MILONE & MACBROOM

January 22, 2020

Mr. Alex Vigliotti
Vigliotti Construction Co.
140 North Branford Road
Branford, CT 06405

RE: Wetland and Watercourse Delineation
343 Clintonville Road
North Haven, Connecticut
MMI #2709-13

Dear Mr. Vigliotti:

As requested, Milone & MacBroom, Inc. (MMI) visited the property at 343 Clintonville Road in North Haven, Connecticut, to identify the boundaries of inland wetlands and watercourses. This letter includes the methods and results of the investigation, which was completed on May 24, 2019. In summary, wetland and watercourse systems on the property are comprised of Waterman's Brook, a perennial stream that drains to the Quinnipiac River, and abutting wetlands, which include 2.15 acres of red maple forested wetlands and a 0.20-acre farm pond. One small (0.0044-acre) vernal pool was identified north of Waterman's Brook within the interior of the red maple forested wetland.

Regulatory Definitions

The Inland Wetlands and Watercourses Act (Connecticut General Statutes §22a-38) defines inland wetlands as "land, including submerged land...which consists of any soil types designated as poorly drained, very poorly drained, alluvial, and floodplain." Watercourses are defined in the act as "rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs and all other bodies of water, natural or artificial, vernal or intermittent, public or private, which are contained within, flow through or border upon the state or any portion thereof." The act defines intermittent watercourses as having a defined permanent channel and bank and the occurrence of two or more of the following characteristics: A) evidence of scour or deposits of recent alluvium or detritus, B) the presence of standing or flowing water for a duration longer than a particular storm incident, and C) the presence of hydrophytic vegetation.

The Tidal Wetlands Act (Connecticut General Statutes §22a-28) defines wetlands as "those areas which border on or lie beneath tidal waters, such as, but not limited to banks, bogs, salt marsh, swamps, meadows, flats, or other low lands subject to tidal action, including those areas now or formerly connected to tidal waters and whose surface is at or below an elevation of 1 foot above local extreme high water; and upon which may grow or be capable of growing hydrophytic vegetation as identified in the Statutes."

Upland Review Area, per the Town of North Haven Inland Wetlands and Watercourses Regulations, means any area within 50 feet of the boundary of any wetland or watercourse. Additionally, any activity that occurs in uplands outside of this area that is likely to impact or affect inland wetlands or watercourses may be reviewed by the Inland Wetlands Commission.

Methodology

A second-order soil survey in accordance with the principles and practices noted in the United States Department of Agriculture (USDA) publication *Soil Survey Manual* (1993) was completed on the 13.32-acre property. The classification system of the National Cooperative Soil Survey was used in this investigation. Soil map units identified at the project site generally correspond to those included in the *Soil Survey of the State of Connecticut* (USDA, 2005).

Wetland determinations were completed based on the presence of poorly drained, very poorly drained, alluvial, or floodplain soils and submerged land (e.g., a pond). Soil types were identified by observation of soil morphology (soil texture, color, structure, etc.). To observe the morphology of the property's soils, test pits and/or borings (maximum depth of 2 feet) were completed at the site.

Intermittent watercourse determinations were made based on the presence of a defined permanent channel and bank and the occurrence of two or more of the following characteristics: A) evidence of scour or deposits of recent alluvium or detritus, B) the presence of standing or flowing water for a duration longer than a particular storm incident, and C) the presence of hydrophytic vegetation.

Wetland boundaries were delineated by MMI registered soil scientist Peter Shea and Alyse Oziolor, MS, Wetland Professional in Training (WPIT), on May 24, 2019. Wetland boundaries were demarcated (flagged) with pink surveyor's tape (hung from vegetation) or small flags (on wire stakes) that are generally spaced a maximum of every 50 feet. Complete boundaries are located along the lines that connect these sequentially numbered flags. The wetland boundaries are subject to change until adopted by local, state, or federal regulatory agencies. Wetland boundaries are depicted by flag series wa2-wa25, wa200-wa203, and w101-w130. The ordinary high water mark of Waterman's Brook is depicted by flag series OHW2-OHW17. MMI employed direct observation techniques as well as dip nets to evaluate vernal pool species presence/absence within all suitable wetland environments, i.e., surface water absent perennial flow. On May 24, 2019, the weather was overcast and 65° Fahrenheit. The upland soil was dry, and wetland soil was moist to saturated.

Site Description and Existing Soils

The 13.32-acre subject property is located at 343 Clintonville Road in North Haven, Connecticut (Figure 1). Accessed to the north from Clintonville Road, the property consists of a fallow farm and contains old fields and various supportive infrastructure. The site is located within a moderately settled, largely residential community within the central portion of the town of North Haven.

The subject property is comprised of two ecological communities, and Waterman's Brook bisects the site to create these two areas. Early successional forest is located in the northern portion of the property, and fallow agricultural field and support infrastructure exist within the southern portion. A garden center is located in the southwest of a previous agricultural field. Piles of debris, both vegetative and earthen, exist throughout the property and attest to past farming use. The successional area is dominated by thickets of multiflora rose (*Rosa multiflora*) and small stands of Japanese knotweed (*Polygonum cuspidatum*) punctuated by red maple (*Acer rubrum*), white pine (*Pinus strobus*), and red oak (*Quercus rubra*) saplings. Groundcover is variable and generally comprised of patches of garlic mustard (*Alliaria petiolata*) and pachysandra (*Pachysandra terminalis*).

Moderate topography on the site slopes toward Waterman's Brook, which bisects the center of the property, flowing west to the Quinnipiac River. The local watershed to the Quinnipiac River is approximately 1.40 square miles, and the subject property is centrally located within this watershed. Waterman's Brook is a low-energy perennial watercourse with a shallow, approximately 2-feet-deep channel and an unconsolidated silt bottom. Banks are approximately 1 foot in height, gently sloping, and densely vegetated. The channel has very little sinuosity on the property.

Waterman's Brook is surrounded by 2.15 acres of red maple forested wetlands extending to the north and south (Figure 2). These wetlands receive hydrology from groundwater, runoff from adjacent uplands, and overbank flooding from Waterman's Brook. The wetlands are dominated by a red maple canopy and an understory of speckled alder (*Alnus incana*) and spice bush (*Lindera benzoin*) with a groundcover of skunk cabbage (*Symplocarpus foetidus*), cinnamon fern (*Osmundastrum cinnamomeum*), and jewel weed (*Impatiens capensis*).

One 0.20-acre man-made pond is located within the wetland boundary south of Waterman's Brook. Though no plant growth was observed within the pond, the banks were well vegetated, and no signs of erosion were noted. The northern edge is dominated by a canopy of red maple trees and understory of spice bush, and white pine trees and oak saplings abut the pond to the south.

One small (0.0044-acre) vernal pool was identified within the delineated wetland boundary in the northwest portion of the wetland system. Wood frog (*Lithobates sylvaticus*) tadpoles, an obligate vernal pool species, were found within this pool during the site survey performed by MMI on May 24, 2019. The pool appeared to have sufficient hydrology for complete development of these tadpoles to metamorphs prior to seasonal drying. No other wetland areas on site contained sufficient hydrology to support vernal pool species breeding and development.

Three soil map units were identified on the property (two upland and one wetland; Figure 3). Each map unit represents a specific area on the landscape and consists of one or more soils for which the unit is named. Other soils (inclusions that are generally too small to be delineated separately) may account for 10 to 15 percent of each map unit. The mapped units are by name, symbol, and typical characteristics (parent material, drainage class, high water table, depth to bedrock, and slope) (Table 1). These characteristics are generally the primary characteristics to be considered in land use planning and management. A description of each characteristic and its land use implications follows the table. A complete description of each soil map unit can be found in the *Soil Survey of the State of Connecticut* (USDA, 2005) and at *http://soils.usda.gov/technical/classification/osd/index*.

TABLE 1
Soil Unit Properties

Map Unit		Parent Material	Slope (%)	Drainage Class	High Water Table			Depth To Bedrock (inches)
Sym	Name				Depth (feet)	Kind	Months	
Upland Soil								
37C	Manchester gravelly sandy loam, 3 to 15 percent	Sandy and gravelly glaciofluvial deposits	3-15	Excessively drained	-	-	-	>60
308	Udorthents, smoothed	Fill material/drift	0-35	Moderately well drained	4.5-6.0	Apparent	January-April; November-December	>60
Wetland Soil								
12	Raypol silt loam	Coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits	0-3	Poorly drained	-	-	-	>60

Parent material is the unconsolidated organic and mineral material in which soil forms. Soil inherits characteristics, such as mineralogy and texture, from its parent material. Glacial till is unsorted while nonstratified glacial drift, consisting of clay, silt, sand, and boulders, is transported and deposited by glacial ice. Glacial outwash consists of gravel, sand, and silt, which are commonly stratified, deposited by glacial meltwater. Alluvium is material such as sand, silt, or clay, deposited on land by streams. Organic deposits consist of decomposed plant and animal parts.

A soil's texture affects the ease of digging, filling, and compacting and the permeability of a soil. Generally, sand and gravel soils, such as outwash soils, have higher permeability rates than most glacial till soils. Soil permeability affects the cost to design and construct subsurface sanitary disposal facilities and, if too slow or too fast, may preclude its use. Outwash soils are generally excellent sources of natural aggregates (sand and gravel) suitable for commercial use such as construction subbase material. Organic layers in soils can cause movement of structural footings. Compacted glacial till layers make excavating more difficult and may preclude the use of subsurface sanitary disposal systems or increase their design and construction costs if fill material is required.

Generally, soils with steeper slopes increase construction costs, increase the potential for erosion and sedimentation impacts, and reduce the feasibility of locating subsurface sanitary disposal facilities. Drainage class refers to the frequency and duration of periods of soil saturation or partial saturation during soil formation. There are seven natural drainage classes. They range from excessively drained, where water is removed from the soil very rapidly, to very poorly drained, where water is removed so slowly that free water remains at or near the soil surface during most of the growing season. Soil drainage affects the type and growth of plants found in an area. When landscaping or gardening, drainage class information can be used to assure that proposed plants are adapted to existing drainage

conditions or that necessary alterations to drainage conditions (irrigation or drainage systems) are provided to assure plant survival.

High water table is the highest level of a saturated zone in the soil in most years. The water table can affect the timing of excavations; the ease of excavating, constructing, and grading; and the supporting capacity of the soil. Shallow water tables may preclude the use of subsurface sanitary disposal systems or increase design and construction costs if fill material is required.

The depth to bedrock refers to the depth to fixed rock. Bedrock depth affects the ease and cost of construction such as digging, filling, compacting, and planting. Shallow depth bedrock may preclude the use of subsurface sanitary disposal systems or increase design and construction costs if fill material is required.

Wetland Functional Assessment

A cumulative functional evaluation of the on-site wetlands based on MMI field observations is summarized below (Table 2). The first column lists the functions and values generally ascribed to wetlands while the second column summarizes the rationale used to determine whether these functions and values are being performed within the subject wetlands and watercourses.

TABLE 2
Wetland Functions and Values Assessment

	Functions and Values	Comments
	Groundwater Recharge/Discharge	Yes - Groundwater recharge and discharge support the hydrology of the delineated wetlands.
	Flood Flow Alteration (Storage and Desynchronization)	Yes - Though the area is not located in a mapped Federal Emergency Management Agency (FEMA) flood zone, the abutting forested wetlands to Waterman's Brook provide area for overbank flow attenuation.
	Fish and Shellfish Habitat	Yes - Waterman's Brook provides potential finfish habitat.
	Sediment/Toxicant Retention	Yes - Wetlands provide sediment and toxicant retention potential through increased residence time.
	Nutrient Removal/Retention/ Transformation	Yes - The vegetated nature of the wetlands allows for nutrient removal, retention, and transformation.
	Production Export (Nutrient)	Yes - The structural heterogeneity within the wetland allows for trophic-level interactions.
	Sediment/Shoreline/Watercourse Bank Stabilization	Yes - The vegetated banks of Waterman's Brook provide contribution to this function.
	Wildlife Habitat	Yes - Waterman's Brook and the surrounding wetlands provide suitable habitat for a variety of wildlife. The vernal pool supports development of obligate vernal pool species, as observed on site.
	Recreation (Consumptive and Non-Consumptive)	No - The delineated wetlands do not demonstrate recreation values.
	Educational Scientific Value	No - The wetlands do not provide potential for educational value.
	Uniqueness/Heritage	No - The wetlands do not display uniqueness or heritage.
	Visual Quality/Aesthetics	No - The wetlands do not provide significant visual quality.
ES	Endangered Species	Yes - Per Connecticut Natural Diversity Data Base mapping, the wetland is located within a mapped area for state listed flora/fauna. An eastern box turtle adult and nest were observed during a site visit on June 21, 2019.

The principal functions of the delineated wetlands are the following:

- Groundwater discharge/recharge
- Flood flow alteration
- Sediment/toxicant retention
- Nutrient removal/retention/transformation
- Production export
- Bank stabilization
- Wildlife habitat

Conclusions

On May 24, 2019, MMI delineated inland wetland and watercourse boundaries in the 13.32-acre property at 343 Clintonville Road in North Haven, Connecticut. The property consists primarily of fallow agricultural land and disturbed/early successional land. Waterman's Brook flows southwest through the center of the property and is surrounded by a broad red maple forested wetland corridor. One 0.20-acre man-made pond exists south of, and continuous with, the wetland corridor. MMI additionally identified one small (0.0044-acre) vernal pool within the forested wetlands north of Waterman's Brook.

Thank you for the opportunity to assist you. If you should have any questions or comments, please do not hesitate to contact me.

Very truly yours,

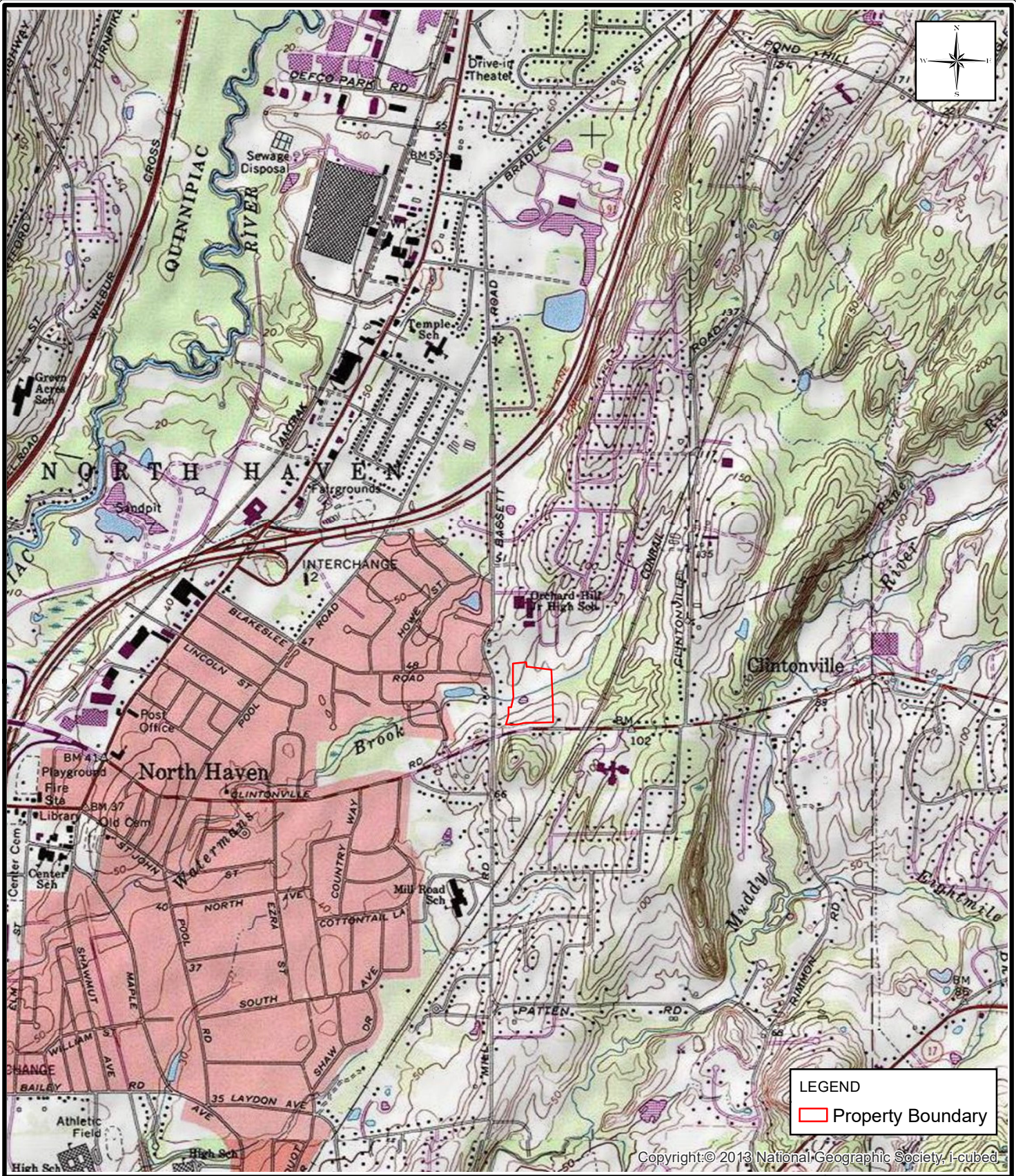
MILONE & MACBROOM, INC.

Megan B. Raymond, MS, PWS
Senior Project Manager, Environmental Science

Enclosures

2709-13-03-j2120-ltr

MXD: Y:\2709-13\GIS\Maps\2709_13_vicinity.mxd



MILONE & MACBROOM
195 Church Street
New Haven, Connecticut 06510
(203) 344-7887
www.mminc.com

SITE LOCATION

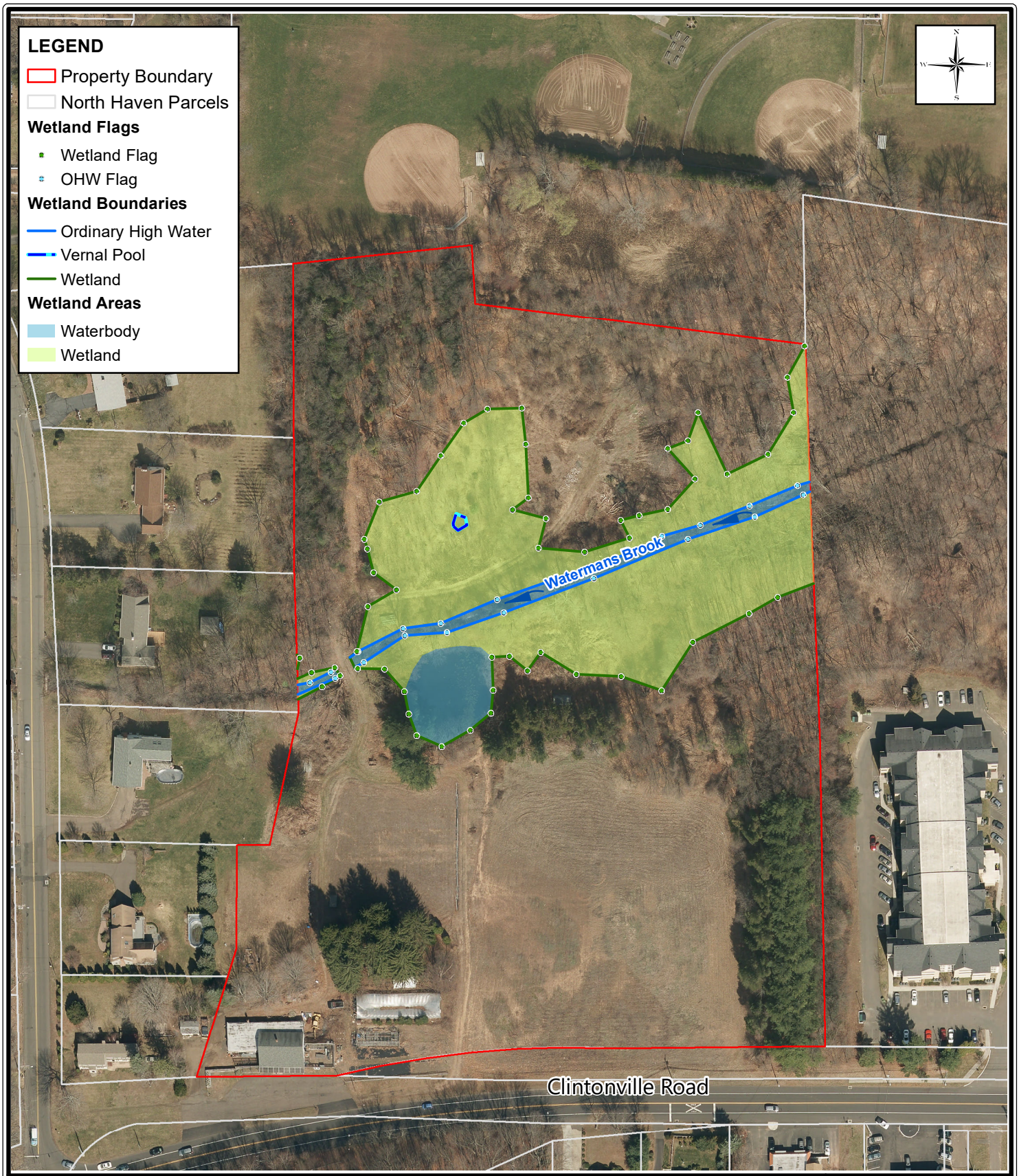
CLINTONVILLE ROAD PARCEL

343 CLINTONVILLE ROAD
NORTH HAVEN, CONNECTICUT

SOURCE: 2013 NATIONAL GEOGRAPHIC SOCIETY

DATE: 26 JULY 2019		
SCALE: 1 " = 2,000 '		
PROJ. NO.: 2709-13		
DESIGNED AYO	DRAWN AYO	CHECKED MBR
DRAWING NAME: FIG. 1		

MXD: Y:\2709-13\GIS\Maps\wetland_map_.mxd



MILONE & MACBROOM
195 Church Street
New Haven, Connecticut 06510
(203) 344-7887
www.mminc.com

WETLAND DELINEATION

CLINTONVILLE ROAD PARCEL

343 CLINTONVILLE ROAD
NORTH HAVEN, CONNECTICUT

SOURCE: 2016 AERIAL PHOTO, CTDEEP, 2006

DATE: 26 JULY 2019		
SCALE: 1 " = 150 '		
PROJ. NO.: 2709-13		
DESIGNED AYO	DRAWN AYO	CHECKED MBR

DRAWING NAME:

FIG. 2

MXD: Y:\2709-13\GIS\Maps\2709_13_soils.mxd

MILONE & MACBROOM
195 Church Street
New Haven, Connecticut 06510
(203) 344-7887
www.mminc.com

NRCS SOILS

CLINTONVILLE ROAD PARCEL

343 CLINTONVILLE ROAD
NORTH HAVEN, CONNECTICUT

SOURCE: 2016 AERIAL PHOTO, CTDEEP, 2006

DATE: 26 JULY 2019		
SCALE: 1 " = 150 '		
PROJ. NO.: 2709-13		
DESIGNED AYO	DRAWN AYO	CHECKED MBR
DRAWING NAME: FIG. 3		