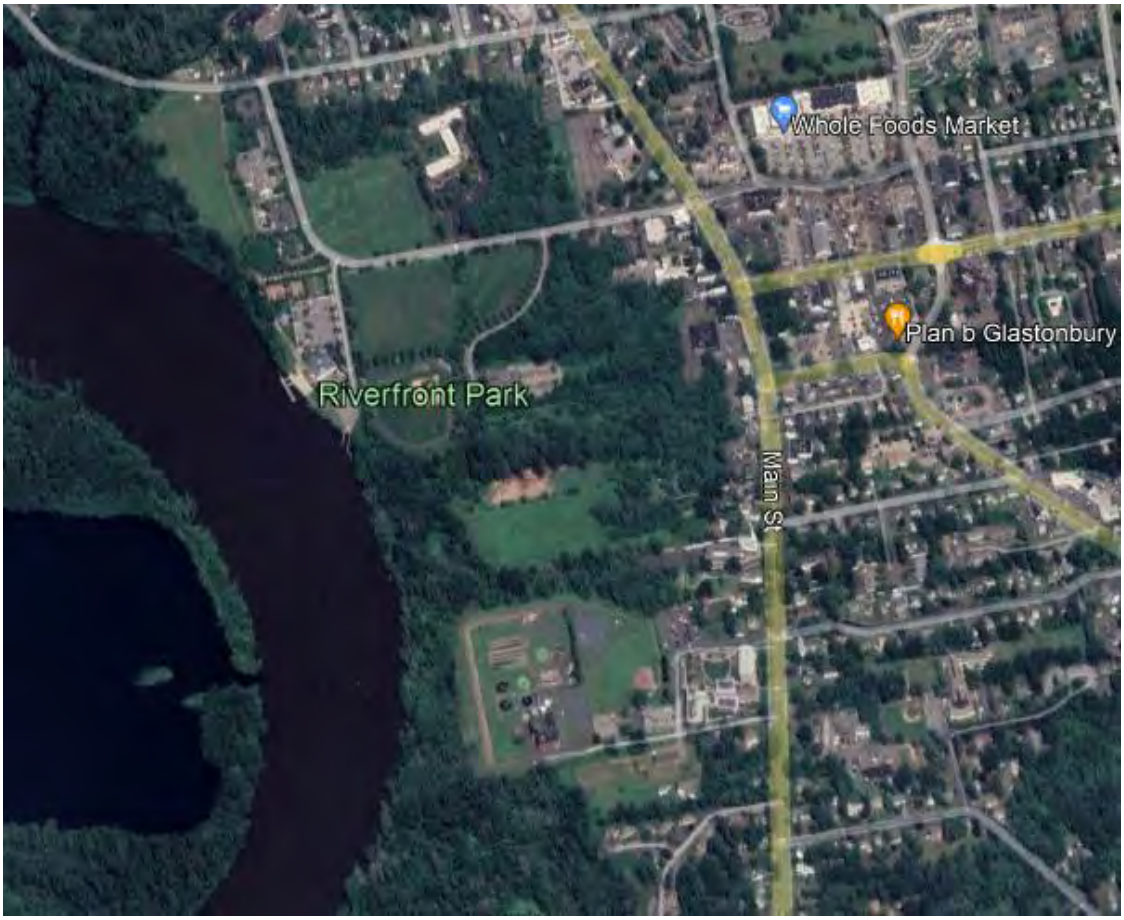
Martin Brogie, Inc.
ENVIRONMENTAL SERVICES

- Environmental Site Investigations
- Building Contaminant Surveys
- Wetlands Consulting
- Remediation Contract Management

Wetland Assessment Report

Proposed Development Project
2283-2289, 2327-2333, 2341-2355, and 2389 Main Street
Glastonbury, Connecticut



Google Earth

SUBMITTED TO:

Will Walter, PE, LEED AP
Senior Project Manager
Alfred Benesch & Company
120 Hebron Avenue, 2nd Floor
Glastonbury, CT 06033

November 8, 2021

28 Arbor Lane
Madison, CT 06443

martinbrogieinc@gmail.com
860-208-0360

1. Introduction

1.1 Purpose

Martin Brogie, Inc. (MBI) is pleased to submit the following wetland report regarding a proposed development along the west side of Main Street in Glastonbury, Connecticut.

The general scope of services was to conduct a wetland delineation for the property, perform a wetland assessment, review proposed project construction plans, assess potential wetland impacts, and to provide wetland mitigation recommendations, as needed.

1.2 Background

Martin Brogie, Inc. (MBI) was engaged to conduct the wetland delineation, assessment and project review by Alfred Benesch & Company of Glastonbury, Connecticut in anticipation of the Town of Glastonbury Inland Wetland Commission review of the proposed project. Martin Brogie, Certified Soil Scientist with MBI conducted the field delineation and assessment aspects of the project.

MBI previously prepared a Wetland Delineation Report dated January 11, 2021 and a supplemental Functions and Values report on September 2, 2021 for 4 of the 5 subject parcels. This report provides a full wetlands report for all 5 properties that are the subject of the pending wetlands application.

2. Site and Vicinity Characteristics

2.1 General Site Description and Location

The subject property consists of 5 commercial properties totaling 10.53 acres of land and located along the west side of Main Street in downtown Glastonbury, Connecticut. The eastern portion of the property contains 5 commercial buildings on 4 parcels and associated paved parking and driveway areas as well as lawn and landscaping. The western portion of the property consists of wooded wetlands and includes a wooded rear parcel totaling 2.45 acres. A wooded, linear Town of Glastonbury-owned property (Rankin Road) borders the 4 Main Street parcels to the west and the 5th parcel is located west of the town-own property. A 25-foot-wide sanitary sewer easement crosses the site wooded wetland area from north to south.

The site is located in downtown Glastonbury with commercial properties located north and south of the site along Main Street. The Town Library and associated parking area borders the site to the north. A walking path leading to a dog park and the Riverfront Park along the Connecticut River borders the site to the south. Wooded land and open areas associated with the park extend westward from the site to the Connecticut River.

A site location map is provided as Figure 1. An aerial view of the property is provided as Figure 2. Photographs of the wetland areas are provided as Attachment A

2.2 Site Soils

The Natural Resource Conservation Service (NRCS) identifies Scarboro Muck as the wetland soil type in the delineated wetland area. The Scarboro series consists of very deep, very poorly drained soils in sandy glaciofluvial deposits on outwash plains, deltas, and terraces. They are nearly level soils in depressions. Slope ranges from 0 through 3 percent. Upland soils found along the west side of the delineated wetlands are mapped as Ninigret Fine Sandy Loam, which is very deep, moderately well drained soils formed in loamy soils over sandy and gravelly glacial outwash. They are nearly level to strongly sloping soils on glaciofluvial landforms, typically in slight depressions and broad drainage ways.

Soils encountered on the site are consistent with these descriptions. NRCS soil mapping and descriptions are provided as Attachment B.

2.3 Site Hydrology

A 48-inch, corrugated metal pipe discharges on to the southeastern portion of the property adjacent to a walking path that borders the property to the south. The watercourse associated with the discharge appears to exhibit perennial flows and bank floods during periods of heavy precipitation.

Two shallow ponds are located on and adjacent to the northwestern portion of the site (see Figure 2). The southern pond is approximately 80 feet in diameter and appears to range in depth from 6 inches to 2 feet and may dry up in summer. The northern pool is approximately 100 by 200 feet in size and ranges from 1 to 3 feet in depth. It may dry up during very dry seasons. These ponds were identified as Vernal Pools by others who explored the area during Spring.

A sanitary sewer easement crosses the central portion of the wetland from north to south. The easement is generally cleared of trees and carries overland flows from the northeastern portion of the site resulting primarily from a 36" storm water outfall located to the rear of 2377 Main Street. Similar to the southerly outfall, some base flow, possibly resulting from groundwater exfiltration, is evident although the discharge could dry up in summer months. MBI observed the pipe outfall in March and January so no dry season data was collected.

The northern portion of the wetland also receives intermittent stormwater discharges from a flared concrete pipe outfall located on the northern property boundary (adjacent to the library parking area). This pipe appears to discharge stormwater generated by the adjacent paved parking area.

A pavement leak-off, located to the rear of 2327-2333 Main Street also delivers stormwater flows into the wetland area.

The northern outfalls ultimately deliver surface flows that follow the sewer easement southward. The leak-off from the paved parking area joins these surface flows from the east where they join and form a channel that turns westward and joins the channel from the southern watercourse near the western property boundary. The confluence flows west and southwest, eventually discharging into the Connecticut River approximately 1500 feet west of the property.

Topography across the site is generally flat and groundwater appears to be relatively shallow. Overall groundwater flow direction is expected to be east to west toward the Connecticut River located generally 1500 feet to the west.

2.4 Site Vegetative Cover Types

Woody vegetation observed within the Wetland area includes Red Maple (*Acer rubra*), Silver Maple (*Acer saccharinum*), Eastern Cottonwood (*Populus deltoides*), and Slippery Elm (*Ulmus rubra*). The shrub layer included Sweet Pepperbush (*Clethra alnifolia*), Silky Dogwood (*Cornus amomum*), Spice Bush (*Lindera benzoin*), Multiflora Rose (*Rosa multiflora*), and Asiatic Bittersweet (*Celastrus orbiculatus Thunb*.). Herbaceous species observed include Japanese Knotweed (*Polygonum cuspidatum*), Sensitive Fern (*Onoclea sensibilis*), Skunk Cabbage (*Symplocarpus foetidus)*, and Evergreen Woodfern (*Dryopteris intermedia**).*** A large, dense stand of Japanese Knotweed occupies the northeastern portion of the wetland and extends along the majority of the wetland boundary where it abuts the paved areas. Abutting upland areas included Black Oak (*Quercus velutina*), Red Oak (*Quercus rubra*), Black Cherry (*Prunus serotina*) and Green Briar *(Smilax rotundifolia L.).*

3. Wetland Delineation

On March 12, 2020 MBI's Soil Scientist Martin Brogie, LEP, Certified Soil Scientist (Society of Soil Scientists of Southern New England), reported to the site to assess the presence of wetlands and watercourses/intermittent watercourses in accordance with the definitions provided in Connecticut General Statutes Section 22a-38 definitions (15) and (16) including: soil types designated as poorly drained, very poorly drained, alluvial, and floodplain by the National Cooperative Soils Survey; and, rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs and all other bodies of water, natural or artificial, vernal or intermittent. In addition, intermittent watercourses defined as having a permanent channel and bank and the occurrence of two or more of the following characteristics: evidence of scour or deposits of recent alluvium or detritus; the presence of standing or flowing water for a duration longer than a storm incident; and/or the presence of hydrophytic vegetation will be delineated.

MBI was charged with delineating the wetland line located to the rear of the developed portion of the site.

MBI accessed the property via the paved parking lot behind 2327-2333 Main Street and commenced the evaluation along the southern property boundary. A 48-inch, corrugated metal pipe discharges on to the southeastern portion of the property adjacent to a walking path that borders the property to the south. The watercourse associated with the discharge appears to exhibit perennial flows and bank floods during periods of heavy precipitation. Evidence of scour and rack lines were noted along the streambed. Subsurface exploration in this area using a hand auger exhibited soil generally consistent with the Scarboro Muck Soil Series. The adjacent non-wetland soil consisted of sandy, gravelly fill material along the edge of the paved parking area. Subsurface exploration west of the paved area, within the wooded wetland, exhibit similar soil as previously described with an apparent increase in organic matter. Wetland soils were generally characterized by 18-24 inches of black, mucky silt loam underlain with grey fine silty sand.

The wetland limits were identified at the boundary between fill materials located along adjacent paved areas and the very poorly-drained Connecticut-regulated wetland soil series. Wetland flags 1-1 through 1-36 were placed along the interpreted wetland limits.

4. Wetland Functions and Values

A qualitative review of the functions and values of the on-site wetlands was performed to assist in determining wetland impacts resulting from the project. Wetland functions consistent with U.S. Army Corps of Engineers methodology were assessed and are summarized below.

Groundwater Recharge/Discharge – This function considers the potential for a wetland to serve as a groundwater recharge and/or discharge area. Recharge should relate to the potential for the wetland to contribute water to an aquifer. Discharge should relate to the potential for the wetland to serve as an area where groundwater can be discharged to the surface. The onsite wetlands system is complex and includes areas of exfiltration along the topographic side slopes and along the brook. Opportunities for infiltration and recharge exists along the stream bottoms.

Floodflow Alteration - (Storage & Desynchronization) - This function considers the effectiveness of the wetland in reducing flood damage by attenuation of floodwaters for prolonged periods following precipitation events. The wetland system is primarily a flow-through system although opportunities for floodwater retention exist in the organic soils and broad floodways associated with the watercourses.

Sedimentation/Shoreline Stabilization – This function relates to the effectiveness of a wetland to stabilize streambanks and shorelines against erosion. Stream banks contain well-established woody vegetation offering soil stabilization on the whole. Some streamside erosion is evident as a result of flood flows and relatively erosive soil properties.

Sediment/Toxicant Retention and Nutrient Removal/Retention/Transformation – Stormwater associated with nearby and adjacent developed commercial areas pass through the site wetlands. Contaminant retention/removal is provided by the relatively long flow paths, the level grade, high organic content soils and the attenuation of flow velocities.

Production Export – This function relates to the effectiveness of the wetland to produce food or usable products for humans or other living organisms. The wetland offers some wildlife food sources including nut-producing trees, amphibians, and insects.

Fish and Shellfish Habitat – This function considers the effectiveness of seasonal or permanent waterbodies associated with the wetland in question for fish and shellfish habitat. This function is not likely present in the wetland due to physical barriers inhibiting fish passage.

Wildlife Habitat - This function considers the effectiveness of the wetland to provide habitat for various types and populations of animals typically associated with wetlands and the wetland edge. Both resident and/or migrating species are considered. The wetland offers some wildlife habitat functions associated with wetland forest cover and interaction with nearby natural resources including the Connecticut River. The presence of Vernal Pools in the northwestern portion of the site add to the functionality of the wetlands system in terms of diversity and food sources in the ecosystem. However, the pools were found to have low productivity and species variety based on a previous study. (Vernal Pool Report in Attachment C).

Endangered Species Habitat – The Connecticut Department of Energy and Environmental Protection (CTDEEP) Natural Diversity Database does not depict any mapped State or Federal Listed Species or Significant Natural Communities on or adjacent to the Property.

Visual Quality/Aesthetics – The wetland offers some visual qualities/aesthetics associated with the perennial stream entering the site although the disturbed eastern edge of the wetlands has resulted in the presence of significant invasives species.

Educational/Scientific Value, Recreation, and Uniqueness Heritage – The onsite wetlands offer little in the way of recreational value, or educational/scientific resources due to the lack of uniqueness, small size and level of disturbance.

Overall, the functions and values of the site wetland area are primarily associated with flood attenuation and water quality/renovation associated with stormwater passing through the site from adjacent developed areas. Given the presence of the Connecticut River just downstream, these functions/values play an important role in maintaining downstream surface water quality. The wetlands also offer some wildlife value given the presence of the Vernal Pools and the interconnectivity with other undeveloped areas all leading to the Connecticut River.

5. Conclusions and Recommendations

The identified wetlands on the subject property are the nexus between the urban/developed downtown area to the east and the forest/park and riparian areas along the Connecticut River to the west. The wetlands located on the property have been significantly disturbed as a result of the installation of a sanitary sewer line and by the placement of fill/improvements on its borders. Untreated stormwater enters the wetlands from 4 locations and significant, aggressive invasive species have taken hold along and within the wetlands. The wetland and its bordering forested uplands consist of a habitat island with some development or man-made improvements found nearby in all directions.

The primary function of the evaluated wetlands is to provide for stormwater renovation and attenuation as it receives untreated stormwater from developed areas, decreases velocities, retains volumes, and renovates water quality prior to discharge offsite to the Connecticut River. Wildlife habitat has also been identified as an important wetland function.

The proposed project under consideration significantly improves stormwater treatment associated with run-off from the site. Currently, stormwater is discharged directly across paved parking areas with no treatment or thermal reduction. Under the proposed design, the water quality treatment requirements of CT DEEP are met and thermal impact are reduced by detaining and infiltrating runoff prior to discharge to the wetlands.

Plans that include the removal of invasive species from the site are currently under development for consideration. The stand of Knotweed along the watercourse represents a source of invasive seed stock that can be mobilized downstream. An aggressive plan for removal of these plants is strongly advised.

In addition, supplemental, native plantings that can enhance wildlife value should be included in the project plans including those that provide food sources, cover, and mitigate light sources from along Main Street development.

Please contact the undersigned at 860-208-0360 is you have any questions or require further information. Thank you for the opportunity to be of service.

Sincerely,

Martin Brogie, LEP
Soil Scientist
President

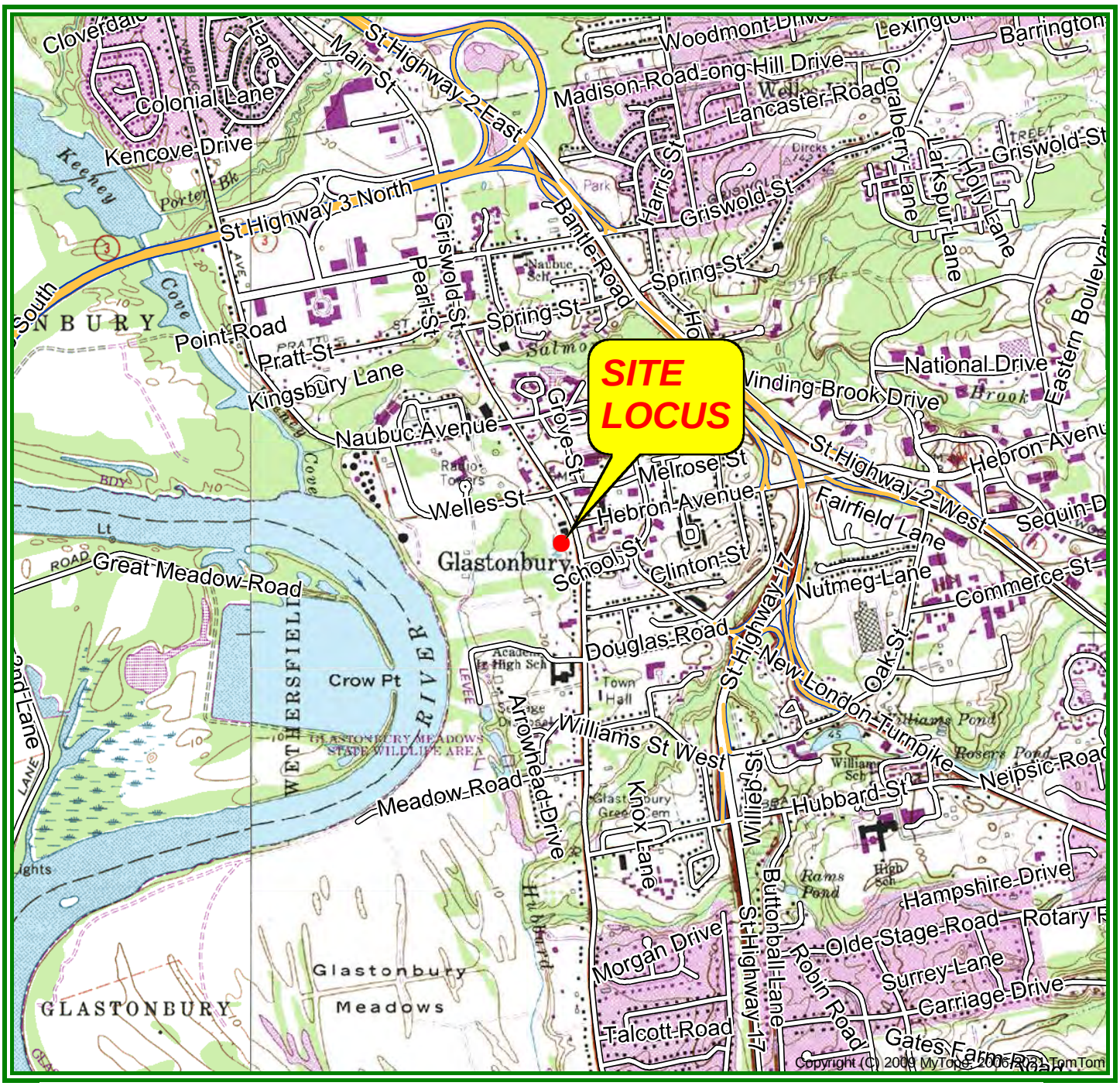
w/attachments

6. References

DeGraaf, Richard M. and Yamasaki, Mariko. 2001. New England Wildlife Habitat, Natural History, and Distribution. University Press of England

Martin, et. al., 1951. American Wildlife and Plants – A Guide to Wildlife Food Habits. Dover Books, General Publishing Co., Ltd., 1951

U.S. Army Corps of Engineers, The Highway Methodology Workbook Supplement, November 1995



GLASTONBURY Topographic 1964 41072-F5-TF-024 National Geodetic Vertical Datum 1929

N
NW NNW NNE NE
WNW ENE
W E
WSW ESE
SW SSW SSE SE
S

SCALE 1:24000

0 1000 2000 3000 4000 5000
FEET

0 1
MILE

Site Coordinates:
041° 42' 41.91" N, 072° 36' 35.14" W

Project:
2333 Main Street

Site Location:
2333 Main Street
Hartford County,
Glastonbury, Connecticut

Martin Brogie, Inc.
ENVIRONMENTAL SERVICES

28 Arbor Lane, Madison, Connecticut 06443
ph: (860) 208-0360
email: martinbrogieinc@gmail.com

Figure 1 - Site Locus Map

– APPROXIMATE PROPERTY BOUNDARY

TP-3 – TEST PIT LOCATION

Martin Brogie, Inc.
ENVIRONMENTAL SERVICES

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email: martinbrogieinc@gmail.com

Figure 2 - Aerial Site Plan

2333 Main Street

Glastonbury, Hartford County, Connecticut

Project:	2333 Main Street
Drawn by:	KMH
Date:	11/7/21
Scale:	NOT TO SCALE

ATTACHMENT A

SITE PHOTOGRAPHS

SOUTHERN PORTION OF SITE LOOKING EAST TOWARD CORRUGATED METAL PIPE OUTFALL (SEE ARROW) AND ASSOCIATED STREAMBED. NOTE FLOOD DEPOSITION IN FRONT OF MAPLE TREE CLUSTER IN LEFT CENTER OF PHOTOGRAPH.

WETLAND AREA SOUTHWEST OF PAVED PARKING AREA WITH EVIDENCE OF FLOOD FLOWS ALONG BROOK

TYPICAL WETLAND AREA CONTAINING BUTTRESSED RED MAPLES. NOTE SITE COMMERCIAL BUILDING IN BACKGROUND..

SURFACE WATER FLOWS FROM NORTHEAST PORTION OF WETLAND FLOWING SOUTHWARD

VIEW LOOKING NORTH ALONG SEWER EASEMENT SHOWING THE CLEARED EASEMENT AREA AND SURFACE FLOWS.

STORMWATER OUTFALL IN NORTHEASTERN PORTION OF WETLAND LOCATED WITHIN KNOTWEED STAND.

KNOTWEED STAND IN NORTHEAST PORTION OF WETLAND. BEHIND 2341-2355 MAIN STREET BUILDING

ATTACHMENT B

NRCS SOIL SURVEY DATA

Soil Map—State of Connecticut
(Glastonbury)

Map Scale: 1:2,300 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 20, Jun 9, 2020

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

Date(s) aerial images were photographed: Jul 15, 2019—Aug 29, 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
12	Raypol silt loam	4.8	18.1%
15	Scarboro muck, 0 to 3 percent slopes	5.2	19.9%
29A	Agawam fine sandy loam, 0 to 3 percent slopes	0.3	1.2%
36B	Windsor loamy sand, 3 to 8 percent slopes	0.6	2.4%
236B	Windsor-Urban land complex, 0 to 8 percent slopes	0.4	1.5%
307	Urban land	5.7	21.6%
701A	Ninigret fine sandy loam, 0 to 3 percent slopes	9.3	35.3%
Totals for Area of Interest		**26.3**	**100.0%**

ATTACHMENT C

VERNAL POOL STUDY

July 21, 2019

Mark Friend, P.E.
Megson, Heagle & Friend
81 Rankin Road
Glastonbury, CT 06033

RE: Vernal pool survey
Proposed Parking Lot Expansion
St. Paul Church

Dear Mark Friend,

I have completed my survey of the wetlands on the above referenced site for the presence of vernal pools. *No vernal pools are present on the site*. The following summarizes my findings:

Vernal pool surveys began in 2018. On May 16 and 30, 2018, intensive dip-netting was conducted throughout the pool to search for larval amphibians. None were observed. However, because my work was initiated later in the annual vernal pool breeding cycle (i.e., beyond the point at which breeding choruses or egg masses could be recorded), we could not say conclusively that the site's wetland did not provide vernal pool function. As a result, we conducted additional surveys in 2019. Specifically, surveys timed to capture the breeding amphibian choruses and egg mass deposition period were conducted. Survey dates and weather coincided with the active vernal pool season as observed at other sites that I was surveying during this same time period. The timing of this 2019 work was such that all aspects of breeding activity would have been observed.

Site visits were conducted on March 25th and 30th and April 17th. In addition to surveying the onsite wetland I also surveyed the wetland south of Welles Road within the riverfront park where two pools are located as shown on attached Figure 1. My observations were as follows:

March 25th and 30th

- Onsite Pool: no breeding choruses or egg masses were found during any site visit.
- Park Pools: chorusing wood frog (*Rana sylvatica*) and spring peeper (*Psuedacris crucifer*) were heard within and adjacent to both pools. A small number (approximately 5-10) of chorusing wood frogs and small number (approx. 5-10) spring peeper were heard

April 4th

- Onsite Pool: no egg masses observed
- Park Pools: only one wood frog egg mass was found in the southern pool

In summary, the 2019 survey work confirmed what was predicted in 2018, that no vernal pools are present on the site. I want to state unequivocally that the level of effort expended to survey the onsite wetland was comprehensive. I state this to assure the commission that no additional work is necessary to assess the onsite wetland for vernal pools.

With respect to the productivity and quality of the two riverfront park pools, both showed very low population levels and little breeding activity of one vernal pool indicator species, the wood frog, and one facultative vernal pool species, the spring peeper. The number of chorusing frogs was low. There were a small number of chorusing male wood frogs present within both pools, but based on the very low number of egg masses observed, female frogs are likely present in very low numbers.

I have also attached my resume. To summarize my experience, I am a degreed Wildlife Biologist with approximately 20 years of experience conducted wildlife surveys in Connecticut.

If you have any questions regarding my findings, please feel free to contact me.

Sincerely,

Eric Davison

Eric Davison
Wildlife Biologist
Certified Professional Wetland Scientist

FIGURE 1
Aerial Map
2019 Vernal Pool Survey
St. Paul Church
Glastonbury, CT

Legend

Site Boundary (approx)

Wetlands Surveyed for Vernal Pools

Map Description
Parcel boundary taken from the CT DEEP GIS parcel layer. This map is intended for general planning purposes only.

SCALE
0 75 150 Feet

N

Davison Environmental, LLC
10 Maple Street
Chester, CT 06412
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DAVISON ENVIRONMENTAL

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Email: eric@davisonenvironmental.com
Web: www.davisonenvironmental.com

EDUCATION

- New England Regional Soil Science Certificate Program
  University of Massachusetts, Amherst, MA, 2000

- Bachelor of Science, Wildlife Conservation & Management
  University of Massachusetts, Amherst, MA, 1998

WORK EXPERIENCE

Davison Environmental, LLC, Chester, CT (owner/operator)
Wildlife Biologist, Wetland Scientist and Soil Scientist
(2002-present)

Provided the following consulting services to clients:

- Herpetological surveys
- Vernal pool inventory and impact assessment
- Breeding bird surveys
- Wetland delineation and soil mapping
- Local, state and federal wetland permitting assistance
- Wetland impact assessments
- Wetland restoration and mitigation plans
- Land management planning
- Wetland functions and values assessments
- GIS based environmental assessments

Metropolitan Conservation Alliance, Cary Institute of Ecosystem Studies, Millbrook, NY
Biodiversity Specialist
2009-2011 (three-year grant funded position)

- Conducted biodiversity studies throughout Connecticut and eastern New York under the direct supervision of program founder Dr. Michael W. Klemens
- Conduct herpetological surveys using a variety of techniques to identify amphibians and reptiles in aquatic and terrestrial environments including audial and visual surveys, dip-net surveys and cover-searching as well as various live-trap techniques such as minnow, hoop-net and pit-fall traps
- Characterize and map upland and wetland habitats, soils, geology and other natural resources
- Catalogue breeding bird species via visual identification and song
- Collect field data using GPS equipment and compile data collected using GIS software (ArcMap); create GIS maps and files of all field data collected

Northwest Park and Nature Center, Windsor, CT
Naturalist -Land Manager
(2000-2002)

- Responsible for habitat management and wildlife monitoring at 473-acre municipal park, with a focus on early-successional habitat management and monitoring of rare and state-listed grassland and shrubland wildlife
- Conducted conservation-related public outreach
- Staff liaison for the Town of Windsor Conservation Commission

Certifications

- Certified Soil Scientist (Society of Soil Scientists of Southern New England)
- Certified Professional Wetland Scientist (Society of Wetland Scientists)

Relevant Publications & Projects

Publications

- Audubon Connecticut Important Bird Area Conservation Plan, Greenwich Point Park, Greenwich, CT 2016
- Town of Ridgefield Natural Resource Inventory, 2012 (co-author)
- Audubon Connecticut Important Bird Area Conservation Plan, Bent of the River Sanctuary, Southbury, CT, 2011
- Haines Pond Management Plan, Brewster, NY, 2010 (field biologist and co-author)
- Eastern Westchester Biotic Corridor: Northern Terminus Addendum, North Salem and Southeast, NY, 2010 (field biologist and co-author)
- Haines Pond Biodiversity Study, Brewster, NY, 2009
- Eastern Westchester Biotic Corridor: Titicus Reservoir, North Salem, NY, 2009 (field biologist and co-author)
- Audubon Connecticut Important Bird Area Conservation Plan, Northwest Park, Windsor, CT, 2007
- Town of Windsor Natural Resource Inventory, 2005 (field biologist and co-author)

Projects

- Breeding bird point-count surveys for CT Audubon, multiple sites in Connecticut and Rhode Island in 2010 and 2011
- Wetland delineation and biological surveys (of wildlife, vernal pool herpetofauna and breeding birds), including GPS and GIS mapping, on the following linear utility projects in 2015:
    - Frost Bridge to Campville 115-kV Project, Watertown to Harwinton
    - 3424 Line Reclamation Project, Portland and Glastonbury
    - 1779 Line Rebuild Project, East Hartford and South Windsor
    - 1770-1622 Line Maintenance Project, Southbury
    - 364 Line Maintenance Project, Haddam and East Haddam
    - 352 Line Reclamation Project, Woodbury to New Milford
    - 1682-1470 Lines (SW CT), Norwalk to Ridgefield
    - Distribution Line Removal, Branford to Guilford
    - 1900-1732 Line Maintenance Project, Torrington and Harwinton

Professional Affiliations

- Commissioner - Inland Wetlands and Watercourses Commission, Town of Chester, CT
- Board Member - Connecticut River Coastal Conservation District
- Member - Society of Soil Scientists of Southern New England
- Member - Society of Wetland Scientists