



**Ivas Environmental
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**Town of Norwell Community Preservation Committee
Norwell Town Offices
345 Main Street, P.O. Box 295
Norwell MA 02061-0295**

15 Jan 17

RE: Wetlands Evaluation and Report - Main Street - Dolan - Carleton Parcels

Dear Mr. Chairman and Members of the Board,

This letter report provides details of the wetlands delineation that was performed in December of 2016 on the Main Street Dolan-Carleton parcels, both north and south of Main Street, Norwell. The fields along Main Street between Lincoln Street and Homestead Farm Lane on the north, and Jordan Lane on the south, are the easily-observable locations along Main Street associated with the parcels.

The parcels are listed by the Town of Norwell Assessors' Office as parcels 41-17, 45-27, 28, 29, 30, 34, and 56-26, 28, 29, and 31.

Follows is a brief description of the location of each of the ten parcels, beginning at the northwesterly parcel, moving along the north side of Main Street, then the parcel between Main and Lincoln Streets, then the parcels south of Main Street.

Parcel #	Acres	Description
North of Main Street		
45 - 34	50.7 ac	Large parcel along Lincoln, Hemlock, and a private parcel on Lincoln Street.
45 - 30	1.8 ac	Long, narrow parcel from Lincoln Street and Main Street to Black Pond Brook. Contains a field at Lincoln St.
45 - 29	3.0 ac	Field just east of Lincoln/Main Streets intersection.
45 - 27	2.8 ac	Field to west of development along Homestead Farm Lane.
45 - 28	22.3 ac	Large parcel to the west of Fogg Forest and north of 45-27.
Between Main and Lincoln Streets		
41 - 17	4.1 ac	Triangular property between Main and Lincoln Streets.
South of Main Street		
56 - 26	6.8 ac	Parcel west of private lot at Lincoln/Main Streets intersection, at curve in Main Street.
56 - 28	3.5 ac	Field along Main Street just west of Jordan Lane.
56 - 29	19.4 ac	Large parcel just west of Jordan Lane and south of 56 - 28.
56 - 31	2.6 ac	Parcel just southwest of 56 - 29.

The report's sections address the various environmental considerations, including both opportunities and constraints for development of the parcels. Thirteen (13) Figures are included, that provide additional graphical information regarding Rare and Endangered Species, Vernal Pools, Federal and Commonwealth Wetlands, Soils, Flood Zones, Historic District, and relationship of the parcels to other town-owned properties.

1. General Site Conditions.

This section discusses the general site condition of each of the parcels, in numerical sequence.

- 41-17:** This is the 4.1-acre triangular parcel at the intersection of Main and Lincoln Streets. It is wooded, and drops from its westerly boundary from about 122 feet to about 100 feet at the intersection of Main and Lincoln Streets. The westerly, higher-elevation portion is dry, and the easterly portion has been delineated with the "G" Series.
- 45-27:** This is the 2.8-acre mowed field to the west of the development along Homestead Farm Lane. Generally, the drops field about ten feet from its southwest corner toward its northeast corner. There is an open marshland near the field's northwest corner. A portion of the "C" Series delineates the marshland.
- 45-28:** This 22.3-acre parcel is a wooded parcel to the north of the field at 45-27, above, and to the immediate west of Fogg Forest. It contains an stormwater outfall from street drainage on Main Street, from about 498 Main Street to about 598 Main Street, as noted on the EPG plans of the re-construction of Main Street, dated 2016. It contains wetlands at its southerly boundary that flow into an Intermittent Stream that directs flows into Black Pond Brook, which is at its northerly portion. It also contains a wetlands area that surrounds an isolated upland in its north-center. This parcel contains portions of the "B" and "C" series, and the entire "L" series wetland delineations. The topography is generally flat, varying about ten feet, until the land drops another ten feet to Black Pond Brook.
- 45-29:** This is the 3.0-acre trapezoid-shaped mowed field just east of the Main and Lincoln Streets intersection. The landform drops about ten feet from Main Street to its northwest corner, where a small portion of the "C" series wetlands delineation line passes. Its easterly boundary is along a double row of stone walls running north-south. At its northeast corner, there are two "lobes" of the "C" series, one in an obvious wet meadow, and another in the mowed field that contains hydric soils.
- 45-30:** This is a long-narrow, 1.8-acre parcel that extends from Lincoln Street at Main Street to Black Pond Brook, nearly 2,000 feet to the north. Portions of the "B" and "C" series are found in the north and south sections, respectively. This parcel appears to be at the toe of a slope of a portion of the hill that extends uphill and offsite, to the southwest of Lincoln Street. It is also adjacent to the Black Pond Brook floodplain at its northerly boundary. Portions of the "B" series are at its northerly and southerly section in the woodland. The field at Lincoln Street contains the entirety of the "M" series wetland delineation.
- 45-34:** This is a 50.7-acre parcel is located along the southeast side of the residences along Hemlock Drive, and has street frontage at Lincoln Street. Its northerly boundary is near both Trout and Black Pond Brooks. Its topography drops from about 142 feet at Lincoln Street, to about 70 feet at its northeast corner, at Black Pond Brook. The "A" series is contained within the site, as are the "I" and "J" series wetlands delineations. A portion of the "B" series is also this parcel.
- 56-26:** This is a 6.8-acre lot south of the curve in Main Street, just west of Lincoln Street and west of a private residence parcel. The topography on the parcel drops from Main Street into a wetland area, from about 108 feet to about 88 feet. The site contains the "E" and "F" series wetland delineations.
- 56-28:** This is the 3.5-acre mowed field along Main Street, just west of Jordan Lane. Elevations drop from the north at Main Street, to the southerly. The "D" series wetland delineation crosses the southwesterly corner of the field.
- 56-29:** This parcel is the 19.4-acre, nearly square parcel on the west side of Jordan Lane just south of the mowed field at Main Street. Elevations drop generally from the northeast to the southwest corner of the parcel. It contains most of the "D" series wetland delineation. The parcel is mainly wet.

56-31: This is a 2.6-acre parcel southwest of the southwest corner of the larger parcel, 56-29. The topography drops from the northwest to the southeast on the site. The parcel is wet. No flags were placed on this parcel.

2. Rare Species

2.1 Estimated and Priority Habitats.

An Estimated Habitat (EH) of Rare Wildlife and Priority Habitat (PH) of Rare Species is extant on the easterly side of two of the parcels south of Main Street, 56-28 and 29. The EH is number EH 124, and the PH is number PH 238. This requires that an Notice of Intent for activities within the EH or PH (they overlie one another) must be forwarded to the Natural Heritage and Endangered Species Program for at least one month before the Conservation Commission may close a Public Hearing.

2.2. Certified and Potential Vernal Pools.

There are no Certified Vernal Pools on or adjacent to the subject property. **One Potential Vernal Pool (PVP 17360 is located at the northerly tip of the site on the north side of Main Street, on parcel 45-34.** On-site observations note that this PVP may be slightly mis-justified, as there is what appears as a PVP just to the southwest of the location on the MassGIS data layer, within a wet kettlehole.

3.0 Wetland Resources Boundary Determination Methodology

3.1 Section 404 - Clean Water Act

The US Army Corps of Engineers (ACE, *Federal Register*, 1982) and the US Environmental Protection Agency (USEPA, *Federal Register*, 1980) jointly define wetlands as: "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." (1987 ACE Wetlands Delineation Manual).

Wetlands and other waters of the U.S. are regulated under Section 404 of the Clean Water Act (CWA) by ACE. Federally jurisdictional wetlands include interstate wetlands, wetlands adjacent to waters of the U.S. and intrastate wetlands whose degradation or destruction could affect interstate or foreign commerce as per the application of the CWA.

The 1987 Wetlands Delineation Manual cites three general diagnostic characteristics (vegetation, soil, and hydrology) and indicators of each of the diagnostic characteristics:

1. Vegetation. The prevalent vegetation consists of macrophytes that are typically adapted to areas having hydrologic and soil conditions described in the definition above. Hydrophytic species, due to morphological, physiological, and/or reproductive adaptation(s), have the ability to grow, effectively compete, reproduce and/or persist in anaerobic soil conditions.
2. Soil. Soils are present and have been classified as hydric, or they possess characteristics that are associated with reducing soil conditions.
3. Hydrology. The area is inundated either permanently or periodically at mean water depths less than or equal to 6.6 ft (2 m) or the soil is saturated to the surface at some time during the growing season of the prevalent vegetation.

Please see the attached Figure 6 for a depiction of the Federal wetlands on the site.

3.2 Commonwealth of Massachusetts Wetlands and Rivers Protection Acts

The Massachusetts Wetlands Protection Act (WPA), M.G.L. c. 131 § 40, ¶ 7 defines freshwater wetlands as “... wet meadows, marshes, swamps, bogs, areas where groundwater, flowing or standing surface water or ice provide a significant part of the supporting substrate for a plant community for at least five months of the year; emergent and submergent plant communities in inland waters; that portion of any bank which touches any inland waters.” The WPA regulations at 310 CMR 10.00 are administered by the Massachusetts Department of Environmental Protection (MA DEP) and municipal conservation commissions.

The Rivers Protection Act, Chapter 258 of the Acts of 1996, creates a 200-foot Riverfront Area that extends on both sides of rivers and streams. In certain urban areas, the Riverfront Area is 25 feet. The Rivers Protection Act regulations are a part of the regulations at 310 CMR 10.58, and are administered by MA DEP and the municipal conservation commissions.

3.2.1 Bordering Vegetated Wetlands (BVWs)

BVWs are *freshwater wetlands which border on creeks, rivers, streams, ponds, and lakes and where the soils are saturated and/or inundated such that they support a predominance of wetland indicator plants* [310 CMR 10.55(2)(a)]. The boundary of BVW is defined at 310 CMR 10.55 (2) (c) as the line within 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist.

The issuing authority must evaluate vegetation and indicators of saturated or inundated conditions if submitted by a credible source, or may require credible evidence of saturated or inundated conditions when determining the boundary. Indicators of saturated or inundated conditions sufficient to support wetland indicator plants shall include one or more of the following:

- a. Groundwater, including the capillary fringe, within a major portion of the root zone;
- b. Observation of prolonged or frequent flowing or standing water;
- c. Characteristics of hydric soils.

The extent of Bordering Vegetated Wetlands (BVW) was determined through observations of the existing plant communities, soils, and hydrology in accordance with 310 CMR 10.55 (2) and the Handbook prepared by Massachusetts Department of Environmental Protection entitled *Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act* (March 1995).

Specifically, the methodology utilized the “fifty percent criteria” to determine whether the area is dominated by wetland indicator plants or upland plant species. Notes were taken of overstory, shrub story, herbaceous story, and vine story at each flag location. The upland/wetland boundary of Bordering Vegetated Wetlands (BVWs) on the site is demarcated with orange surveyors’ tape flags with an alpha-numeric beginning with IE (for Ivas Environmental), and then a sequential number, e.g, IE A1 is the first flag in the “A” BVW series. There are other BVW series of flags, B, C, D, E, F, G, and L. Other flag series include I, J, and M, which are Isolated Vegetated Wetlands (IVWs) that are locally-jurisdictional. There is one series that is along an Intermittent Stream, the K Series.

3.3 Measurement of Floristic Characteristics

3.3.1 Plant Species Identification

Ivas Environmental identified plant species comprising 5% or greater of the vegetative cover in the existing BVW. Identifications were made to the species level when morphologically possible and were used in conjunction with topography, to define the boundary of BVW in accordance with definitions and criteria in 310 CMR 10.00.

3.3.2 Identification of Wetland Indicator Species

The regional wetland indicator status of all identified plant species were obtained from the classification system described in the US Army Corps of Engineers Northcentral and Northeast 2014 Regional Wetland Plant List from the Cold Regions Research and Engineering Laboratory, although the *National List of Plant Species that Occur in Wetlands: Massachusetts* (Reed 1988), is listed within the Commonwealth's Wetlands Protection Act as the regulatory reference. The rationale for utilizing the more recent US Army Corps of Engineers list is that the science has progressed well during the past 25 years, and all wetland resource regulators and delineators should use the most recent and accepted science. The difference between the 2014 and 1988 lists is that the plus and minus modifiers have been removed from the wetland indicators of the 1988 List, and that some species have changed categories.

The system divides plant species into five categories ("wetland indicator status") based on the frequency of their occurrence in wetland habitat, and has been adopted by the Department of Environmental Protection (DEP) as the definitive source regarding the indicator status of wetland plants.

The indicators address the range of estimated probabilities of a species occurring in wetlands versus non-wetlands. These probabilities are expressed as percentages, and called a frequency of occurrence. There are five major categories: **Obligate (OBL)**, for those plants that almost always occur in wetlands (estimated probability of >99%) under natural conditions; **Facultative Wetland (FACW)**, for those plants that usually occur in wetlands (67 - 99%); **Facultative (FAC)**, for those plants that are equally likely to occur in non-wetlands or wetlands (estimated probability of 34-66%); **Facultative Upland (FACU)**, those that usually occur in non-wetlands (estimated probability of 67-99%), but sometimes found in wetlands (estimated probability of 1 - 33%); and **Obligate Upland (UPL)** plants that may occur in wetlands in another region, but occur almost always in non-wetlands (estimated probability of 99%) under natural conditions in this State.

Additional information that assists in forming a delineation line are the condition regarding the presence or absence of hydric soils and/or obvious hydrology near the surface of the ground.

3.3.3. Wetlands Resource Area Delineations On Site

Ivas Environmental wetlands delineations on site on the following days in December, 2016: 01, 04, 06, 08, 11, 13, 14, 21, 28, and 29 Dec 2016. The weather conditions on the site were as follows. The ground was not frozen unless noted:

Date	Temperatures (°F)	Sky	Wind	Notes
01 Dec	40s - 50s	clear	windy	After storm event previous day.
04 Dec	30s - 40s	clear	breezy	
06 Dec	30s	clear	breezy	Snow & rain previous day.
08 Dec	high 30s	mostly cloudy	no wind	Vegetation dripping wet.
11 Dec	30s	cloudy	windy	Cold previous night (freezing).
13 Dec	30s	clear	NW wind	Snow & rain previous day.
14 Dec	30s	clear	breezy	
21 Dec	30s	some clds	no wind	Ground frozen at surface only.
28 Dec	30s	ptly cldy	breezy	
29 Dec	30s	cloudy	No wind	

Please see the attached plan by Merrill Associates, Inc., for a depiction of the locations of the wetland flags.

3.4 Cowardin Classification of Federal Wetlands - National Wetland Inventory Data Layer

The National Wetland Inventory (NWI) data layer available from MassGIS shows five types of wetlands on and adjacent to the site, however the area of the wetland types is not precise enough to use as a final field delineation. In this case, the NWI data layer polygons overlies some of the MA DEP South Coastal Watersheds Wetland data layer. These NWI and MA DEP polygons are smaller than the actual field-observed and delineated wetlands on site.

The NWI uses the Cowardin Classification System for wetlands (Cowardin, 1979) where a system of wetland classification codes, a series of letter and number codes have been developed to adapt the NWI national wetland classification system to map form. These alpha-numeric codes correspond to the classification nomenclature that best describes the habitat. (for example, PFO1E).

In this case, the NWI data layer shows five classification codes close to the site. These are listed below, with the locations of their designations. Offsite locations are noted, as jurisdiction extends to the subject parcels.

<u>Code</u>	<u>Location(s)</u>
PEM5E	East side of Parcel 45-28, and west of Homestead Farm Lane.
PF01E	West center of Parcel 45-34, extending down-gradient from lots along Hemlock Drive. Offsite, at extreme northwest corner of Parcel 45-34, on parcels along Hemlock Drive Extremely east side of Parcel 45-28.
PF01/4E	South-central portion of Parcel 56-29. Northwest corner of Parcel 45-28. Northeast corner of Parcel 45-28.
PSS1E	East side of Parcel 45-28, and west of Homestead Farm Lane. Northwest center of Parcel 56-29, south of Main Street.
R2UBH	Along north portion of Parcels 45-28 and 45-30, Black Pond Brook. Offsite, just north of Parcel 45-34, Trout Brook.

These five classifications are described more fully below.

PEM5E: The designation “P” indicates the System, PALUSTRINE. The Palustrine System includes all non-tidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 ppt. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than 8 ha (20 acres); (2) active wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than 2.5 m (8.2 ft) at low water; and (4) salinity due to ocean-derived salts less than 0.5 ppt. The designation “EM” indicates the Class, EMERGENT, which is characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants. The “5” indicates the Subclass *Phragmites australis*, a large perennial grass found in wetlands throughout temperate and tropical regions of the world. It is characterized by its towering height of up to four meters (about 14 feet) and its stiff wide leaves and hollow stem. Its feathery and drooping inflorescences (clusters of tiny flowers) are purplish when flowering and turn whitish, grayish or brownish in fruit. The “E” indicates the Water Regime of Seasonally Flooded/Saturated: Surface water is present for extended periods (generally for more than a month) during the growing season, but is absent by the end of the season in most years. When surface water is absent, the substrate typically remains saturated at or near the surface.

PFO1E: The designation "P" describes the PALUSTRINE System which includes all non-tidal wetlands dominated by trees, shrubs emergents, mosses or lichens, and all such wetlands that occur in tidal areas where salinity is due to ocean-derived salts is below five parts per thousand. Wetlands lacking such vegetation are also included if they exhibit all of the following characteristics: 1. are less than eight hectares (20 acres); 2. do not have an active wave-formed or bedrock shoreline feature; 3. have at low water a depth less than two meters (6.6 ft) in the deepest part of the basin; and 4. have a salinity due to ocean-derived salts of less than 0.5 ppt. The Class designator "FO" (FORESTED) is an area characterized by woody vegetation that is six meters tall or taller. The Subclass "1" is Broad-Leaved Deciduous, which are woody angiosperms (trees or shrubs) with relatively wide, flat leaves that are shed during the cold or dry season; e.g., red maple (*Acer rubrum*). The modifier "E" designates the WATER REGIME, which is defined as Seasonally Flooded/Saturated, where surface water is present for extended periods (generally for more than a month) during the growing season, but is absent by the end of the season in most years. When surface water is absent, the substrate typically remains saturated at or near the surface.

PFO1/4E: The designation "P" indicates the PALUSTRINE System, which includes all non-tidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 ppt. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than 8 ha (20 acres); (2) active wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than 2.5 m (8.2 ft) at low water; and (4) salinity due to ocean-derived salts less than 0.5 ppt. The Class designator "FO" (FORESTED) is an area characterized by woody vegetation that is six meters tall or taller. The Subclass "1" is Broad-Leaved Deciduous, which are woody angiosperms (trees or shrubs) with relatively wide, flat leaves that are shed during the cold or dry season; e.g., red maple (*Acer rubrum*). The Subclass "4" represents Needle-Leaved Evergreen: The dominant species in Needle-leaved Evergreen wetlands are young or stunted trees such as black spruce or pond pine. The "E" indicates the Water Regime of Seasonally Flooded/Saturated: Surface water is present for extended periods (generally for more than a month) during the growing season, but is absent by the end of the season in most years. When surface water is absent, the substrate typically remains saturated at or near the surface.

PSS1E: The designation "P" indicates the System PALUSTRINE, which includes non-tidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 ppt. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than 8 ha (20 acres); (2) active wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than 2.5 m (8.2 ft) at low water; and (4) salinity due to ocean-derived salts less than 0.5 ppt. The "SS" indicates Class SCRUB-SHRUB, which includes areas dominated by woody vegetation less than 6 m (20 feet) tall. The species include true shrubs, young trees (saplings), and trees or shrubs that are small or stunted because of environmental conditions. The Subclass "1" indicates Broad-Leaved Deciduous: Woody angiosperms (trees or shrubs) with relatively wide, flat leaves that are shed during the cold or dry season; e.g., black ash (*Fraxinus nigra*). The "E" Water Regime is Seasonally Flooded/Saturated, where surface water is present for extended periods (generally for more than a month) during the growing season, but is absent by the end of the season in most years. When surface water is absent, the substrate typically remains saturated at or near the surface.

R2UBH: The "R" indicates the System, RIVERINE, which includes all wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and (2) habitats with water containing ocean-derived salts of 0.5 ppt or greater. A channel is an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water. The Subsystem, "2" indicates LOWER PERENNIAL, which is characterized by a low gradient. There is no tidal influence, and some water flows all year, except during years of extreme drought. The substrate consists mainly of sand and mud. Oxygen deficits may sometimes occur. The fauna is composed mostly of species that reach their maximum abundance in still water, and true planktonic organisms are common. The gradient is lower than that of the Upper Perennial Subsystem and the floodplain is well developed.

The Class "UB" is for UNCONSOLIDATED BOTTOM, which Includes all wetlands and deepwater habitats with at least 25% cover of particles smaller than stones (less than 6-7 cm), and a vegetative cover less than 30%. The "H" Water Regime indicates Permanently Flooded, water covers the substrate throughout the year in all years.

Please note that these five classifications, while verifiable in the field, do not fully describe the entirety of the wetland resources on the site, as the polygons for the Federal wetlands are smaller than the field conditions found on site.

3.5 Bordering Vegetated Wetlands.

BVWs are freshwater wetlands which border on creeks, rivers, streams, ponds, and lakes and where the soils are saturated and/or inundated such that they support a predominance of wetland indicator plants[310 CMR 10.55(2)(a)]. The boundary of BVW is defined at 310 CMR 10.55 (2) (c) as the line within 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist.

The issuing authority must evaluate vegetation and indicators of saturated or inundated conditions if submitted by a credible source, or may require credible evidence of saturated or inundated conditions when determining the boundary. Indicators of saturated or inundated conditions sufficient to support wetland indicator plants shall include one or more of the following:

- a. Groundwater, including the capillary fringe, within a major portion of the root zone;
- b. Observation of prolonged or frequent flowing or standing water;
- c. Characteristics of hydric soils.

There are seven series of BVW lines on site, including the E- and F-series as one line. The various series are listed above, and are described in the following sections.

3.5.1 A Series BVW - Parcel 45-34

This BVW begins near a boundary at the rear of a single-family residence on the southeast side of Hemlock Drive. It moves to the easterly, then northerly, the northeasterly down parallel to a flowage that may occur during spring high water conditions, across a walking pathway, then the line drops into a BVW complex adjacent to Black Pond Brook. Along the parallel to the Brook reach, there are a number of "lobes" of BVW that move up-gradient, then down-gradient to the large complex along the Brook. This complex continues, and reaches the wetland complex adjacent to Trout Brook, and then there are some "lobes", one of which is around a kettlehole that appears that it may be a mis-justified Potential Vernal Pool (PVP 17360). The line ends near a walking path that reaches Trout Brook. Please review Fig. 1A, and note a high area that points nearly north. The wetland flow is on the westerly side of this high area. The flag numbers are on blue surveyors' tape, and are IE A1 through IE A110.

The BVW's overstory is a mix of red maple (*Acer rubrum*, FAC), tupelo, also called black tupelo, (*Nyssa sylvatica*, FAC), eastern white pine (*Pinus strobus*, FACU), eastern hemlock (*Tsuga canadensis*, FACU), sparse American beech (*Fagus grandifolia*, FACU), very sparse white oak (*Quercus alba*, FACU), occasional black birch (*Betula nigra*, FACU), very sparse northern red oak (*Quercus rubra*, FACU), and very sparse yellow birch (*Betula alleghaniensis*, FAC).

The BVW's sapling/shrub story, where extant, (as much of the area is devoid of a shrub story, and quite easy to walk through, although in some locations it is quite dense due to heavy sweet or coast pepperbush (*Clethra alnifolia*, FAC)), is a mix of mainly sapling and shrub layer American beech and eastern hemlock, with small areas of sweet or coast pepperbush, common winterberry (*Ilex verticillata*, FACW), northern spicebush (*Lindera benzoin*, FACW), some scattered American holly (*Ilex opaca*, FACU), sparse sassafras (*Sassafras albidum*, FACU), some eastern white pine in isolated areas, American witch hazel (*Hamamelis americana*, FACU) also in some areas, scattered highbush blueberry (*Vaccinium corymbosum*, FACW).

The BVW's herbaceous story or ground cover is a mix of cinnamon fern (*Osmunda cinnamomea*, FACW), coast or sweet pepperbush in some areas, eastern white pine, American holly, hay-scented fern (*Dennstaedtia punctilobula*, UPL) on hummocks, lady fern (*Athyrium angustum*, also called *felix-femina*, FAC), three-leaf goldthread (*Coptis trifolia*, FACW), partridge-berry (*Mitchella repens*, FACU), common greenbrier (*Smilax rotundifolia*, FAC), dense in some areas and absent in others, tea-berry or wintergreen (*Gaultheria procumbens*, FACU), also on hummocks, occasional royal fern (*Osmunda regalis*, also called *spectabilis*, OBL), sensitive fern (*Onoclea sensibilis*, FACW), highbush blueberry, American beech, common winterberry, Princess-pine (*Dendrolycopodium obscurum*, FACU), and poison ivy (*Toxicodendron radicans*, FAC) in a few locations. *Sphagnum* moss (OBL) was seen in a few areas.

The liana or vine story in the BVW is poison ivy that grows up trees, and some grape vines (*Vitis* sp.).

The up-gradient overstory is dominated by American beech, eastern white pine, black birch, northern red oak, some eastern hemlock, some red maple, white oak, and very sparse yellow birch. The up-gradient shrub story, where extant, as some areas are devoid of sapling/shrub story vegetation, while other areas are heavier, are American beech, eastern white pine, sparse eastern hemlock, and some American holly. The up-gradient herbaceous story is a mix of American beech, very sparse cinnamon fern, common greenbrier, absent in most areas, and heavy in some areas, sweet or coast pepperbush, hay-scented fern, in some areas, partridge-berry, wintergreen or teaberry, and eastern white pine in some areas. The up-gradient liana or vine story is poison ivy and grape vines in some locations.

Please see the soils section below for a discussion of soil map units 48A, 49A, 253C, and 311A that are extant along this line. The first two are hydric soils, and the second two are upland soils, however the wetland is characterized by a pit-and-mound topography, similar to many of the wetlands on the Dolan-Carleton sites. The pits contain deep black soils, with gleyed matrix just below, while the mounds exhibit upland soils. This creates a wetland with the overstory dominated by eastern white pine in many locations, a shrub and sapling story dominated by American beech, and a herbaceous story dominated by cinnamon fern.

Using the U.S. Army Corps of Engineers Wetlands Regulatory Assistance Program Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: NorthCentral and Northeast Region, dated October 2009 provides guidance regarding problematic hydrophytic vegetation. It notes that there are FACU species (e.g., eastern white pine) that commonly dominate wetlands. The guidance states:

"If the potential wetland area lacks hydrophytic vegetation indicators due to the presence of one or more of the FACU listed above (there is a list of species on page 129 of the document that includes eastern white pine, multiflora rose (*Rosa multiflora*), Tartarian honeysuckle (*Lonicera tatarica*), common buckthorn (*Rhamnus cathartica*), and eastern hemlock), use the following procedure to make the hydrophytic vegetation determination:

1. At each sampling point in the potential wetland, drop any FACU species listed above from the vegetation data, and compile the species list and coverage data for the remaining species in the community.
2. Reevaluate the remaining vegetation using hydrophytic vegetation indicators 2 (Dominance Test) and/or 3 (Prevalence Index). If either indicator is met, then the vegetation is hydrophytic."

Using this guidance, removing the eastern white pines that dominate the overstory in the wetland, provides results that reflect the field conditions much better. **The A-series wetland is a mixed forested swamp adjacent to Trout and Black Pond brooks.**

3.5.2 B-series BVW - Parcels 45-28, 30, and 34

This wetland delineation line begins near the southwest corner of Parcel 45-34, about three lots from Lincoln Street, and moves to the southeast parallel to a stone wall, then turns and is located at the toe of the slope of the westerly side of the upland lobe in the center of the parcel, then turns and moves easterly and onto the long, narrow parcel 45-30, then onto parcel 45-28, then it turns again, and moves southwesterly parallel to another stone wall, across a pathway adjacent to the Scrub-shrub swamp just north of Homestead farm Lane, then westerly again to end at the stone wall at the southeast side of the private property “in-holding” along Lincoln Street. The flag station numbers are IE B1 through IE B92.

The BVW overstory is a mix of tupelo, eastern white pine, red maple, sparse American beech, black birch, sparse northern red oak, yellow birch, and eastern hemlock, with a few Norway spruce (*Picea abies*, UPL) and American elm (*Ulmus americana*, FACW). The BVW sapling and shrub story includes sparse American beech, a few highbush blueberry, eastern hemlock, eastern white pine, northern arrowwood (*Viburnum dentatum*, FACW), sweet or coast pepperbush (thick in some areas, and absent in most areas), with many of the areas missing the sapling and shrub story. The BVW herbaceous story is a mix of cinnamon fern, lady fern, teaberry or wintergreen on hummocks, partridge-berry (also on hummocks), American holly, very sparse hay-scented fern on hummocks, sweet or coast pepperbush, sensitive fern, common greenbrier, invasive Japanese barberries (*Berberis thunbergii*, FACU), some invasive European privet (*Ligustrum vulgare*, FACU), invasive Asian bittersweet (*Celastrus orbiculata*, UPL), one of the dewberries, perhaps bog dewberry (*Rubus hispidus*, FACW), and very sparse American beech. The BVW liana or vine story is invasive Asian bittersweet in some areas, mainly adjacent to the privately-owned site, common greenbrier, and poison ivy.

The up-gradient overstory is a mix of American beech, eastern white pine, with a few of each of the following: northern red oak, yellow birch, black birch, eastern hemlock, red maple, and very sparse tupelo. The up-gradient shrub and sapling story is a mix of sweet pepperbush, eastern hemlock, sapling and shrub American beech, eastern white pine in some locations, American witch hazel, sparse American holly, sparse and sassafras. The up-gradient herbaceous story is a mix of American beech, eastern white pine, invasive Japanese barberry, raspberries (*Rubus* sp.), bog dewberry, lady fern, hay-scented fern, sweet pepperbush, very sparse northern arrowwood, American holly, common greenbrier, some cinnamon fern, sparse Princess-pine, partridge-berry, and eastern hemlock. The liana or vine story up-gradient is a few grapevines and poison ivy along some trunks, and invasive Asian bittersweet.

Please see the soils section below for detailed descriptions of soil map units 49A, 51A, 223B, 254B, and 311A. The first two are wetland (hydric soils) and the remainder are all upland soils that may have hydric inclusions.

This wetland has the same characteristics of the A-series wetland, that of many pits and mounds, and the FACU eastern white pine in the wetland, as it is the other side of the A-series wetland on the easterly side of the A-series line. It becomes the northerly side of the C-series wetland, and the westerly side of the L-series wetland that is further to the easterly, adjacent to the Fogg Forest parcels.

The wetland is a mixed forested swamp, as above.

3.5.3 C- Series BVW - Parcels 45-27, 28, 29, and 30.

The C-series begins at the stone wall at the southeast side of the private property “in-holding” on the narrow parcel, 45-30. It moves easterly at the edge of the field, moves around an open marsh area at the easterly boundary of the field, across a stone wall, then around to the north and east and south of a large raised wooded area of white pine, on Parcel 45-28, then to the southeasterly adjacent to a scrub-shrub swamp, out into the field on Parcel 45-29, within two “lobes” of marsh, then back across a twin (i.e, two parallel walls) stone wall, onto Parcel 45-27, adjacent to the southerly boundary of the same scrub-shrub swamp, and ending up along an Intermittent Stream that is generated by stormwater drainage from Main Street. The flag stations are IE C1 through IE C82.

The BVW overstory, where extant, is a mix of red maple, eastern white pine, pussy willow (*Salix discolor*, FACW), that reaches the 20-foot threshold of the overstory, and sparse American elm. The sapling and shrub story is a mix of invasive European privet, invasive multiflora rose, northern arrowwood, red maple, pussy willow, very sparse eastern red cedar (*Juniperus virginiana*, FACU), invasive glossy buckthorn (*Rhamnus frangula*, FAC), eastern white pine, sparse American holly, highbush blueberry, sweet pepperbush in some areas, common winterberry in some areas, and invasive burning bush (also called eastern wahoo) (*Euonymus atropurpureus* FACU). The down-gradient herbaceous story is a mix of cinnamon fern, highbush blueberry, silky dogwood (*Cornus amomum*, FACW), American holly, invasive glossy buckthorn, invasive multiflora rose, sensitive fern, sweet or coast pepperbush, poison ivy, common greenbrier, invasive Japanese barberry, invasive Asian bittersweet, pussy willow, goldenrods (*Solidago* spp.), eastern white pine, northern arrowwood, sparse invasive European privet, lady fern, tussock or upright sedge (*Carex stricta*, OBL), skunk cabbage (*Symplocarpus foetidus*, OBL), royal fern, *Sphagnum* moss in a few locations, and some unidentified hydric grasses in some small areas.

The scrub-shrub area, near flag station IE C33, includes the herbaceous species broad-leaf meadowsweet (*Spirea latifolia*, FACW), Joe-pye weed (formerly *Eupatoriadelphus maculatus*, now *Eutrochium maculatus*, FACW), wool-grass, also called cotton-grass bullrush (*Scirpus cyperinus*, OBL), broad-leaved cat-tail (*Typha latifolia*, OBL), and hydric grasses.

The open wet marshes on Parcels 45-29 and 45-27, at the lowest elevations of the mowed fields, also adds some species, including soft rush (*Juncus effusus*, FACW), the invasive purple loosestrife (*Lythrum salicaria*, FACW), marsh milkweed (*Asclepias incarnata*, OBL), one of the willow-herbs, most likely bog willow-herb (*Epilobium leptophyllum*, OBL), and swamp rose (*Rosa palustris*, OBL).

The up-gradient overstory of the C-series where the up-gradient conditions are not mowed fields includes eastern white pine, American beech, tupelo, northern red oak, sparse black oak (*Quercus velutina*, UPL), black cherry (*Prunus serotina*, FACU), sparse American elm, sparse white oak, very sparse gray birch (*Betula populifolia*, FAC), and black birch. The up-gradient sapling and shrub story is a mix of eastern white pine, occasional highbush blueberry, northern arrowwood, sapling and shrub tupelo, invasive multiflora rose and glossy buckthorn, eastern red cedar, white oak, red maples, American holly, and occasional black birch. The herbaceous story of the C-series is a mix of invasive glossy buckthorn, invasive multiflora rose, eastern white pine, common greenbrier, invasive English ivy (*Hedera helix*, FACU), goldenrods, little bluestem (*Schizachyrium scoparium*, FACU), Asian bittersweet, and poison ivy. The liana or vine story up-gradient is Asian bittersweet and poison ivy.

Please review the soils sections below, for the soil map units 51A, 223B, 254B, 310B, and 311A that are found on the three parcels.

Some of the C-series BVW is at the lowest elevation at the northerly end of the three fields on site. Other reaches of the line are on or near the toe of slopes above the scrub-shrub swamp or open marsh areas. In one case, a "lobe" is within a mowed field in an area that has been mowed recently, with mowed soft rush in evidence, and deep black organic soils over gleyed soils. Other "lobes" are obviously open wet marshes, and are easily to detect at all seasons, as they are not mowed.

The C-series BVW is composed of a number of reaches - some are mixed forested wetlands, and others are scrub-shrub wetlands, and even other small reaches are open wet marshes (in the fields).

3.5.4 D-series BVW - Parcel 56-28, 29, and 31.

The D-series line begins on the southerly side of Main Street, adjacent to a stone wall at the easterly stone wall of the one in-holding property, a single-family residence opposite the intersection of Lincoln Street with Main Street. It crosses the southwest corner of the field at an angle, heading southeast, and continues into the woodland, to the south and west, traveling nearly parallel to Jordan Lane and ending at Jordan Lane at a property boundary corner on the west side of Jordan Lane north of another private parcel. The flag stations are IE D1 through D39.

The BVW overstory is a mix of eastern white pine, red maple, tupelo, yellow birch, American beech, black birch, some northern red oak, occasional pignut hickory (*Carya glabra*, FACU) and occasional shagbark hickory (*Carya ovata*, FACU), and very sparse white oak. The BVW sapling and shrub story is a mix of sweet or coast pepperbush, common winterberry, eastern white pine, American beech, eastern hemlock, some American holly, occasional highbush blueberry, and American witch hazel. The bVW herbaceous story is a mix of sweet or coast pepperbush, common greenbrier, three-leaf goldthread, sparse American holly, sparse Princess-pine, highbush blueberry, teaberry or wintergreen on hummocks, lady fern, some eastern white pine. The small area of open wet marsh at the southwest corner of the field contains bog willow-herb, Joe-pye weed, cinnamon fern, linear-leaved goldenrod, also called flat-top goldenrod, (*Euthamia graminifolia*, FAC), soft rush, deer-tongued grass, also called deer-tongue rosette grass (*Dichanthelium clandestinum*, FACW), northern arrowwood, and some unidentified hydric grasses. The liana or vine story is poison ivy in some locations, and common greenbrier, also in some locations, and absent in others.

The up-gradient overstory, where extant, is a mix of eastern white pine, northern red oak, red maple, pignut hickory, very sparse white oak, some eastern hemlock, and American beech. The up-gradient sapling and shrub story is a mix of northern arrowwood, sweet or coast pepperbush, highbush blueberry, common winterberry, black cherry, black birch, American holly, and American beech. The up-gradient herbaceous story contains hay-scented fern, sweet or coast pepperbush, teaberry or wintergreen, Princess-pine, American holly, invasive Japanese barberry, and eastern white pine. The up-gradient liana story is invasive Asian bittersweet and grapevines.

The boundary between the NRCS-delineated hydric soil map unit 69A, Mattapoissett loamy sand, 0 to 3 percent slopes, extremely stony, and the soil map unit 310B, Woodbridge fine sandy loam, 3 to 8 percent slopes is very close to where the BVW delineation flag stations were placed. Please see the soils sections for the characteristics of these soils and other soils further down-gradient within the wetland on this parcel.

This BVW is a mixed forested swamp, with many of the same characteristics that are exhibited within the previous three wetland delineation series, with many eastern white pines in the overstory, and a majority of pit-and-mound topography with hydric soils within the pits. There is a Scrub-shrub swamp in the center of this large wetland complex, which has no overstory trees within it, due to open water areas. This swamp is noted as "SS" on Figure 2, attached.

3.5.5 E- and F-series BVW - Parcel 56-26.

The E- and F-series BVW line is on parcel 56-26, west of the parcel at 536 Main Street (which is opposite of the intersection of Lincoln Street and Main Street). The E-series begins at the southwest corner of the parcel at 536 Main Street, moves westerly, then northerly, then westerly again along the embankment of Main Street, to meet the F-series line, that begins along Main Street. The F-series moves southwesterly parallel to a stone wall, then ascends the hillside toward Main Street, and then parallels Main Street high on the hillside, to end at a stone wall adjacent to 498 Main Street. A portion of the BVW here is along the flat bottom-land at the southwest corner of the private parcel at 536 Main Street, and most of the remainder is a slope BVW along the hillside. The E-series includes flags from IE E1 through E12, and the F-series includes flags from IE F1 through F16.

The down-gradient overstory is a mix of red maple, sparse pignut and shagbark hickory, Tupelo, eastern white pine, and very sparse American beech. The down-gradient sapling and shrub story is a mix of eastern white pine, northern spicebush, tupelo, American beech on hummocks, common winterberry, northern arrowwood, and sparse ironwood, blue beech, or American hop-hornbeam (*Carpinus caroliniana*, FAC). The herbaceous story of the BVW is a mix of sweet or coast pepperbush, eastern white pine (sparse), northern spicebush, northern arrowwood, very sparse invasive European privet, common greenbrier, very thick in some areas, and absent in others, royal fern, cinnamon fern, common winterberry, and dewberry. The liana story down-gradient is common greenbrier, some invasive Asian bittersweet, and poison ivy.

The up-gradient overstory is a mix of eastern white pine, American beech, northern red oak, sparse red maple, black cherry, and pignut hickory. The up-gradient sapling and shrub story includes eastern white pine, sweet or coast pepperbush, invasive burning bush, black cherry, highbush blueberry, some northern spicebush, pignut hickory, some American beech, and a few Norway spruce. The up-gradient herbaceous story is a mix of northern spicebush, eastern white pine, common greenbrier, dewberry, sweet or coast pepperbush, invasive European privet, invasive multiflora rose, pignut hickory, black birch, and sparse American beech. The up-gradient liana story is common greenbrier, poison ivy in some locations, and invasive Asian bittersweet in some areas.

The soil map units on parcel 56-26 are 69A, 49A, 71B, 306B, and 311B. The first three are hydric soils, and the last two are upland soils, that are higher-elevation map units on the hillside. The delineation line was completed with multiple soils tests, some in very rocky soils, in combination with observed vegetation.

The BVW is a mixed forested swamp, and the delineated flag station line is more consistent with the NRCS Plymouth County soils data layer than the MA DEP North and South Rivers Watershed Wetlands data layer.

3.5.6 G-Series BVW, Parcel 41-17.

The G-series is located on the triangle-shaped parcel that is at the intersection of Lincoln and Main Streets. The line begins along Lincoln Street, moves along Lincoln Street for a short ways, then across the toe of the slope of the hillside, then, near the Main Street portion of the site, it ascends the hillside, to end at a stone wall after having taken another perpendicular turn close to Main Street. The wetland at the tip of the triangle between the two streets has grown up over the past 30 years - it's all 30-year pole-sized red maples, where there are trees.

The down-gradient overstory is red maple, spare American Elm, and even more sparse northern red oak, and some tupelo, with occasional eastern white pine. The down-gradient sapling and shrub story, where extant, is a mix of northern spicebush, northern arrowwood, invasive multiflora rose, sparse eastern white pine, invasive glossy buckthorn, and highbush blueberry. The down-gradient herbaceous story is a mix of invasive glossy buckthorn, American holly, common greenbrier, dewberry, invasive English ivy, poison ivy, tussock or uptight sedge, northern arrowwood, eastern white pine, soft rush, and some unidentified hydric grasses. The down-gradient liana story is poison ivy, and very sparse invasive Asian bittersweet.

The up-gradient overstory is a mix of eastern white pine, black cherry, northern red oak, some red maple, green ash, and very sparse American elm. The up-gradient sapling and shrub story is invasive glossy buckthorn, highbush blueberry, sparse northern arrowwood, shagbark hickory (also sparse), and eastern white pine, when there is a shrub story, as it is missing over most of the delineation line. The up-gradient herbaceous story is a mix of invasive Norway maple, invasive glossy buckthorn, invasive multiflora arose, eastern white pine, common greenbrier, unidentified upland grasses, grape vines, invasive European buckthorn, and shagbark hickory. The up-gradient liana story is grapevines, in one location.

There are two soil types on this site, soil map unit 69A, Mattapoisett loamy sand, 0 to 3 percent slopes, extremely stony, a hydric soil, on the lower elevations, and soil map unit 306B, Paxton fine sandy loam, 3 to 8 percent slopes, very stony, an upland soil. Field soils tests are consistent with the NRCS soils data layer. Please see the soils sections below for a detailed characterization of the soil types.

The BVW on parcel 41-17 is a deciduous forested swamp, also called a red maple swamp. It appears to have connected across Main Street to the E and F-Series, which in turn connects to the D-Series.

3.5.7 L-series BVW - Parcel 45-28.

The L-series line circumnavigates an isolated upland in the center of parcel 45-28. The parcel contains Black Pond Brook, a Perennial Stream wetland resource, to the northerly, and an un-named Intermittent Stream to the easterly, near its easterly boundary. The south is a wetland complex north of the residences at Homestead Farm Lane that charges the Intermittent Stream. This complex includes stormwater from 498 to 598 Main Street that discharges to a ditch at the extreme southeast corner of parcel 45-28. To the west of the L-series line is a wetland complex that appears to be in a very shallow valley that has its highest elevation at the center of the site, and drops to both the north (to Black Pond Brook) and south (to the wetland complex north of Homestead Farm Lane). This valley is best described by the area that is within the 84 foot contour elevation, and may be easily observed on Fig. 1A, attached. The line on the other side of the very shallow valley is the B-series. The L-Series flag stations are IE L1 through L35.

The L-series is adjacent to Black Pond Brook from about flag station L24 through L28. This line is along a steep drop into the Brook's floodplain valley. There are also boulders at the surface of the ground in a portion of the wetland down-gradient of the delineation line.

The down-gradient overstory is a mix of eastern white pine, red maple, eastern hemlock, and sparse American beech. The down-gradient shrub/sapling story is a mix of American witch hazel, common winterberry, eastern white pine, sweet or coast pepperbush, northern spicebush, red maple, eastern hemlock, and tupelo, heavy in some areas, and absent in others. The down-gradient herbaceous story is unidentified hydric grasses, eastern white pine, sweet or coast pepperbush, cinnamon fern,, common greenbrier, occasional hay-scented ferns on hummocks, common winterberry, northern spicebush, and one colony of shining clubmoss (*Formerly Lycopodium lucidulum*, now *Huperzia lucidulum*, FAC), near flag station L21. No liana story was observed down-gradient.

The up-gradient overstory is a mix of eastern white pine, black birch, northern red oak, American beech, and sparse red maple. The up-gradient shrub and sapling story is a mix of American beech, eastern white pine, American witch hazel, sparse sweet or coast pepperbush, and very sparse eastern hemlock. The up-gradient herbaceous story is a mix of eastern white pine, American beech, partridge-berry, common greenbrier, hay-scented fern, very sparse cinnamon fern, and sweet or coast pepperbush. No liana story was observed up-gradient.

The soil map units in this area include 48A, Norwell sandy loam, 0 to 3 percent slopes, extremely stony, 51A, Swansea muck, 0 to 3 percent slopes, and 223B, Scio very fine sandy loam, 3 to 8 percent slopes. The first two are hydric soils, and the last is an upland soil, however the Scio very fine sandy loam is noted for seasonal high watertables and slow permeability in the silty substratum. Please see the soils section below for more detailed soils characteristics.

3.6. K-Series "Land Subject" to Inundation that continues into a BVW adjacent to Trout Brook - Parcel 45-34.

Intermittent Streams are defined at 310 CMR 10.58(a)(1) as areas where..."surface water does not flow within them throughout the year. When surface water is not flowing in an intermittent stream, it may remain in isolated pools or it may be absent." Additional criteria include the stream on the current USGS Topographic Quadrangle as intermittent, having a watershed of at least one-half square mile, and the surficial geology of the contributing drainage area to the stream at the project site contains 75% or less stratified drift.

An additional requirement of an Intermittent Stream is that it must have a wetland resource at the upstream end. In this case, the Intermittent Stream directs stormwater flows from the Hemlock Drive development into the large wetland complex adjacent to both Trout Brook and Black Pond Brook. Since no up-gradient wetland resource was found for the stream flow, it does fit within the locally-jurisdictional resource definition of "land subject to inundation by surface water or groundwater..." under Section 3(4) of the Town of Norwell Wetland Protection Bylaw Regulations for Administering Article XVI-a of the Norwell General Bylaws.

The K-series is a partial parallel line along a stormwater outfall that drains Hemlock Drive, and directs flows in a ditch that begins with an outfall between two single-family residences along Hemlock Drive, numbers 64 and 70 Hemlock Drive. The flag series IE K101 through K107 is on the side away from the subject property, closer to the single-family residence at 70 Hemlock Drive. It begins half-way down the ditch from the outfall, and ends where the stream turns into the BVW. If the stormwater system drains the wetland in the center of the U-shaped Hemlock Drive (See Fig. 6, for the location of this wetland), which is unknown at this time, then the stream may be classified as an Intermittent Stream.

The other side of the parallel series is the flag series IE K1 through K12, that begins opposite K101, and continues past the point where the stream turns northerly into the BVW, to end along the wetland complex adjacent to Trout Brook.

The BVW overstory is a mix of red maple, yellow birch, tupelo, and sparse American elm. The BVW sapling and shrub story is northern spicebush, sparse yellow birch, and sweet or coast pepperbush. The herbaceous story is a mix of cinnamon fern, lady fern, three-leaved goldthread, sparse hay-scented fern on hummocks, skunk cabbage, and common greenbrier. The liana story in the wetland is poison ivy and common greenbrier.

The up-gradient overstory, which is along a hillside, as the flags are placed at the toe of a slope, is eastern white pine and American beech. The sapling and shrub story is American beech. The up-gradient herbaceous story is American beech, hay-scented fern, some eastern white pine, and sparse cinnamon fern.

The soils of the higher elevations along the ditch, which appears to be an esker, is an upland with soil map unit 253C, Hinckley gravelly sandy loam, 8 to 15 percent slopes, an upland soil, while the wetland area within the BVW is soil map unit 51A, Swansea muck, 0 to 3 percent slopes, a hydric soil. Please see the soils characterizations, below for a detailed review of the soil characteristics.

The BVW along the toe of the slope of the esker series is a Commonwealth-jurisdictional Deciduous Forested Swamp. The flowage is a locally-jurisdictional Land Subject to Inundation.

3.7 Isolated Vegetated Wetlands (IVWs).

Locally-jurisdictional IVWs are wetlands that contain hydric soils and wetlands vegetation that are areas that hold less than one-quarter acre-foot, which is a portion of the definition of a Commonwealth-jurisdictional Isolated Land Subject to Flooding. There are three series of IVWs on the Dolan-Carleton site, and they are characterized with flag series I, J, and M. They appear to all be under the quarter acre-foot threshold, but meet the IVW locally-jurisdictional definition. These three IVWs are described below.

3.7.1 IVW I - Parcel 43-34.

The I-series IVW is a small IVW within a kettlehole near the westerly boundary of Parcel 45-34. It is southwest of the esker that is above the ditch that directs flows from the street drainage from Hemlock Drive. There are eight flags, from IE I1 through I8 that form a circular area.

The IVW has an overstory that is mostly missing, with a couple of red maples, a shrub story of common winterberry, and sweet or coast pepperbush, and a herbaceous story of sweet or coast pepperbush, common winterberry, and sparse common greenbrier, and common cinnamon fern.

The up-gradient overstory around the IVW is eastern white pine, American beech, sparse American holly, and sparse eastern hemlock. The shrub and sapling story up-gradient is American beech, eastern hemlock, and witch hazel. The up-gradient herbaceous story is sparse American holly, sparse eastern hemlock, sparse American beech, and sparse common greenbrier.

The soil within the IVW is about eight inches of dark black organic soil over a gleyed fine sandy loam.

3.7.2 IVW J - Parcel 43-34.

The I-series IVW is an irregular oval that is separated from a “lobe” along the A-series delineation line by about 75 feet, near flag station IE A51 and IE A52. It is a low depression with an extremely gentle slope to the easterly, toward the A-series BVW wetland resource line. The slopes to the other directions are slightly steeper.

The J-series down-gradient overstory is mostly missing as well. The sapling/shrub story is mostly missing as well, with common winterberry, a snag eastern white pine, and the herbaceous story is cinnamon fern, American holly, and sparse common greenbrier.

The up-gradient overstory is eastern white pine and American beech, the sapling and shrub story is American beech, and the herbaceous story is American beech, very sparse cinnamon fern, American holly, and common greenbrier.

The soil in this IVW has less black organic soil above a gleyed matrix than does the I-series, above.

3.7.3. M-Series IVW, Parcel 45-30.

The M-series is an isolated vegetated wetland that is within a mowed field adjacent to Lincoln Street. The area is noted as an open marsh on the MA DEP South Coastal Watersheds Wetlands data layer, and while the area does not have a preponderance of obvious above-ground wetlands vegetation, due to mowing, the soils are hydric below a particular elevation contour. The flag station series is from IE M1 through M16, and the flags circumnavigate a two-lobed irregular figure. Only M15 and M16 are blue surveyors’ tape; the rest of the flag stations are pink pins.

The IVW vegetation that was identifiable within the IVW included wool-grass, soft rush, and one thicket of shrub-story common winterberry along the stone wall between the field and Lincoln Street.

The up-gradient overstory along Lincoln Street is a mix of invasive Norway maple, eastern red cedar, green ash, and black cherry. The shrub story up-gradient of the IVW is invasive multiflora rose, northern arrowwood, sparse American holly, and invasive glossy buckthorn. The up-gradient herbaceous story is black oak, burning bush, invasive multiflora rose, goldenrods, and garlic mustard, and invasive European privet. The liana story is a combination of invasive Asian bittersweet, grapevines, and poison ivy.

The soil type within this IVW is 69A, Mattapoisett loamy sand, 0 to 3 percent slopes, extremely stony, a hydric soil. The up-gradient soil around the IVW is soil map unit 310B, Woodbridge fine sandy loam, 3 to 8 percent slopes, an upland soil type. **The IVW is a locally-jurisdictional wetland resource.**

3.8 Perennial Streams, Banks, and Land Under Waterbodies - Trout and Black Pond Brooks and their corresponding Riverfront Area - Parcels 45-28, 30, and 34.

- 3.8.1** A River is defined as any natural flowing body of water that empties into any ocean, lake, pond or other river which flows throughout the year. Rivers include streams that are perennial because surface water flows within them throughout the year. Intermittent streams are not rivers as defined herein because surface water does not flow within them throughout the year. When surface water is not flowing within an intermittent stream, it may remain in isolated pools or it may be absent. When surface water is present in contiguous and connected pool/riffle systems, it shall be determined to be flowing. Rivers begin at the point an intermittent stream becomes perennial or at the point a perennial stream flows from a spring, pond, or lake. Downstream of the first point of perennial flow, a stream normally remains a river except where interrupted by a lake or pond. Upstream of the first point of perennial flow, a stream is normally intermittent.”

The criteria include a watershed area of one square mile and the appearance of the stream on the latest USGS Topographic Quadrangle as Perennial (a strong or dark blue line). If the stream is not shown on the Quad or is shown as intermittent, then the criteria include a watershed size of at least one-half square mile and a predicted flow rate greater than or equal to 0.01 cubic feet per second at the 99% percent flow duration using the USGS Streamstats method. If the Streamstats method cannot be used, then a 75% stratified drift surficial geology criteria is added. Stratified drift is sand and gravel deposits that have been layered and sorted by glacial meltwater streams. Field observations after 20 Dec 2002 must be documented by field notes and dated photos or video.

The Riverfront area is defined at 310 CMR 10.58(2)(a) as *"the area of land between a river's mean annual high water line and a parallel line measured horizontally. The riverfront area may include or overlap other resource areas or their buffer zones. The riverfront area does not have a buffer zone."* The Riverfront Area is further defined at 310 CMR 10.58(a)(3), as *"the area of land between a river's mean annual high-water line measured horizontally outward from the river and a parallel line located 200 feet away."*

Both Trout Brook and Black Pond Brook, located at or near the northerly boundary of the three parcels, are Perennial Streams and contain a Riverfront Area. The Mean Annual High Water (MAHW) that determines the origin of the 200-foot parallel Riverfront Area along the two brooks, which is Commonwealth-jurisdictional. The MAHW was not flagged, as it is enclosed within the BVW along the Perennial Streams.

3.8.2 Banks.

Banks are defined at 310 CMR 10.54 (2)(a) as *"the portion of the land surface which normally abuts and confines a water body. It normally occurs between a water body and a vegetated bordering wetland and adjacent flood plain or, in the absence of these, it occurs between a water body and an upland. A Bank may be partially or totally vegetated, or it may be comprised of exposed soil, gravel, or stone."* The definition continues in 310 CMR 10.54(2)(c) as *"the upper boundary of a bank is the first observable break in slope or the mean annual flood level, whichever is lower. The lower boundary of the bank is the mean annual low flow level."*

Both Trout Brook and Black Pond Brook are enclosed within Bank wetland resources.

3.8.3 Land Under Waterbodies and Waterways (LUW) (Under any Creek, River, Stream, Pond or Lake)

Land Under Waterbodies and Waterways is defined at 10.56 (2)(a) as *"the land beneath any creek, river, stream, pond or lake. Said land may be composed of organic muck or peat, fine sediments, rocks or bedrock."* The definition continues at 10.56(2)(c) as *"The boundary of Land Under Water Bodies and Waterways is the mean annual low water level."*

Both Trout Brook and Black Pond Brook contain Land Under Waterbodies wetland resources.

4.0 Bordering Land Subject to Flooding/FEMA FIRM Flood Zones.

BLSFs are defined at 310 CMR 10.57 (1) (a) as *"...an area which floods from a rise in a bordering waterway or water body."*

Bordering Land Subject to Flooding (BLSF) is defined at 310 CMR 10.57(2)(a) as *"BLSF is an area with low, flat topography adjacent to an inundated by flood waters rising from creeks, rivers, streams, ponds or lakes. It extends from the banks of these waterways and water bodies; where a bordering vegetated wetland occurs, it extends from said wetland."* The definition section continues: *"The boundary of BLSF is the estimated maximum later extent of flood water which will theoretically results from the statistical 100-year frequency storm. Said boundary shall be that determined by reference to the most recently available flood profile data prepared for the community within which the work is proposed under the National Flood Insurance Program (NFIP, currently administered by the Federal Emergency Management Agency, successor to the U.S. Department of Housing and Urban Development).*

The Flood Insurance Rate Map (FIRM) number 25023C0116J, effective 17 July 2012, transferred to the Flood Emergency Management Agency (FEMA) Data layer shows a flood zone designation of "AE" that is defined as the limit of the one percent (1%) annual chance (formerly the 100 year) flood also known as the base flood, is the flood which has a one percent (1%) chance of being equaled or exceeded in any year. The Special Flood Hazard Area (SFHA) is the area subject to flooding by the one percent (1%) annual chance flood. The SFHA on the Dolan-Carleton site is an AE Flood Zone, which is defined as the flood where the Base Flood Elevations have been determined.

Figure 5 shows the FEMA "Firmette" in the area of the subject site. Trout Brook and Black Pond Brook both have Special Flood Hazard Areas along the streams. These are the areas enclosed with blue dots. Additionally, both streams contain Floodways, which are indicated with white parallel lines perpendicular to the streams. Floodways are defined as the channel of the stream plus any adjacent floodplain areas that must be kept free of encroachment so that the one percent (1%) annual chance flood can be carried without substantial increases in flood heights.

Figure 5 shows that for the section of Black Pond Brook on the northeast side of the site, the Base Flood Elevation (BFE) within the AE Flood Zone ranges from 63 feet (elevation contour) at the easterly boundary of the site, to just less than 69 feet slightly off-site. For Trout Brook, which is offsite to the northeast, and upstream of Black Pond Brook, the BFEs range from 69 feet to 75 feet elevation.

Additionally, the AE FEMA FIRM Flood Zone defines the Bordering Land Subject to Flooding (BLSF). In this case, the BLSF is well within the already-described BVW area for Black Pond Brook on the site.

5.0 Soils.

There are a number of Natural Resources and Conservation Service (NRCS) soils types on the Dolan-Carleton site, shown on the attached figures 2A and 2B with the MA DEP South Coastal Watersheds Wetlands data layer, and on Figs. 3A and 3B as colored areas, with the brown areas generally indicating upland soils, and the green colors indicating wetland soils. Table 1, below, provides a list of these soils. The soils are described further in Exhibit A, attached, by ascending Soil Map Unit number, with the hydric (wet) soils first. Please note that soils with Soil Map Numbers less than or equal to 74 are hydric, or soils found in wetlands, while Soil Map Units above 74 are upland soils, with some exceptions. There are no soils over 74 that are exceptions on the Dolan-Carleton site.

Table 1 - List of Soil Map Units - Dolan-Carleton Site, Main Street, Norwell

<u>Map Unit</u>	<u>Soil Map Unit Name</u>
48A	Brockton sandy loam, 0 - 3% slopes, extremely stony
49A	Norwell sandy loam, 0 - 3% slopes, extremely stony
51A	Swansea muck, 0 - 3% slopes
69A	Mattapoisett loamy sand, 0 - 3% slopes, extremely stony
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony
HYDRIC	
NON-HYDRIC	
223B	Scio very fine sandy loam, 3 - 8% slopes
253C	Hinckley gravelly sandy loam, 8 - 15% slopes
254B	Merrimac sandy loam, 3 to 8 percent slopes
306B	Paxton fine sandy loam, 3 to 8 percent slopes, very stony
310 B	Woodbridge fine sandy loam, 3 - 8% slopes
311A	Woodbridge fine sandy loam, 3 - 8% slopes, very stony
311B	Woodbridge fine sandy loam, 8 - 15% slopes, very stony
426A	Newfields sandy loam, 0 to 3 percent slopes

6.0 ACECs, Biomap 2, Natural Communities, and ORWs

Other potential environmental issues are Areas of Critical Environmental Concern (ACECs), BioMap 2, a measure of ecological resistance and resilience, and Outstanding Resource Waters (ORWs).

There are no ACECs on or adjacent to the site. The closest ACEC is the Weymouth Back River ACEC, about ten km to the northwest.

BioMap 2 is a project that was completed in 2010 by the Commonwealth's Department of Fish and Game, Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program to map the Core Habitat and Critical Natural Landscapes in the State. The following definitions are from the BioMap2 document of 2010:

Core Habitat are key areas that are critical for long-term persistence of rare species and other Species of Conservation Concern, as well as a wide diversity of natural communities and intact ecosystems across the Commonwealth. Critical Natural Landscape are large Landscape Blocks that provide habitat for wide-ranging native species, support intact ecological processes, maintain connectivity among habitats, and enhance ecological resilience, as well as buffering land around coastal, wetland, and Aquatic Core habitats to help ensure their long-term integrity.

There are a number of components to Critical Natural Landscapes, that include Aquatic and Forest Cores, Priority Natural Communities, Species of Conservation Concern, Vernal Pool Cores, Aquatic Buffers, Coastal Habitats, Tern Habitat, and Wetland Buffers.

There are no Critical Natural Landscape on the subject Dolan-Carleton site, however 450 meters downstream is a Priority Natural Community Wetland Number PNC_ID_685, associated with Torrey Pond and its associated wetland complex just north of Mill Lane between Central and Winter Streets. Black Pond Brook flows into Torrey Pond and joins with Second Herring Brook that drains the Pond and its wetland complex after it flows through the subject site.

Outstanding Resource Waters (ORWs) are defined on the MassGIS website as:

This data layer delineates areas in which certain waters are afforded Outstanding Resource Water (ORW) protection under the Massachusetts Surface Water Quality Standards, 314 CMR 4.00 (WQS). According to 314 CMR 4.04(3): "Certain waters are designated for protection under this provision in 314 CMR 4.06. These waters include Class A Public Water Supplies (314 CMR 4.06(1)(d)1.) and their tributaries, certain wetlands as specified in 314 CMR 4.06(2) and other waters as determined by the Department based on their outstanding socio-economic, recreational, ecological and/or aesthetic values. The quality of these waters shall be protected and maintained."

The North River and its associated estuarine wetlands are the closest ORW, as the Town of Norwell does not contain any surface water supplies.

7.0 Policy Issues - Norwell Master Plan and Open Space and Recreation Plans

7.1 Master Plan

The Town of Norwell Master Plan (2005 - 2025) provides a series of Goals within which the landscape of the Dolan-Carleton parcels fit. The Master Plan Vision Statement for 2021 includes the following two statements:

"Protecting the Town's natural beauty, water resources and environmental health through a network of "green infrastructure" and

"Preserving historic buildings and landscapes."

Similarly, the first Master Plan Goal of the Plan is “Protecting the Natural and Cultural Heritage of Norwell - The Green Network. The objectives of this goal are:

“Preserve open space in interconnected natural resource systems to protect water resources and wildlife habitat.”

“Preserve the cultural resources of Norwell in the form of historic buildings and sites, and the working landscapes of farms, nurseries, and wood lots.”

“Provide recreational access to open space for both passive and active recreation.”

The Dolan-Carleton parcel fields, also referred to as the “Whiting Fields” are a part of the cultural heritage and working farm landscape of the Town. They are located at the westerly edge of the Norwell Village Historic District as defined on the Massachusetts Historic Commission data layer. Please see Figure 9, attached, for a view of the Dolan-Carleton Parcels and the MHC-designated Norwell Village Historic District. These fields are a longstanding part of the character of the Town of Norwell.

Additionally, the wetlands habitat and flood plains associated with Trout Brook and Black Pond Brook address the Master Plan Goal objectives of interconnected natural resource systems, water resources, and wildlife habitat. The two Perennial Streams are just offsite and on-site (Trout and Black Pond brooks, respectively) at the northerly portion of the subject site.

7.2 Norwell Open Space and Recreation Plan Issues - Goals and Relationship to Other Open Space Parcels

7.2.1 Open Space & Recreational Plan Goals Discussion

The Norwell Open Space and Recreation Plan (OS&R Plan) (2012-2019) goals are an over-arching goal of preserving Norwell’s quality of life, with a prioritized series of goals that are:

1. Support and Enhance Passive and Active Recreation in Balance with Nature.
2. Protect the Quality and Quantity of Norwell’s Water Supply.
3. Protect Natural Resources and Promote Biodiversity.
4. Protect Norwell’s Scenic Quality and Historic Resources.

In the discussion on Agricultural Lands and Open Fields, the statement is made, “In all planning efforts to date, Norwell residents have made clear that the preservation of the Whiting Fields on Main Street is a high priority. (Page 45, Norwell OS&R Plan)”

The southerly Dolan-Carleton Parcels, south of Main Street, are the headwaters of the Town’s South Street Water Supply wells, Municipal Wells #s 1 and 6, and contribute water to the well field.

The southerly parcels also host habitat for a State-Listed Species, within the Estimated and Priority Habitats that overlie one another.

7.2.2 Relationship to Other Open Space Parcels

Please review Figure 8, attached, that shows the Dolan-Carleton Parcels with relationship to other Open Space Parcels. The subject site is directly adjacent to the Gould Property, which is between Hemlock Drive and Trout Brook Lane. It is also directly adjacent to the Fogg Forest, which lies between Main and Central Streets, through which Black Pond Brook flows. The southerly Dolan-Carleton parcels are directly adjacent to Miller Woods, which is between Main and Forest Streets. Miller Woods also forms the east side of Jordan Lane, a gravel roadway, and the subject property forms the westerly side of Jordan Lane.

A walk southerly along Jordan Lane, and along the recently-constructed sidewalk along Forest Street can bring one into the Donovan Field complex, then to the Middle School, and the pathway through the woodland to the east of the School ends on Cushing Hill Road, opposite the High School and Library complex. The same walk down Jordan Lane and opposite (easterly) on Forest Street brings one to Gaffield Park, and The Trustees' Norris Reservation along the North River. Soon, a pathway, currently in permitting with the Town of Norwell Conservation Commission, will be constructed from Gaffield Park into the center of the Norwell Village area, which is the intersection of Central and Main Street.

Therefore, connections among and to many other locations in the Town can be made from and to the Dolan-Carleton sites.

8.0 Summary

- 8.1 One Perennial Stream, Black Pond Brook, flows through the site, and contains associated Riverfront Area, Banks, and Land Under Waterbodies.**
- 8.2 One Perennial Stream, Trout Brook, flows adjacent to the site, and contains associated Riverfront Area, Banks, and Land Under Waterbodies.**
- 8.3 The Bordering Land Subject to Flooding (BLSF) / FEMA FIRM Flood Zones from each of these Perennial Streams extends to the site.**
- 8.4 A complex of Bordering Vegetated Wetlands (BVW) is associated with the Perennial Streams on the parcels north of Main Street. There is another BVW complex associated with the headwaters of Wildcat Brook on the parcels southerly of Main Street. These BVWs contain deciduous forested swamps, mixed forested swamps, deep marshes, and scrub-shrub swamps. Some of the delineation lines are in areas that do not appear at first to exhibit overstory wetlands indicator vegetation, however the soils within the extensive pit-and-mound topography shows hydric soils and either FACW (e.g, cinnamon ferns) or OBL (e.g., *Sphagnum* moss) within the pits.**
- 8.5 The Conservation Commission has jurisdiction through the Rivers and Wetlands Protection Acts and the Local Bylaws of the above Streams, Banks, Land Under Waterbodies, BLSF, and BVWs.**
- 8.6 There are three locally-jurisdictional Isolated Vegetated Wetlands (IVWs) within the Dolan-Carleton parcels north of Main Street. The local Conservation Commission has jurisdiction over these sites.**
- 8.7 There is one potential Intermittent Stream that may drain a headwater wetland in the center of Hemlock Drive that flows very close to the northwesterly corner of the parcels north of Main Street. If this stormwater ditch is not connected to the headwaters wetland, then it is locally-jurisdictional only.**
- 8.8 Soils appropriate for development are mainly on Parcel 45-34, the most northwesterly parcel. The remainder of the parcels have a majority of wetlands, except for the open fields on the north and south of Main Street.**
- 8.9 Wetlands on Parcel 56-29 form the headwaters of a brook that charges the Old Pond Meadows watershed, and Municipal Wells numbers 1 and 6.**
- 8.10 There are no Areas of Critical Environmental Concern or Outstanding Resource Waters on or adjacent to the parcels.**
- 8.11 There is one Potential Vernal Pool (PVP 17360) that is close to the northwest point of Parcel 45-34. The location of this PVP may be mis-justified, and the site may be on the parcel to the immediate southwest of where it is located on the NHESP data layer.**

- 8.12 There are both an Estimated Habitat of Rare Wildlife (EH 124) and a Priority Habitat of Rare Species (PH 238) on the easterly side of the Dolan-Carleton Parcels south of Main Street. Any permitting activity (Notice of Intent) within the EH or PH must be copied to the NHESP for one month before the local Conservation Commission may issue an Order of Conditions.
- 8.13 The Whiting Fields on both sides of Main Street are part of the character of the Town of Norwell, and are noted within the Norwell Master Plan.
- 8.14 The parcels allow direct connections among and between local open space areas, particularly between the Gould Property, Fogg Forest, and Miller Woods, and provide wildlife habitat along Black Pond Brook, thus addressing some of the goals of the Norwell Open Space and Recreational Plan.

If you have any questions regarding the above or attached information, please do not hesitate to contact me.

Sincerely,



Steve Ivas, Principal

- Encl: Fig. 1A - MassGIS Orthophoto & Data Layers - Dolan-Carleton Site - North of Main St - 10 Jan 17
Fig. 1A - MassGIS Orthophoto & Data Layers - Dolan-Carleton Site - South of Main St - 10 Jan 17
Fig. 2A - MassGIS Orthophoto & Wetlands & Soils - Dolan-Carleton North of Main St - 10 Jan 17
Fig. 2B - MassGIS Orthophoto & Wetlands & Soils - Dolan-Carleton South of Main St - 10 Jan 17
Fig. 3A - MassGIS Orthophoto & Soils - Dolan-Carleton North of Main St - 10 Jan 17
Fig. 3B - MassGIS Orthophoto & Soils - Dolan-Carleton South of Main St - 10 Jan 17
Fig. 4A - MassGIS Orthophoto & Wetlands - Dolan-Carleton North of Main St - 10 Jan 17
Fig. 4B - MassGIS Orthophoto & Wetlands - Dolan-Carleton South of Main St - 10 Jan 17
Fig. 5 - FEMA "Firmette" Around Dolan-Carleton Site, Norwell - 14 Jan 17
Fig. 6 - Federal Wetlands - Dolan-Carleton Site, Main St., Norwell - 15 Jan 17
Fig. 7 - Site Locus with Assessor's Parcel Number, Dolan-Carleton Parcels, Main St., Norwell - 16 Jan 17
Fig. 8 - Relationship with Town-Owned Parcels, Dolan-Carleton Parcels, Main St., Norwell - 16 Jan 17
Fig. 9 - Norwell Village Historic District and Dolan-Carleton Parcels, Main St., Norwell - 16 Jan 17

XC: J. Bows, P.E. & D. Keller, P.E., Merrill Associates, Inc., 427 Columbia Road, Hanover, 02339

File: C:\2017\Wetlands\Norwell\Dolan-Carleton Parcels\Letter Report - 16Jan 17.wp

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1. 48A Brockton sandy loam, 0 - 3% slopes, extremely stony [HYDRIC]

Brockton soils are defined as very deep, nearly level, very poorly drained soil formed in dense glacial till. Brockton soils are in depressions and drainageways in upland areas and ice-contact deposits. Stones and boulders cover 3 to 15 percent of the surface.

The Taxonomic Classification is Sandy, mixed, mesic, Typic Humaquepts, very poorly drained of dense till parent material. The permeability is moderately rapid in the solum, slow in the substratum. The depth to bedrock is greater than 65 inches, and the seasonal high water table depth is from +1.0 to 0.5 feet below the surface, and is perched from September to June.

The soil is in Hydrologic Group D, it is a hydric soil, and it is frequently ponded for long periods, December to March.

Potential inclusions include: Whitman soils are a similar inclusion. Poorly drained Ridgebury, Norwell, and Mattapoisett soils are on higher elevations. Moderately well drained Scituate and Birchwood soils are on upland landscapes.

The Brockton stony loam is poorly suited for most agricultural and woodland uses due to wetness. It is also poorly suited for development due to seasonal high watertables at or near the surface for prolonged periods of time.

2. 49A Norwell sandy loam, 0 to 3 percent slopes, extremely stony [HYDRIC]

Norwell soils are defined as very deep, nearly level, poorly drained soil formed in compact glacial till derived mainly from granite, gneiss and schist. Norwell soils are on upland depressions and drainageways. The taxonomic classification of the Norwell map unit is Sandy, mixed, mesic, Aerlic Epiaquepts, poorly drained soils of parent material that is dense till.

The permeability is moderately rapid to rapid in the solum and slow in the substratum, with a low available water-holding capacity. The depth to bedrock is greater than 65 inches, with a perched seasonal water table, 0.0 to 1.5 feet below the surface from November to May. The soil is in Hydrologic Group C, and is a hydric soil. The soil is commonly ponded from December to March, for brief to long periods.

Potential inclusions are Ridgebury and Mattapoisett soils. Very poorly drained Whitman and Brockton soils are on lower elevations. Moderately well drained Scituate and Birchwood soils are on higher elevations.

The soil is poorly suited for most agricultural and woodland uses mainly due to wetness. It is also poorly suited for development due to seasonal high watertables at or near the surface for prolonged periods of time.

3. 51A Swansea, 0 to 3 percent slopes [HYDRIC]

Swansea soils are defined as very deep, level, very poorly drained soil formed in 16 to 51 inches of highly decomposed organic material overlying glacial sediments. Swansea soils are in depressions, kettles or in low level areas of outwash plains and uplands. The Taxonomic classification is : Sandy or sandy skeletal, mixed, dysic mesic, Terric Medisaprists. The soils are very poorly drained, formed in 16 to 51 inches of organic material underlain by fluvial or lacustrine sediments.

The permeability of the Swansea soils is moderate or moderately rapid, with a high available water-holding capacity. The depth to bedrock is greater than 65 inches, with a seasonal high water table depth of +2.5 to 0.5 feet below the surface, from January to December. The soil is in Hydrologic Group D, and is a hydric soil, which is frequently ponded, for long to very long periods, from November to May.

Potential inclusions are the similar very poorly drained Scarboro, Berryland, and Freetown soils. Poorly drained Wareham, Saugatuck and Pipestone soils are on higher elevations.

Swansea soils are poorly suited for most agricultural and woodland uses mainly due to wetness. Swansea soils have a severe limitation for tree throw hazard. They are also poorly suited for development due to seasonal high watertables at or near the surface for prolonged periods of time. Organic layers have very low strength and should be removed to support loads.

4. 69A Mattapoissett loamy sand, 0 to 3 percent slopes, extremely stony [HYDRIC]

Mattapoissett soils are very deep, nearly level, poorly and somewhat poorly drained soils formed in sandy eolian and/or fluvial deposits underlain by loamy glacial till. Mattapoissett soils are in depressions, drainageways and low lying areas on ground moraines, ice-contact deposits and uplands. Their taxonomic classification is sandy, mixed, mesic, Ortstein Typic Epiaquods.

The soils are poorly drained, of sandy eolian and/or fluvial deposits underlain by loamy dense till. The permeability is moderate or moderately rapid in the sandy horizons, slow to very slow in the dense till, with a low available water holding capacity.

The depth to bedrock is greater than 65 inches, and the seasonal high watertable depth is +0.5 to 1.5 feet below the surface, perched, from November to May. The Mattapoissett soils are in Hydrologic Group C, and are hydric soils, and are problem hydric soils, having a spodic horizon. The lesser slopes are commonly ponded, moderately long, from November to May.

Potential inclusions are Ridgebury, Norwell, Saugatuck and Pipestone soils. Very poorly drained Sippican, Swansea, Scarboro, and Berryland soils are on lower elevations. Moderately well drained Birchwood and Scituate soils are on higher elevations.

The soils are poorly suited for most agricultural uses and woodlands mainly due to wetness. They are also poorly suited due to seasonal high watertables at or near the surface for prolonged periods of time and slow permeability of the substratum.

5. 71B Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony [HYDRIC]

Ridgebury Soils are defined as very deep, level, somewhat poorly and poorly drained soil formed in compact glacial till derived mainly from granite, gneiss and schist. Ridgebury soils are on upland depressions and drainageways. Their taxonomic classification is coarse - loamy, mixed, nonacid, mesic, Aeric Epiaquepts, in the poorly drained drainage class.

The parent material is dense till, and the permeability of these soils is moderate to moderately rapid in the solum, slow to very slow in the dense till. The available water holding capacity is moderate. The depth to bedrock is greater than 65 inches, with a seasonal high watertable depth: 0.0 to 1.5 feet below the surface. The water table is perched, November to May. The soil is in Hydrologic Group C and is a hydric soil.

The flooding/ponding potential of the Ridgebury soil is commonly ponded (A slope only), moderately long, November to May. Potential inclusions are Norwell and Mattapoissett soils. Very poorly drained Brockton, Sippican, Whitman, and Swansea soils are on lower elevations. Moderately well drained Scituate and Woodbridge soils are on higher elevations.

Ridgebury soils are poorly suited for most agricultural and woodland uses mainly due to wetness. They are also poorly suited due to seasonal high watertables at or near the surface for prolonged periods of time and slowly permeable layers.

6. 223B Scio very fine sandy loam, 3 to 8 percent slopes.

Scio soils are very deep, moderately well drained soils formed in glacial lacustrine silts and very fine sand. Scio soils are on glacial lake plains, deltas, and low terraces. The taxonomic classification is coarse - silty, mixed, mesic, Aquic Dystrochrepts. The drainage class is moderately well drained, of parent material of lacustrine silts, very fine sand and silty clay loam sediments.

The permeability in Scio soils is slow to moderately slow. The available water holding capacity: Moderate to high. The depth to bedrock is greater than 65 inches, and the seasonal high water table is 1.5 to 3.5 feet below the surface, is perched, from December to April. The soil is Hydrologic Group B, and is not a hydric soil., although it may have hydric inclusions. Scio soils have no flooding/ponding potential.

Potential inclusions are the similar Deerfield and Eldridge soils. Poorly drained Enosburg, Raynham, and Wareham soils are on lower elevations. Well drained Hinesburg, Windsor, and Wampanucket soils are on higher elevations.

Scio soils are well suited for most agricultural uses. Scio soils are prime farmland soils. They are also well suited for woodland. They have major limitations related to seasonal high watertables and slow permeability in the silty substratum for development.

7. 253C Hinckley gravelly sandy loam, 8 to 15 percent slopes.

This soil is classified as sandy-skeletal, mesic, Typic Udorthents, excessively drained, from parent material of gravelly glacial fluvial deposits, with very rapid permeability. The available water holding capacity is very low, and the depth to bedrock is greater than 65 inches. The seasonal high water table is greater than five feet below surface elevation. The soil is in Hydrologic Group A, and is not a hydric soil. Its flooding and ponding potential is none. Plymouth, Windsor, Merrimac, and Carver soils are similar inclusions. Moderately well-drained Deerfield and Sudbury soils are found on lower elevations. Poorly drained Wareham and Pipestone soils are found along drainageways.

Map Series 253B is important for agriculture. Major limitations are related to droughtiness. Irrigation is needed for optimal yield. The soil is also poorly suited for woodland due to droughtiness.

Hinckley soils have few limitations for development. They are often associated with aquifer recharge areas, and measures should be taken to protect aquifers.

In this location, the Hinckley soils appear a bit steeper than three to eight percent. They have less importance for agriculture, as such.

8. 254B Merrimac sandy loam, 3 to 8 percent slopes.

This soil's taxonomic classification is sandy, mixed, mesic, Typic Dystrochrepts, a somewhat excessively drained soil from parent material of gravelly glacial fluvial deposits. The permeability of this soil is moderately rapid or rapid in the solum and rapid or very rapid in the substratum, with a very low available water-holding capacity. The depth to bedrock is greater than 65 inches, and the depth to the water table is greater than five feet for Merrimac sandy loam. It is Hydrologic Group A, and is not a hydric soil. There is no flooding or ponding on this soil.

Barnstable, Windsor, Hinckley and Carver soils are similar inclusions. Moderately well drained Sudbury and Deerfield soils are found on lower elevations. Poorly drained Wareham and Pipestone soils are extant along drainageways.

The suitability for agriculture is excellent, as the soil is prime farmland soil map unit. Irrigation is needed for optimal production. The soil is also well-suited for woodland. Merrimac soils have few limitations for development. They are sometimes associated with aquifer recharge areas and measures should be taken to protect aquifers.

9. 306B Paxton Fine Sandy Loam, 3 to 8 Percent Slopes, Very Stony

Paxton soils are described as very deep, well drained soil formed in compact glacial till derived mostly from schist, gneiss and granite. Paxton soils are on smooth convex side slopes and top slopes of glaciated hills and drumlins. This is the Official State Soil of Massachusetts.

The taxonomic classification of Paxton soils is coarse - loamy, mixed, nonacid, Oxyaquic Dystrochrepts. The soils are described as well-drained of dense glacial till parent material. The permeability of Paxton Soils is moderate in the solum, slow or very slow in the dense substratum, with a moderate available water holding capacity.

The depth to bedrock is defined as greater than 65 inches, with a seasonal high watertable depth of 2.5 to 4 feet, perched, from January to May. The soil is in Hydrologic Group: C, and is not a hydric soil, with no flooding or ponding potential.

Potential inclusions are the similar Poquonock and Montauk soils. Poorly drained Norwell, and Ridgebury soils are along drainageways. Moderately well drained Scituate, Birchwood, and Woodbridge soils are on concave slopes. Map unit 305B (not stony) is a prime farmland soil. Map units 305C, 306C and 306B are important farmland soils. The soil is well-suited for woodland. Major limitations for development are related to slow permeability in the dense till substratum. Large surface and subsurface stones and boulders may interfere with excavation. Erosion hazards are likely during development, and measures should be taken to prevent erosion.

10. 310 B Woodbridge fine sandy loam, 3 to 8 percent slopes.

Woodbridge soils are very deep, moderately well drained soil formed in compact glacial till. They are on the smooth top slopes, upper side slopes and toe slopes of glaciated hills. The taxonomic classification is coarse-loamy, mixed, mesic, Aquic Dystrochrepts. The soil is moderately well-drained, of parent material of dense glacial till. The permeability is moderate in the solum, slow or very slow in the dense substratum.

The available water holding capacity is moderate, with a depth to bedrock of greater than 65 inches. The seasonal high water table depth is 1.5 to 3 feet, and is perched, from November to May. The soil is in Hydrologic Group C, and is not a hydric soil, although it may have hydric inclusions. Woodbridge soils have no flooding or ponding potential.

Potential inclusions are Scituate, Birchwood, and Newfields soils. Poorly drained Norwell, Sippican, and Ridgebury soils are along drainageways. Well drained Paxton, Poquonock and Montauk soils are on convex slopes.

Map unit 310A is a prime farmland soil, which is also well-suited for woodland. The soil has major limitations for development related to slow permeability in the dense till substratum and seasonal high watertables. Large surface and subsurface stones and boulders may interfere with excavation. Erosion hazards are likely during development, and measures should be taken to prevent erosion

**11. 311A Woodbridge, 0 to 3 percent slopes
311B Woodbridge, 3 to 8 percent slopes**

Woodbridge soils are defined as coarse-loamy mixed mesic, Aquic Dystrochrepts. They are moderately well-drained, and formed in dense glacial till. The permeability of this soil is moderate in the solum, or in the A and B horizons, where the living roots and other plant and animal life are extant. The permeability is slow or very slow in the dense substratum, below the A and B horizons. The available water-holding capacity is described as moderate and the depth to bedrock is greater than 65 inches. The seasonal water table is 1.5 to 3 feet below the surface, perched, November to May. The soil is in Hydrologic Group C, and is not a hydric soil but may have hydric inclusions. Its flooding and ponding potential is described as none.

Potential inclusions are Scituate, Birchwood and Newfields. Poorly drained Norwell, Sippican, and Ridgebury are along drainageways. Well-drained Paxton, Poquonock, and Montauk soils are on convex slopes.

This is an important farmland soil, and is also well-suited for woodlands. Limitations for development are associated with the slow permeability in the substratum and seasonal high water tables. Large surface and subsurface stones and boulders may interfere with excavation.

12. 426A Newfields sandy loam, 0 to 3 percent slopes

Newfields soils are very deep, moderately well drained soils formed in loamy mantle, underlain by sandy glacial till and ice-contact deposits. Newfields soils are on uplands, moraines and ice-contact areas. Their taxonomic classification is coarse-loamy over sandy or sandy skeletal, mixed, mesic, Oxyaquic Dystrochrepts. They are moderately well drained. The parent material is ice contact deposits and/or ablation till.

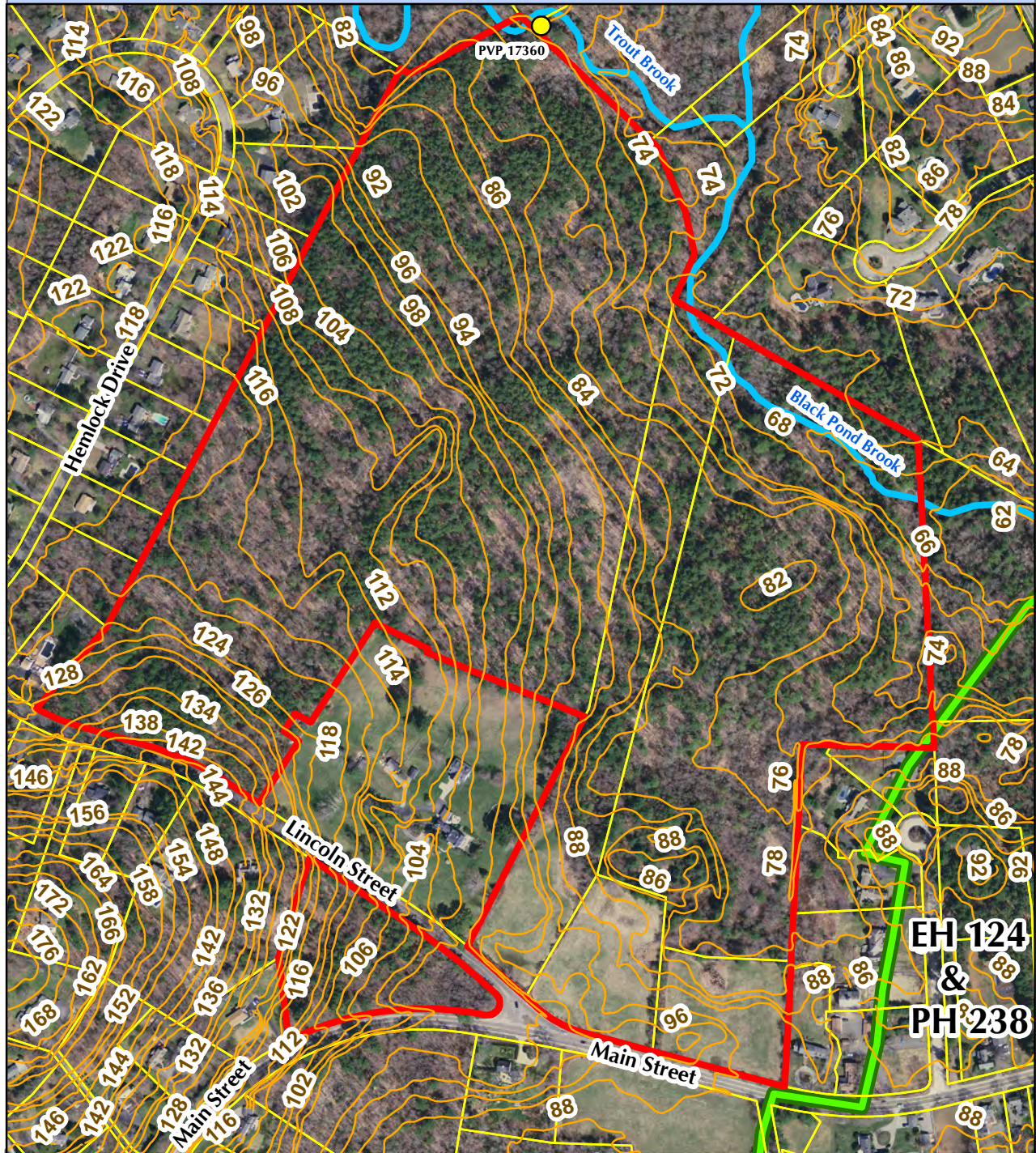
The permeability of Newfields soils is moderate throughout, with a moderate water holding capacity. The depth to bedrock is greater than 65 inches, and the seasonal high water table depth is 1.5 to 4 feet below the ground surface. The type is apparent/perched, from November to April.

The soil is within Hydrologic Group B, and is not a hydric soil, although it may have hydric inclusions. It has no flooding or ponding potential. Birchwood and Scituate soils are similar potential inclusions. Poorly drained Mattapoisett and Norwell soils are along drainageways. Well drained Canton, Montauk and Merrimac soils are on convex slopes.

Map units 426A and 426B are prime farmland soils. Irrigation is needed for optimal yield. The seasonal high water table may delay some practices during the spring and limit root growth. Newfields soils are well-suited for woodland productivity.

Major limitations for development are related to the seasonal high watertable. Mounded septic systems are usually required. Newfields soils are mapped in ice contact areas and the substratum may consist of variable types of geologic sediments. Slowly permeable layers may result in slow percolation rates for on-site sewage disposal systems.

Fig. 1A - MassGIS 2013 Orthophoto & Contours & Rare Species Datalayers Around Dolan-Carleton Parcels, North of Main St., Norwell



Legend

- NHESP Certified Vernal Pools
- NHESP 2001 Potential Vernal Pools
- NHESP 2008 Estimated Habitats of Rare Wildlife
- Dolan - Carleton Parcels North of Main Street
- MassGIS / Norwell Parcels
- NHESP 2008 Priority Habitats of Rare Species
- Town of Norwell Two Foot Contours
- USGS Hydrology - 1:25,000



Scale: 1:4,500

0 125 250 500 750 1,000 Feet



Ivas Environmental
315 Winter St., Norwell MA 02061
781.659.1690, spivas@comcast.net

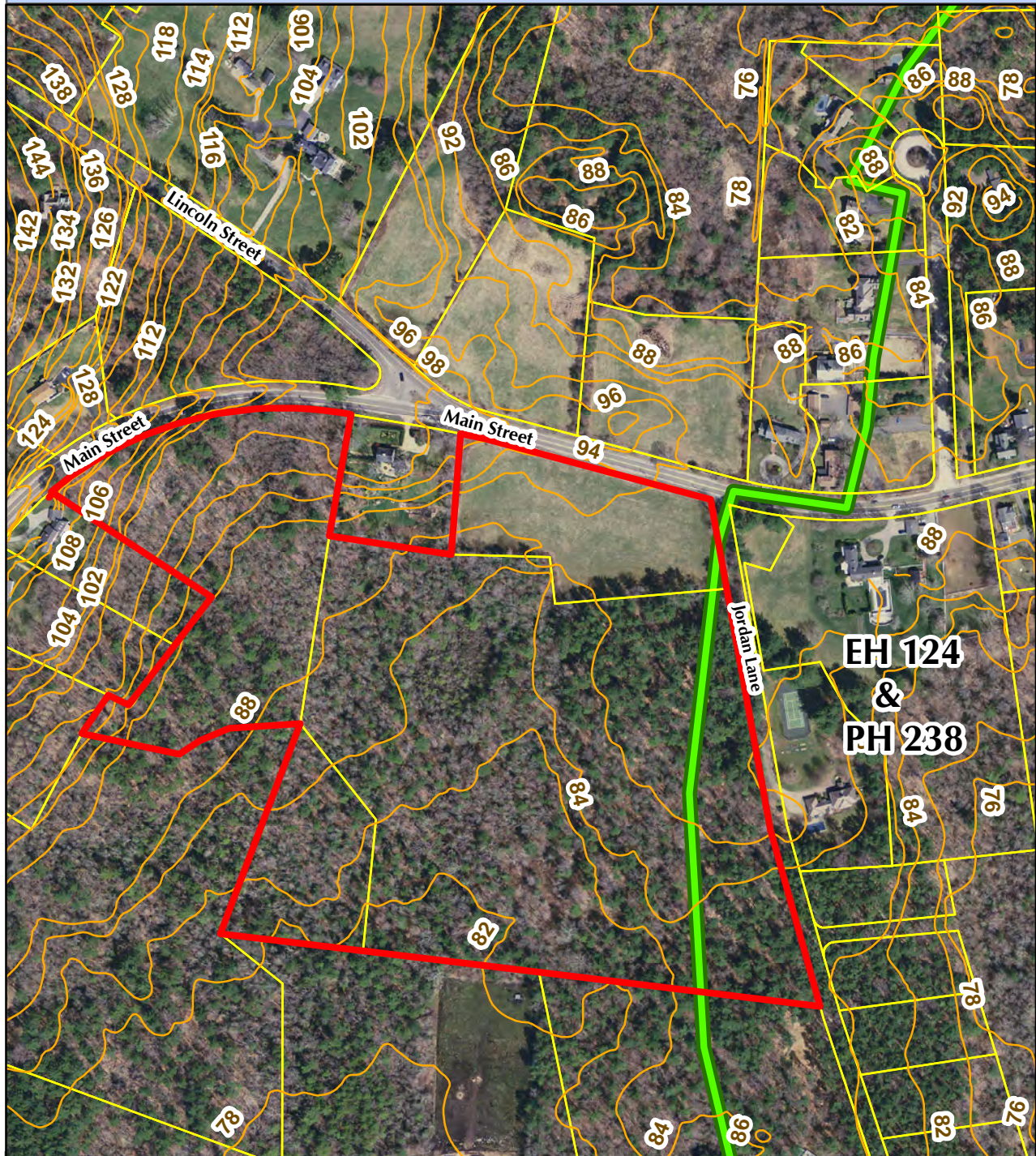
C:\2016\Wetlands\Norwell\Main St - Dolan-Carleton \Fig. 1A - 10Jan16.mxd

Sources:

MassGIS / USGS 0.3m 2013 Orthophoto (coq2013_9.sid)
NHESP 2001 Potential Vernal Pools (pvp1.shp)
NHESP 2016 Certified Vernal Pools (cvp_pt.shp)
NHESP 2008 Estimated Habitats of Rare Wildlife (esthab_poly.shp)
NHESP Priority Habitats of Rare Species (prihab_poly.shp)
Norwell Two-foot Elevation Contours (countor.shp)
MassGIS / Norwell Parcels (par219.shp)
USGS 1:25,000 Hydrology (HYDR25K_ARC.shp)

Projection: Massachusetts State Plane NAD 83M

Fig. 1B - MassGIS 2013 Orthophoto & Contours & Rare Species Datalayers Around Dolan-Carleton Parcels, South of Main St., Norwell



Legend

- Dolan - Carleton Parcels South of Main Street
- CVP_PT
- NHESP Certified Vernal Pools
- NHESP 2001 Potential Vernal Pools
- Town of Norwell Two Foot Contours
- MassGIS / Norwell Parcels
- NHESP 2008 Estimated Habitats of Rare Wildlife
- NHESP 2008 Priority Habitats of Rare Species
- Town of Norwell Two-foot Elevation Contours
- USGS Hydrology - 1:25,000



Scale: 1:3,500

0 125 250 500 750 1,000 Feet



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315 Winter St., Norwell MA 02061
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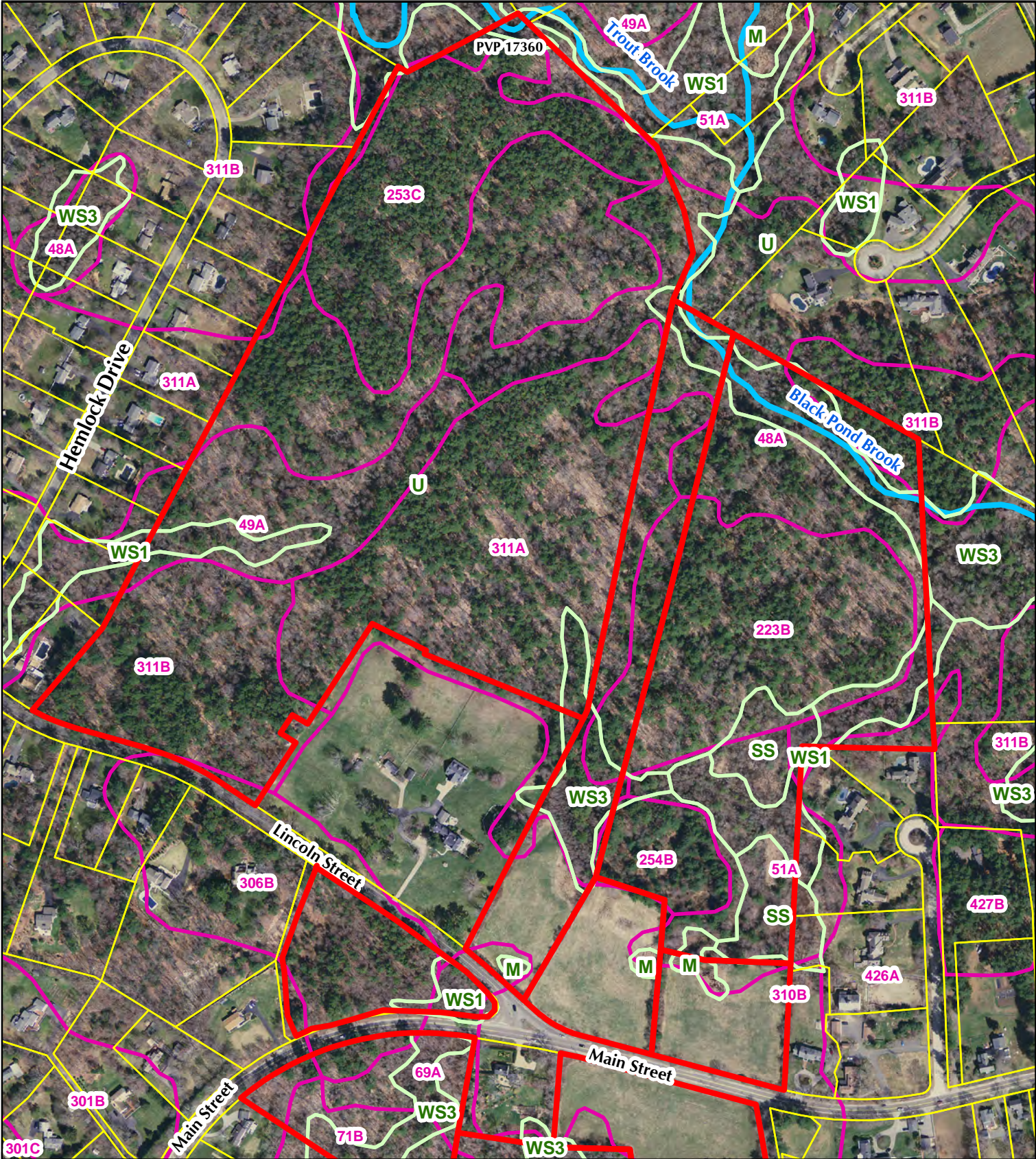
C:\2016\Wetlands\Norwell\Main St - Dolan-Carleton \Fig. 1B - 10Jan17.mxd

Sources:

MassGIS / USGS 0.3m 2013 Orthophoto (coq2013_9.sid)
NHESP 2001 Potential Vernal Pools (pvp1.shp)
NHESP 2016 Certified Vernal Pools (cvp_pt.shp)
NHESP 2008 Estimated Habitats of Rare Wildlife (esthab_poly.shp)
NHESP Priority Habitats of Rare Species (prihab_poly.shp)
Norwell Two-foot Elevation Contours (countor.shp)
MassGIS / Norwell Parcels (par219.shp)
USGS 1:25,000 Hydrology (HYDR25K_ARC.shp)

Projection: Massachusetts State Plane NAD 83M

Fig. 2A - MassGIS 2013 Orthophoto & Contours & Rare Species Datalayers Around Dolan-Carleton Parcels, North of Main St., Norwell



Legend

- DOLAN - CARLETON PARCELS
- NorwellParcels_MAgis_rev2
- MA DEP So. Coastal Watersheds Wetlands
- USGS HYDROLOGY - 1:25,000
- NRCS Plymouth County Soils
- M** Deep Marsh
- SS** Scrub-shrub Swamp
- WS1** Deciduous Forested Swamp
- WS3** Mixed Forested Swamp
- U** Upland

Greater Than or Equal to 74 Hydic Soil
Less Than 74 Upland Soils (with Exceptions)



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781.659.1690, spivas@comcast.net

C:\2016\Wetlands\Norwell\Main St - Dolan\Carleton \Fig. 2A - 09Jan17.mdx

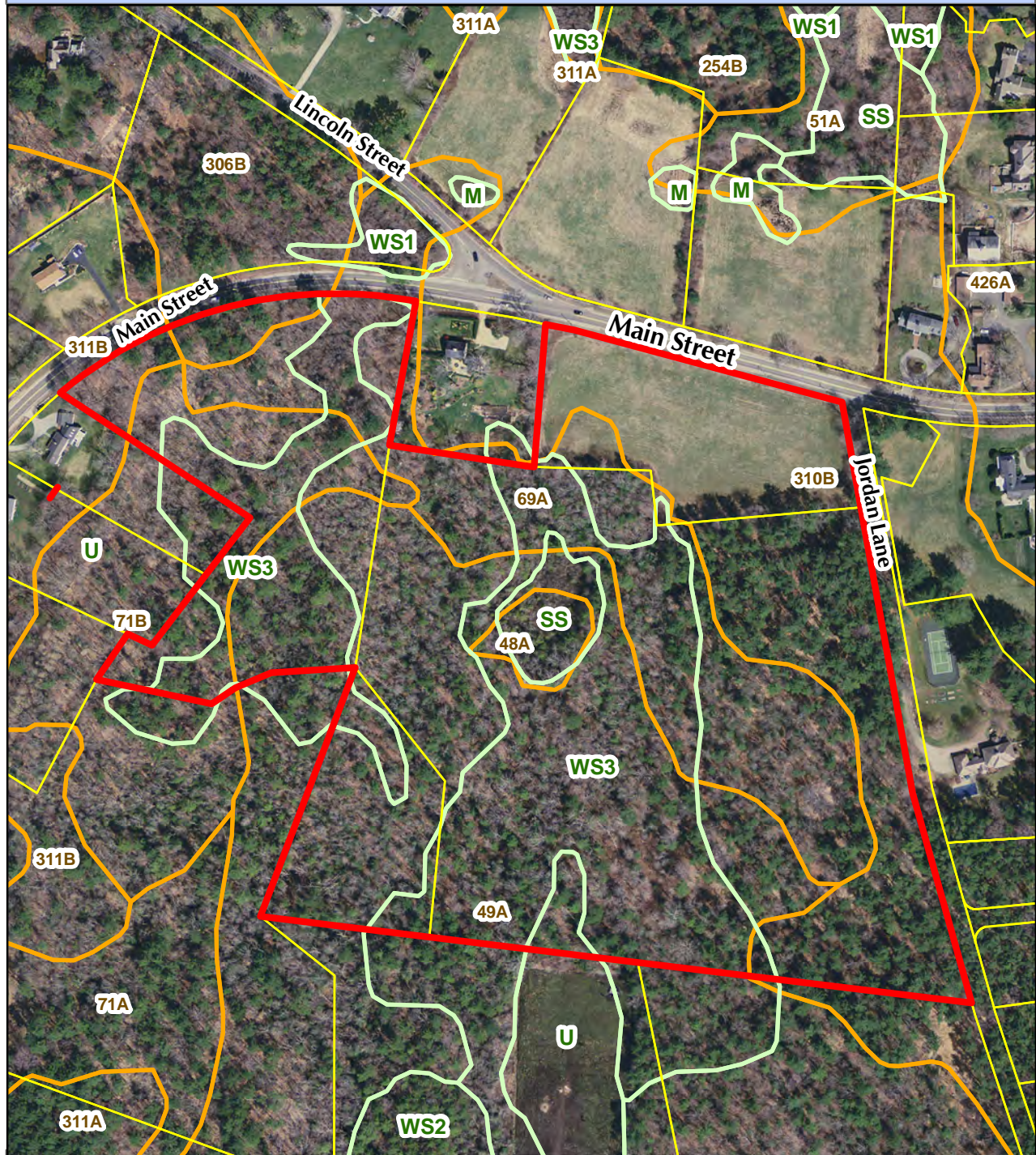
Sources:

MassGIS / USGS 0.3m 2013 Orthophoto (coq2013_9.sid)
MA DEP So. Coastal Watersheds Wetlands (wetdep_scoaa.shp)
NRCS Plymouth Co. Soils (soi_plym.shp)
MassGIS / Norwell Parcels (par219.shp)
USGS 1:25,000 Hydrology (HYDR25K_ARC.shp)

Projection: Massachusetts State Plane NAD 83M

0 125 250 500 750 1,000 Feet

Fig. 2B - MassGIS 2013 Orthophoto & Wetlands & Soils Datalayers Around Dolan-Carleton Parcels, South of Main St., Norwell



Legend

- Dolan - Carleton Parcels South of Main St.
- MassGIS / Norwell Parcels
- MA DEP So. Coastal Watersheds Wetlands
- USGS HYDROLOGY - 1:25,000
- NRCS Plymouth County Soils w/Soil Map Units

SS Scrub-shrub Swamp
 WS3 Mixed Forested Swamp
 U Upland

Less Than or Equal to 74 Hydric Soils
 Greater Than > 74 Upland Soils (with exceptions)



Scale: 1:3,500



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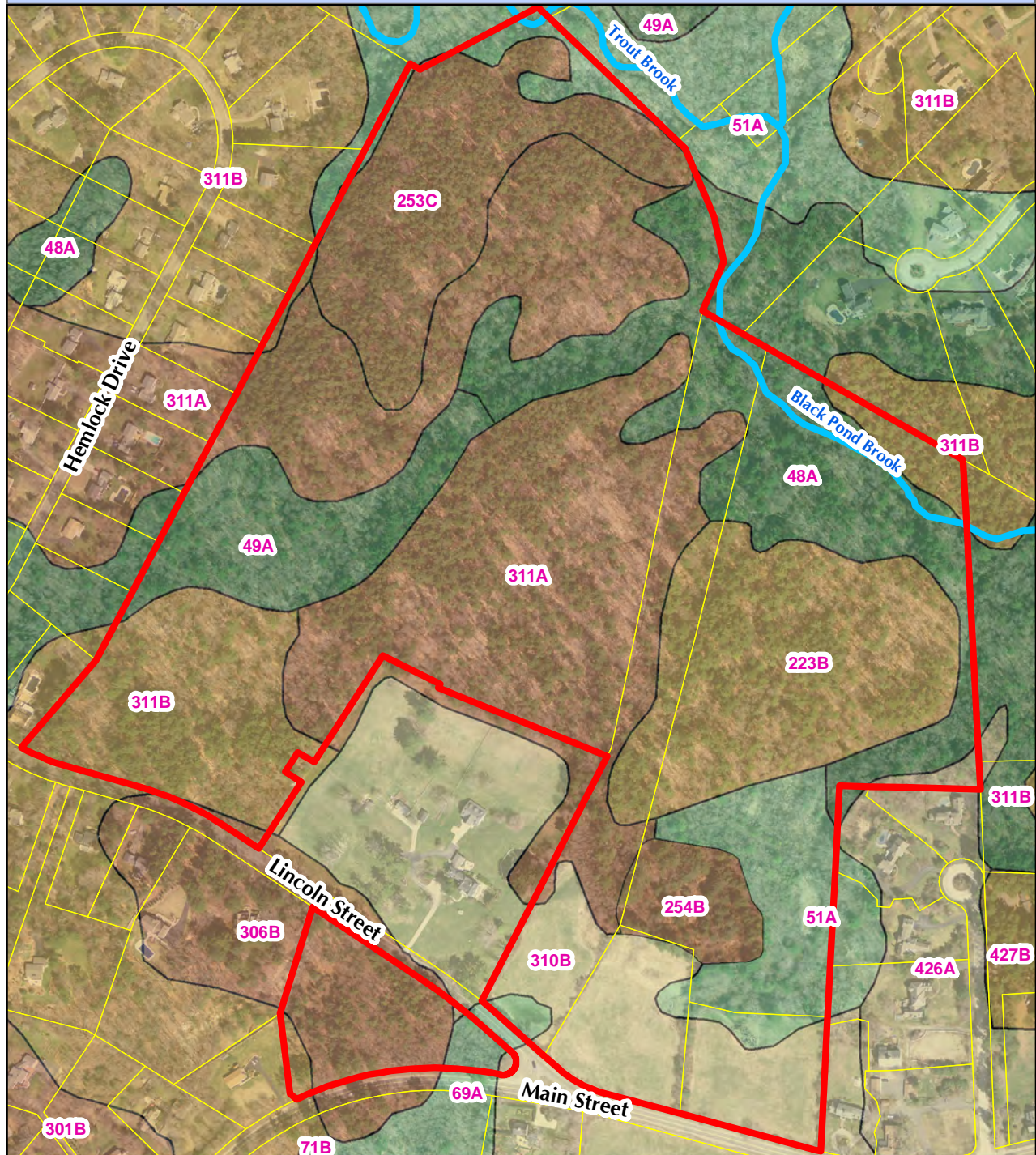
Sources:

MassGIS / USGS 0.3m 2013 Orthophoto (coq2013_9.sid)
 MA DEP So. Coastal Watersheds Wetlands (socoa.shp)
 NRCS Plymouth Co. Soils (soil_plym.shp)
 MassGIS / Norwell Parcels (par219.shp)
 USGS 1:25,000 Hydrology (HYDR25K_ARC.shp)

Projection: Massachusetts State Plane NAD 83M

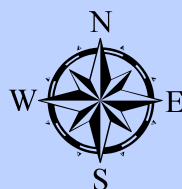
0 105 210 420 630 840 Feet

**Fig. 3A - MassGIS 2013 Orthophoto & Soils Datalayer
Around Dolan-Carleton Parcels, North of Main St., Norwell**



Dolan - Carleton North Parcels

Brown Colors (Generally) Upland Soils
Green Colors (Generally) Wetland Soils



Scale: 1:5,000

Less Than or Equal to 74 Hydric Soil
Greater Than 74 Upland Soils (with Exceptions)



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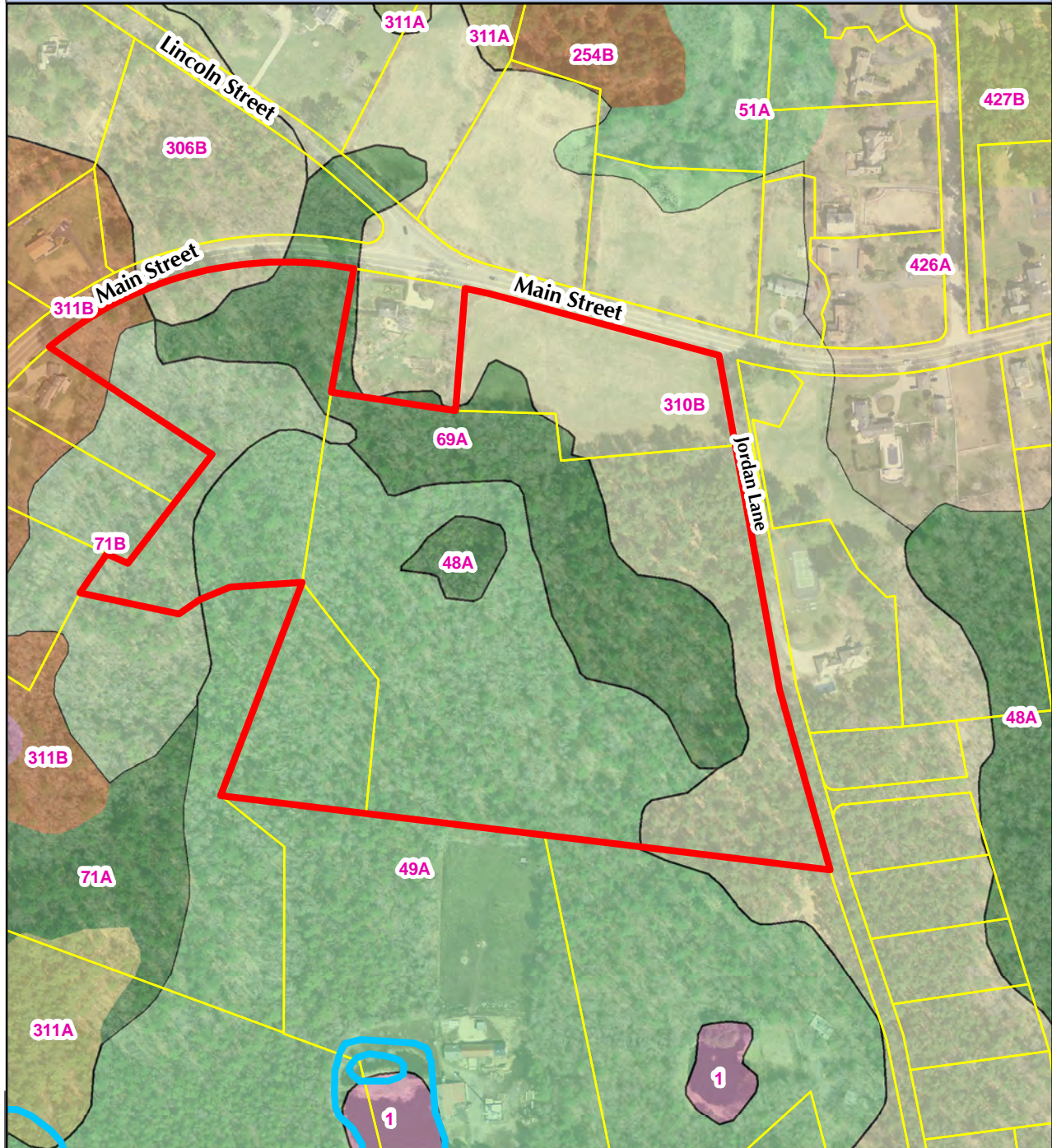
Sources:

MassGIS / USGS 0.3m 2013 Orthophoto (coq2013_9.sid)
NRCS Plymouth Co. Soils (soi_plym.shp)
MassGIS / Norwell Parcels (par219.shp)
USGS 1:25,000 Hydrology (HYDR25K_ARC.shp)

Projection: Massachusetts State Plane NAD 83M

0 125 250 500 750 1,000
Feet


**Fig. 3B - MassGIS 2013 Orthophoto & Soils Datalayers
Around Dolan-Carleton Parcels, South of Main St., Norwell**

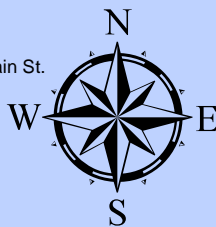


Legend

 USGS HYDROLOGY - 1:25,000

 Dolan - Carleton Parcels South of Main St.

 NorwellParcels_MAgis_rev2



Scale: 1:3,500



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C:\2016\Wetlands\Norwell\Main St - Dolan\Carleton \Fig. 3B - 10Jan17.mxd

Sources:

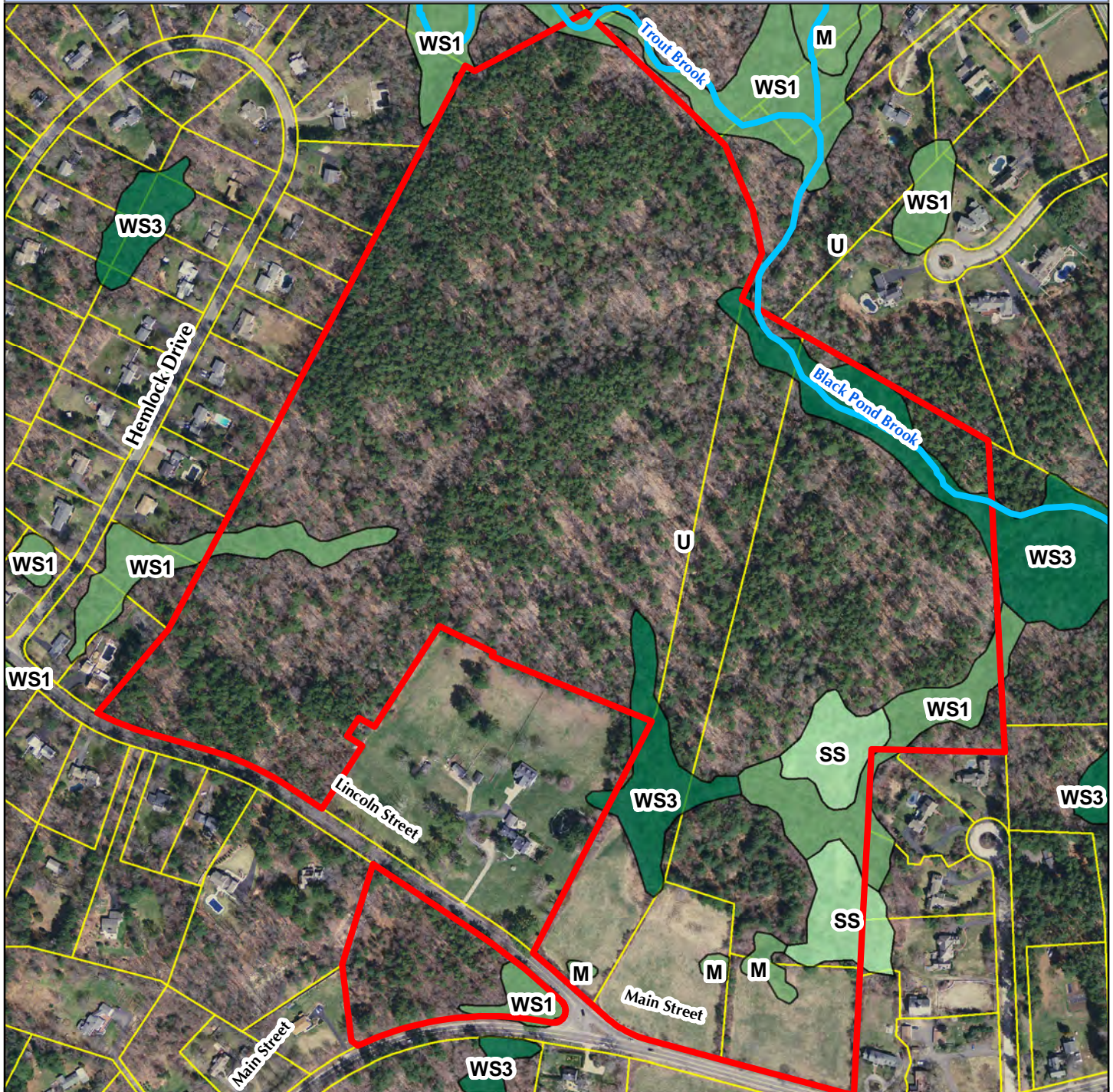
MassGIS / USGS 0.3m 2013 Orthophoto (coq2013_9.sid)
NRCS Plymouth Co. Soils (soil_plym.shp)
MassGIS / Norwell Parcels (par219.shp)
USGS 1:25,000 Hydrology (HYDR25K_ARC.shp)








Projection: Massachusetts State Plane NAD 83M

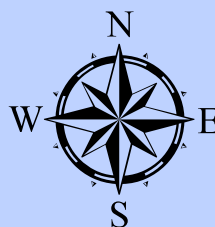
Less Than or Equal to 74 Hydric Soils
Greater Than 74 Upland Soils (with exceptions)

0 125 250 500 750 1,000 Feet

Fig. 4A - MassGIS 2013 Orthophoto & Wetlands Datalayer Around Dolan/Carleton Parcels, North of Main St., Norwell



-  USGS Hydrology 1:25,000
-  Dolan - Carleton North Parcels
-  Deep Marsh
-  Scrub Shrub Swamp
-  Deciduous Forested Swamp
-  Mixed Forested Swamp
-  MassGIS / Norwell Parcels



Scale: 1:5,000

0 120 240 480 720 960
Feet



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315 Winter St., Norwell MA 02061
781.659.1690, spivas@comcast.net

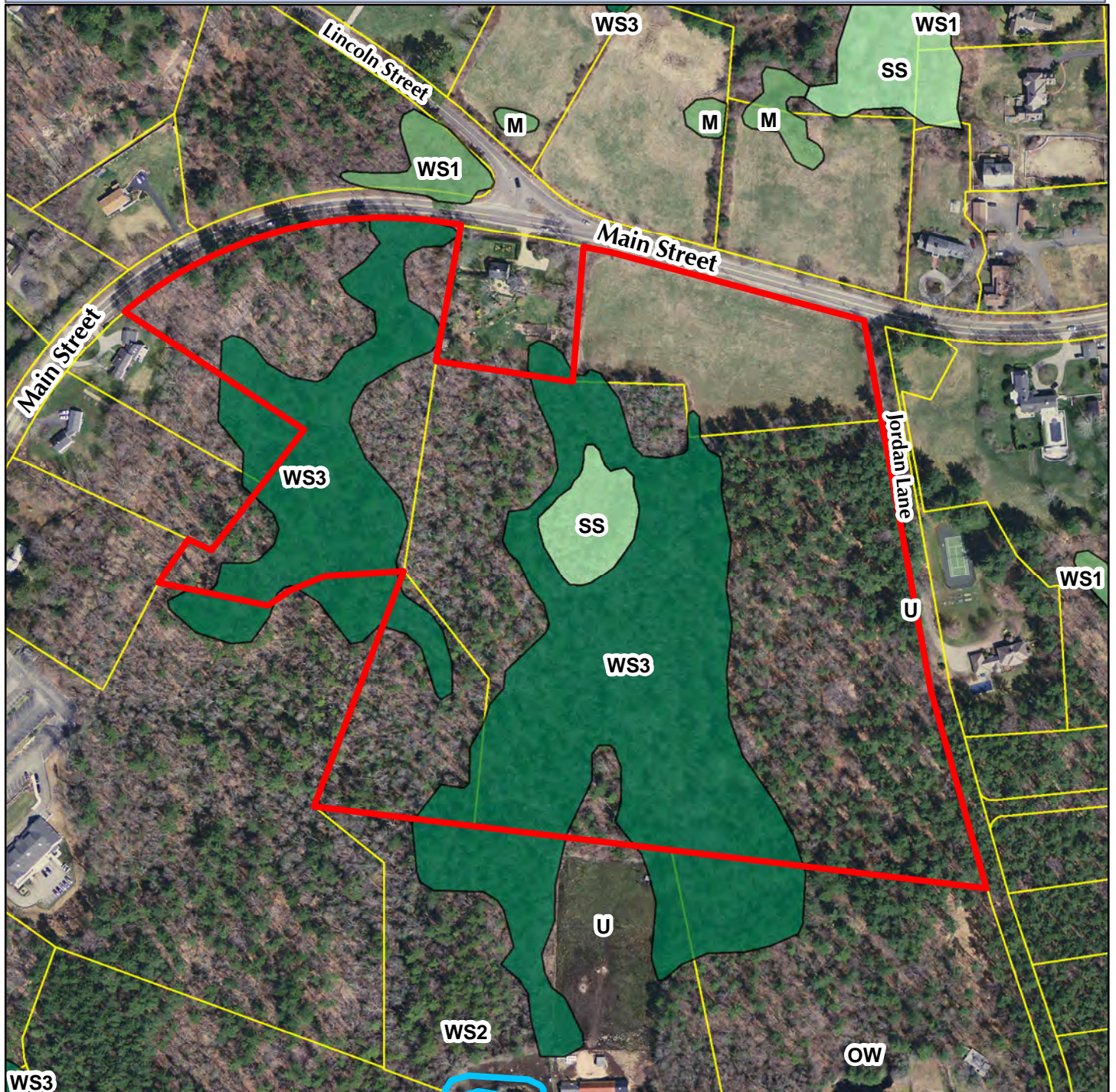
Sources:








MassGIS / USGS 0.3m 2013 Orthophoto (coq2013_9.sid)
MA DEP So. Coastal Watersheds Wetlands (wetdep_scoaa.shp)
MassGIS / Norwell Parcels (par219.shp)
USGS 1:25,000 Hydrology (HYDR25K_ARC.shp)

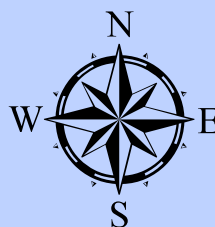
Projection: Massachusetts State Plane NAD 83M

C:\2016\Wetlands\Norwell\Main St - Dolan-Carleton \
Fig. 4A - 10Jan17.mxd

Fig. 4B - MassGIS 2013 Orthophoto & Wetlands Datalayer Around Dolan/Carleton Parcels, South of Main St., Norwell



-  USGS Hydrology 1:25,000
-  Dolan - Carleton South Parcels
-  Deep Marsh
-  Scrub Shrub Swamp
-  Deciduous Forested Swamp
-  Mixed Forested Swamp
-  MassGIS / Norwell Parcels



Scale: 1:3,500

0 80 160 320 480 640 Feet



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781.659.1690, spivas@comcast.net

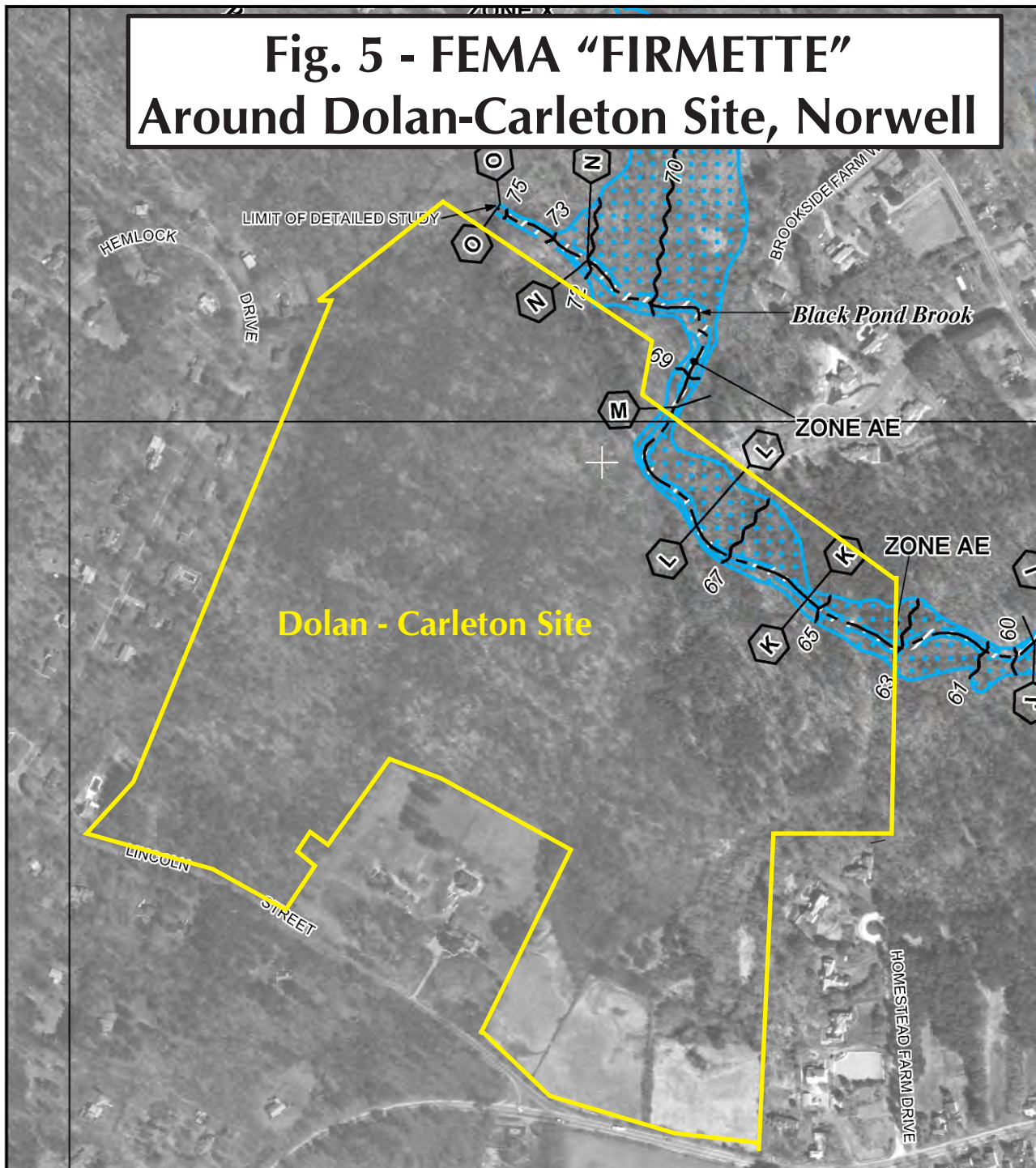
Sources:

MassGIS / USGS 0.3m 2013 Orthophoto (coq2013_9.sid)
MA DEP So. Coastal Watersheds Wetlands (wetdep_scoaa.shp)
MassGIS / Norwell Parcels (par219.shp)
USGS 1:25,000 Hydrology (HYDR25K_ARC.shp)

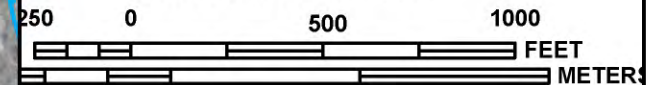
Projection: Massachusetts State Plane NAD 83M

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Fig. 4B - 10Jan17.mxd

**Fig. 5 - FEMA "FIRMETTE"
Around Dolan-Carleton Site, Norwell**



MAP SCALE 1" = 500'



NFP

PANEL 0116J

FIRM

FLOOD INSURANCE RATE MAP
PLYMOUTH COUNTY,
MASSACHUSETTS
(ALL JURISDICTIONS)

PANEL 116 OF 650
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARSHFIELD, TOWN OF	250273	0116	J
NORWELL, TOWN OF	250276	0116	J
SCITUATE, TOWN OF	250282	0116	J

Site Locus by:

Ivas Environmental
315 Winter St., Norwell MA 02061-1401
781.659.1690, spivas@comcast.net

C:\2017\Wetlands\Norwell\Carleton\
Fig. 5 - 14Jan17.cdr

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

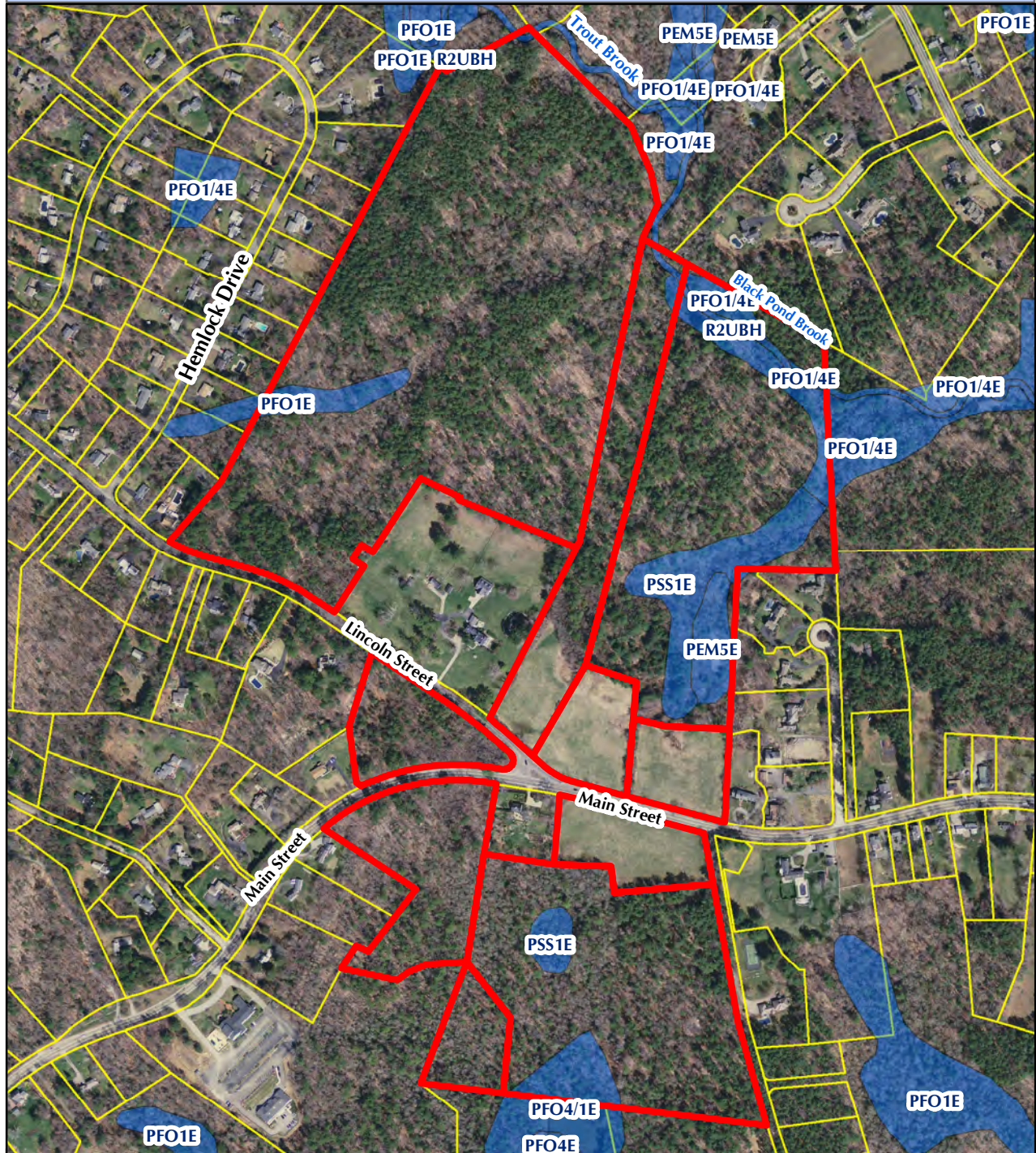


MAP NUMBER
25023C0116J
EFFECTIVE DATE
JULY 17, 2012

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Fig. 6 - Federal Wetlands Datalayer Around Dolan-Carleton Parcels, Main St., Norwell



Legend

- Dolan - Carleton Parcels
- Federal National Wetlands Inventory
- MassGIS / Norwell Tax Parcels - Town 219



Scale: 1:7,200



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781.659.1690, spivas@comcast.net

C:\2017\Wetlands\Norwell\Main St - Dolan/Carleton \Fig. 6 - 15Jan17.mdx

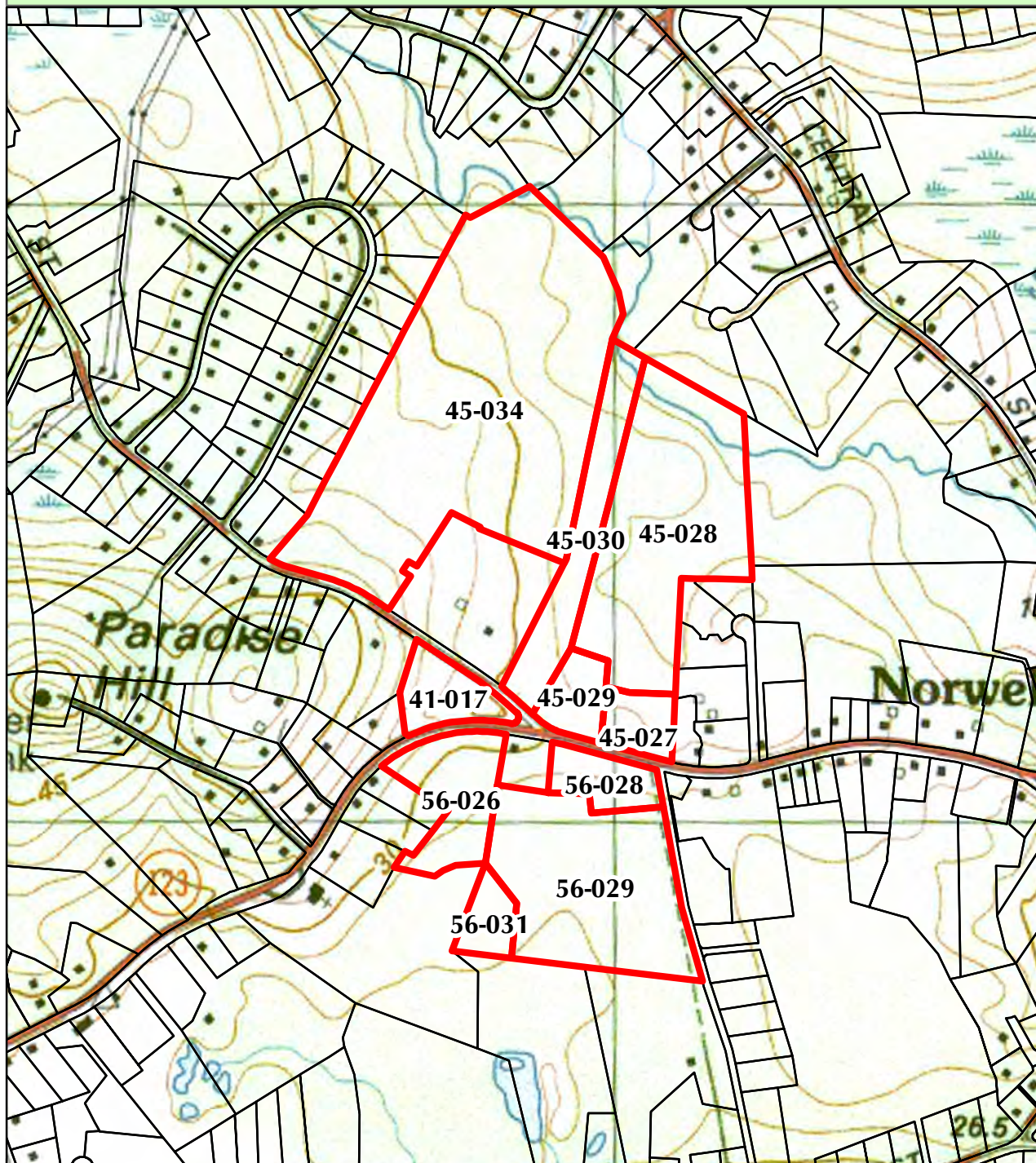
Sources:

MassGIS / USGS 0.3m 2013 Orthophoto (coq2013_9.sid)
MassGIS / Norwell Parcels (par219.shp)
USGS 1:25,000 Hydrology (HYDR25K_ARC.shp)
Federal Wetlands (NWI_POLY.shp)

Projection: Massachusetts State Plane NAD 83M

0 170 340 680 1,020 1,360
Feet

**Fig. 7 - Site Locus with Assessors' Parcel Numbers
Dolan-Carleton Parcels, Main St., Norwell**



Legend

- Dolan - Carleton Parcels - Site Locus
- MassGIS / Norwell Tax Parcels - Town 219



Scale: 1:10,000



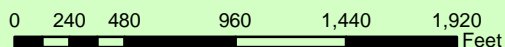
Ivas Environmental
315 Winter St., Norwell MA 02061
781.659.1690, spivas@comcast.net

C:\2017\Wetlands\Norwell\Main St - Dolan/Carleton \Fig. 7 - 15Jan17.mxd

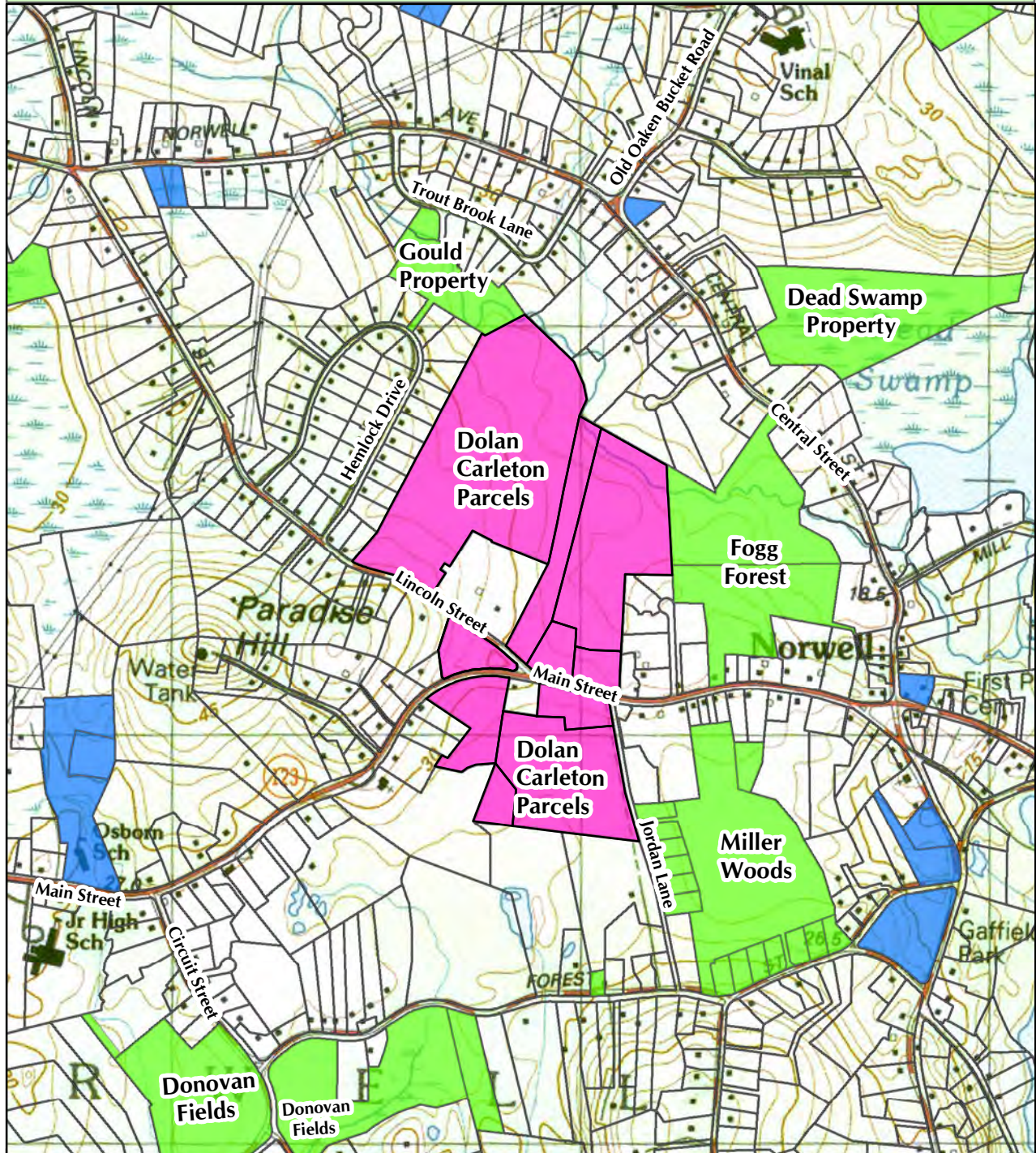
Sources:

USGS Seamless Topographic Quadrangles (usgs.sid)
MassGIS / Norwell Parcels (par219.shp)

Projection: Massachusetts State Plane NAD 83M



**Fig. 8 - Relationship With Town-Owned Parcels
Dolan-Carleton Parcels, Main St., Norwell**



Legend

- Dolan-Carleton Parcels - North of Main Street
- Dolan-Carleton Parcels South of Main Street
- Norwell Conservation Commission Parcels
- Other Norwell Town-owned Parcels
- Town of Norwell Assessors' Parcels
- MassGIS / Norwell Tax Parcels - Town 219



Scale: 1:10,000



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315 Winter St., Norwell MA 02061
781.659.1690, spivas@comcast.net

C:\2017\Wetlands\Norwell\Main St - Dolan/Carleton \Fig. 8 - 15Jan17.mxd

Sources:

USGS Seamless Topographic Quadrangles (usgs.sid)
MassGIS / Norwell Parcels (par219.shp)

Projection: Massachusetts State Plane NAD 83M

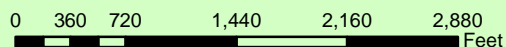
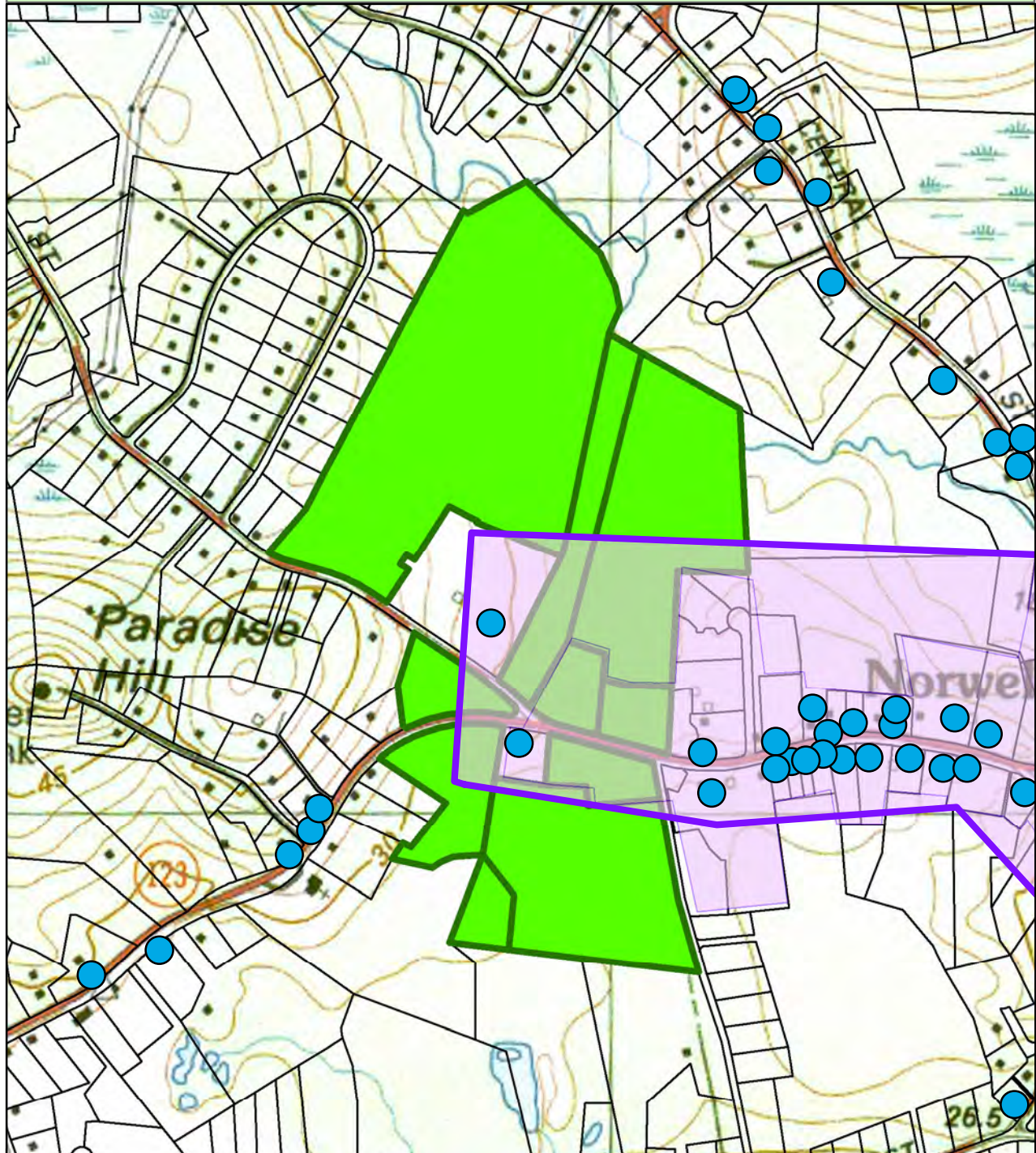







Fig. 9 - Norwell Village Historic District and Dolan-Carleton Parcels, Main St., Norwell



Legend

-  Norwell Village Historic District Outline
-  Norwell Village Historic District
-  Dolan - Carleton Parcels - Site Locus
-  MassGIS / Norwell Tax Parcels - Town 219
-  MHC Historic Points



Scale: 1:10,000



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781.659.1690, spivas@comcast.net

C:\2017\Wetlands\Norwell\Main St - Dolan/Carleton \Fig. 9 - 16Jan17.mxd

Sources:

USGS Seamless Topographic Quadrangles (usgs.sid)
MassGIS / Norwell Parcels (par219.shp)
MHC - Norwell Historic District (in_area.shp)
MHC - Norwell Historic Points (in_pts.shp)

Projection: Massachusetts State Plane NAD 83M

0 240 480 960 1,440 1,920 Feet