Wetland Delineation and Impact Assessment Lyme Street Campus Multi-Purpose Athletic Field

69 Lyme Street
Old Lyme, Connecticut
March 17, 2020

Prepared for:
Regional 18
Lyme-Old Lyme Public Schools
49 Lyme Street
Old Lyme, Connecticut 06371

MMI #2999-03-15

Prepared by:
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ENGINEERING | PLANNING | LANDSCAPE ARCHITECTURE | ENVIRONMENTAL SCIENCE

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1.0 INTRODUCTION

On behalf of Regional 18 School District, Milone & MacBroom, Inc. (MMI) has evaluated existing site conditions and prepared design drawings to renovate an existing 3-acre manicured lawn field in the eastern portion of the Lyme/Old Lyme High School Campus. Proposed improvements to the multi-purpose athletic field include the reconfiguration of playing surface geometry and the conversion from manicured lawn to synthetic turf. Stormwater management is also proposed and will include subsurface infiltration and conveyance. The proposed subsurface system will tie into an existing detention basin located immediately south of the field.

Portions of the proposed activities take place within the 100-foot upland review area to inland wetlands. MMI delineated inland wetlands adjacent to the field in July 2018 and March 2020. Wetland resource areas are located east and north of the field and consist of the Duck River riparian corridor, which is a mixed class wetland system comprised of an open water pond and palustrine forested red maple wetland. Approximately 0.75 acres of the proposed field improvements are located within the upland review area. Proposed activities are depicted on the site plans prepared by MMI entitled *Synthetic Turf Field - Lyme- Old Lyme High School*, dated March 2020.

As presented in the following report, the proposed activities do not demonstrate the potential to adversely impact inland wetlands or affect their capacity to perform wetland functions. The work will take place within an existing field area, with no loss of perimeter woodland. No direct wetland impacts are proposed, and indirect wetland impacts have been managed in the short and long term. Sedimentation and erosion controls will provide wetland protection in the short term, while stormwater management is designed to minimize long-term impacts to adjacent inland wetland systems.

2.0 GENERAL SITE DESCRIPTION

The subject area consists of the eastern portion of the Lyme/Old Lyme High School campus located at 68 Lyme Street (Figure 1). The school lies in a lightly settled mixed-use area within the town center of Old Lyme with the town library, government buildings, small businesses, and single-family residences in close proximity. The high school campus consists of buildings, asphalt parking and access drives, and athletic playing fields and courts. Lyme/Old Lyme Middle School is located immediately south of the high school. Upland soils on the property are derived from fill material, glaciofluvial deposits, glacial till, and eolian sands. Wetland soils are derived from organic material. Topographically flat, the campus extends east to the Duck River riparian corridor.

The Duck River drains a small watershed, 0.84 square miles, within western Old Lyme and confluences with the Connecticut River approximately 1.5 miles from the site. Federal Emergency Management Act (FEMA) 100-year and 500-year floodplains are mapped on this watercourse, with the 100-year floodplain extending to elevation 9.0 North American Vertical Datum (NAVD). On the subject parcel, wetlands systems are comprised of inland wetlands, though just downstream of the high school, wetland hydrology is driven by the semi-diurnal tide cycle of the

Duck River. State coastal jurisdiction in Old Lyme extends from the coastal jurisdiction line, which is elevation 2.9 feet NAVD, seaward.

Megan B. Raymond, a registered soil scientist and professional wetland scientist (PWS) with MMI, delineated inland wetlands and watercourses within the 12.5-acre study area centric to the proposed field improvements in July 2018 and March 2020 (Figure 2).

3.0 WETLAND DELINEATION

Within the study area, inland wetlands consist of a palustrine forested broad-leaved deciduous wetland and an open pond associated with the Duck River located east of the field, and a short length of an open ditch that conveys stormwater generated from campus impervious to the north. No vernal pools or potential vernal pools were identified in the wetland investigation area.

The palustrine forested wetland is dominated by a red maple canopy with a moderate shrub layer consisting of highbush blueberry, spice bush, and winterberry. Scattered American holly shrubs are also present. Snarls of greenbrier are also common. Groundcover is typified by patches of cinnamon fern. The forest floor within the wetland is dry and does not display evidence of routine or seasonal saturation or inundation. Wetland hydrology is supported by groundwater discharge and direct precipitation. Narrow walking trails are located within and adjacent to the wetland within the southern portion of the investigation area, between the detention basin and the baseball field.

An impoundment on the Duck River has created a large open water pond in the northern portion of the wetland investigation area. A dense variety of hydrophytic shrubs and herbs exist along the shoreline of the pond, generally dominated by native sedges and rushes, a variety of willows, and speckled alder. Beaver activity was noted in this area. An open ditch conveys stormwater from the campus to the pond. The ditch displays earthen banks and lies at a low gradient. Banks are vegetated by native shrubs and non-native multiflora rose.

A detention basin is located to the south of the wetland investigation area. The detention basin renovates stormwater generated by a portion of the high school campus and drains to the forested wetland via a 24-inch corrugated plastic pipe. The basin is a wet detention basin and displays standing water and hydrophytic vegetation in areas, though is not protected as a wetland resource due to its provenance and function.

3.1 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 Old Lyme Inland Wetlands and Watercourses Regulations, includes any area within 100 feet of the boundary of any wetland or within 400 feet of the boundary of any vernal pool.

3.2 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 within the wetland investigation area in July 2018. 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 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. The wetland boundary is represented by wetland flags 1a through 50a and 1b to 6b.

3.3 Soil Mapping

Six soil map units were identified in the wetland investigation area (one wetland and five upland; 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 3-1). 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 3-1
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								
38C	Hinckley loamy sand	Glaciofluvial deposits	3-15	Excessively drained	-	-	-	>80
46B	Woodbridge fine sandy loam, very stony	Lodgment till	0-8	Moderately well drained	1.5-2.2	Perched	January-May; November-December	20-43
73E	Charlton-Chatfield complex, very rocky	Melt-out till	15-45	Well drained	-	-	-	>80
74C	Narragansett-Hollis complex, very rocky	Eolian deposits over melt-out till	3-15	Well drained	-	-	-	>80
703B	Haven silt loam	Eolian deposits over glaciofluvial deposits	3-8	Well drained	-	-	-	18-36
Wetland Soil								
18	Catden and Freetown soils	Highly decomposed organic material	0-2	Very poorly drained	0-0.5	Apparent	January-December	>60

3.4 Wetland Functional Assessment

A functional evaluation of on-site wetlands based on MMI field observations is summarized (Table 3-2). 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 wetland and/or watercourse. The identified wetlands contribute to the majority of known wetland functions.

TABLE 3-2
Wetland Functions and Values Assessment – Duck River Riparian Corridor

	Functions and Values	Comments
	Groundwater Recharge/Discharge	Yes – The wetland areas are supported by groundwater discharge and provide some recharge.
	Flood Flow Alteration (Storage and Desynchronization)	Yes – The floodplain allows for storage and attenuation of flood flows. Mapped 100-year and 500-year FEMA floodplains are associated with the Duck River.
	Fish and Shellfish Habitat	Yes – The perennial hydrology of the Duck River may support fish habitat.
	Sediment/Toxicant Retention	Yes – Vegetated floodplain wetlands provide mechanisms for sediment and toxicant retention.
	Nutrient Removal/Retention/ Transformation	Yes – Vegetated wetlands contribute to this function.
	Production Export (Nutrient)	Yes – Structural complexity and vegetative diversity allows for trophic level interaction within the wetland and watershed.
	Sediment/Shoreline/Watercourse Bank Stabilization	Yes – The landscape position and morphology of these wetlands contribute to bank stability.
	Wildlife Habitat	Yes – Structural complexity and native vegetative diversity across strata provide opportunities for wildlife habitat utilization.
	Recreation (Consumptive and Non-Consumptive)	No – These wetlands do not provide recreational opportunities.
	Educational Scientific Value	Yes – Given the location on a school site, these wetlands may provide educational opportunities.
	Uniqueness/Heritage	No – This area does not present unique attributes.
	Visual Quality/Aesthetics	No – The wetlands do not contain inherent visual quality or aesthetic value.
ES	Endangered Species	Yes – This area is mapped as Natural Diversity Data Base (NDDB) area as outlined by the Connecticut Department of Energy & Environmental Protection (CT DEEP) NDDB map dated December 2019, though no state listed flora or fauna was observed during the wetland delineation.

The principal functions of the wetlands include the following:

- Groundwater Recharge/Discharge
- Flood Flow Alteration
- Fish and Shellfish Habitat
- Sediment/Toxicant Retention
- Nutrient Removal/Transformation
- Production Export
- Bank Stabilization
- Wildlife Habitat
- Educational Scientific Value

4.0 PROPOSED PROJECT

The Lyme Street Campus Multi-Purpose Athletic Field project involves improvements to an existing manicured lawn field through the modification of field geometry and the conversion of grass to synthetic turf. The proposed athletic field will include multi-purpose athletic fields, a baseball practice field, and a softball practice field. The proposed playing surface will consist of 143,000 square feet of synthetic turf infill atop a permeable stone base and under drain system. Installation of appurtenant structures, including ball safety netting, electrical utilities, and tie in to existing access ways are also proposed. The field will be graded through cut and fill to attain a surface elevation of approximately 14 to 16 feet NAVD. The field grading has been designed to maintain adequate cover over a geothermal well field located in the central portion of the playing area. The project will result in a net fill of material on the field, approximately 1,770 cubic yards. Proposed activities will maintain the existing field footprint and will not encroach closer to adjacent inland wetlands, which are located a minimum of 75 feet from the field boundary. Approximately 0.75 acres of the proposed work is located within the upland review area to the on-site wetlands.

Connecticut regulates activities in and adjacent to wetlands and watercourses due to the potential for land development to result in short- and long-term direct and indirect impacts to wetlands and watercourses. This project has been designed to avoid direct and indirect impacts to wetlands and watercourses from a short- and long-term perspective. No direct wetland impacts are proposed. Work within the upland review area has been designed to avoid indirect wetland impacts.

Portions of the proposed project will be conducted within the 100-foot upland review area to on-site wetlands. These activities include site grading and installation of turf playing fields, ball safety netting, bituminous concrete access paths, electrical utilities, and stormwater management infrastructure (drain pipes described in Section 4.2 below). Impervious surfaces (bituminous concrete access paths) proposed within the upland review area total 950 square feet (0.02 acre). No tree clearing within the upland review area is proposed, as existing developed athletic field grounds will be utilized for improvements. Proposed activities are depicted on the site plans prepared by MMI entitled *Synthetic Turf Field - Lyme- Old Lyme High School*, dated March 2020.

4.1 Sediment and Erosion Control Measures

A Sediment and Erosion (S&E) Control Plan has been developed to mitigate any potential short-term impacts of development during construction. The S&E Control Plan includes descriptive specifications concerning land grading, topsoiling, temporary and permanent vegetative cover, and erosion checks. Details have been provided for all erosion controls with corresponding labels on the S&E Control Plan. All S&E controls provided are in accordance with the *2002 Connecticut Guidelines for Soil Erosion and Sediment Control*. The site will be accessed via a temporary construction entrance to be located at the proposed access drive on the north side of the site. The construction site will be bordered by sediment filter fence and haybales along the southern and eastern limits of construction, upgradient of wetland areas. One temporary stockpile area surrounded by sediment filter fence will be located on the north side of the site.

4.2 Stormwater Management and Water Quality Protection

The project includes a stormwater management system that has been designed and will be installed and maintained in accordance with town and state standards. The system design and components employ standard engineering practices that are regularly used throughout the town and the northeast to prevent stormwater pollution.

The proposed stormwater management system will direct stormwater to an existing detention pond south of the athletic fields. A series of 12-inch diameter composite flat drains will be installed below the playing field surface that will connect to a 12-inch diameter perforated collector pipe surrounding the athletic field complex. The collector pipe will drain to the existing detention pond via an 18-inch diameter high density polyethylene (HDPE) pipe. A French drain will also be installed at the toe of slope to the west of the field to capture runoff from this hillside.

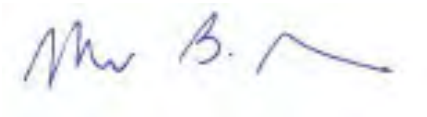
5.0 CONCLUSION

The proposed project includes improvements to an existing multi-use athletic field and conversion to synthetic turf at 69 Lyme Street in Old Lyme, Connecticut. Portions of the proposed activities, 0.75 acres, will take place within the upland review area to on-site wetlands. No direct wetland impacts are proposed. Indirect impacts will be managed by sediment and erosion control measures in the short term and stormwater management in the long term. Due to the implementation of short- and long-term site protections, the proposed project will not impact or affect the physical characteristics of the adjacent inland wetland system associated with the Duck River.

If there are any questions regarding this report or the wetlands and watercourses on this site, I may be reached at (203) 344-7889 or mraymond@mminc.com.

Very truly yours,

MILONE & MACBROOM, INC.



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

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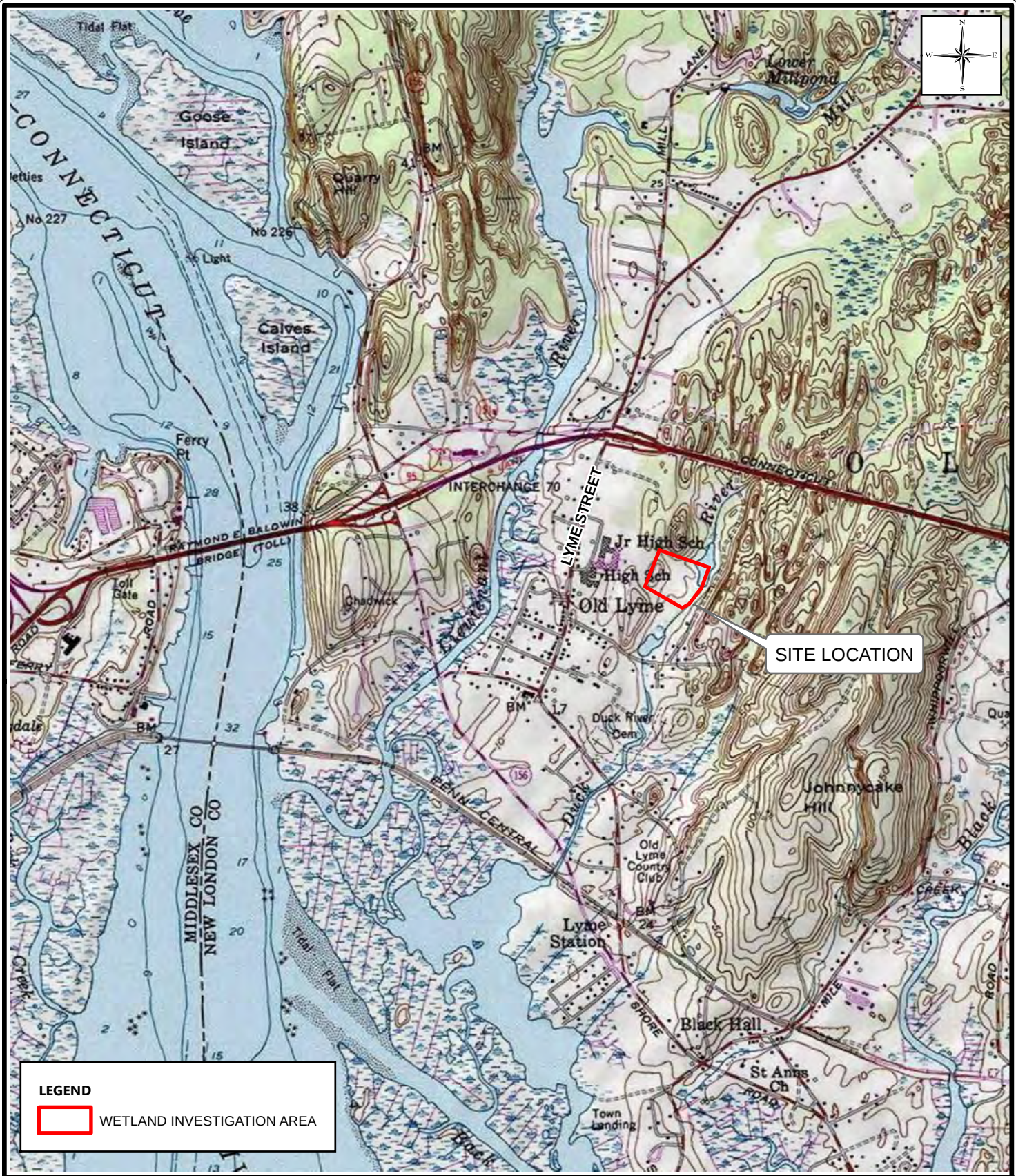
APPENDIX A

NATURAL RESOURCE MAPS

MXD: Y:\2999-03\Maps\OldLymeHS_usgs.mxd



LEGEND

WETLAND INVESTIGATION AREA

MILONE & MACBROOM

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SITE LOCATION

LYME STREET CAMPUS MULTI-PURPOSE ATHLETIC FIELD
REGIONAL 18 LYME-OLD LYME PUBLIC SCHOOLS

69 LYME STREET
OLD LYME, CONNECTICUT

SOURCE: 2013 TOPOGRAPHIC MAP, US GEOLOGIC SURVEY

DATE: 12 MARCH 2020		
SCALE: 1 " = 2,000 '		
PROJ. NO.: 2999-03		
DESIGNED AYO	DRAWN AYO	CHECKED MBR

DRAWING NAME:

FIG. 1

MXD: Y:\2999-03\Maps\Figure 1 - Wetland Delineation.mxd

MILONE & MACBROOM
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WETLAND DELINEATION

LYME STREET CAMPUS MULTI-PURPOSE ATHLETIC FIELD
REGIONAL 18 LYME-OLD LYME PUBLIC SCHOOLS

69 LYME STREET
OLD LYME, CONNECTICUT

SOURCE: 2016, CT DEEP ORTHOIMAGERY

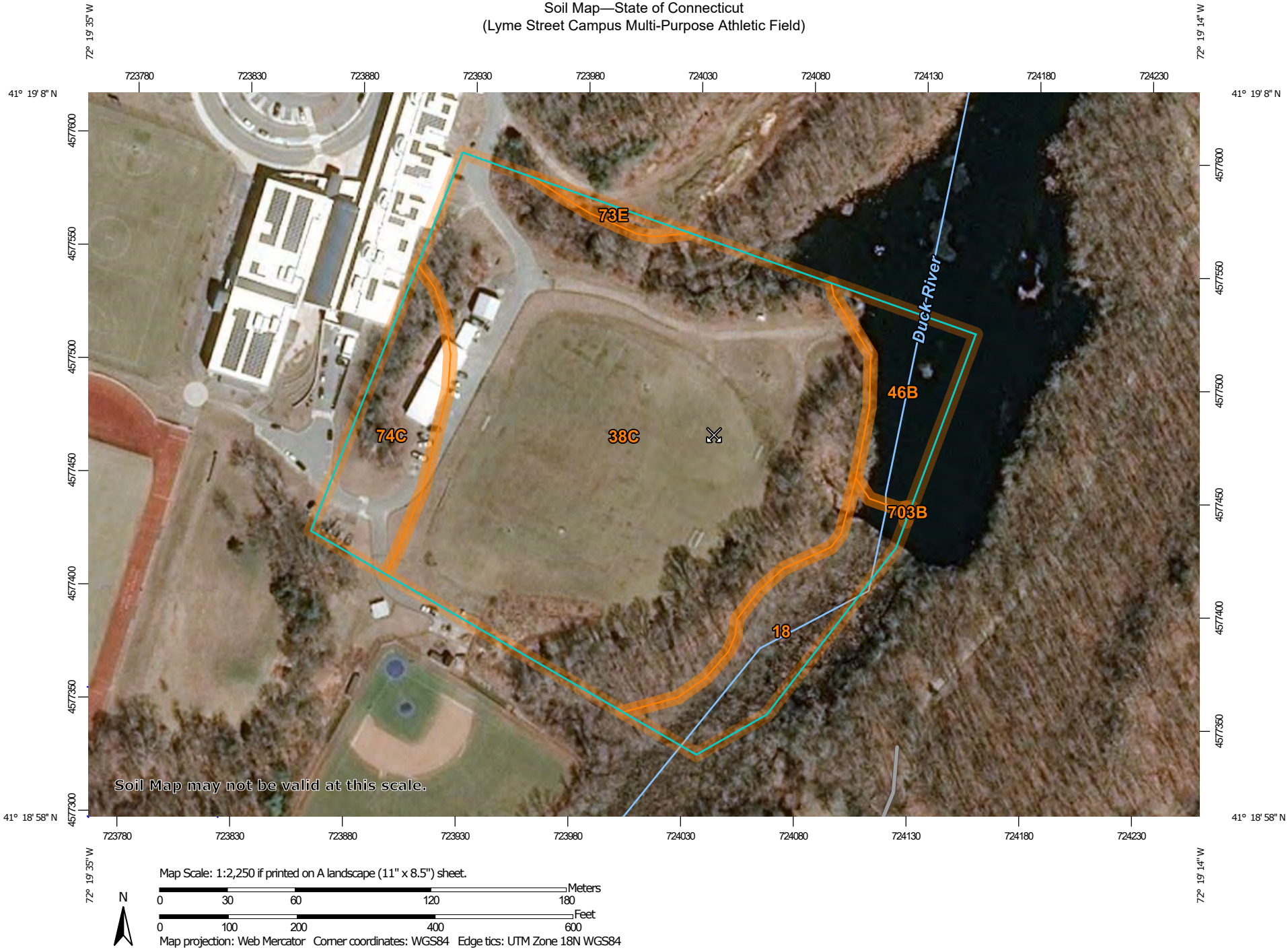
DATE: 13 MARCH 2020
SCALE: 1 " = 300 '
PROJ. NO.: 2999-03

DESIGNED	DRAWN	CHECKED
PAS	AYO	MBR

DRAWING NAME:

FIG. 2

Soil Map—State of Connecticut
(Lyme Street Campus Multi-Purpose Athletic Field)



Map Scale: 1:2,250 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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

Soil Survey Area: State of Connecticut
Survey Area Data: Version 19, Sep 13, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 20, 2019—Mar 27, 2019

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
18	Catden and Freetown soils, 0 to 2 percent slopes	1.1	9.2%
38C	Hinckley loamy sand, 3 to 15 percent slopes	8.6	74.3%
46B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	0.8	6.9%
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	0.1	0.8%
74C	Narragansett-Hollis complex, 3 to 15 percent slopes, very rocky	1.0	8.8%
703B	Haven silt loam, 3 to 8 percent slopes	0.0	0.0%
Totals for Area of Interest		**11.6**	**100.0%**