineated Wetland Boundary

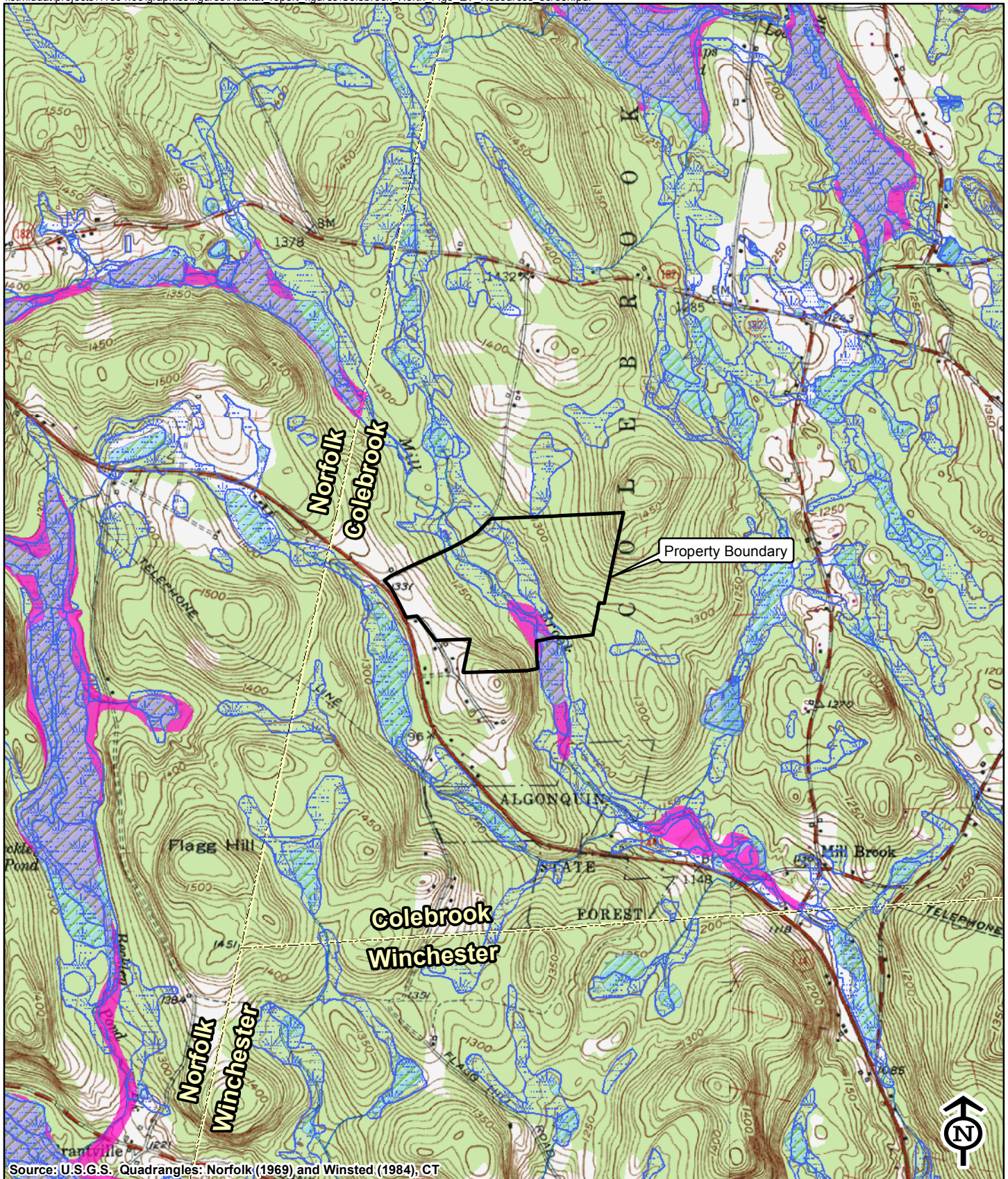
### Habitat Type

-  Early Successional Northern Hardwood Forest
-  Palustrine Forested Wetlands
-  Maintained Lawn (Golf Driving Range)
-  Second Growth Northern Hardwood Forest
-  Second Growth Northern Hardwoods - Hemlock - White Pine Forest
-  Palustrine Scrub/Shrub - Emergent Wetland

Base Map Source: ConnDOT 2004 aerial photograph with 0.5-foot resolution.

Mill Brook Data: CT DEP Hydrography Line  
[http://www.ct.gov/dep/cwp/view.asp?a=2698&q=322898&depNav\\_GID=1707](http://www.ct.gov/dep/cwp/view.asp?a=2698&q=322898&depNav_GID=1707)





Source: U.S.G.S. Quadrangles: Norfolk (1969) and Winsted (1984), CT

1,000 500 0 1,000 Feet

**Legend**

- Property Boundary
- NDDB Areas (buffered; last updated 08/2010)
- CTDEP Wetlands
- National Wetland Inventory Wetlands
- Open Water
- Town Line
- FEMA Flood Zone**
- 100 Year Flood Zone
- 500 Year Flood Zone
- Floodway in Zone AE
- Other Flood Areas

**Vanasse Hangen Brustlin, Inc.**

**Figure 3**  
**Environmental Resources Screen**  
**Wind Colebrook North**  
**BNE Energy, Inc.**  
**Winsted-Norfolk Road and**  
**Rock Hall Road**  
**Colebrook, Connecticut**

November 16, 2010

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# **Attachment A**

# **Wetlands Delineation Report**



**WETLANDS DELINEATION REPORT**

*Vanasse Hangen Brustlin, Inc.*

**Date:** August 11, 2010  
**Project No.:** 41604.00  
**Prepared For:** BNE Energy Inc.  
29 South Main Street  
Town Center Suite 200  
West Hartford, CT 06107  
**Site Location:** Route 44 & Rock Hall Road  
Colebrook, CT  
**Site Map:** VHB Wetland Resources Map  
**Inspection Date:** July 27 to 29 & August 2, 2010  
**Field Conditions:** Weather: partly sunny, mid 70's & low 80's  
Snow Depth: 0 inches  
General Soil Moisture: moist  
Frost Depth: 0 inches

**Type of Wetlands Identified and Delineated:**

Connecticut Inland Wetlands and Watercourses   
Tidal Wetlands   
U.S. Army Corps of Engineers

**Local Regulated Upland Review Areas:** Wetlands: 100 feet      Watercourses: 100 feet

**Field Numbering Sequence of Wetlands Boundary:** Connecticut - WF 1-01 to 1-121, WF 1-131 to 1-218, WF 1-228 to 1-275, WF 1-285 to 1-351, WF 1-361 to 368, WF 1-378 to 1-383, WF 1-393 to 434, WF 1-500 to 1-507, IWC 1-01 to 1-06, IWC 2-01 to 2-04, WF 2-01 to 2-08, WF 3-01 to 3-07, WF 4-01 to 4-08, WF 4-30 to 4-39, WF 4-50 to 4-53

*[as depicted on attached Wetland Resources Map]*

*The classification systems of the National Cooperative Soil Survey, the U.S. Department of Agriculture, Natural Resources Conservation Service, County Soil Survey Identification Legend, Connecticut Department of Environmental Protection and United States Army Corps of Engineers New England District were used in this investigation.*

*All established wetlands boundary lines are subject to change until officially adopted by local, state, or federal regulatory agencies.*

The wetlands delineation was conducted and reviewed by:

Matthew Davison  
Registered Soil Scientist

Enclosures

54 Tuttle Place  
Middletown, Connecticut 06457-1847  
**860.632.1500 • FAX 860.632.7879**  
email: info@vhb.com  
www.vhb.com

# Attachments

- 
- Wetland Delineation Field Form
  - Soil Map
  - Soil Report
  - VHB Wetland Resources Map





**Wetland Delineation Field Form**

Project Address:	Route 44 and Rock Hall Road Colebrook, Connecticut	Project Number:	41604.00
Inspection Date:	July 27,28, 29 & August 2, 2010	Inspector:	Matthew Davison
Wetland I.D.:	Wetland 1		

Field Conditions:	Weather: partly cloudy, mid 80's	Snow Depth: 0 inches
	General Soil Moisture: moist	Frost Depth: 0 inches
Type of Wetland Delineation:	Connecticut <input checked="" type="checkbox"/>	
	ACOE <input type="checkbox"/>	
	Tidal <input type="checkbox"/>	

Field Numbering Sequence: WF 1-01 to 1-121, WF 1-131 to 1-218, WF 1-228 to 1-275, WF 1-285 to 1-351, WF 1-361 to 368, WF 1-378 to 1-383, WF 1-393 to 434, WF 1-500 to 1-507, IWC 1-01 to 1-06, IWC 2-01 to 2-04

**WETLAND HYDROLOGY:**

**NONTIDAL**

Intermittently Flooded <input type="checkbox"/>	Artificially Flooded <input type="checkbox"/>	Permanently Flooded <input type="checkbox"/>
Semipermanently Flooded <input checked="" type="checkbox"/>	Seasonally Flooded <input type="checkbox"/>	Temporarily Flooded <input type="checkbox"/>
Permanently Saturated <input checked="" type="checkbox"/>	Seasonally Saturated – seepage <input checked="" type="checkbox"/>	Seasonally Saturated - perched <input type="checkbox"/>
Comments: Wetland includes perennial/intermittent watercourses, broad seasonally saturated forested wetland and permanently saturated emergent/scrub-shrub marsh		

**TIDAL**

Subtidal <input type="checkbox"/>	Regularly Flooded <input type="checkbox"/>	Irregularly Flooded <input type="checkbox"/>
Irregularly Flooded <input type="checkbox"/>		
Comments: N/A		

**WETLAND TYPE:**

**SYSTEM:**

Estuarine <input type="checkbox"/>	Riverine <input type="checkbox"/>	Palustrine <input checked="" type="checkbox"/>
Lacustrine <input type="checkbox"/>	Marine <input type="checkbox"/>	
Comments: Dominant system is Palustrine Forested (PFO)		

**CLASS:**

Emergent <input checked="" type="checkbox"/>	Scrub-shrub <input checked="" type="checkbox"/>	Forested <input checked="" type="checkbox"/>
Open Water <input checked="" type="checkbox"/>	Disturbed <input type="checkbox"/>	Wet Meadow <input type="checkbox"/>
Comments: Dominant class is Palustrine Forested Wetland (PFO)		

**WATERCOURSE TYPE:**

Perennial <input checked="" type="checkbox"/>	Intermittent <input checked="" type="checkbox"/>	Tidal <input type="checkbox"/>
Comments: Two intermittent watercourses (IWC's) flow west to east into bordering wetland, one IWC flows east to west down hillside within deeply scoured channel into Mill Brook.		

**SPECIAL AQUATIC HABITAT:**

Vernal Pool <input type="checkbox"/>	Other <input type="checkbox"/>	
Comments: N/A		

**Wetland Delineation Field Form (Cont.)**

**MAPPED SOILS:**

SOIL SERIES (Map Unit Symbol)	WET	UP	NRCS MAPPED	FIELD IDD/ CONFIRMED
Bice-Millsite complex (413)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Bice fine sandy loam (417)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Schroon fine sandy loam (418)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Shelburne fine sandy loam (425)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Ashfield fine sandy loam (427)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Wonsqueak mucky peat (437)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Brayton-Loonmeadow complex (443)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

**DOMINANT PLANTS:**

red maple ( <i>Acer rubrum</i> )	eastern hemlock ( <i>Tsuga Canadensis</i> )
sugar maple ( <i>Acer saccharum</i> )	yellow birch ( <i>Betula alleghaniensis</i> )
white ash ( <i>Fraxinus americana</i> )	American beech ( <i>Fagus gradifolia</i> )
hayscented fern ( <i>Dennstaedtia</i> )	cinnamon fern ( <i>Osmunda cinnamomea</i> )
maidenhair fern ( <i>Adiantum</i> )	sensitive fern ( <i>Onoclea sensibilis</i> )
royal fern ( <i>Osmunda regalis</i> )	Christmas fern ( <i>Polystichum acrostichoides</i> )
Canada mayflower ( <i>Maianthemum canadense</i> )	Indian cucumber root ( <i>Medeola virginica</i> )
trillium ( <i>Trillium sp.</i> )	jewelweed ( <i>Impatiens capensis</i> )
spicebush ( <i>Lindera benzoin</i> )	poison ivy ( <i>Toxicodendron radicans</i> )
bush honeysuckle ( <i>Lonicera spp.</i> )	eastern white pine ( <i>Pinus strobus</i> )
blue cohosh ( <i>Caulophyllum thalictroides</i> )	ironwood/hophornbeam ( <i>Ostrya virginiana</i> )
sedge sp. ( <i>Carex sp.</i> )	starflower ( <i>Trientalis borealis</i> )
rush sp ( <i>Juncus sp.</i> )	northern arrowwood ( <i>Viburnum recognitum</i> )
tussock sedge ( <i>Carex stricta</i> )	

**WETLAND NARRATIVE:**

Wetland 1 consists of a broad bordering forested wetland associated with Mill Brook. This bordering system, which is dominated by a hemlock overstory, is characterized by hummock-hollow topography and numerous small upland inclusions which are commonly associated with this type of wetland. Several larger upland inclusions were delineated (designated WF 1-361 to 368, WF 1-378 to 1-383, and WF 1-393 to 434). Mill Brook, a perennial watercourse, originates at a corrugated metal culvert on the south side of Rockhall Road and flows southeast through the center of the Site. The stream is characterized as having a well defined bank with decreasing gradient from the culvert flowing south. The streambed is characterized as a large particle sand bottom with mixed cobble/gravel and a few bedrock outcrops. Finfish and crawfish were observed within shallow pools. As Mill Brook flows south to the southern property boundary it opens into a large emergent marsh and scrub/shrub wetland dominated by *Juncus spp.*, *Carex spp.*, and various wetland shrub species. Several hillside seep wetlands and associated intermittent watercourses were identified and delineated on the Site. These seeps convey storm water runoff during high water events, spring melt, and sheet flow from the open field upslope to the west into the perennial stream. The most significant of which is an intermittent watercourse which flows into Wetland 1 from the north Site boundary. This watercourse flows within a deeply scoured channel at its upper extent before discharging into Wetland 1 within a shallow braided channel.

**Wetland Delineation Field Form**

Project Address:	Route 44 and Rock Hall Road Colebrook, Connecticut	Project Number:	41604.00
Inspection Date:	July 27,28, 29 & August 2, 2010	Inspector:	Matthew Davison
Wetland I.D.:	Wetland 2		

Field Conditions:	Weather: partly cloudy, mid 80's	Snow Depth: 0 inches
	General Soil Moisture: moist	Frost Depth: 0 inches
Type of Wetland Delineation:	Connecticut <input checked="" type="checkbox"/>	
	ACOE <input type="checkbox"/>	
	Tidal <input type="checkbox"/>	
Field Numbering Sequence: WF 2-01 to 2-08		

**WETLAND HYDROLOGY:**

**NONTIDAL**

Intermittently Flooded <input type="checkbox"/>	Artificially Flooded <input type="checkbox"/>	Permanently Flooded <input type="checkbox"/>
Semipermanently Flooded <input type="checkbox"/>	Seasonally Flooded <input type="checkbox"/>	Temporarily Flooded <input type="checkbox"/>
Permanently Saturated <input type="checkbox"/>	Seasonally Saturated <input checked="" type="checkbox"/>	Seasonally Saturated - perched <input type="checkbox"/>
Comments: Isolated, seasonally saturated wetland depression.		

**TIDAL**

Subtidal <input type="checkbox"/>	Regularly Flooded <input type="checkbox"/>	Irregularly Flooded <input type="checkbox"/>
Irregularly Flooded <input type="checkbox"/>		
Comments: N/A		

**WETLAND TYPE:**

**SYSTEM:**

Estuarine <input type="checkbox"/>	Riverine <input type="checkbox"/>	Palustrine <input checked="" type="checkbox"/>
Lacustrine <input type="checkbox"/>	Marine <input type="checkbox"/>	
Comments: Palustrine Forested Wetland (PFO)		

**CLASS:**

Emergent <input type="checkbox"/>	Scrub-shrub <input type="checkbox"/>	Forested <input checked="" type="checkbox"/>
Open Water <input type="checkbox"/>	Disturbed <input type="checkbox"/>	Wet Meadow <input type="checkbox"/>
Comments: see above		

**WATERCOURSE TYPE:**

Perennial <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Tidal <input type="checkbox"/>
Comments: N/A		

**SPECIAL AQUATIC HABITAT:**

Vernal Pool <input type="checkbox"/>	Other <input type="checkbox"/>	
Comments: N/A		

**Wetland Delineation Field Form (Cont.)**

**MAPPED SOILS:**

SOIL SERIES (Map Unit Symbol)	WET	UP	NRCS MAPPED	FIELD IDD/ CONFIRMED
Bice fine sandy loam (417)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Schroon fine sandy loam (418)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Brayton-Loonmeadow complex (443)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

**DOMINANT PLANTS:**

sugar maple ( <i>Acer saccharum</i> )	eastern hemlock ( <i>Tsuga Canadensis</i> )
hayscented fern ( <i>Dennstaedtia</i> )	yellow birch ( <i>Betula alleghaniensis</i> )
Canada mayflower ( <i>Maianthemum canadense</i> )	American beech ( <i>Fagus gradifolia</i> )
trillium ( <i>Trillium sp.</i> )	cinnamon fern ( <i>Osmunda cinnamomea</i> )
sensitive fern ( <i>Onoclea sensibilis</i> )	

**WETLAND NARRATIVE:**

Wetland 2 is a small forested wetland depression located at the base of a western facing slope. Several surface indicators of hydrology were observed, such as water stained leaves and detritus, which indicate this area may be subject to shallow seasonal inundation.

**Wetland Delineation Field Form**

Project Address:	Route 44 and Rock Hall Road Colebrook, Connecticut	Project Number:	41604.00
Inspection Date:	July 27,28, 29 & August 2, 2010	Inspector:	Matthew Davison
Wetland I.D.:	Wetland 3		

Field Conditions:	Weather: partly cloudy, mid 80's	Snow Depth: 0 inches
	General Soil Moisture: moist	Frost Depth: 0 inches
Type of Wetland Delineation:	Connecticut <input checked="" type="checkbox"/>	
	ACOE <input type="checkbox"/>	
	Tidal <input type="checkbox"/>	
Field Numbering Sequence: WF 3-01 to 3-07		

**WETLAND HYDROLOGY:  
NONTIDAL**

Intermittently Flooded <input type="checkbox"/>	Artificially Flooded <input type="checkbox"/>	Permanently Flooded <input type="checkbox"/>
Semipermanently Flooded <input type="checkbox"/>	Seasonally Flooded <input type="checkbox"/>	Temporarily Flooded <input type="checkbox"/>
Permanently Saturated <input type="checkbox"/>	Seasonally Saturated – seepage <input checked="" type="checkbox"/>	Seasonally Saturated - perched <input type="checkbox"/>
Comments: Hillside seep wetland with associated intermittent watercourse (IWC)		

**TIDAL**

Subtidal <input type="checkbox"/>	Regularly Flooded <input type="checkbox"/>	Irregularly Flooded <input type="checkbox"/>
Irregularly Flooded <input type="checkbox"/>		
Comments: N/A		

**WETLAND TYPE:  
SYSTEM:**

Estuarine <input type="checkbox"/>	Riverine <input type="checkbox"/>	Palustrine <input checked="" type="checkbox"/>
Lacustrine <input type="checkbox"/>	Marine <input type="checkbox"/>	
Comments: Palustrine Forested Wetland (PFO)		

**CLASS:**

Emergent <input type="checkbox"/>	Scrub-shrub <input type="checkbox"/>	Forested <input checked="" type="checkbox"/>
Open Water <input type="checkbox"/>	Disturbed <input type="checkbox"/>	Wet Meadow <input type="checkbox"/>
Comments: see above		

**WATERCOURSE TYPE:**

Perennial <input type="checkbox"/>	Intermittent <input checked="" type="checkbox"/>	Tidal <input type="checkbox"/>
Comments: IWC originating at seepage flows short distance before infiltrating at eastern tip of wetland		

**SPECIAL AQUATIC HABITAT:**

Vernal Pool <input type="checkbox"/>	Other <input type="checkbox"/>	
Comments: N/A		



**Wetland Delineation Field Form**

Project Address:	Route 44 and Rock Hall Road Colebrook, Connecticut	Project Number:	41604.00
Inspection Date:	July 27,28, 29 & August 2, 2010	Inspector:	Matthew Davison
Wetland I.D.:	Wetland 4		

Field Conditions:	Weather: partly cloudy, mid 80's	Snow Depth: 0 inches
	General Soil Moisture: moist	Frost Depth: 0 inches
Type of Wetland Delineation:	Connecticut <input checked="" type="checkbox"/>	
	ACOE <input type="checkbox"/>	
	Tidal <input type="checkbox"/>	
Field Numbering Sequence: WF 4-01 to 4-08, WF 4-30 to 4-39, WF 4-50 to 4-53		

**WETLAND HYDROLOGY:  
NONTIDAL**

Intermittently Flooded <input type="checkbox"/>	Artificially Flooded <input type="checkbox"/>	Permanently Flooded <input type="checkbox"/>
Semipermanently Flooded <input type="checkbox"/>	Seasonally Flooded <input type="checkbox"/>	Temporarily Flooded <input type="checkbox"/>
Permanently Saturated <input type="checkbox"/>	Seasonally Saturated – seepage <input checked="" type="checkbox"/>	Seasonally Saturated - perched <input type="checkbox"/>
Comments: Hillside seep wetland complex		

**TIDAL**

Subtidal <input type="checkbox"/>	Regularly Flooded <input type="checkbox"/>	Irregularly Flooded <input type="checkbox"/>
Irregularly Flooded <input type="checkbox"/>		
Comments: N/A		

**WETLAND TYPE:  
SYSTEM:**

Estuarine <input type="checkbox"/>	Riverine <input type="checkbox"/>	Palustrine <input checked="" type="checkbox"/>
Lacustrine <input type="checkbox"/>	Marine <input type="checkbox"/>	
Comments: Palustrine Forested Wetland (PFO)		

**CLASS:**

Emergent <input type="checkbox"/>	Scrub-shrub <input type="checkbox"/>	Forested <input checked="" type="checkbox"/>
Open Water <input type="checkbox"/>	Disturbed <input type="checkbox"/>	Wet Meadow <input type="checkbox"/>
Comments: see above		

**WATERCOURSE TYPE:**

Perennial <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Tidal <input type="checkbox"/>
Comments: N/A		

**SPECIAL AQUATIC HABITAT:**

Vernal Pool <input type="checkbox"/>	Other <input type="checkbox"/>	
Comments: N/A		








## MAP LEGEND






















### Area of Interest (AOI)


 Area of Interest (AOI)

### Soils

 Soil Map Units

### Special Point Features




-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot
-  Spoil Area
-  Stony Spot

 Very Stony Spot

 Wet Spot

 Other



### Special Line Features

-  Gully
-  Short Steep Slope
-  Other






### Political Features

 Cities

### Water Features

-  Oceans
-  Streams and Canals

### Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

## MAP INFORMATION

Map Scale: 1:8,730 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
Coordinate System: UTM Zone 18N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut  
Survey Area Data: Version 7, Dec 3, 2009

Date(s) aerial images were photographed: 8/14/2006

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

State of Connecticut (CT600)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
302	Dumps	3.6	0.9%
308	Udorthents, smoothed	1.8	0.4%
413C	Bice-Millsite complex, 3 to 15 percent slopes, very rocky	33.5	8.2%
413E	Bice-Millsite complex, 15 to 45 percent slopes, very rocky	30.4	7.5%
417B	Bice fine sandy loam, 3 to 8 percent slopes, very stony	21.7	5.3%
417C	Bice fine sandy loam, 8 to 15 percent slopes, very stony	48.5	11.9%
417D	Bice fine sandy loam, 15 to 25 percent slopes, very stony	22.5	5.5%
418C	Schroon fine sandy loam, 2 to 15 percent slopes, very stony	27.9	6.9%
424B	Shelburne fine sandy loam, 3 to 8 percent slopes	32.6	8.0%
424C	Shelburne fine sandy loam, 8 to 15 percent slopes	4.4	1.1%
425B	Shelburne fine sandy loam, 3 to 8 percent slopes, very stony	30.3	7.4%
425C	Shelburne fine sandy loam, 8 to 15 percent slopes, very stony	32.4	8.0%
426D	Shelburne fine sandy loam, 15 to 35 percent slopes, extremely stony	9.6	2.4%
427B	Ashfield fine sandy loam, 2 to 8 percent slopes, very stony	3.4	0.8%
427C	Ashfield fine sandy loam, 8 to 15 percent slopes, very stony	34.9	8.6%
437	Wonsqueak mucky peat	28.3	7.0%
443	Brayton-Loonmeadow complex, extremely stony	40.6	10.0%
W	Water	0.5	0.1%
<b>Totals for Area of Interest</b>		<b>406.9</b>	<b>100.0%</b>

## Map Unit Description (Brief)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the selected area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit. A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

The "Map Unit Description (Brief)" report gives a brief, general description of the major soils that occur in a map unit. Descriptions of nonsoil (miscellaneous areas) and minor map unit components may or may not be included. This description is written by the local soil scientists responsible for the respective soil survey area data. A more detailed description can be generated by the "Map Unit Description" report.

Additional information about the map units described in this report is available in other Soil Data Mart reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the Soil Data Mart reports define some of the properties included in the map unit descriptions.

## Report—Map Unit Description (Brief)

### State of Connecticut

**Description Category:** SOI

**Map Unit:** 302—Dumps

Dumps This map unit is in the New England and Eastern New York Upland, Southern Part Connecticut Valley Major Land Resource Area. The mean annual precipitation is 37 to 50 inches (940 to 1270 millimeters) and the average annual air temperature is 37 to 52 degrees F. (3 to 11 degrees C.) This map unit is 95 percent Dumps. 5 percent minor components. Dumps Dumps are areas of smoothed or uneven accumulations or piles of waste rock and general refuse. The slope ranges from 0 to 15 percent and the runoff class is very low. The Nonirrigated Land Capability Class is 8

**Map Unit:** 308—Udorthents, smoothed

Udorthents, Smoothed This map unit is in the New England and Eastern New York Upland, Southern Part Connecticut Valley Major Land Resource Area. The mean annual precipitation is 32 to 50 inches (813 to 1270 millimeters) and the average annual air temperature is 45 to 55 degrees F. (7 to 13 degrees C.) This map unit is 80 percent Udorthents soils. 20 percent minor components. Udorthents soils This component occurs on leveled land and fill landforms. The slope ranges from 0 to 35 percent and the runoff class is medium. The depth to a restrictive feature varies, but is commonly greater than 60 inches. The drainage class is typically well drained. The slowest permeability within 60 inches is about 0.00 in/hr (very slow), with about 9.0 inches (high) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 1.4 LEP (low). The flooding frequency for this component is none. The ponding hazard is none. The minimum depth to a seasonal water table is greater than 60 inches. The maximum calcium carbonate within 40 inches is none. The maximum amount of salinity in any layer is about 0 mmhos/cm (nonsaline). The Nonirrigated Land Capability Class is 3e Typical Profile: 0 to 5 inches; loam 5 to 21 inches; gravelly loam 21 to 80 inches; very gravelly sandy loam

**Map Unit:** 413C—Bice-Millsite complex, 3 to 15 percent slopes, very rocky

Bice-Millsite Complex, 3 To 15 Percent Slopes, Very Rocky This map unit is in the New England and Eastern New York Upland, Southern Part Major Land Resource Area. The mean annual precipitation is 35 to 55 inches (889 to 1397 millimeters) and the average annual air temperature is 39 to 45 degrees F. (4 to 7 degrees C.) This map unit is 45 percent Bice soils, 40 percent Millsite soils. 15 percent minor components. Bice soils This component occurs on upland hill landforms. The parent material consists of melt-out till derived from granite, gneiss, and schist. The slope ranges from 3 to 15 percent and the runoff class is low. The depth to a restrictive feature is greater than 60 inches. The drainage class is well drained. The slowest permeability within 60 inches is about 0.57 in/hr (moderate), with about 7.0 inches (high) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 1.5 LEP (low). The flooding frequency for this component is none. The ponding hazard is none. The minimum depth to a seasonal water table, when present, is greater than 6 feet. The maximum calcium carbonate within 40 inches is none. The maximum amount of salinity in any layer is about 0 mmhos/cm (nonsaline). The Nonirrigated Land Capability Class is 6s Typical Profile: 0 to 1 inches; slightly decomposed plant material 1 to 7 inches; fine sandy loam 7 to 16 inches; fine sandy loam 16 to 24 inches; gravelly fine sandy loam 24 to 60 inches; gravelly sandy loam Millsite soils This component occurs on upland hill and ridge landforms. The parent material consists of melt-out till derived from gneiss, granite, and schist. The slope ranges from 3 to 15 percent and the runoff class is low. The depth to a restrictive feature is 20 to 40 inches to bedrock (lithic). The drainage class is well drained. The slowest permeability within 60 inches is about 0.57 in/hr (moderate), with about 3.8 inches (moderate) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 1.5 LEP (low). The flooding frequency for this component is none. The ponding hazard is none. The minimum depth to a seasonal water table, when present, is greater than 6 feet. The maximum calcium carbonate within 40 inches is none. The maximum amount of salinity in any layer is none. The Nonirrigated Land Capability Class is 6s Typical Profile: 0 to 1 inches; moderately decomposed plant material 1 to 5 inches; fine sandy loam 5 to 13 inches; stony fine sandy loam 13 to 24 inches; fine sandy loam 24 to 31 inches; sandy loam 31 to 39 inches; bedrock

**Map Unit:** 413E—Bice-Millsite complex, 15 to 45 percent slopes, very rocky

Bice-Millsite Complex, 15 To 45 Percent Slopes, Very Rocky This map unit is in the New England and Eastern New York Upland, Southern Part Major Land Resource Area. The mean annual precipitation is 35 to 55 inches (889 to 1397 millimeters) and the average annual air temperature is 39 to 45 degrees F. (4 to 7 degrees C.) This map unit is 45 percent Bice soils, 40 percent Millsite soils. 15 percent minor components. Bice soils This component occurs on upland hill landforms. The parent material consists of melt-out till derived from granite, gneiss, and schist. The slope ranges from 15 to 45 percent and the runoff class is medium. The depth to a restrictive feature is greater than 60 inches. The drainage class is well drained. The slowest permeability within 60 inches is about 0.57 in/hr (moderate), with about 7.0 inches (high) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 1.5 LEP (low). The flooding frequency for this component is none. The ponding hazard is none. The minimum depth to a seasonal water table, when present, is greater than 6 feet. The maximum calcium carbonate within 40 inches is none. The maximum amount of salinity in any layer is about 0 mmhos/cm (nonsaline). The Nonirrigated Land Capability Class is 7s Typical Profile: 0 to 1 inches; slightly decomposed plant material 1 to 7 inches; fine sandy loam 7 to 16 inches; fine sandy loam 16 to 24 inches; gravelly fine sandy loam 24 to 60 inches; gravelly sandy loam Millsite soils This component occurs on upland hill and ridge landforms. The parent material consists of melt-out till derived from gneiss, granite, and schist. The slope ranges from 15 to 45 percent and the runoff class is medium. The depth to a restrictive feature is 20 to 40 inches to bedrock (lithic). The drainage class is well drained. The slowest permeability within 60 inches is about 0.57 in/hr (moderate), with about 3.8 inches (moderate) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 1.5 LEP (low). The flooding frequency for this component is none. The ponding hazard is none. The minimum depth to a seasonal water table, when present, is greater than 6 feet. The maximum calcium carbonate within 40 inches is none. The maximum amount of salinity in any layer is none. The Nonirrigated Land Capability Class is 7s Typical Profile: 0 to 1 inches; moderately decomposed plant material 1 to 5 inches; fine sandy loam 5 to 13 inches; stony fine sandy loam 13 to 24 inches; fine sandy loam 24 to 31 inches; sandy loam 31 to 39 inches; bedrock

**Map Unit:** 417B—Bice fine sandy loam, 3 to 8 percent slopes, very stony

Bice Fine Sandy Loam, 3 To 8 Percent Slopes, Very Stony This map unit is in the New England and Eastern New York Upland, Southern Part Major Land Resource Area. The mean annual precipitation is 35 to 55 inches (889 to 1397 millimeters) and the average annual air temperature is 39 to 45 degrees F. (4 to 7 degrees C.) This map unit is 85 percent Bice soils. 15 percent minor components. Bice soils This component occurs on upland hill landforms. The parent material consists of melt-out till derived from granite, gneiss, and schist. The slope ranges from 3 to 8 percent and the runoff class is low. The depth to a restrictive feature is greater than 60 inches. The drainage class is well drained. The slowest permeability within 60 inches is about 0.57 in/hr (moderate), with about 7.0 inches (high) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 1.5 LEP (low). The flooding frequency for this component is none. The ponding hazard is none. The minimum depth to a seasonal water table, when present, is greater than 6 feet. The maximum calcium carbonate within 40 inches is none. The maximum amount of salinity in any layer is about 0 mmhos/cm (nonsaline). The Nonirrigated Land Capability Class is 6s Typical Profile: 0 to 1 inches; slightly decomposed plant material 1 to 7 inches; fine sandy loam 7 to 16 inches; fine sandy loam 16 to 24 inches; gravelly fine sandy loam 24 to 60 inches; gravelly sandy loam

**Map Unit:** 417C—Bice fine sandy loam, 8 to 15 percent slopes, very stony

Bice Fine Sandy Loam, 8 To 15 Percent Slopes, Very Stony This map unit is in the New England and Eastern New York Upland, Southern Part Major Land Resource Area. The mean annual precipitation is 35 to 55 inches (889 to 1397 millimeters) and the average annual air temperature is 39 to 45 degrees F. (4 to 7 degrees C.) This map unit is 85 percent Bice soils. 15 percent minor components. Bice soils This component occurs on upland hill landforms. The parent material consists of melt-out till derived from granite, gneiss, and schist. The slope ranges from 8 to 15 percent and the runoff class is low. The depth to a restrictive feature is greater than 60 inches. The drainage class is well drained. The slowest permeability within 60 inches is about 0.57 in/hr (moderate), with about 7.0 inches (high) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 1.5 LEP (low). The flooding frequency for this component is none. The ponding hazard is none. The minimum depth to a seasonal water table, when present, is greater than 6 feet. The maximum calcium carbonate within 40 inches is none. The maximum amount of salinity in any layer is about 0 mmhos/cm (nonsaline). The Nonirrigated Land Capability Class is 6s Typical Profile: 0 to 1 inches; slightly decomposed plant material 1 to 7 inches; fine sandy loam 7 to 16 inches; fine sandy loam 16 to 24 inches; gravelly fine sandy loam 24 to 60 inches; gravelly sandy loam

**Map Unit:** 417D—Bice fine sandy loam, 15 to 25 percent slopes, very stony

**Bice Fine Sandy Loam, 15 To 25 Percent Slopes, Very Stony** This map unit is in the New England and Eastern New York Upland, Southern Part Major Land Resource Area. The mean annual precipitation is 35 to 55 inches (889 to 1397 millimeters) and the average annual air temperature is 39 to 45 degrees F. (4 to 7 degrees C.) This map unit is 85 percent Bice soils. 15 percent minor components. Bice soils This component occurs on upland hill landforms. The parent material consists of melt-out till derived from granite, gneiss, and schist. The slope ranges from 15 to 25 percent and the runoff class is medium. The depth to a restrictive feature is greater than 60 inches. The drainage class is well drained. The slowest permeability within 60 inches is about 0.57 in/hr (moderate), with about 7.0 inches (high) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 1.5 LEP (low). The flooding frequency for this component is none. The ponding hazard is none. The minimum depth to a seasonal water table, when present, is greater than 6 feet. The maximum calcium carbonate within 40 inches is none. The maximum amount of salinity in any layer is about 0 mmhos/cm (nonsaline). The Nonirrigated Land Capability Class is 6s Typical Profile: 0 to 1 inches; slightly decomposed plant material 1 to 7 inches; fine sandy loam 7 to 16 inches; fine sandy loam 16 to 24 inches; gravelly fine sandy loam 24 to 60 inches; gravelly sandy loam

**Map Unit:** 418C—Schroon fine sandy loam, 2 to 15 percent slopes, very stony

**Schroon Fine Sandy Loam, 2 To 15 Percent Slopes, Very Stony** This map unit is in the New England and Eastern New York Upland, Southern Part Major Land Resource Area. The mean annual precipitation is 32 to 44 inches (813 to 1118 millimeters) and the average annual air temperature is 39 to 45 degrees F. (4 to 7 degrees C.) This map unit is 85 percent Schroon soils. 15 percent minor components. Schroon soils This component occurs on upland hill landforms. The parent material consists of melt-out till derived from granite, gneiss, and schist. The slope ranges from 2 to 15 percent and the runoff class is low. The depth to a restrictive feature is greater than 60 inches. The drainage class is moderately well drained. The slowest permeability within 60 inches is about 0.57 in/hr (moderate), with about 7.3 inches (high) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 1.5 LEP (low). The flooding frequency for this component is none. The ponding hazard is none. The minimum depth to a seasonal water table, when present, is about 24 inches. The maximum calcium carbonate within 40 inches is none. The maximum amount of salinity in any layer is about 0 mmhos/cm (nonsaline). The Nonirrigated Land Capability Class is 6s Typical Profile: 0 to 1 inches; slightly decomposed plant material 1 to 2 inches; moderately decomposed plant material 2 to 3 inches; highly decomposed plant material 3 to 9 inches; fine sandy loam 9 to 14 inches; fine sandy loam 14 to 23 inches; fine sandy loam 23 to 30 inches; sandy loam 30 to 60 inches; sandy loam

**Map Unit:** 424B—Shelburne fine sandy loam, 3 to 8 percent slopes



Shelburne Fine Sandy Loam, 3 To 8 Percent Slopes This map unit is in the New England and Eastern New York Upland, Northern Part Major Land Resource Area. The mean annual precipitation is 38 to 48 inches (965 to 1219 millimeters) and the average annual air temperature is 39 to 45 degrees F. (4 to 7 degrees C.) This map unit is 85 percent Shelburne soils. 15 percent minor components. Shelburne soils This component occurs on upland hill and drumlin landforms. The parent material consists of loamy lodgement till derived from granite, gneiss, and schist. The slope ranges from 3 to 8 percent and the runoff class is low. The depth to a restrictive feature is 20 to 30 inches to densic material. The drainage class is well drained. The slowest permeability within 60 inches is about 0.00 in/hr (very slow), with about 3.5 inches (moderate) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 1.5 LEP (low). The flooding frequency for this component is none. The ponding hazard is none. The minimum depth to a seasonal water table, when present, is about 24 inches. The maximum calcium carbonate within 40 inches is none. The maximum amount of salinity in any layer is none. The Nonirrigated Land Capability Class is 2s Typical Profile: 0 to 1 inches; slightly decomposed plant material 1 to 2 inches; fine sandy loam 2 to 7 inches; fine sandy loam 7 to 21 inches; gravelly fine sandy loam 21 to 27 inches; bouldery fine sandy loam 27 to 32 inches; gravelly fine sandy loam 32 to 43 inches; fine sandy loam 43 to 55 inches; fine sandy loam 55 to 80 inches; fine sandy loam

**Map Unit:** 424C—Shelburne fine sandy loam, 8 to 15 percent slopes

Shelburne Fine Sandy Loam, 8 To 15 Percent Slopes This map unit is in the New England and Eastern New York Upland, Northern Part Major Land Resource Area. The mean annual precipitation is 38 to 48 inches (965 to 1219 millimeters) and the average annual air temperature is 39 to 45 degrees F. (4 to 7 degrees C.) This map unit is 85 percent Shelburne soils. 15 percent minor components. Shelburne soils This component occurs on upland hill and drumlin landforms. The parent material consists of loamy lodgement till derived from granite, gneiss, and schist. The slope ranges from 8 to 15 percent and the runoff class is low. The depth to a restrictive feature is 20 to 30 inches to densic material. The drainage class is well drained. The slowest permeability within 60 inches is about 0.00 in/hr (very slow), with about 3.5 inches (moderate) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 1.5 LEP (low). The flooding frequency for this component is none. The ponding hazard is none. The minimum depth to a seasonal water table, when present, is about 24 inches. The maximum calcium carbonate within 40 inches is none. The maximum amount of salinity in any layer is none. The Nonirrigated Land Capability Class is 3e Typical Profile: 0 to 1 inches; slightly decomposed plant material 1 to 2 inches; fine sandy loam 2 to 7 inches; fine sandy loam 7 to 21 inches; gravelly fine sandy loam 21 to 27 inches; bouldery fine sandy loam 27 to 32 inches; gravelly fine sandy loam 32 to 43 inches; fine sandy loam 43 to 55 inches; fine sandy loam 55 to 80 inches; fine sandy loam

**Map Unit:** 425B—Shelburne fine sandy loam, 3 to 8 percent slopes, very stony

Shelburne Fine Sandy Loam, 3 To 8 Percent Slopes, Very Stony This map unit is in the New England and Eastern New York Upland, Southern Part Major Land Resource Area. The mean annual precipitation is 38 to 48 inches (965 to 1219 millimeters) and the average annual air temperature is 39 to 45 degrees F. (4 to 7 degrees C.) This map unit is 85 percent Shelburne soils. 15 percent minor components. Shelburne soils This component occurs on upland hill and drumlin landforms. The parent material consists of lodgement till derived from granite, gneiss, and schist. The slope ranges from 3 to 8 percent and the runoff class is low. The depth to a restrictive feature is 20 to 30 inches to densic material. The drainage class is well drained. The slowest permeability within 60 inches is about 0.00 in/hr (very slow), with about 3.5 inches (moderate) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 1.5 LEP (low). The flooding frequency for this component is none. The ponding hazard is none. The minimum depth to a seasonal water table, when present, is about 24 inches. The maximum calcium carbonate within 40 inches is none. The maximum amount of salinity in any layer is none. The Nonirrigated Land Capability Class is 6s Typical Profile: 0 to 1 inches; slightly decomposed plant material 1 to 2 inches; fine sandy loam 2 to 7 inches; fine sandy loam 7 to 21 inches; gravelly fine sandy loam 21 to 27 inches; bouldery fine sandy loam 27 to 32 inches; gravelly fine sandy loam 32 to 43 inches; fine sandy loam 43 to 55 inches; fine sandy loam 55 to 80 inches; fine sandy loam

**Map Unit:** 425C—Shelburne fine sandy loam, 8 to 15 percent slopes, very stony

Shelburne Fine Sandy Loam, 8 To 15 Percent Slopes, Very Stony This map unit is in the New England and Eastern New York Upland, Southern Part Major Land Resource Area. The mean annual precipitation is 38 to 48 inches (965 to 1219 millimeters) and the average annual air temperature is 39 to 45 degrees F. (4 to 7 degrees C.) This map unit is 85 percent Shelburne soils. 15 percent minor components. Shelburne soils This component occurs on upland hill and drumlin landforms. The parent material consists of lodgement till derived from granite, gneiss, and schist. The slope ranges from 8 to 15 percent and the runoff class is low. The depth to a restrictive feature is 20 to 30 inches to densic material. The drainage class is well drained. The slowest permeability within 60 inches is about 0.00 in/hr (very slow), with about 3.5 inches (moderate) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 1.5 LEP (low). The flooding frequency for this component is none. The ponding hazard is none. The minimum depth to a seasonal water table, when present, is about 24 inches. The maximum calcium carbonate within 40 inches is none. The maximum amount of salinity in any layer is none. The Nonirrigated Land Capability Class is 6s Typical Profile: 0 to 1 inches; slightly decomposed plant material 1 to 2 inches; fine sandy loam 2 to 7 inches; fine sandy loam 7 to 21 inches; gravelly fine sandy loam 21 to 27 inches; bouldery fine sandy loam 27 to 32 inches; gravelly fine sandy loam 32 to 43 inches; fine sandy loam 43 to 55 inches; fine sandy loam 55 to 80 inches; fine sandy loam

**Map Unit:** 426D—Shelburne fine sandy loam, 15 to 35 percent slopes, extremely stony

Shelburne Fine Sandy Loam, 15 To 35 Percent Slopes, Extremely Stony This map unit is in the New England and Eastern New York Upland, Southern Part Major Land Resource Area. The mean annual precipitation is 38 to 48 inches (965 to 1219 millimeters) and the average annual air temperature is 39 to 45 degrees F. (4 to 7 degrees C.) This map unit is 85 percent Shelburne soils. 15 percent minor components. Shelburne soils This component occurs on upland hill and drumlin landforms. The parent material consists of lodgement till derived from granite, gneiss, and schist. The slope ranges from 15 to 35 percent and the runoff class is very high. The depth to a restrictive feature is 20 to 30 inches to densic material. The drainage class is well drained. The slowest permeability within 60 inches is about 0.00 in/hr (very slow), with about 3.5 inches (moderate) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 1.5 LEP (low). The flooding frequency for this component is none. The ponding hazard is none. The minimum depth to a seasonal water table, when present, is about 24 inches. The maximum calcium carbonate within 40 inches is none. The maximum amount of salinity in any layer is none. The Nonirrigated Land Capability Class is 7s Typical Profile: 0 to 1 inches; slightly decomposed plant material 1 to 2 inches; fine sandy loam 2 to 7 inches; fine sandy loam 7 to 21 inches; gravelly fine sandy loam 21 to 27 inches; bouldery fine sandy loam 27 to 32 inches; gravelly fine sandy loam 32 to 43 inches; fine sandy loam 43 to 55 inches; fine sandy loam 55 to 80 inches; fine sandy loam

**Map Unit:** 427B—Ashfield fine sandy loam, 2 to 8 percent slopes, very stony

Ashfield Fine Sandy Loam, 2 To 8 Percent Slopes, Very Stony This map unit is in the New England and Eastern New York Upland, Southern Part Major Land Resource Area. The mean annual precipitation is 36 to 46 inches (914 to 1168 millimeters) and the average annual air temperature is 39 to 45 degrees F. (4 to 7 degrees C.) This map unit is 85 percent Ashfield soils. 15 percent minor components. Ashfield soils This component occurs on upland hill and drumlin landforms. The parent material consists of lodgement till derived from granite, gneiss, and schist. The slope ranges from 2 to 8 percent and the runoff class is low. The depth to a restrictive feature is 20 to 33 inches to densic material. The drainage class is moderately well drained. The slowest permeability within 60 inches is about 0.00 in/hr (very slow), with about 3.4 inches (moderate) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 1.5 LEP (low). The flooding frequency for this component is none. The ponding hazard is none. The minimum depth to a seasonal water table, when present, is about 18 inches. The maximum calcium carbonate within 40 inches is none. The maximum amount of salinity in any layer is about 0 mmhos/cm (nonsaline). The Nonirrigated Land Capability Class is 6s Typical Profile: 0 to 1 inches; slightly decomposed plant material 1 to 2 inches; moderately decomposed plant material 2 to 3 inches; highly decomposed plant material 3 to 7 inches; fine sandy loam 7 to 12 inches; fine sandy loam 12 to 18 inches; fine sandy loam 18 to 24 inches; fine sandy loam 24 to 29 inches; fine sandy loam 29 to 44 inches; fine sandy loam 44 to 57 inches; sandy loam 57 to 80 inches; fine sandy loam

**Map Unit:** 427C—Ashfield fine sandy loam, 8 to 15 percent slopes, very stony

Ashfield Fine Sandy Loam, 8 To 15 Percent Slopes, Very Stony This map unit is in the New England and Eastern New York Upland, Southern Part Major Land Resource Area. The mean annual precipitation is 36 to 46 inches (914 to 1168 millimeters) and the average annual air temperature is 39 to 47 degrees F. (4 to 7 degrees C.) This map unit is 85 percent Ashfield soils. 15 percent minor components. Ashfield soils This component occurs on upland hill and drumlin landforms. The parent material consists of lodgement till derived from granite, gneiss, and schist. The slope ranges from 8 to 15 percent and the runoff class is low. The depth to a restrictive feature is 20 to 33 inches to densic material. The drainage class is moderately well drained. The slowest permeability within 60 inches is about 0.00 in/hr (very slow), with about 3.4 inches (moderate) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 1.5 LEP (low). The flooding frequency for this component is none. The ponding hazard is none. The minimum depth to a seasonal water table, when present, is about 18 inches. The maximum calcium carbonate within 40 inches is none. The maximum amount of salinity in any layer is about 0 mmhos/cm (nonsaline). The Nonirrigated Land Capability Class is 6s Typical Profile: 0 to 1 inches; slightly decomposed plant material 1 to 2 inches; moderately decomposed plant material 2 to 3 inches; highly decomposed plant material 3 to 7 inches; fine sandy loam 7 to 12 inches; fine sandy loam 12 to 18 inches; fine sandy loam 18 to 24 inches; fine sandy loam 24 to 29 inches; fine sandy loam 29 to 44 inches; fine sandy loam 44 to 57 inches; sandy loam 57 to 80 inches; fine sandy loam

**Map Unit:** 437—Wonsqueak mucky peat

Wonsqueak Mucky Peat This map unit is in the New England and Eastern New York Upland, Southern Part Major Land Resource Area. The mean annual precipitation is 36 to 55 inches (914 to 1397 millimeters) and the average annual air temperature is 39 to 45 degrees F. (4 to 7 degrees C.) This map unit is 85 percent Wonsqueak soils. 15 percent minor components. Wonsqueak soils This component occurs on depression landforms. The parent material consists of woody organic material over loamy drift. The slope ranges from 0 to 2 percent and the runoff class is negligible. The depth to a restrictive feature is greater than 60 inches. The drainage class is very poorly drained. The slowest permeability within 60 inches is about 0.20 in/hr (moderately slow), with about 6.8 inches (high) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 3.6 LEP (moderate). The flooding frequency for this component is rare. The ponding hazard is frequent. The minimum depth to a seasonal water table, when present, is about 2 inches. The maximum calcium carbonate within 40 inches is none. The maximum amount of salinity in any layer is about 0 mmhos/cm (nonsaline). The Nonirrigated Land Capability Class is 5w Typical Profile: 0 to 2 inches; mucky peat 2 to 11 inches; muck 11 to 22 inches; muck 22 to 25 inches; mucky silt loam 25 to 45 inches; gravelly fine sandy loam 45 to 60 inches; fine sandy loam

**Map Unit:** 443—Brayton-Loonmeadow complex, extremely stony

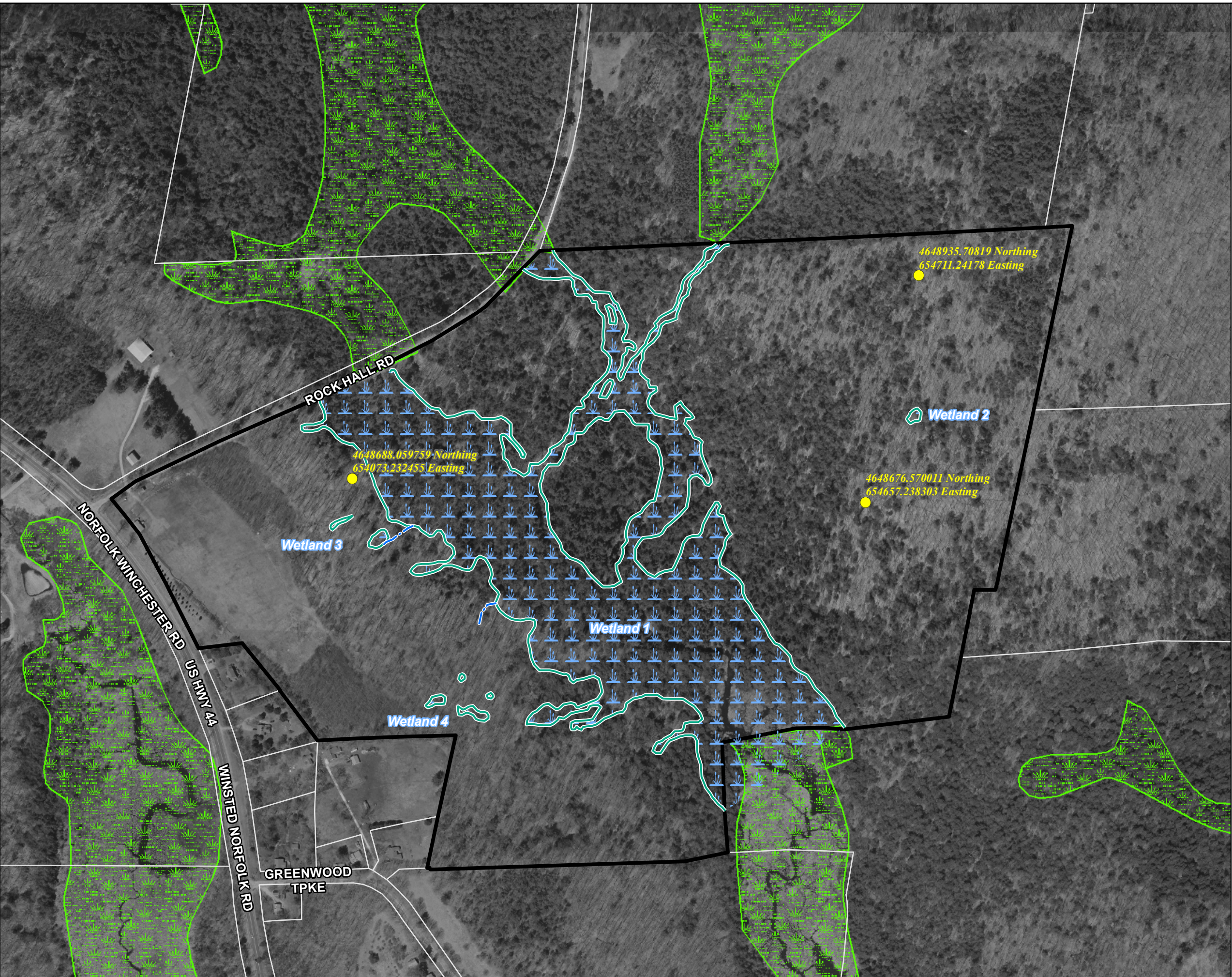
Brayton-Loonmeadow Complex, Extremely Stony This map unit is in the New England and Eastern New York Upland, Northern Part Major Land Resource Area. The mean annual precipitation is 36 to 55 inches (914 to 1400 millimeters) and the average annual air temperature is 39 to 45 degrees F. (4 to 7 degrees C.) This map unit is 50 percent Brayton soils, 35 percent Loonmeadow soils. 15 percent minor components. Brayton soils This component occurs on upland depression and drainageway landforms. The parent material consists of loamy lodgement till derived from phyllite and schist. The slope ranges from 0 to 8 percent and the runoff class is negligible. The depth to a restrictive feature is 20 to 27 inches to densic material. The drainage class is poorly drained. The slowest permeability within 60 inches is about 0.00 in/hr (very slow), with about 3.4 inches (moderate) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 1.5 LEP (low). The flooding frequency for this component is none. The ponding hazard is none. The minimum depth to a seasonal water table, when present, is about 6 inches. The maximum calcium carbonate within 40 inches is none. The maximum amount of salinity in any layer is about 0 mmhos/cm (nonsaline). The Nonirrigated Land Capability Class is 7s Typical Profile: 0 to 2 inches; moderately decomposed plant material 2 to 9 inches; loam 9 to 17 inches; gravelly sandy loam 17 to 22 inches; gravelly sandy loam 22 to 27 inches; sandy loam 27 to 42 inches; gravelly sandy loam 42 to 65 inches; gravelly sandy loam Loonmeadow soils This component occurs on upland depression and drainageway landforms. The parent material consists of lodgement till derived from dolomite, phyllite, granite, gneiss and schist. The slope ranges from 0 to 3 percent and the runoff class is negligible. The depth to a restrictive feature is greater than 60 inches. The drainage class is very poorly drained. The slowest permeability within 60 inches is about 0.06 in/hr (slow), with about 7.3 inches (high) available water capacity. The weighted average shrink-swell potential in 10 to 60 inches is about 1.5 LEP (low). The flooding frequency for this component is none. The ponding hazard is frequent. The minimum depth to a seasonal water table, when present, is about 9 inches. The maximum calcium carbonate within 40 inches is 5 percent. The maximum amount of salinity in any layer is about 0 mmhos/cm (nonsaline). The Nonirrigated Land Capability Class is 7s Typical Profile: 0 to 2 inches; slightly decomposed plant material 2 to 9 inches; mucky fine sandy loam 9 to 18 inches; sandy loam 18 to 35 inches; gravelly sandy loam 35 to 80 inches; gravelly sandy loam

## Data Source Information

Soil Survey Area: State of Connecticut  
Survey Area Data: Version 7, Dec 3, 2009

# Wetland Resources Map

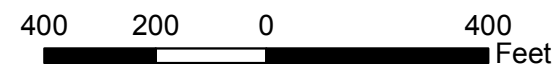
Wind Colebrook North  
Route 44 & Rock Hall Road  
Colebrook, Connecticut



### Legend

- WC North WT 1.6 Turbine Locations
- Delineated Intermittent Watercourse
- Delineated Wetland Boundary
- ↕ Wetland
- ▨ CTDEP Wetland (off site property)
- ▭ Approximate Site Parcel Boundary
- ▭ Assessor Parcel Boundary

Base Map Source: 2004 aerial photograph with 0.5-foot resolution.



**VHB** Vanasse Hangen Brustlin, Inc.

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# **Attachment B**

# **Photographic Documentation**

**Vanasse Hangen Brustlin, Inc.**  
PHOTOGRAPHIC DOCUMENTATION  
Wind Colebrook North, Proposed Wind Energy Development  
Colebrook, Connecticut



Photo 1: View of approximate location of first of two intermittent watercourse (IWC) crossings looking east. This is the smaller of the two watercourse crossings. Note the right (south) side of the watercourse where the channel terminates and drainage is sub-surface.



Photo 2: View of approximate location of second of two IWC crossings looking east. This is the larger of the two IWC crossings.



**Vanasse Hangen Brustlin, Inc.**  
PHOTOGRAPHIC DOCUMENTATION  
Wind Colebrook North, Proposed Wind Energy Development  
Colebrook, Connecticut



Photo 3: View of larger IWC crossing looking north from the approximate location of the proposed access road crossing.



Photo 4: View of Mill Brook.

**Vanasse Hangen Brustlin, Inc.**  
PHOTOGRAPHIC DOCUMENTATION  
Wind Colebrook North, Proposed Wind Energy Development  
Colebrook, Connecticut



Photo 5: View of typical forested wetland.



Photo 6: View of shrub swamp along the southern Property boundary.

**Vanasse Hangen Brustlin, Inc.**  
PHOTOGRAPHIC DOCUMENTATION  
Wind Colebrook North, Proposed Wind Energy Development  
Colebrook, Connecticut



Photo 7: View of typical second growth Northern Hardwoods-Hemlock-White Pine forest type.



Photo 8: View of typical second growth Northern Hardwood forest type.

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# **Attachment C**

# **Smooth Green Snake Habitat**

# **Survey**





November 17, 2010

*Vanasse Hangen Brustlin, Inc.*

Ref: 41604.00

Ms. Julie Victoria  
Wildlife Biologist  
Department of Environmental Protection  
Franklin Wildlife Management Area  
391 Route 32  
N. Franklin, Connecticut 06254

Re: Smooth Green Snake Habitat Survey  
Proposed Wind Colebrook North – Wind Energy Facility  
NDDDB - 17983  
Winsted-Norfolk Road & Rock Hall Road  
Colebrook, CT

Dear Ms. Victoria:

Vanasse Hangen Brustlin Inc. (VHB) has been retained by BNE Energy, Inc. ("BNE") to review environmental resource information, including threatened or endangered species or designated critical habitats on property located southeast of the intersection of Winsted-Norfolk Road (Route 44) and Rock Hall Road in Colebrook, Connecticut ("Property"). A Property Location Map, provided as Figure 1, is attached for reference. BNE proposes to construct a wind energy facility on the aforementioned Property. The proposed facility includes construction of three 1.6 megawatt GE wind turbines, associated access roads, and utility interconnection to the existing electrical grid. Access to the Property will be from Rock Hall Road. Activities associated with the proposed wind energy facility include construction of a new access road and installation of associated ground equipment including an electrical collector yard and associated utility infrastructure so that the turbines can be interconnected to the electrical grid. Please see attached Site Plan with Aerial Imagery and Clearing Limits Plan, Sheets C-002 and C-003, provided in Attachment A. A habitat survey was performed on the Property prior to your response letter of September 3, 2010, provided in Attachment B. A summary of this inspection is provided below.

The smooth green snake (*Ophoedrys vernalis*) favors open, unforested habitats including meadows, pastures, fens, coastal grasslands, mountaintop "balds", but is also found in transitional and lightly forested habitats such as grassy old fields with scattered shrubs and trees, as well as oak-pitchpine woodland<sup>1</sup>.

<sup>1</sup> Klemens, M. W. (1993). Amphibians and Reptiles of Connecticut and Adjacent Regions. State Geological and Natural History Survey of Connecticut, Bulletin 112.

## Habitat Survey

Four major habitat types exist on the Property, including second growth upland forest (Northern Hardwood Forest types), forested wetlands (which include Mill Brook, a perennial watercourse), maintained lawn (golf driving range) and a shrub swamp. A Habitat Type Map, provided as Figure 2, is attached for reference.

### Second Growth Upland Forest

The dominant habitat type on the Property is second growth upland forest. The dominant size class is sawtimber (trees 12 inches diameter at breast height [DBH] and greater). The forest type is described as Northern Hardwoods, which is a broadly defined type characterized by enormous variability among the dominant species. Trees associated with a Northern Hardwood Forest type are often shade tolerant species that thrive on moist, fertile soils. The eastern portion of the Property is characterized as a Northern Hardwoods-Hemlock-White Pine forest type dominated by eastern hemlock (*Tsuga Canadensis*). This type is most dominant at lower elevations, adjacent to the Mill Brook wetland complex. At higher elevations, further east on the Property the forest is characterized as a Northern Hardwoods type dominated by deciduous species such as American beech (*Fagus grandifolia*). Beech trees on the Property have suffered from substantial and widespread infestation of beech bark disease. Beech bark disease results when trees are attacked by beech scale (*Cryptococcus fagisuga*) which causes wounding to the bark and ultimately infection from fungi in the genus *Nectria*. Mortality rates due to secondary infection are high. Infested areas of the Property contain numerous beech snags. This area has been subject to selective timber harvesting as evidenced by decayed stumps and widespread logging roads.

The western portion of the Property is also characterized by a Northern Hardwoods forest type with dominant species including sugar maple (*Acer saccharum*), black cherry (*Prunus serotina*) and yellow birch (*Betula allegheniensis*). Previous timber harvesting activities are less obvious within this portion of the Property, however forested areas immediately east of the golf driving range have been subject to more recent and intensive disturbance and are dominated by pioneer tree species such as black birch (*Betula lenta*).

### Forested Wetlands

Four wetland areas were delineated on the Site. These wetlands are depicted on the attached Habitat Type Map, Figure 2. Wetland 1, the dominant resource on the Property, consists of a broad bordering forested wetland associated with Mill Brook. This bordering system, which is dominated by eastern hemlock, is characterized by hummock-hollow topography and numerous small upland inclusions which are commonly associated with this type of wetland. The understory vegetation is relatively sparse due to the degree of canopy closure. Mill Brook, a perennial watercourse, originates at a corrugated metal culvert on the south side of Rock Hall Road and flows southeast through the center of the Site. The stream is characterized as having a well defined bank with decreasing gradient from the culvert flowing south. The streambed is characterized as a large particle sand bottom with mixed cobble/gravel and a few bedrock outcrops. As Mill Brook flows south to the southern Property boundary it opens into a large emergent marsh and scrub/shrub wetland dominated by *Juncus* spp., *Carex* spp., and various



wetland shrub species. Several hillside seep wetlands and associated intermittent watercourses were identified and delineated on the Site. These seeps convey storm water runoff during high water events, spring melt, and sheet flow from the open field upslope to the west into Wetland 1 (Mill Brook system). The most significant seepage area includes an intermittent watercourse which flows into Wetland 1 from the north Property boundary. This watercourse flows within a deeply scoured channel at its upper extent before discharging into Wetland 1 within a shallow braided channel.

Wetland 2 is a small forested wetland pocket located at the base of a western facing slope. Several surface indicators of hydrology were observed, such as water stained leaves and detritus, which indicate this area may be subject to shallow seasonal inundation.

Wetland 3 is a small linear shaped forested hillside seep wetland draining easterly towards Wetland 1. No surface water or wetland connections were identified between this wetland and Wetland 1.

Wetland 4 is a series of small forested hillside seep wetlands located along an eastern facing slope. They are generally interconnected via subsurface groundwater flows or shallow surface water flows. No surface water or wetland connections were identified between this wetland and Wetland 1.

#### **Maintained Lawn (Golf Driving Range)**

This area is a golf driving range and includes a maintained lawn area, building structure, gravel access and parking area and tee boxes.

#### **Shrub Swamp**

The northern tip of a large shrub swamp is located along the southern Property boundary. This habitat type, which is associated with Mill Brook, extends in a southerly direction off the Property. The vegetation is characterized by a variety of shrubs, persistent emergents and *Carex* and *Juncus* species.

#### **Discussion**

The smooth green snake favors open, unforested habitats including meadows, pastures, fens, coastal grasslands, mountaintop "balds", but is also found in transitional and lightly forested habitats such as grassy old fields with scattered shrubs and trees, as well as oak-pitchpine woodland<sup>2</sup>. While a large maintained lawn area exists on the Property, it is associated with a golf driving range and will not be subject to disturbance as a result of the proposed development activities. Additionally, this area is subject to regular mowing and would not provide favorable habitat for the smooth green snake. The areas that will be subject to disturbance activities are characterized as upland forest (more specifically, variations of a

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<sup>2</sup> Klemens, M. W. (1993). Amphibians and Reptiles of Connecticut and Adjacent Regions. State Geological and Natural History Survey of Connecticut, Bulletin 112.





Ms. Julie Victoria  
NDDB - 17983  
November 17, 2010  
Page 4

northern hardwood forest type). Therefore, the proposed development will not adversely affect smooth green snakes or their preferred habitat.

Very truly yours,

VANASSE HANGEN BRUSTLIN, INC.



Matthew Davison  
Registered Soil Scientist  
CT Certified Forester 193

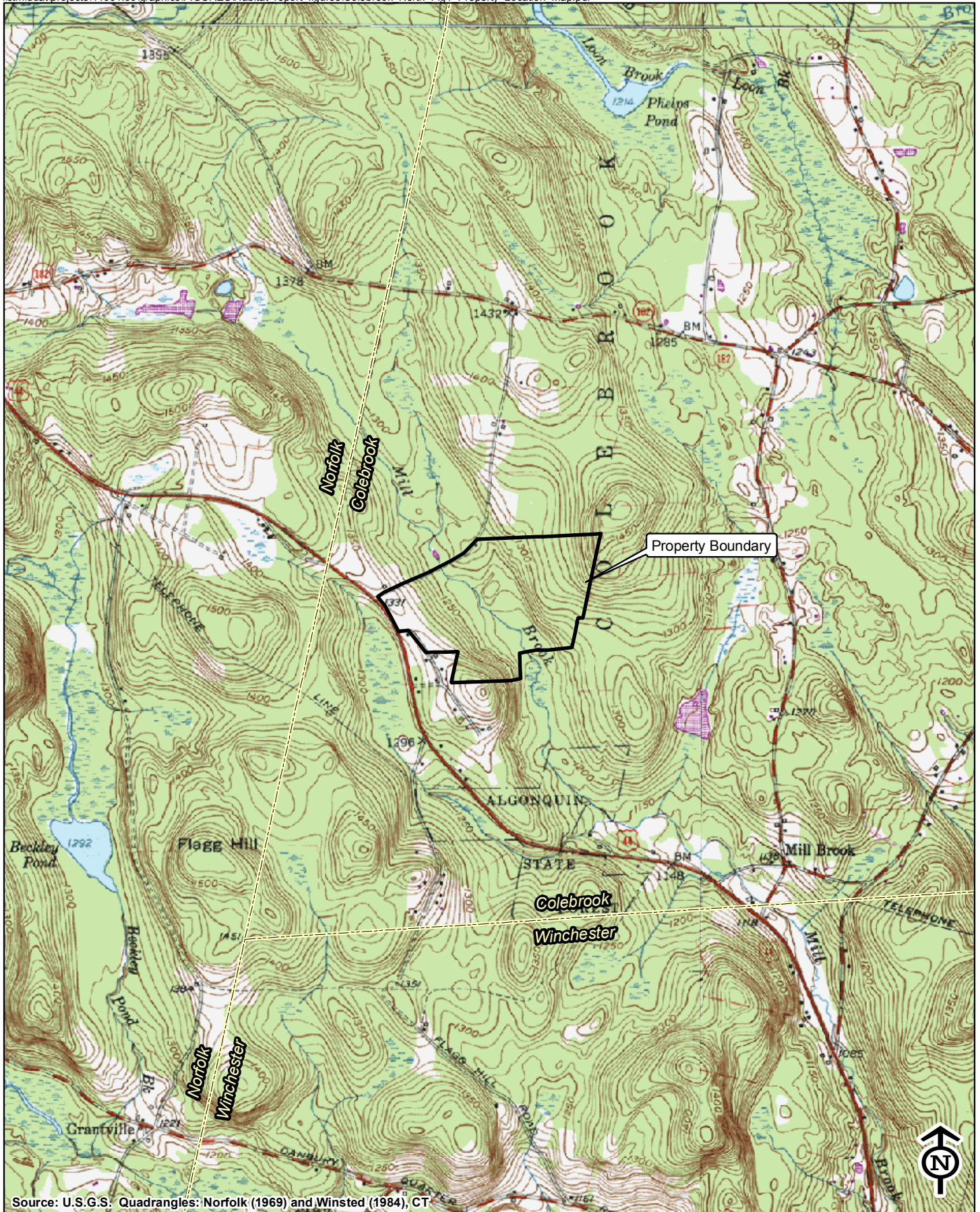
Enclosures



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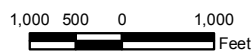
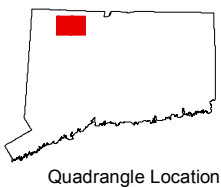
## Figures





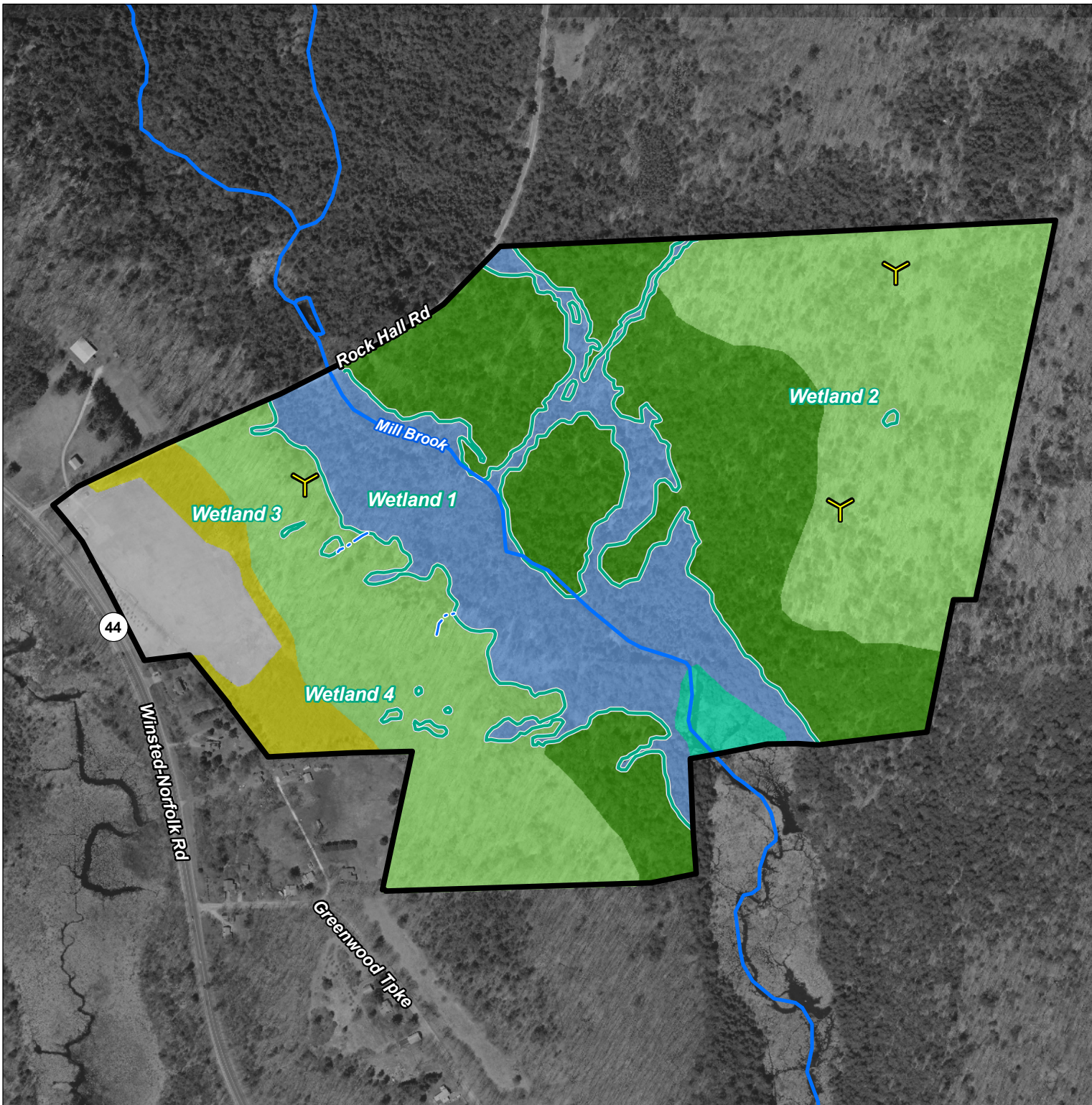
Vanasse Hangen Brustlin, Inc.

**Figure 1**  
**Property Location Map**  
**Wind Colebrook North**  
**BNE Energy, Inc.**  
**Winsted-Norfolk Road**  
**Colebrook, Connecticut**



# Figure 2 Habitat Type Map

Wind Colebrook North  
BNE Energy, Inc.  
Winsted-Norfolk Road &  
Rock Hall Road  
Colebrook, Connecticut



### Legend

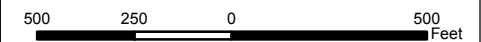
- Proposed Wind Turbine Location
- Property Boundary
- Intermittent Watercourse
- Delineated Wetland Boundary

### Habitat Type

- Early Successional Northern Hardwood Forest
- Palustrine Forested Wetlands
- Maintained Lawn (Golf Driving Range)
- Second Growth Northern Hardwood Forest
- Second Growth Northern Hardwoods - Hemlock - White Pine Forest
- Palustrine Scrub/Shrub - Emergent Wetland

Base Map Source: ConnDOT 2004 aerial photograph with 0.5-foot resolution.

Mill Brook Data: CT DEP Hydrography Line  
[http://www.ct.gov/dep/cwp/view.asp?a=2698&q=322898&depNav\\_GID=1707](http://www.ct.gov/dep/cwp/view.asp?a=2698&q=322898&depNav_GID=1707)



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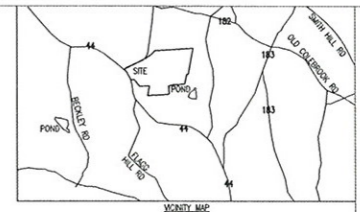
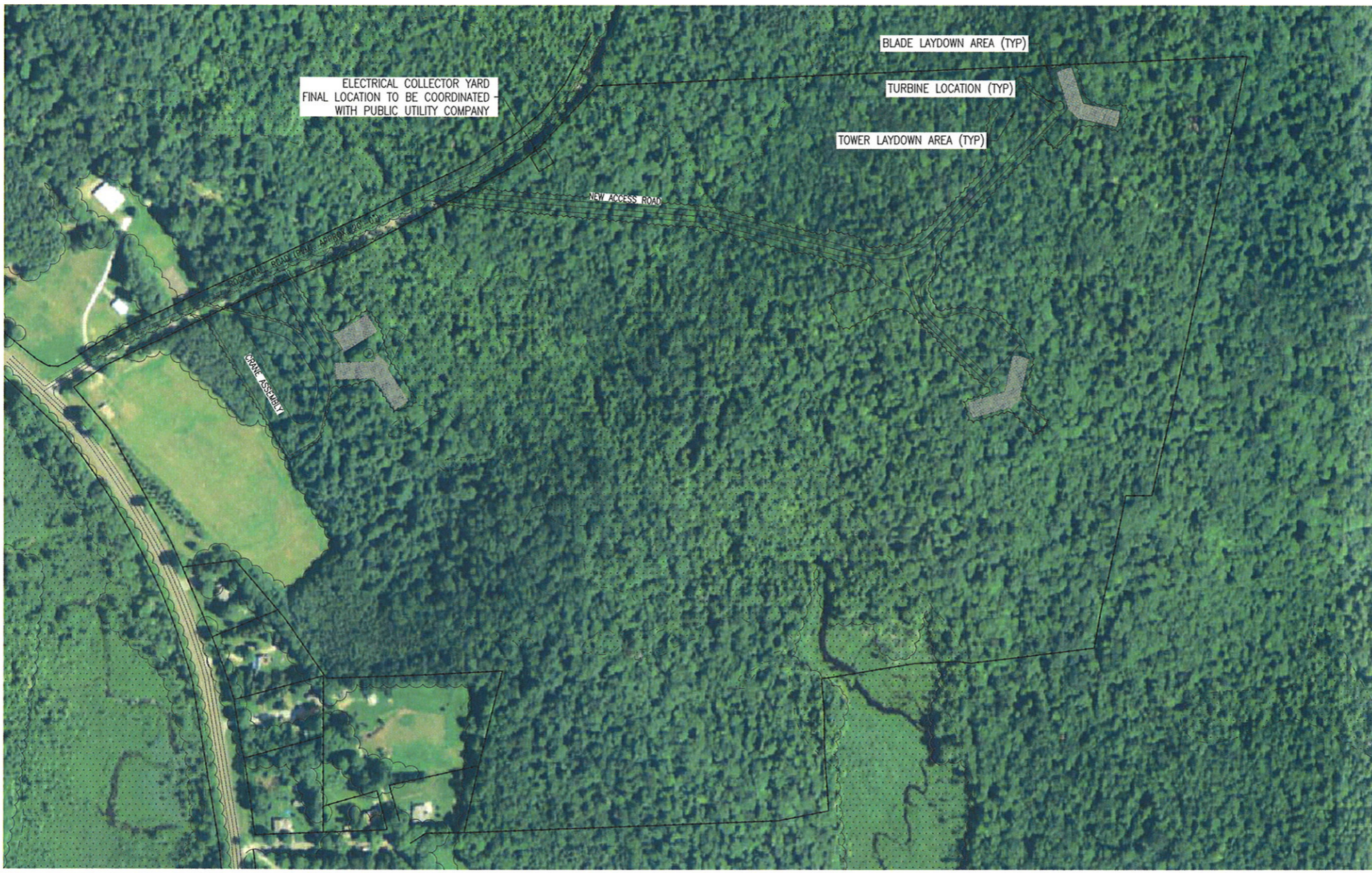
**Attachment A**

**Site Plan with Aerial Imagery and Clearing  
Limits Plan, Sheets C-002 – C-003**

DRAFT ONLY

GENERAL NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE FOR SITE SECURITY AND JOB SAFETY. CONSTRUCTION ACTIVITIES SHALL BE IN ACCORDANCE WITH OSHA STANDARDS, LOCAL REQUIREMENTS AND GOVERNMENT REQUIREMENTS.
2. AREAS DISTURBED DURING CONSTRUCTION AND NOT RESTORED WITH IMPEROUS SURFACES (BUILDINGS, PAVEMENTS, WALKS, ETC.) SHALL RECEIVE SIX INCHES OF TOPSOIL AND SHALL BE SEEDED, UNLESS OTHERWISE NOTED.
3. UPON AWARD OF CONTRACT, CONTRACTOR SHALL MAKE NECESSARY CONSTRUCTION NOTIFICATIONS AND APPLY FOR AND OBTAIN NECESSARY PERMITS, PAY FEES, AND POST BONDS ASSOCIATED WITH THE WORK INDICATED ON THE DRAWINGS, IN THE SPECIFICATIONS, AND IN THE CONTRACT DOCUMENTS.
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LEGEND

	PROJECT BOUNDARY LINE
	EXISTING VEGETATION
	WETLAND LIMITS
	POST CONSTRUCTION VEGETATION BOUNDARY
	COMPACTED FILL
	WETLANDS
	GRAVEL

LAYOUT AND MATERIALS NOTES

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AREA TO BE CLEARED - 445604 SQ. FT. / 10.23 ACRES  
 AREA WITHIN 100' WETLAND OFFSET - 113445 SQ. FT. / 2.60 ACRES

TEMPORARY DIRECT WETLAND IMPACT NOT TO EXCEED 3724 SQ. FT. THIS IS LESS THAN THE 5000 SQ. FT. THRESHOLD ESTABLISHED BY APPLICABLE REGULATIONS. APPROPRIATE MITIGATION PROCEDURES AND REQUIRED PERMITS WILL BE OBTAINED PRIOR TO CONSTRUCTION.

**BNE Energy Inc.**  
 Producer of green clean energy



MARK	DESCRIPTION	DATE	APPR.
1	CONNECTICUT SITING COUNCIL SUBMISSION	10-28-10	TLK

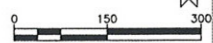
NOT FOR CONSTRUCTION - CONNECTICUT SITING COUNCIL USE ONLY

DESIGNED BY:	DATE:	10-28-10
DWN BY:	CHK BY:	TLK
SUBMITTED BY:	BNE ENERGY	
PLOT SCALE:	PLOT DATE:	FILE NUMBER:
DATE:	FILE NAME:	FILE:
ANSI D	Project Name: Wind_Colebrook_North_Connecticut	



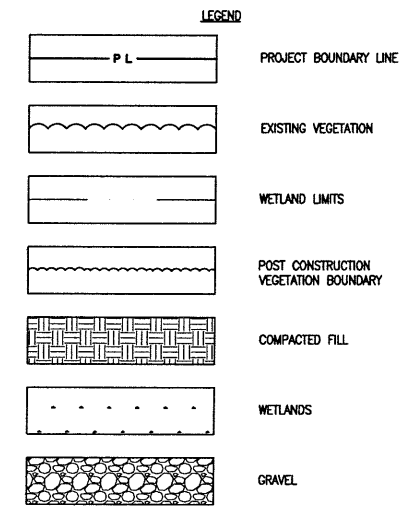
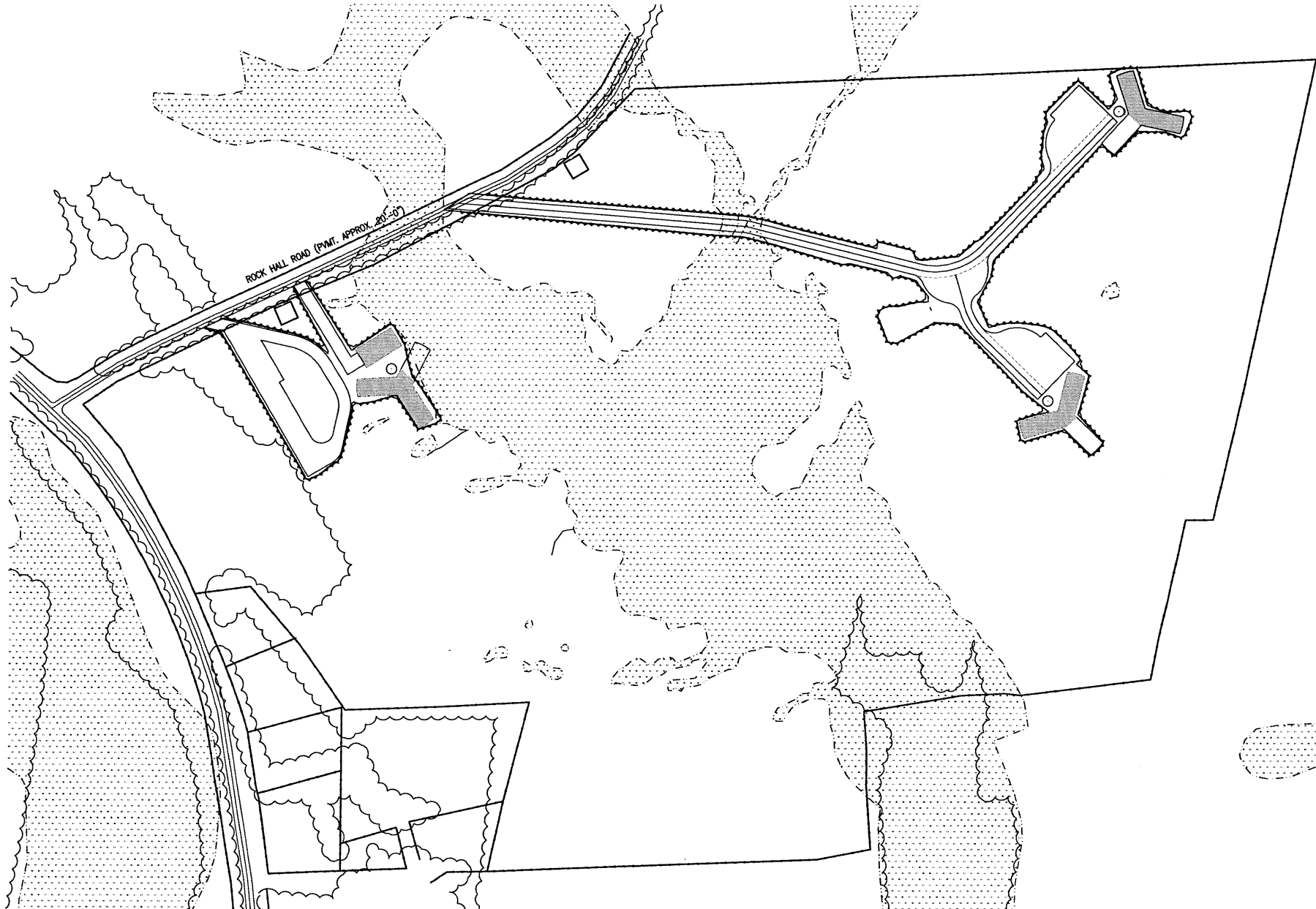
WIND COLEBROOK NORTH  
 CONNECTICUT  
 SITE PLAN WITH AERIAL IMAGERY

SHEET IDENTIFICATION  
**C-002**



DRAFT ONLY

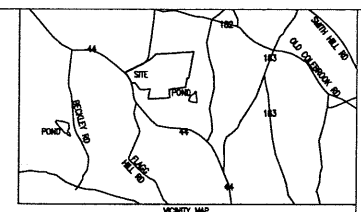
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**BNE Energy Inc.**  
*Producer of green clean energy*

MARK	DESCRIPTION	DATE	APPROVED
1	CONNECTICUT SITING COUNCIL SUBMISSION	10-28-10	

DESIGNED BY: RRS  
 DATE: 10-28-10  
 DOWN BY: RSW  
 CWD BY: TLK  
 SUBMITTED BY: BNE ENERGY  
 AS SHOWN: AS SHOWN  
 FILE NAME: AS SHOWN  
 FILE NUMBER: AS SHOWN

FOR INFORMATION CONTACT: [www.zapata.com](mailto:www.zapata.com)

**ZAPATA**  
 CONSULTING ENGINEERS  
 200 PARKER ROAD, SUITE 200, WESTFIELD, MA 01095  
 TEL: (413) 254-3434  
 FAX: (413) 254-3434  
 WWW.ZAPATA.COM

WIND COLEBROOK NORTH  
 CONNECTICUT  
 CLEARING LIMITS PLAN

SHEET IDENTIFICATION  
**C-003**



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**Attachment B**

**CTDEP Response Letter  
dated September 3, 2010**

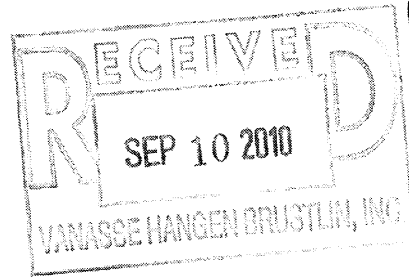


STATE OF CONNECTICUT  
DEPARTMENT OF ENVIRONMENTAL PROTECTION



September 3, 2010

Mr. Matthew Davison  
Vanasse Hangen Brustlin, Inc.  
54 Tuttle Place  
Middletown, CT 06457-1847



re: proposed wind energy facility, Winsted-Norfolk Road, Colebrook


Dear Mr. Davison:

Your request was forwarded to me on 9/1/10 from Dawn McKay of the Department of Environmental Protection (DEP) Natural Diversity Data Base. Their records indicate that a state species of special concern, Smooth Green Snake (*Liochlorophis vernalis*) in the vicinity of your property. Additional populations of non-listed species may occur at this site or fly over it, please see the additional recommendations provided at the following link:  
[http://www.fws.gov/habitatconservation/windpower/wind turbine advisory committee.html](http://www.fws.gov/habitatconservation/windpower/wind_turbine_advisory_committee.html)

The Smooth Green snake favors meadows and moist grassy field along the forest edge where their coloration can camouflage them. This species is dormant from November 1 to April 1. It has been negatively impacted by the loss of suitable habitat.

The Wildlife Division has not been provided with details or a timetable of the work to be done. Past practices do not preclude the existence of this species on this property. If this work will be conducted in this species' habitat or any staging areas or equipment or access roads will be located in this species' habitats, the Wildlife Division recommends that a herpetologist familiar with the habitat requirements of this species conduct surveys. A report summarizing the results of such surveys should include habitat descriptions, herptile species list and a statement/resume giving the herpetologist' qualifications. The DEP doesn't maintain a list of qualified surveyors. A DEP Wildlife Division permit may be required by the surveyors to conduct survey work, you should ask if your surveyor has one. The results of this investigation can be forwarded to the Wildlife Division and, after evaluation, recommendations for additional surveys, if any, will be made.

Standard protocols for protection of wetlands should be followed and maintained during the course of the project. Additionally, all silt fencing should be removed after soils are stable so that reptile and amphibian movement between uplands and wetlands is not restricted. Please be advised that the Wildlife Division has not made a field inspection of the project nor have we seen detailed timetables for work to be done. Consultation with the Wildlife Division should not be substituted for site-specific surveys that may be required for environmental assessments. The time of year when this work will take place will affect these species if they are present on the site when the work is scheduled. Please be advised that should state permits be required or should state involvement occur in some other fashion, specific restrictions or conditions relating to the species discussed above may apply. In this situation, additional evaluation of the proposal by the DEP Wildlife Division should be requested. If the proposed project has not been initiated within 12 months of this review, contact the NDDDB for an updated review. If you have any additional questions, please feel free to contact me at [Julie.Victoria@ct.gov](mailto:Julie.Victoria@ct.gov), please reference the NDDDB # at the bottom of this letter when you e-mail or write. Thank you for the opportunity to comment.

Sincerely,  
  
Julie Victoria, Wildlife Biologist  
Franklin Swamp Wildlife Management Area  
391 Route 32  
N. Franklin, CT 06254

cc: NDDDB – 17983

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**Attachment D**  
**Summary of *The Highway***  
***Methodology Workbook***  
***Supplement, Wetland Functions***  
***and Values: A Descriptive***  
***Approach & Wetland Functions***  
**and Values Field Forms**

The understanding that freshwater wetlands contribute to the quality and integrity of the state's environment has been acknowledged since the enactment of the Connecticut Inland Wetlands and Watercourses Act ("Act") in 1972. The Act recognizes that "...wetlands and watercourses are an interrelated web of nature essential to an adequate supply of surface and underground water; to hydrological stability and control of flooding and erosion; to the recharging and purification of groundwater; and to the existence of many forms of animal aquatic and plant life." The Act also recognizes the need to protect "...the quality of wetlands and watercourses for their conservation, economic, aesthetic, recreational and other public and private uses and values."

There are many methods of evaluating wetlands and these methods have often chosen different parameters to evaluate. This study uses *The Highway Methodology Workbook Supplement, Wetland Functions and Values: A descriptive Approach* issued by the US Army Corps of Engineers New England District (COE NED), September 1999. This evaluation provides a qualitative approach in which wetland functions can be considered primary, secondary, or unlikely to be provided at a significant level. Functions and values can be principal if they are an important physical component of a wetland ecosystem (function only), and/or are considered of special value to society, from a local, regional, and/or national perspective. The COE NED recommends that wetland values and functions be determined through "best professional judgment" based on a qualitative description of the physical attributes of wetlands and the functions and values exhibited.

The basis for determination of this qualitative approach relies on over 20 years of field experience and extensive knowledge of other scientific methods used for wetland evaluation purposes.

The Highway Methodology recognizes 13 separate wetland functions and values, similar to those identified in *Method for the Evaluation of Inland Wetlands in Connecticut*, CTDEP Bulletin No. 9, October 1986, revised March 1991. These functions and values can be grouped into four basic categories as follows:

#### I. Biological Functions

- A. Fish and Shellfish Habitat — This function considers the effectiveness of seasonal or permanent waterbodies associated with the wetland in question for fish and shellfish habitat.
- B. Wildlife Habitat — This function considers the effectiveness of the wetland to provide habitat for various types and populations of animals typically associated with wetlands and the wetland edge. Both resident and/or migrating species must be considered. Species lists of observed and potential animals should be included in the wetland assessment report.

- C. Production Export (Nutrient) — This function relates to the effectiveness of the wetland to produce food or usable products for humans or other living organisms

## II. Hydrologic Functions

- A. Floodflow Alteration (Storage & Desynchronization) — This function considers the effectiveness of the wetland in reducing flood damage by attenuation of floodwaters for prolonged periods following precipitation events.
- B. Groundwater Recharge/Discharge — This function considers the potential for a wetland to serve as a groundwater recharge and/or discharge area. Recharge should relate to the potential for the wetland to contribute water to an aquifer. Discharge should relate to the potential for the wetland to serve as an area where groundwater can be discharged to the surface.

## III. Water Quality Functions

- A. Sediment/Toxicant/Pathogen Retention — This function reduces or prevents degradation of water quality. It relates to the effectiveness of the wetland as a trap for sediments, toxicants, or pathogens.
- B. Nutrient Removal/Retention/Transformation — This function relates to the effectiveness of the wetland to prevent adverse effects of excess nutrients entering aquifers or surface waters such as ponds, lakes, streams, rivers, or estuaries.
- C. Sediment/Shoreline Stabilization — This function relates to the effectiveness of a wetland to stabilize streambanks and shorelines against erosion.

## IV. Societal Values

- A. Recreation (Consumptive and Non-Consumptive) — This value considers the effectiveness of the wetland and associated watercourses to provide recreational opportunities such as canoeing, boating, fishing, hunting, and other active or passive recreational activities. Consumptive activities consume or diminish the plants, animals, or other resources that are intrinsic to the wetland, whereas non-consumptive activities do not.
- B. Educational/Scientific Value — This value considers the effectiveness of the wetland as a site for an “outdoor classroom” or as a location for scientific study or research.
- C. Uniqueness/Heritage — This value relates to the effectiveness of the wetland or its associated waterbodies to produce certain special values. Special values may include such things as archaeological sites, unusual aesthetic quality, historical events, or unique plants, animals, or geologic features.

- D. Visual Quality/Aesthetics — This value relates to the visual and aesthetic qualities of the wetland.
- E. Threatened or Endangered Species Habitat — This value relates to the effectiveness of the wetland or associated waterbodies to support threatened or endangered species.

The degree to which a wetland provides each of these functions is determined by one or more of the following factors: landscape position, substrate, hydrology, vegetation, history of disturbance, and size. Each wetland may provide one or more of the listed functions at significant levels.

The determining factors that affect the level of function provided by a wetland can often be broken into two categories. The effectiveness of a wetland to provide a specified function is generally dependent on factors within the wetland whereas the opportunity to provide a function is often influenced by the wetland's position in the landscape and adjacent land uses. For example, a depressed wetland with a restricted outlet may be considered highly effective in trapping sediment due to the long residence time of runoff water passing through the system. If this wetland is located in gently sloping woodland, however, there is no significant source of sediment in the runoff therefore the wetland is considered to have a small opportunity of providing this function.



Field / Office Wetland Function-Value Evaluation Form

Date(s): October 24, 2010
Inspector(s): Matthew Davison
Corps Delineation: Yes [ ] No [x]
Wetland Area: unknown
Created Wetland: Yes [ ] No [x]
Dominate System: Palustrine Forested
Wildlife Corridor: Yes [x] No [ ]
Tributaries: Int. headwater stream
Site Photo(s): yes
Project #/Location: 41604.02 Colebrook North
VHB Wetland ID: Wetland 1
CT Delineation: Yes [x] No [ ]
Proposed Impact: filling/clearing
Adjacent Land Use: undeveloped
Nearest Roadway: approximately 450 feet
Habitat Island: Yes [ ] No [x]
Buffer Condition: undeveloped/forest
Species List(s):
Separate hydraulic system or part of drainage basin: headwater system

Existing wetland disturbances/ alterations: Logging road (skid road) crossing north of area of proposed impacts.

GROUNDWATER RECHARGE/DISCHARGE FUNCTION

Table with 4 columns: CONSIDERATIONS/QUALIFIERS, Y, N, Principal. Rows 1-16 detailing groundwater recharge/discharge criteria.

17. Comments: Only portion of Wetland 1 in proximity to proposed impacts were considered for this wetland function.

### FLOODFLOW ALTERATION FUNCTION

CONSIDERATIONS/QUALIFIERS	Y	N	Principal
1. Area of this wetland is large relative to its watershed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Wetland occurs in the upper portions of its watershed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Effective flood storage is small or non-existent upslope of or above the wetland.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Wetland watershed contains a high percent of impervious surfaces.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5. Wetland contains hydric soils which are able to absorb and detain water.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Wetland exists in a relatively flat area that has flood storage potential.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. Wetland has an intermittent outlet, ponded water, or signs are present of variable water level.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. During flooding wetland retains higher volumes of water than under normal/average rainfall conditions.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9. Wetland receives and retains overland or sheet flow runoff from surrounding uplands.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. During a storm, this wetland may receive and detain excessive flood water from a nearby watercourse.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11. Valuable properties, structures, or resources are located in/near floodplain downstream of the wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12. The watershed has a history of economic loss due to flooding.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13. This wetland is associated with one or more watercourses.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. This wetland watercourse is sinuous or diffuse.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
15. This wetland outlet is constricted.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
16. Channel flow velocity is affected by this wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
17. Land uses downstream are protected by this wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18. This wetland contains a high density of vegetation.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**19. Comments: Only portion of Wetland 1 in proximity to proposed impacts were considered for this wetland function.**

### FISH AND SHELLFISH HABITAT (FRESHWATER) FUNCTION

CONSIDERATIONS/QUALIFIERS	Y	N	Principal
1. Forest land dominant in the watershed above this wetland.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Abundance of cover objects present.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<b>STOP HERE IF THIS WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE</b>			
3. Size of this wetland is able to support large fish/shellfish populations.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Wetland is part of a larger, contiguous watercourse.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Sufficient open water size/depth so as not to freeze solid and retain some open water during winter.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. Stream width (bank to bank) is more than 50 feet.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. Quality of watercourse associated with wetland is able to support healthy fish/shellfish populations	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Streamside vegetation provides shade for the watercourse.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Spawning areas are present (submerged vegetation or gravel beds).	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. Food is available to fish/shellfish populations within this wetland.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Anadromous fish barrier(s) absent from stream reach associated with this wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12. Evidence of fish is present.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Wetland is stocked with fish.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14. The watercourse is persistent.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
15. Man-made streams are absent.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Water velocities are not too excessive for fish usage.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Defined stream channel is present.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**18. Comments: Only portion of Wetland 1 in proximity to proposed impacts were considered for this wetland function.**



**FISH AND SHELLFISH HABITAT (MARINE) FUNCTION**

CONSIDERATIONS/QUALIFIERS	Y	N	Principal
1. Special aquatic sites (tidal marsh, mud flats, eelgrass beds) are present.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Suitable spawning habitat is present at the site or in the area.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Commercially or recreationally important species are present or suitable habitat exists.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. The wetland/waterway supports prey for higher trophic level marine organisms.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. The waterway provides migratory habitat for anadromous fish.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Essential fish habitat (1996 amendments to the Magnuson-Stevens) Fishery & Conservation Act present	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. **Comments:** N/A

**SEDIMENT/TOXICANT/PATHOGEN RETENTION FUNCTION**

CONSIDERATIONS/QUALIFIERS	Y	N	Principal
1. Potential sources of excess sediment are in the watershed above the wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Potential or known sources of toxicants are in the watershed above the wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Opportunity for sediment trapping by slow moving water/deepwater habitat is present in wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Fine grained mineral or organic soils are present.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Long duration water retention time is present in this wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. Public or private water sources occur downstream.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. The wetland edge is broad and intermittently aerobic.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. The wetland is known to have existed for more than 50 years.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Drainage ditches have not been constructed in the wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<b>STOP HERE IF WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE</b>			
10. Wetland is associated with an intermittent or perennial stream or a lake.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Channelized flows have visible velocity decreases in the wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12. Effective floodwater storage in wetland is occurring. Areas of impounded open water are present.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13. No indicators of erosive forces are present. No high water velocities are present.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14. Diffuse water flows are present in the wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
15. Wetland has a high degree of water and vegetation interspersion.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
16. Dense vegetation provides sediment trapping/signs of sediment accumulation are present.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

17. **Comments:** Only portion of Wetland 1 in proximity to proposed impacts were considered for this wetland function.

**NUTRIENT REMOVAL/RETENTION/TRANSFORMATION FUNCTION**

CONSIDERATIONS/QUALIFIERS	Y	N	Principal
1. Wetland is large relative to the size of its watershed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Deep water or open water habitat exists.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Overall potential for sediment trapping exists in the wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Potential sources of excess nutrients are present in the watershed above the wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5. Wetland saturated for most of the season. Pondered water is present in the wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. Deep organic/sediment deposits are present.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. Slowly drained fine grained mineral or organic soils are present.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Dense vegetation is present.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9. Emergent vegetation and/or dense woody stems are dominant.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. Opportunity for nutrient attenuation exists.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11. Vegetation diversity/abundance sufficient to utilize nutrients.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<b>STOP HERE IF WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE</b>			
12. Waterflow through this wetland is diffuse.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13. Water retention/detention time in this wetland is increased by constricted outlet or thick vegetation.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14. Water moves slowly through this wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<b>15. Comments: Only portion of Wetland 1 in proximity to proposed impacts were considered for this wetland function.</b>			

**SEDIMENT/SHORELINE STABILIZATION FUNCTION**

CONSIDERATIONS/QUALIFIERS	Y	N	Principal
1. Indications of erosion or siltation are present.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Topographical gradient is present in wetland.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Potential sediment sources are present up-slope.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Potential sediment sources are present upstream.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5. No distinct shoreline or bank is evident between the waterbody and the wetland or upland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. A distinct step between the open waterbody or stream and the adjacent land exists (i.e., sharp bank) with dense roots throughout.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Wide wetland (>10') borders watercourse, lake, or pond.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. High flow velocities in the wetland.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. The watershed is of sufficient size to produce channelized flow.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Open water fetch is present.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11. Boating activity is present.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12. Dense vegetation is bordering watercourse, lake, or pond.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13. High percentage of energy-absorbing emergents and/or shrubs border a watercourse, lake, or pond.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14. Vegetation is comprised of large trees and shrubs that withstand major flood events or erosive incidents and stabilize the shoreline on a large scale (feet).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Vegetation is comprised of a dense resilient herbaceous layer that stabilizes sediments and the shoreline on a small scale (inches) during minor flood events or potentially erosive events.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<b>16. Comments: Only portion of Wetland 1 in proximity to proposed impacts were considered for this wetland function.</b>			

**PRODUCTION EXPORT (Nutrient) FUNCTION**

CONSIDERATIONS/QUALIFIERS	Y	N	Principal
1. Wildlife food sources grow within this wetland.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Detritus development is present within this wetland	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Economically or commercially used products found in this wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Evidence of wildlife use found within this wetland.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Higher trophic level consumers are utilizing this wetland.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Fish or shellfish develop or occur in this wetland.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. High vegetation density is present.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. Wetland exhibits high degree of plant community structure/species diversity.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9. High aquatic vegetative diversity/abundance is present.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. Nutrients exported in wetland watercourses (permanent outlet present).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. "Flushing" of relatively large amounts of organic plant material occurs from this wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12. Wetland contains flowering plants that are used by nectar-gathering insects.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13. Indications of export are present.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. High production levels occurring with no visible signs of export (assumes export is attenuated).	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**15. Comments: Only portion of Wetland 1 in proximity to proposed impacts were considered for this wetland function.**

**WILDLIFE HABITAT FUNCTION**

CONSIDERATIONS/QUALIFIERS	Y	N	Principal
1. Wetland is not degraded by human activity.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. H2O quality of watercourse/pond/lake associated w/ wetland meets/exceeds Class A or B standards	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Wetland is not fragmented by development.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Upland surrounding this wetland is undeveloped.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. > 40% of wetland edge bordered by upland wildlife habitat at least 500 ft in width.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Wetland is contiguous with other wetland systems connected by a watercourse or lake.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Wildlife overland access to other wetlands is present.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Wildlife food sources are within this wetland or are nearby.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Wetland exhibits a high degree of interspersion of vegetation classes and/or open water.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. Two or more islands or inclusions of upland within the wetland are present.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Dominant wetland class includes deep or shallow marsh or wooded swamp.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. > 3 acres shallow permanent open water (< 6.6 feet deep), including in/adjacent streams present.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13. Density of the wetland vegetation is high.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14. Wetland exhibits a high degree of plant species diversity.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Wetland exhibits high degree plant community structure diversity (tree/shrub/vine/grasses/mosses)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
16. Plant/animal indicator species are present. (List species for project)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Animal signs observed (tracks, scats, nesting areas, etc.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Seasonal uses vary for wildlife and wetland appears to support varied population diversity/abundance during different seasons.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Wetland contains or has potential to contain a high population of insects.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Wetland contains or has potential to contain large amphibian populations.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Wetland has a high avian utilization or its potential.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Indications of less disturbance-tolerant species are present.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Signs of wildlife habitat enhancement are present (birdhouses, nesting boxes, food sources, etc.).	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**24. Comments: Wetland 1 was considered in its entirety for this wetland function.**

**RECREATION (Consumptive and Non-Consumptive) VALUE**

CONSIDERATIONS/QUALIFIERS	Y	N	Principal
1. Wetland is part of a recreation area, park, forest, or refuge.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Fishing is available within or from the wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Hunting is permitted in the wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Hiking occurs or has potential to occur within the wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5. Wetland is a valuable wildlife habitat.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. The watercourse, pond, or lake associated with the wetland is unpolluted.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. High visual/aesthetic quality of this potential recreation site.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Access to water is available at this potential recreation site for boating, canoeing, or fishing.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9. Watercourse associated w/ wetland is wide & deep enough to accommodate canoeing and/or non-powered boating.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. Off-road public parking available at the potential recreation site.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11. Accessibility and travel ease is present at this site.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12. The wetland is within a short drive or safe walk from highly populated public and private areas	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13. <b>Comments: Only portion of Wetland 1 in proximity to proposed impacts were considered for this wetland function.</b>			

**EDUCATIONAL/SCIENTIFIC VALUE**

CONSIDERATIONS/QUALIFIERS	Y	N	Principal
1. Wetland contains or is known to contain threatened, rare, or endangered species.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Little or no disturbance is occurring in this wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Potential educational site contains a diversity of wetland classes & are accessible/potentially accessible.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Potential educational site is undisturbed and natural.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5. Wetland is considered to be a valuable wildlife habitat.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Wetland is located within a nature preserve or wildlife management area.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. Signs of wildlife habitat enhancement present (bird houses, nesting boxes, food sources, etc.).	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. Off-road parking at potential educational site suitable for school bus access in or near wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9. Potential educational site is within safe walking distance or a short drive to schools.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. Potential educational site is within safe walking distance to other plant communities.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11. Direct access to perennial stream at potential educational site is available.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12. Direct access to pond or lake at potential educational site is available.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13. No known safety hazards exist within the potential educational site.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14. Public access to the potential educational site is controlled.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
15. Handicap accessibility is available.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
16. Site is currently used for educational or scientific purposes.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
17. <b>Comments: Only portion of Wetland 1 in proximity to proposed impacts were considered for this wetland function.</b>			

### UNIQUENESS/HERITAGE VALUE

CONSIDERATIONS/QUALIFIERS	Y	N	Principal
1. Upland surrounding wetland is primarily urban.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Upland surrounding wetland is developing rapidly.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. > 3 acres of shallow permanent open water (< 6.6 feet deep), including streams, occur in wetlands.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Three or more wetland classes are present.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Deep and/or shallow marsh or wooded swamp dominate.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. High degree of interspersion of vegetation and/or open water occur in this wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. Well-vegetated stream corridor (15 feet on each side of the stream) occurs in this wetland.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Potential educational site is within a short drive or a safe walk from schools.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9. Off-road parking at potential educational site is suitable for school buses.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. No known safety hazards exist within this potential educational site.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11. Direct access to perennial stream or lake exists at potential educational site.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12. Two or more wetland classes are visible from primary viewing locations.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13. Low-growing wetlands (marshes, scrub-shrub, bogs, open water) visible from primary viewing locations.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14. Half an acre of open water or 200 feet of stream is visible from the primary viewing locations.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
15. Large area of wetland dominated by flowering plants/plants that seasonally turn vibrant colors	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
16. General appearance of the wetland visible from primary viewing locations is unpolluted and/or undisturbed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Overall view of the wetland is available from the surrounding upland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18. Quality of the water associated with the wetland is high.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Opportunities for wildlife observations are available.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Historical buildings are found within the wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
21. Presence of pond or pond site and remains of a dam occur within the wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
22. Wetland is within 50 yards of the nearest perennial watercourse.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Visible stone or earthen foundations, berms, dams, standing structures, or associated features occur within the wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
24. Wetland contains critical habitat for a state- or federally-listed threatened or endangered species.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
25. Wetland is known to be a study site for scientific research.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
26. Wetland is a natural landmark or recognized by the state natural heritage inventory authority as an exemplary natural community.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
27. Wetland has local significance because it serves several functional values.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Wetland has local significance because it has biological, geological, or other features that are locally rare or unique.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
29. Wetland is known to contain an important archaeological site.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
30. Wetland is hydrologically connected to a state or federally designated scenic river.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Wetland is located in an area experiencing a high wetland loss rate.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

32. **Comments: Wetland 1 was considered in its entirety for this wetland value.**

**VISUAL QUALITY/AESTHETICS VALUE**

<b>CONSIDERATIONS/QUALIFIERS</b>	<b>Y</b>	<b>N</b>	<b>Principal</b>
1. Multiple wetland classes are visible from primary viewing locations.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Emergent marsh and/or open water are visible from primary viewing locations.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. A diversity of vegetative species is visible from primary viewing locations	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Wetland is dominated by flowering plants or plants that turn vibrant colors in different seasons.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5. Land use surrounding the wetland is undeveloped as seen from primary viewing locations.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Visible surrounding land use form contrasts with wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. Wetland views absent of trash, debris, and signs of disturbance.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Wetland is considered to be a valuable wildlife habitat.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Wetland is easily accessed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Low noise level at primary viewing locations.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Unpleasant odors absent at primary viewing locations.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Relatively unobstructed sight line exists through wetland.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

13. **Comments: Wetland 1 was considered in its entirety for this wetland value.**

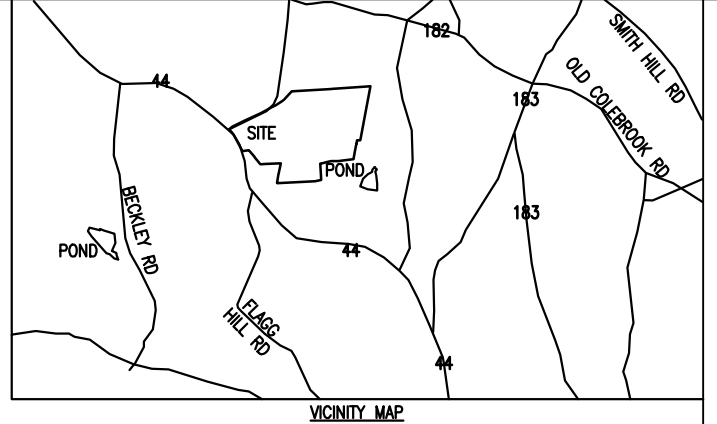
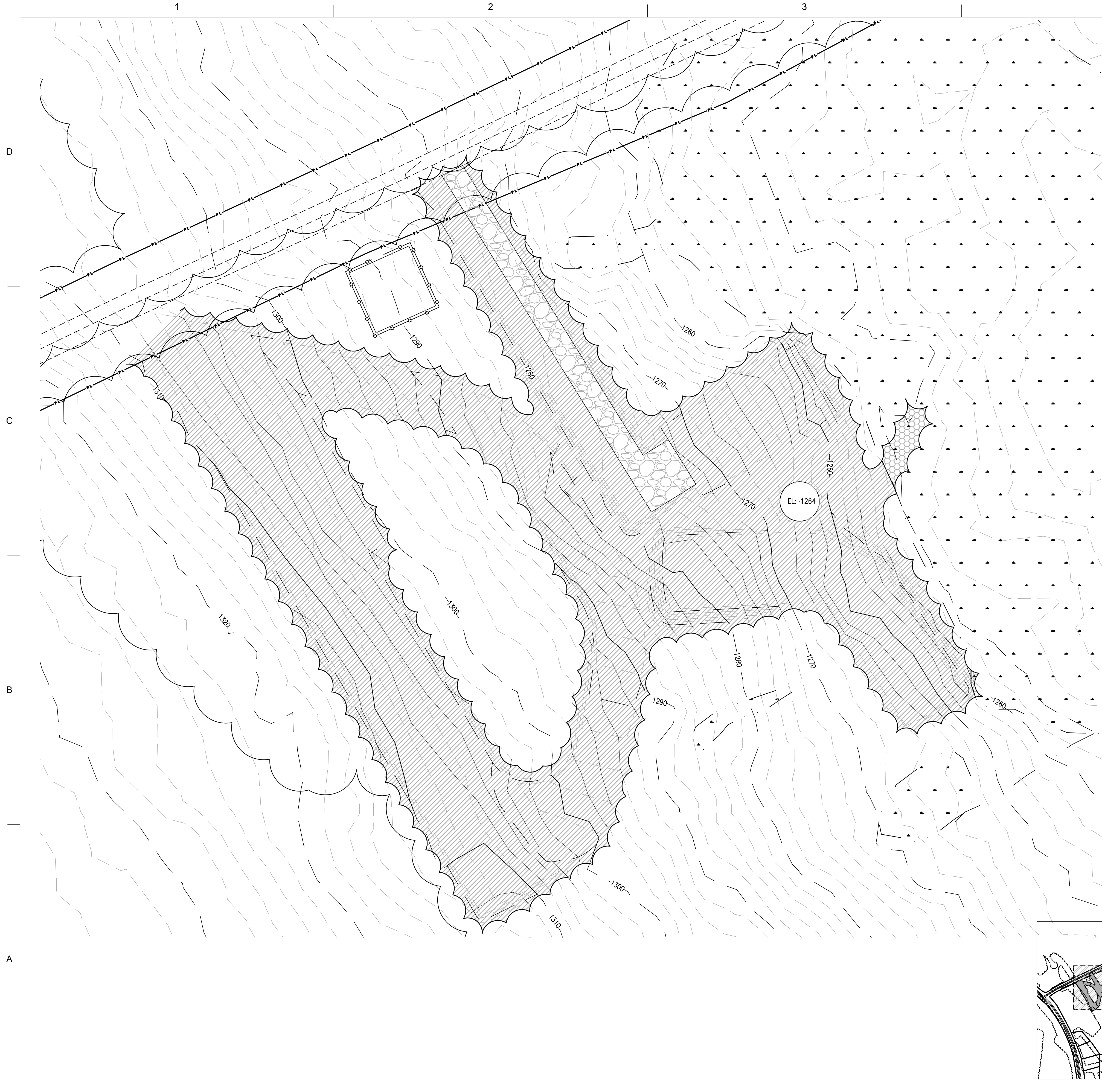
**ENDANGERED SPECIES HABITAT VALUE**

<b>CONSIDERATIONS/QUALIFIERS</b>	<b>Y</b>	<b>N</b>	<b>Principal</b>
1. Wetland contains or is known to contain threatened or endangered species.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Wetland contains critical habitat for a state or federally listed threatened or endangered species.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

3. **Comments: Only portion of Wetland 1 in proximity to proposed impacts were considered for this wetland function.**

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**Attachment E  
Plan Sheets C-313 and C-316,  
Wetland Restoration Area  
Construction Sequence and  
Planting Schedule**



**LEGEND**

	UPLAND MEADOW CREATION AREA
	WETLAND RESTORATION AREA
	STREAMBANK STABILIZATION AREA

**WETLAND RESTORATION AREA CONSTRUCTION SEQUENCE AND PLANTING SCHEDULE**

- PRIOR TO ANY EARTHWORK, A SILT FENCE EROSION CONTROL BARRIER WILL BE INSTALLED BETWEEN THE EXISTING WETLAND AND WETLAND RESTORATION AREA.
- A QUALIFIED WETLAND SCIENTIST RESPONSIBLE FOR THE WETLAND RESTORATION AREA SHALL BE NOTIFIED A MINIMUM OF SEVEN (7) BUSINESS DAYS PRIOR TO ANY PHASE OF THE MITIGATION PROJECT.
- NO GRADING IS PROPOSED WITHIN THE WETLAND RESTORATION AREAS AND AS SUCH, THE EXISTING SOIL MEDIUM SHOULD BE SUFFICIENT TO SUPPORT THE PROPOSED PLANTINGS. IF THE WETLAND SCIENTIST DEEMS THE SOIL MEDIUM TO BE INADEQUATE, THE AREA WILL BE BACKFILLED WITH A MINIMUM OF 6 INCHES OF CLEAN TOPSOIL.
- WETLAND RESTORATION AREA PLANTINGS SHALL TAKE PLACE ONCE THE ABOVE LISTED TASKS HAVE BEEN COMPLETED. THE WETLAND RESTORATION AREA WILL BE PLANTED WITH NATIVE TREES, SHRUBS AND HERBACEOUS VEGETATION AS NOTED IN THE PLANTING SCHEDULE.
- ALL PLANT MATERIALS INSTALLED SHALL MEET OR EXCEED THE SPECIFICATIONS OF THE "AMERICAN STANDARDS FOR NURSERY STOCK" BY THE AMERICAN ASSOCIATION OF NURSEYMEN. ALL PLANT MATERIALS SHALL BE GUARANTEED FOR ONE YEAR FOLLOWING DATE OF FINAL ACCEPTANCE.
- ALL PLANTINGS TO BE SPACED RANDOMLY AT THE DIRECTION OF THE WETLAND SCIENTIST TO SIMULATE NATURAL GROWTH PATTERNS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CAREFUL INSTALLATION, MAINTENANCE (INCLUDING WATERING), AND ESTABLISHMENT OF THE PLANT MATERIAL IN THE RESTORATION AREA. A MAINTENANCE SCHEDULE FOR IRRIGATION WILL BE ESTABLISHED BY THE CONTRACTOR. ALL PLANTS SHALL BE GUARANTEED BY THE CONTRACTOR TO REMAIN ALIVE AND HEALTHY FOR THE FULL TWELVE (12) MONTH PERIOD.

**UPLAND MEADOW CREATION AREA CONSTRUCTION SEQUENCE AND PLANTING SCHEDULE**

- PRIOR TO ALL WORK, EROSION CONTROL BARRIERS ARE TO BE INSTALLED AS DETAILED ON THE EROSION CONTROL PLAN.
- WHERE ADEQUATE TOPSOIL (±6 INCHES) DOES NOT EXIST, THE UPLAND MEADOW CREATION AND RESTORATION AREAS SHALL THEN BE BACKFILLED TO A MINIMUM DEPTH OF 6 INCHES WITH CLEAN TOPSOIL. ONCE FINAL TOPSOIL IS IN PLACE, IT SHALL BE GRADED TO ACHIEVE A RELATIVELY SMOOTH SURFACE.
- ONCE THE ABOVE LISTED TASKS HAVE BEEN COMPLETED, THESE AREAS WILL BE PLANTED WITH NEW ENGLAND CONSERVATION/WILDLIFE GRASS SEED MIX AFTER THE GRADING IS COMPLETED. THE SEED MIX WILL BE APPLIED TO THE ENHANCEMENT AREA AT A RATE OF 1 LB/1,750 SQUARE FEET. SOIL CONDITIONING ACTIVITIES, INCLUDING RAKING, WILL BE COMBINED WITH THE SEED APPLICATION PROCESS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CAREFUL INSTALLATION, MAINTENANCE (INCLUDING WATERING), AND ESTABLISHMENT OF NATIVE PLANT MATERIAL IN THESE AREAS. ALL PLANTS SHALL BE GUARANTEED BY THE CONTRACTOR TO REMAIN ALIVE AND HEALTHY FOR A FULL TWENTY FOUR (24) MONTH PERIOD.
- THE EROSION CONTROL BARRIERS SHALL BE DISASSEMBLED FOLLOWING SUCCESSFUL STABILIZATION OF THIS AREA. SEDIMENT COLLECTED BY THESE DEVICES WILL BE REMOVED AND DISPOSED OF IN A MANNER THAT PREVENTS EROSION AND TRANSPORT TO A WATERWAY OR WETLAND.

**UPLAND MEADOW CREATION AREA PLANTING SCHEDULE**

UPLAND MEADOW CREATION AREA WILL BE PLANTED WITH NEW ENGLAND CONSERVATION/WILDLIFE MIX (OR EQUIVALENT) AT 1750 SQ.FT./LB. OR AS RECOMMENDED BY MANUFACTURER. SEED MIX TO BE PROVIDED BY NEW ENGLAND WETLAND PLANTS, INC. (413-548-8000), OR APPROVED SUPPLIER.

Wetland Restoration Area Planting Schedule (± 1020 sq.ft.)

Botanical Name	Common Name	Size	Spacing (minimum)	Quantity
Trees				
Acer rubrum	Red Maple	4-6 feet	10 feet	3
Shrubs				
Aronia melanocarpa	Black Chokeberry	3-4 feet	5 feet	10
Lindera benzoin	Common Spicebush	3-4 feet	5 feet	10
Viburnum dentatum	Northern Arrowwood	3-4 feet	5 feet	10

WETLAND RESTORATION AREA WILL BE UNDER-SOWN WITH NEW ENGLAND CONSERVATION/WILDLIFE MIX (OR EQUIVALENT) AT 1750 SQ.FT./LB. OR AS RECOMMENDED BY MANUFACTURER. SEED MIX TO BE PROVIDED BY NEW ENGLAND WETLAND PLANTS, INC. (413-548-8000), OR APPROVED SUPPLIER.

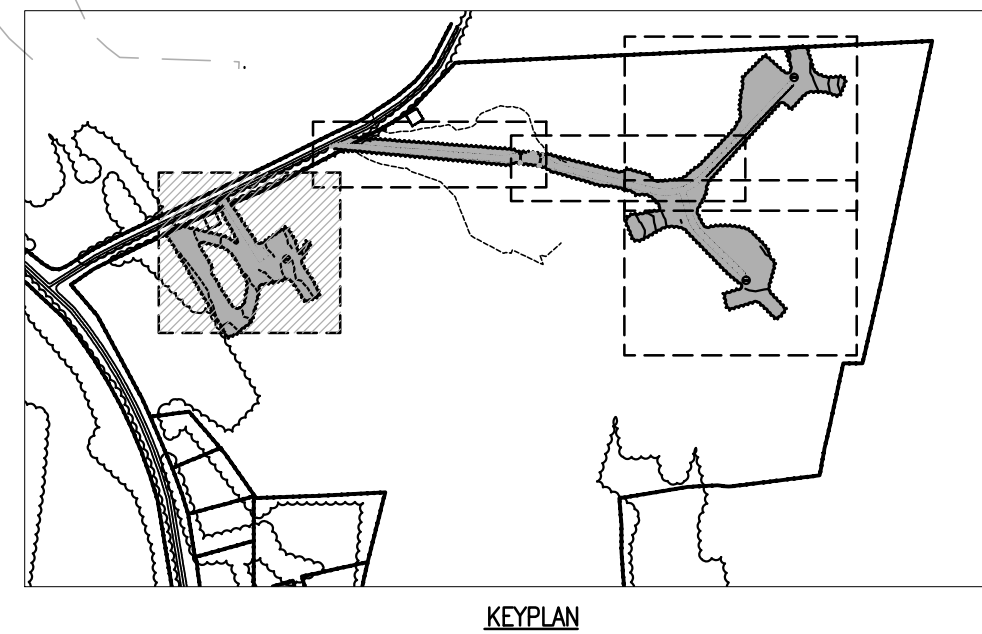
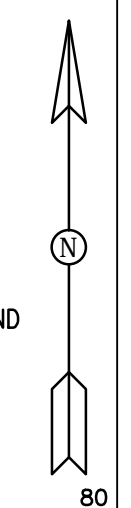
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1	CONNECTICUT SITING COUNCIL SUBMISSION	12-01-10	TLK

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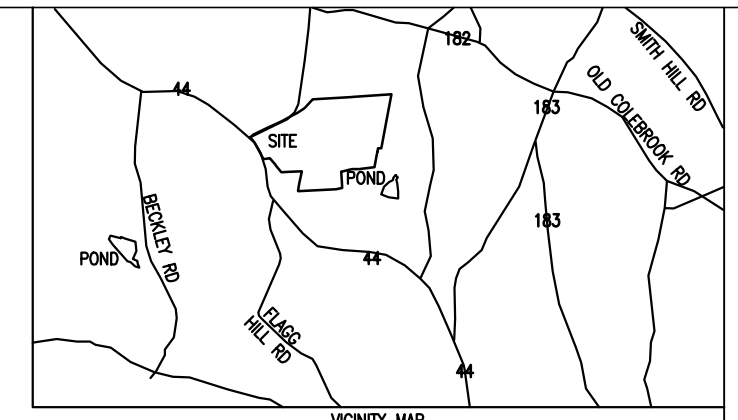
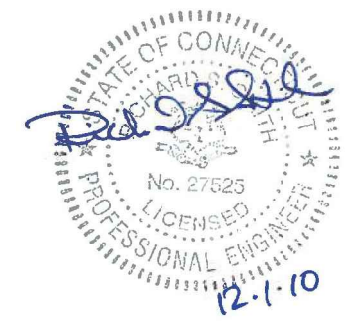
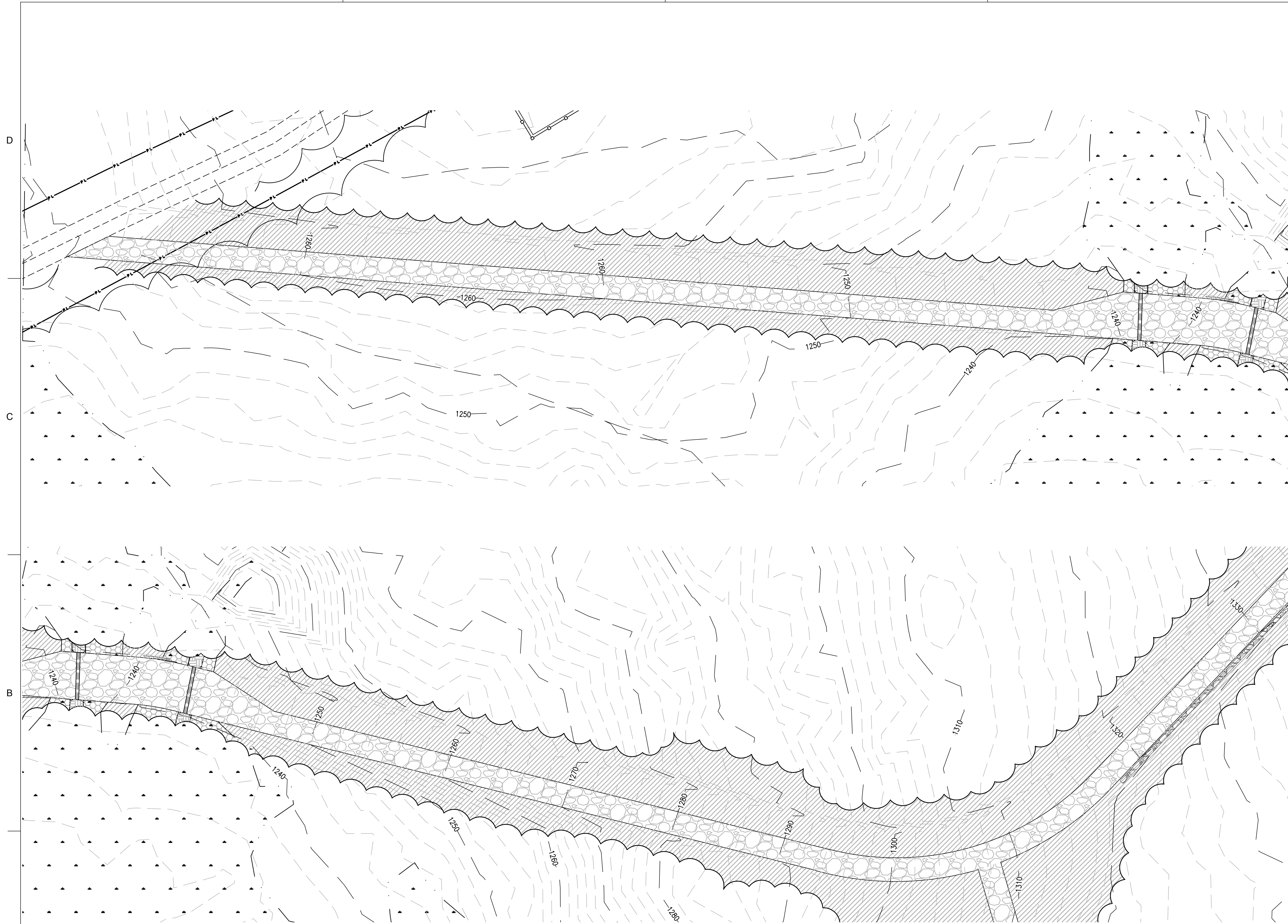
**ZAPATA**  
 6502 LAWRENCE ROAD  
 WINDHAM, VT 05093  
 PHONE: (802) 358-8940  
 FAX: (802) 358-8941  
 WWW.ZAPATAINC.COM

WIND COLEBROOK NORTH  
 WIND-NOBLE ROAD  
 COLEBROOK, CONNECTICUT  
 TURBINE LOCATION ONE AND  
 CRANE ASSEMBLY AREA  
 UPLAND MEADOW (CREATION AND RESTORATION)  
 AND WETLAND RESTORATION PLAN

SHEET IDENTIFICATION  
**C-313**







**WETLAND RESTORATION AREA CONSTRUCTION SEQUENCE AND PLANTING SCHEDULE**

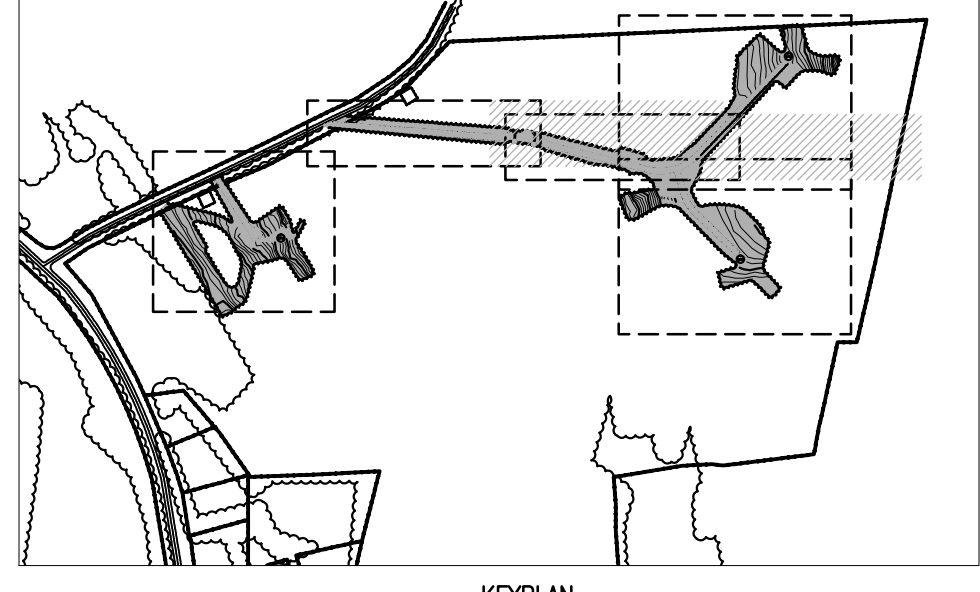
1. PRIOR TO ANY EARTHWORK, A SILT FENCE EROSION CONTROL BARRIER WILL BE INSTALLED BETWEEN THE EXISTING WETLAND AND WETLAND RESTORATION AREA.
2. A QUALIFIED WETLAND SCIENTIST RESPONSIBLE FOR THE WETLAND RESTORATION AREA SHALL BE NOTIFIED A MINIMUM OF SEVEN (7) BUSINESS DAYS PRIOR TO ANY PHASE OF THE MITIGATION PROJECT.
3. MINIMAL OR NO GRADING IS PROPOSED WITHIN THE WETLAND RESTORATION AREAS AND AS SUCH, THE EXISTING SOIL MEDIUM SHOULD BE SUFFICIENT TO SUPPORT THE PROPOSED PLANTINGS. IF THE WETLAND SCIENTIST DEEMS THE SOIL MEDIUM TO BE INADEQUATE, THE AREA WILL BE BACKFILLED WITH A MINIMUM OF 6 INCHES OF CLEAN TOPSOIL.
4. WETLAND RESTORATION AREA PLANTINGS SHALL TAKE PLACE ONCE THE ABOVE LISTED TASKS HAVE BEEN COMPLETED. THE WETLAND RESTORATION AREA WILL BE PLANTED WITH NATIVE TREES, SHRUBS AND HERBACEOUS VEGETATION AS NOTED IN THE PLANTING SCHEDULE.
5. ALL PLANT MATERIALS INSTALLED SHALL MEET OR EXCEED THE SPECIFICATIONS OF THE "AMERICAN STANDARDS FOR NURSERY STOCK" BY THE AMERICAN ASSOCIATION OF NURSERYMEN. ALL PLANT MATERIALS SHALL BE GUARANTEED FOR ONE YEAR FOLLOWING DATE OF FINAL ACCEPTANCE.
6. ALL PLANTINGS TO BE SPACED RANDOMLY AT THE DIRECTION OF THE WETLAND SCIENTIST TO SIMULATE NATURAL GROWTH PATTERNS.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CAREFUL INSTALLATION, MAINTENANCE (INCLUDING WATERING), AND ESTABLISHMENT OF THE PLANT MATERIAL IN THE RESTORATION AREA. A MAINTENANCE SCHEDULE FOR IRRIGATION WILL BE ESTABLISHED BY THE CONTRACTOR. ALL PLANTS SHALL BE GUARANTEED BY THE CONTRACTOR TO REMAIN ALIVE AND HEALTHY FOR THE FULL TWELVE (12) MONTH PERIOD.
8. ROCKS AND BOULDERS, UNCOVERED DURING THE EXCAVATION, MAY BE LEFT IN PLACE PROVIDED THAT THEY DO NOT SIGNIFICANTLY DECREASE THE PLANTABLE AREA OF THE RESTORATION AREA. THESE ROCKS AND BOULDERS WILL BE PLACED IN SUCH A WAY AS TO PROVIDE CREVICES AND CAVITIES SUITABLE FOR USE BY WILDLIFE.
9. FALLEN LOGS, BRANCHES, STUMPS AND OTHER NATURAL DEBRIS WILL BE RELOCATED TO THE RESTORATION AREA TO PROVIDE BENEFICIAL HABITAT FEATURES FOR WILDLIFE. THIS WILL INCLUDE DOWNED AND UNCOVERED MATERIAL THAT IS ACQUIRED DURING GRADING ACTIVITIES AND WILL BE DISTRIBUTED TO COVER 2% OF THE AREA'S SUBSTRATE SURFACE. THE NATURAL DEBRIS SHOULD BE OF VARYING SIZES AND IN VARYING DEGREES OF DECOMPOSITION.
10. THE EROSION CONTROL BARRIERS SHALL BE DISASSEMBLED PROMPTLY FOLLOWING SUCCESSFUL STABILIZATION OF THIS AREA. SEDIMENT COLLECTED BY THESE DEVICES WILL BE REMOVED AND DISPOSED OF IN A MANNER THAT PREVENTS EROSION AND TRANSPORT TO A WATERWAY OR WETLAND.

**STREAMBANK STABILIZATION AREA CONSTRUCTION SEQUENCE**

1. PRIOR TO ALL WORK, EROSION CONTROL BARRIERS ARE TO BE INSTALLED BETWEEN THE STABILIZATION AREAS AND ADJACENT UNDISTURBED AREAS.
2. A QUALIFIED WETLAND SCIENTIST RESPONSIBLE FOR THE STREAMBANK STABILIZATION AREA SHALL BE NOTIFIED A MINIMUM OF SEVEN (7) BUSINESS DAYS PRIOR TO ANY PHASE OF THIS PROJECT.
3. THE STREAMBANK STABILIZATION AREA WAS PREVIOUSLY CLEARED. MINOR GRADING MAY BE REQUIRED TO INSTALL CULVERTS IN THESE AREAS AS SHOWN ON THE PLANS.
4. WHERE MINOR GRADING IS REQUIRED, THE STREAMBANK STABILIZATION AREA SHALL THEN BE BACKFILLED TO A MINIMUM DEPTH OF 6 INCHES WITH CLEAN TOPSOIL. ONCE FINAL TOPSOIL IS IN PLACE, IT SHALL BE GRADED TO ACHIEVE A RELATIVELY SMOOTH SURFACE.
5. STREAMBANK STABILIZATION AREA PLANTINGS SHALL TAKE PLACE ONCE THE ABOVE LISTED TASKS HAVE BEEN COMPLETED. THIS AREA WILL BE PLANTED WITH NATIVE SHRUBS AND HERBACEOUS VEGETATION AS NOTED IN THE PLANTING SCHEDULE AND UNDER SOWN WITH NEW ENGLAND CONSERVATION/WILDLIFE GRASS SEED MIX AFTER THE GRADING IS COMPLETED. THE SEED MIX WILL BE APPLIED TO THE STABILIZATION AREA AT A RATE OF 1 LB/1,750 SQUARE FEET. SOIL CONDITIONING ACTIVITIES, INCLUDING RAKING, WILL BE COMBINED WITH THE SEED APPLICATION PROCESS.
6. ALL PLANT MATERIALS INSTALLED SHALL MEET OR EXCEED THE SPECIFICATIONS OF THE "AMERICAN STANDARDS FOR NURSERY STOCK" BY THE AMERICAN ASSOCIATION OF NURSERYMEN. ALL PLANT MATERIALS SHALL BE GUARANTEED FOR ONE YEAR FOLLOWING DATE OF FINAL ACCEPTANCE.
7. ALL PLANTINGS TO BE SPACED RANDOMLY AT THE DIRECTION OF THE WETLAND SCIENTIST TO SIMULATE NATURAL GROWTH PATTERNS. PLANTINGS WILL BE SITUATED ALONG THE STREAM BANK FOR SLOPE STABILIZATION.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CAREFUL INSTALLATION, MAINTENANCE (INCLUDING WATERING), AND ESTABLISHMENT OF NATIVE PLANT MATERIAL IN THE STABILIZATION AREA. ALL PLANTS SHALL BE GUARANTEED BY THE CONTRACTOR TO REMAIN ALIVE AND HEALTHY FOR A FULL TWENTY FOUR (24) MONTH PERIOD.
9. FALLEN LOGS, BRANCHES, STUMPS AND OTHER NATURAL DEBRIS WILL BE RELOCATED TO THE ENHANCEMENT AREA TO PROVIDE BENEFICIAL HABITAT FEATURES FOR WILDLIFE. THIS WILL INCLUDE DOWNED AND UNCOVERED MATERIAL THAT IS ACQUIRED ON SITE BY THE WETLAND SCIENTIST AND WILL BE DISTRIBUTED TO COVER 2% OF THE AREA'S SUBSTRATE SURFACE. THE NATURAL DEBRIS SHOULD BE OF VARYING SIZES AND IN VARYING DEGREES OF DECOMPOSITION.
10. THE EROSION CONTROL BARRIERS SHALL BE DISASSEMBLED FOLLOWING SUCCESSFUL STABILIZATION OF THIS AREA. SEDIMENT COLLECTED BY THESE DEVICES WILL BE REMOVED AND DISPOSED OF IN A MANNER THAT PREVENTS EROSION AND TRANSPORT TO A WATERWAY OR WETLAND.

**LEGEND**

	UPLAND MEADOW CREATION AREA
	WETLAND RESTORATION AREA
	STREAMBANK STABILIZATION AREA



Wetland Restoration Area Planting Schedule (± 730 sq. ft.)

Botanical Name	Common Name	Size	Spacing (minimum)	Quantity
Trees				
Acer rubrum	Red Maple	4-6 feet	10 feet	3
Shrubs				
Aronia melanocarpa	Black Chokeberry	3-4 feet	5 feet	6
Lindera benzoin	Common Spicebush	3-4 feet	5 feet	6
Viburnum dentatum	Northern Arrowwood	3-4 feet	5 feet	6

WETLAND RESTORATION AREA WILL BE UNDER-SOWN WITH NEW ENGLAND CONSERVATION/ WILDLIFE MIX (OR EQUIVALENT) AT 1750 SQ.FT./LB. OR AS RECOMMENDED BY MANUFACTURER. SEED MIX TO BE PROVIDED BY NEW ENGLAND WETLAND PLANTS, INC. (413-548-8000), OR APPROVED SUPPLIER.

DESIGNED BY:	DATE:	12-01-10
DRAWN BY:	CHKD BY:	
RSW	TJK	
SUBMITTED BY:	BNE ENERGY	
PLOT SCALE:	PLOT DATE:	FILE NUMBER:
AS SHOWN	12-01-10	1385
SIZE:	FILE NAME:	
ANSI D		

**ZAPATA**  
 6302 LAWREN ROAD, SUITE 200, WINDHAM, ME 04990  
 TEL: 603-852-2200 FAX: 603-852-2201  
 WWW.ZAPATAINC.COM

WIND COLEBROOK NORTH  
 WINSTED-NORFOLK ROAD  
 COLEBROOK, CONNECTICUT  
 CRANE ROAD STA: 0+00 TO 17+00  
 UPLAND MEADOW CREATION AND RESTORATION  
 AND WETLAND RESTORATION PLAN

SHEET IDENTIFICATION  
**C-316**

