

MEMORANDUM

**To: Gary Goeschel
Town of East Lyme
Inland Wetlands Agent**

From: Kristen Clarke PE

Date: June 6, 2020

**Subject: Re-Subdivision-Lots 19 & 21
Nottingham Hills Subdivision
Upper Kensington Drive**

The enclosed is submitted for the record as Ex. GG of the pending Application for Determination of Permitted/Non-Regulated Activity with regard to the 4-lot re-subdivision of Nottingham Hills Subdivision Lots 19 and 21 Assessors map 40.0, lot 23 and 22.

EXISTING CONDITIONS

The property is currently two (2) fully approved build lots known as Nottingham Hills Subdivision Phase 3 Lots 19 and 21 that were each subject to approvals received from the Town of East Lyme Planning and Inland Wetland Commissions in December of 2005 . The mylars reflecting the approved plans are on record in the Town of East Lyme Land Records. Sheet SD 7 of those approved Phase 3 plans is also provided as part of this application as Ex. BB. Clearing and grading activities have occurred on these lots and others pursuant to the Phase 3 approvals at various times between 2005 and March 26, 2019.

Additional Data on existing site conditions is provided with the application in a plan titled "Topographic Survey of Lots 19 & 21 Nottingham Hills Subdivision, East Lyme, Connecticut" dated March 26, 2019, which was prepared by Gesick & Associates, P.C. Connecticut Licensed Land Surveyor, which has not yet been assigned an Exhibit letter or number. Finally, Ex. FF is a plan on record with this Agency titled "Nottingham Hills Subdivision Phase II, Niantic Real Estate LLC, EXISTING CONDITIONS MAP dated 5/8/02 prepared by Anchor Engineering Services, Inc. Particular interest should be paid to the upper right hand corner of the plan which

identifies the site conditions, and use, of the subject area as of the date of this plan. More specifically a Christmas Tree farm.

RE-SUBDIVISION PLAN

The re-subdivision plan proposes to re-subdivide the two existing lots into four lots one of which, lot 4, is being donated to the East Lyme Land Trust, Inc., will not be built upon, and which will be subject to a Conservation Easement to be held by the State of Connecticut Department of Energy and Environmental Protection which will preserve this property in Open Space in perpetuity. Further re-subdivision of these properties will be prohibited by deed restrictions on record in the Town of East Lyme Land Records.

While there are Inland Wetlands on the subject properties there are no activities proposed in the wetlands or the 100' wetlands buffer adjacent thereto.

We have taken great care in the proposed plan to not impact the wetlands on the property by incorporating the following into the plan;

- 1) A reduction in impervious surfaces per the following analysis

	<u>Existing Phase 3 Approved Plan</u>	<u>Re-Subdivision Plan</u>
Lot 19 (Lot 1)	Driveway 460'x15' = 6,900 s.f.	140'x10' = 1,400 s.f.
	House Footprint 70'x30' = <u>2,100 s.f.</u>	56'x30' = <u>1,680 s.f.</u>
	9,000 s.f.	3,080 s.f.
Lot 21 (Lot 2)	Driveway 460'x15' = 6,900 s.f.	190'x10' = 1,900 s.f.
	House Footprint 70'x30' = <u>2,100 s.f.</u>	56'x30' = <u>1,680 s.f.</u>
	9,000 s.f.	3,580 s.f.
Lot 3	Driveway N/A	200'x10' = 2,000 s.f.
	House Footprint N/A	56'x30' = <u>1,680 s.f.</u>
		3,690 s.f.
Lot 4	Driveway N/A	N/A
	House Footprint N/A	N/A
Common Driveway 234'x15'	<u>N/A</u>	<u>3,510 s.f.</u>
Totals	18,000 s.f.	13850 s.f

2) Elimination of the Phase 3 plan Inland Wetland Commission approved clearing in the upland review area on proposed Lot 1. See Ex. 1 green highlighted area.

3) Construction of a rain garden that will be the "First Treatment" for all stormwater impacting impervious surfaces on the property to be developed including driveways and roofs . We refer you to Ex. EE which is the Grading, Drainage and Erosion Control plan which I prepared. The Rain Garden is of sufficient size to comply with Section 5-2-(E) of the Town of East Lyme Subdivision Regulations. In addition, it will serve as a landscaped buffer between proposed lot 3 and the abutting property know as 26 Upper Kensington Drive. I would note that Rain Gardens are meant and intended to filter pollutants from storm water and not act as "detention ponds" . A rain garden is designed to drain itself within twenty-four hours. On this property the ability to do that is demonstrated by test hole 411 found on Ex. BB, which is located within the boundaries of the proposed Rain Garden, and which identifies the following favorable subsurface conditions;

Test Hole #411 (Lot 21) Nottingham Hills Subdivision Phase 3 Sheet SD 14

See Ex. 2 to this report

0-4/6" - humus

4-20/22" - brown loamy sand

2-157" - alt. layers orange/tan/brown med/fine to fine silty sand, some stone
-no ledge, no water, max water 131 +/-

Perk Test located 10' down gradient from test hole reflects 4.0 min./inch

Rain gardens are not "mosquito breeding grounds" as was apparently falsely alleged during your June 6, 2020 site walk. I have provided as Ex. 3 to this report detailed information prepared by Michael Dietz, NEMO Program Director, University of Connecticut that addresses the purpose and function of Rain Gardens as well as sample design details.

4) Erosion Control. We have added silt fence outside of the 100' wetlands buffer in any area that presents any potential for erosion that would impact the wetlands or their buffer. We will add a note to the plan that requires additional erosion safety measures by requiring installation of staked haybales in front of the silt fence protecting the upland review area to any disturbed area that occurs within 25' of the upland review area.

5) Grading. As evidenced by the F.F. Elevations of the 3 developable lots on Ex. EE drainage is being directed from impervious surfaces to the rain garden and away from the wetlands. In addition the elevation of the 100' wetlands closest proposed house locations on lots 2 and 3 is actually higher than the f.f. elevation meaning that the back yards in these homes will rise slightly to the upland review area directing surface water down gradient towards the rain garden or to points furthest away from the wetlands buffers. I would note in this regard we are not changing the existing

elevations and drainage courses which presently drains these areas away from the wetlands and wetlands buffers.

6) Use of Advanced Technology Septic Systems. The use of Geomatrix designed GST Septic Systems will allow for far less leaching area than is shown on the re-subdivision current plan. This will reduce the leaching area by more than 50 % or from 60' currently shown to approximately 28' using a GST 6236 product. These systems provide for greater surface area in far less space and maximize wastewater aeration. We will add a note to the final plans requiring the use of GST Septic systems on each of the proposed three buildable lots in this re-subdivision. I have enclosed information on the Geomatrix GST Septic Systems as well as correspondence from Robert W. Skully, Supervising Sanitary Engineer, Environmental Engineering Program, State of Connecticut Department of Public Health as Ex. 4. I would note for the record that the State of Connecticut Department of Public Health requires a setback of 75' from a drinking water well to a septic system. Since it is not deemed a public health hazard to locate a well 75' from a septic system I would submit to you locating a septic system 150' from a wetland, especially a GST Septic System as proposed, presents no risk to the wetlands located on or near this property.

7) National Diversity Data Base. I have obtained and reviewed the National Diversity Data Base Areas Map dated December 2019, attached as Ex. 5, which demonstrates no protected or endangered species or areas located on or near the subject property. Please note the map scale is 9/16' = 1 mile

8) Tree Canopy. The existing Tree Canopy identified on the re-subdivision plan, highlighted in green, see Ex. 6, will not be changed or altered. I will add a note to the plan to reflect this.

CONNECTICUT DEEP GUIDELINES

Current Connecticut Department Of Energy and Environmental Protection guidelines state as follows; "The DEP believes that a 100 foot-wide upland review area is sufficient for reviewing construction activities surrounding wetlands and watercourses because most of these activities which are likely to impact or affect these resources will be located in that area...however beyond 100 feet it is neither practical or desirable, from a wetlands and watercourses perspective, to automatically require an inland wetlands permit for all construction activities. It must be emphasized that other municipal authorities and mechanisms involving planning, zoning and subdivision decisions and plans of conservation and development play a role in addressing the broader watershed issues. (1)

(1) State of Connecticut Department of Environmental Protection, Guidelines, Upland Review Area Regulations, Connecticut's Inland Wetlands & Watercourses Act. Wetlands Management Section, Bureau of Water Management

SUMMARY

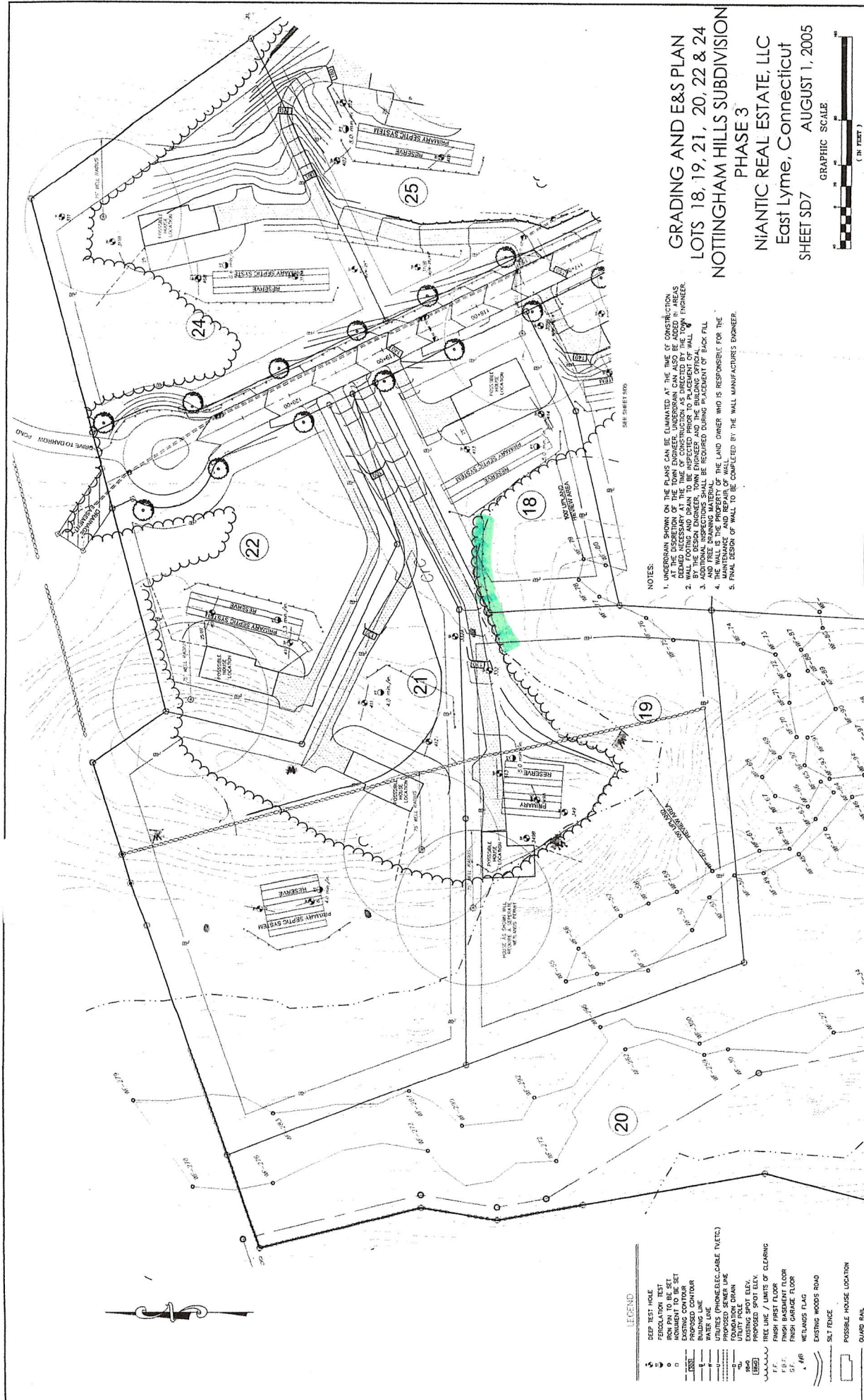
It is my professional opinion that none of the proposed activities identified on the proposed plan will likely impact or affect the physical characteristics of the wetlands on the subject property.

We have taken great care in the preparation of this plan to avoid any such activity. We have followed all guidance provided by the Town of East Lyme Inland Wetlands Regulations and the State of Connecticut Department of Energy and Environmental Protection regulations and guidance. We emphasize that there is no activity planned in the onsite Inland Wetlands or the 100' buffer adjacent to the wetlands boundary. Additionally, we have addressed all potential issues that could affect the inland wetlands, which include but are not limited to drainage, by directing the stormwater from impervious surfaces to a Rain Garden which is located 155' feet at its closest but not lowest point which is located approximately 180' from the closest wetland's boundary, erosion control, retaining the existing tree canopy, reduction of proposed impervious surfaces and use of highly efficient septic systems.

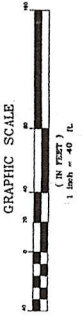
PROPOSED NOTES TO BE ADDED TO PLAN (Exhibit EE)

- 1) Prior to Construction of any house the applicant with flag the limits of the upland review area and install the erosion controls identified on the plans and notes contained thereon and thereafter have those items inspected by the Town of East Lyme Inland Wetlands Agent prior to Construction of any improvements.
- 2) Any area within 25' of the wetlands buffer, in which silt fence is identified on the plan, and in which construction activities are occurring will require staked haybales as additional protection from erosion.
- 3) Geomatrix GST leach fields shall be required for all lots in this re-subdivision
- 4) The existing tree canopy will be maintained unless the Town of East Lyme Inland Wetlands Agency or its Agent approve of otherwise.

EXHIBIT 1



GRADING AND E&S PLAN
LOTS 18, 19, 21, 20, 22 & 24
NOTTINGHAM HILLS SUBDIVISION
PHASE 3
NIANTIC REAL ESTATE, LLC
 East Lyme, Connecticut
SHEET SD7 **AUGUST 1, 2005**



J. ROBERT PFANNER & ASSOCIATES, P.C.
 CIVIL ENGINEERS & LAND SURVEYORS
 37 GRAND STREET NIANTIC, CONNECTICUT 06357
 TEL. 860-739-6216 FAX 860-739-0993
 0305E-0011-0113

- NOTES:**
1. UNDESIRABLE GRASS OR WEEDS CAN BE ELIMINATED AT THE TIME OF CONSTRUCTION AT THE DISCRETION OF THE OWNER. THE OWNER SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF THE LOT.
 2. DEGRADED NECESSARY AT THE TIME OF CONSTRUCTION AS DIRECTED BY THE TOWN ENGINEER.
 3. ADDITIONAL INSPECTIONS SHALL BE REQUIRED DURING PLACEMENT OF BACK FILL.
 4. THE WALL IS THE PROPERTY OF THE LAND OWNER WHO IS RESPONSIBLE FOR THE MAINTENANCE AND REPAIR OF WALL.
 5. FINAL DESIGN OF WALL TO BE COMPLETED BY THE WALL MANUFACTURER'S ENGINEER.

NO.	DATE	DESCRIPTION	BY
1	08-01-05	REVISIONS	JRP
2	08-01-05	TEST THIS AREA	JRP
3	08-01-05	TEST THIS AREA	JRP
4	08-01-05	TEST THIS AREA	JRP
5	08-01-05	TEST THIS AREA	JRP


DATE: August 7, 2005
 DRAWN BY: MUS

- LEGEND:**
- DEEP TEST HOLE
 - FERTILIZATION TEST
 - IRON PIN TO BE SET
 - PROPOSED CONTOUR
 - EXISTING CONTOUR
 - PROPOSED UTILITY
 - UTILITY (PHONE/ELEC. CABLE, TV, ETC.)
 - PROPOSED SEWER LINE
 - EXISTING SEWER LINE
 - UTILITY POLE
 - EXISTING SPOT ELEV.
 - PROPOSED SPOT ELEV.
 - PROPOSED SPACES OF CLEARING
 - F.F. FINISH FIRST FLOOR
 - B.F. FINISH BASEMENT FLOOR
 - S.F. FINISH GARAGE FLOOR
 - W.F. FINISH WOODS ROAD
 - EXISTING WOODS ROAD
 - SILT FENCE
 - POSSIBLE HOUSE LOCATION
 - GUARD RAIL
 - SOIL TYPE DELINEATION
 - SOIL TYPE
 - SHADE TREE TO BE PLANTED
 - LIGHT WETLANDS REVIEW AREA
 - CATCH BASIN

SEE SHEET SD8

EXHIBIT 2

EXHIBIT 3

[Home](#)[Frequently Asked Questions](#)[More Resources](#)[Contact Us](#)

[UConn's
NEMO Website](#)

[Save the Sounds's
Reduce Runoff Website](#)

Rain Gardens 101

[Rain Gardens Home](#)[Rain Gardens 101](#)[Siting & Sizing](#)[Design & Installation](#)[Plants](#)[Maintenance](#)[Cost Calculator](#)

What is a Rain Garden?

Rain gardens are shallow depressions in the landscape that typically include plants and a mulch layer or ground cover. In addition to providing increased groundwater recharge, they are expected to provide pollutant treatment. Pollutant treatment in rain gardens has been attributed to adsorption, decomposition, ion exchange, and volatilization ([Prince George's County Bioretention Manual, 2002](#)). Rain gardens can be used in residential settings to accept runoff from a roof or other impervious surface. In a commercial setting, bioretention areas are similar to rain gardens, but are often larger, and have an engineered design.



The University of Connecticut's Tolland County Extension Center's rain garden located in Vernon, CT. (top photo) the day the rain garden was installed. (bottom photo) the same rain garden several years later.

What is Pollution?

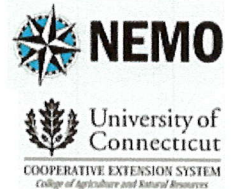
Pollution is the undesirable state of the natural environment being contaminated with harmful substances, often as a result of human activity.

When stormwater (water that originated during precipitation events or from snow melt) moves over pavement, it picks up and carries with it fertilizer, pathogens, toxic contaminants, sediment and other pollutants before entering storm drains. These drains lead directly to waterways which lead to Long Island Sound. Polluted runoff can harm aquatic life and make the Sound unsuitable for fishing and swimming.

As a result of global climate changes, scientists predict that precipitation will increase in the Northeast U.S., leading to a greater volume of runoff. This presents a challenge, since more runoff means more pollution that can enter the Sound. Simply put, the more rain gardens, the less polluted runoff.



Contact: Michael Dietz, NEMO Program Director,
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Phone: 860-345-5225



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NEMO is a part of the College of Agriculture and Natural Resources' Department of Extension.

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Siting & Sizing

[Rain Gardens Home](#)

[Picking a Site](#) | [Checking the Soils](#) | [Soil Drainage Map](#) | [Sizing Your Rain Garden](#) | [Sizing Map](#)

[Rain Gardens 101](#)

[Siting & Sizing](#)

[Design & Installation](#)

[Plants](#)

[Maintenance](#)

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Picking a Site

Planning for your rain garden is an important step and should not be overlooked. Not every location in your yard is ideal for installing a rain garden. For most residential settings, you will be trying to capture runoff from your house roof and directing it to your rain garden. This can be accomplished by piping the downspout directly into your garden, or by letting it run over grass before entering the garden. Here are several points to consider when choosing the site in your yard:

1. Avoid placing the rain garden in a low spot in the yard that always seems wet. **A rain garden is not a water garden or a wetland.** Placing it in poorly drained soils may lead to slow infiltration and unwanted long term ponding.
2. Keep your rain garden at least 10 feet away from your house if you have a basement. Infiltrating water close to your foundation can lead to water problems in the basement.
3. Do not install the rain garden over your septic system, or close to your drinking water well.
4. Do not install a rain garden in an area where bedrock or stone outcrops are closer than 2 feet to the surface.
5. Avoid steep slopes. Rain gardens can be installed using a retaining wall design on moderate slopes, but the construction of this type of garden is more complicated. Rain gardens are easiest to install in flat or slightly sloped areas.
6. Plan for overflow from the garden. Although your garden will be sized to contain the most frequent storms, it will likely not contain the increased volumes of water from larger storms. This is OK, but you will need to be aware of where the water will go if it overflows from the garden. In most cases this will just be on your lawn, but you want to make sure the overflow is not directed towards your foundation.



For most residential settings, you will be trying to capture runoff from your house roof and directing it to your rain garden.

Rain Garden Placement



[Back to Top](#)

Checking the Soils

The underlying soils are an important component of your rain garden. To determine if your soils are suitable for a rain garden:

- A. Determine the soil drainage class at your site using our **soil drainage map**;
and/or
- B. Conduct a **quick infiltration test**:
 1. Dig a hole 6-8 inches deep in the area where you would like to install the garden.
 2. Check the level of the water in the hole after 6 hours. If the water is gone, the site is suitable for a rain garden. If the water takes 6-24 hours to disappear, the site is probably OK, but you may need to amend your soils. If the water has still not disappeared after 24 hours, you should find a different site for your garden. For a better percolation test, see the demonstration video below.
 3. **Special note for newly or recently constructed homes:** Take note of the soil as you dig your hole. Typically with new construction there is a very thin (2-3 inches deep) layer of topsoil over compacted subsoil. What this means is that you may need to loosen up and/or amend the bottom of your rain garden with compost to provide adequate organic matter and a good growing environment for your plants. This will be addressed further in the installation section.



Rain gardens are built to hold water during rain events, however water should infiltrate the ground within 24 hours.



[Back to Top](#)

Sizing Your Rain Garden

Residential rain gardens are often sized to hold one inch of runoff in above-ground storage from the contributing impervious surface. In this area of the country, the majority (around 90%) of storms are one inch or less in size. What this means is that sizing the garden to contain this volume of water will give the most benefit, without oversizing it to try to contain larger, more infrequent events that are a much smaller portion of the total yearly runoff volume.

There are two ways to determine the size of your rain garden:

(ONE) **Click here to use our Sizing Map.** It's as simple as locating your impervious surface(s) on the aerial map, click around the perimeter and click the "Calculate Area" button. That's it!

(TWO) Use the following steps to measure the size of the area draining to your garden (and see figure below)

1. Measure the footprint of your house. This is the area taken up by your house if looking down from above. Multiply the length by the width of the house, the answer will be square feet (or square meters if you are using metric measurements).
2. Estimate how much of the area actually drains to the area where you want to install the garden. Typically, gutters drain to both ends of a house, so the length can be cut in half, but this is not always the case.
3. If you are collecting runoff from your driveway or a section of road, just estimate the size of the impervious surface draining to the spot where you want to put the garden, and continue to step 4.
4. Divide this area by 6. This calculation sizes the garden to hold one inch of runoff from the drainage area, in a garden 6 inches deep. The result is the area in square feet (or square meters) that you need for your rain garden. See the example below.

- 5. You can make the garden and shape you like, as long as it is roughly the size that you calculated above. Ovals or kidney-shaped gardens tend to look nicer than square or rectangular gardens, but it's up to you.

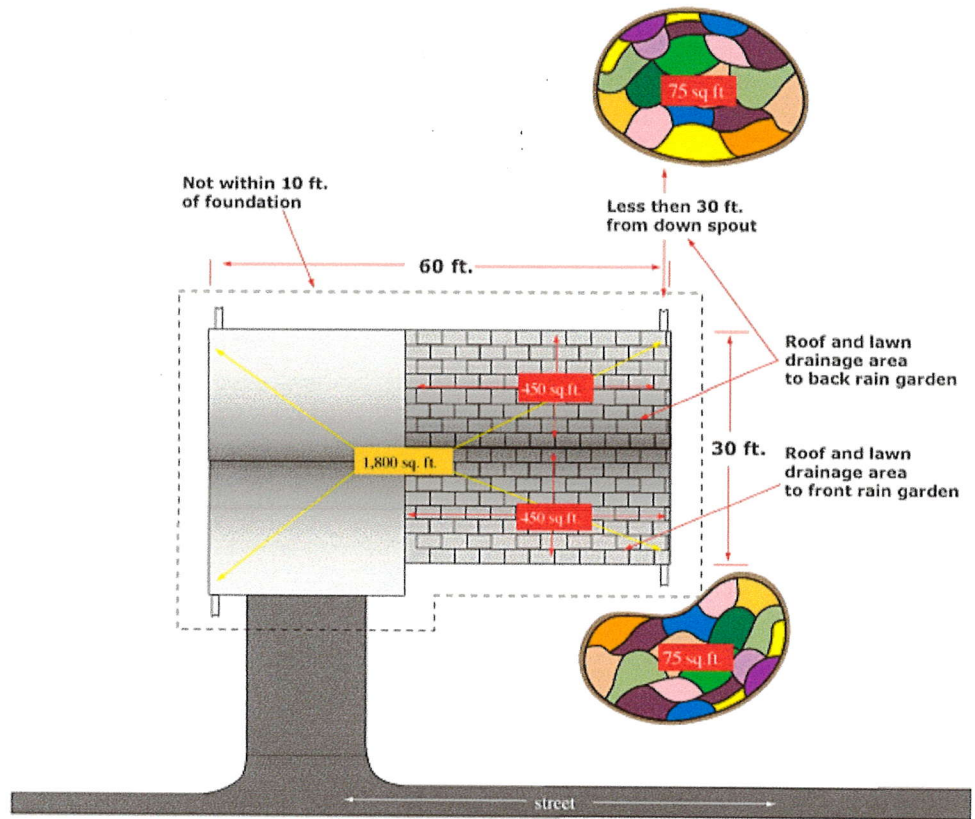



Diagram above adapted from the University of Wisconsin-Extension, *Rain Gardens: A How-to Manual for Homeowners*.

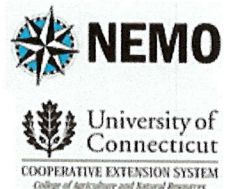
Rain Garden Sizing



[Back to Top](#)



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 Phone: 860-345-5225





Design & Installation

Rain Gardens Home

Getting Ready to Dig | Excavate the Rain Garden | Laying Out Your Plants | Planting

Rain Gardens 101

Getting Ready to Dig

Siting & Sizing

Design & Installation

Plants

Maintenance

Cost Calculator

BEFORE DIGGING: Although you are not required to notify Call Before You Dig (CBYD) for shallow excavations done by hand, CBYD encourages you to call. Even hand tools can damage utility lines. If you are using any type of heavy equipment, you are required by law to call. Dial 1-800-922-4455, or 811. Visit the [Call Before You Dig website](#) for a homeowner's guide to the CBYD service. One important note: this service will not locate small utility lines such as wires run from your house to outside fixtures. These things are your responsibility to locate.

Excavate the Rain Garden

Mark out the area of the garden, based on the size you calculated for the drainage area. If the area is flat, you can remove 8-9 inches of soil from the whole area. Shape a gentle slope from the bottom of the garden to the surrounding lawn area (see [figure 1 below](#)).

If the area is sloped, you can use some of the soil that you removed from the garden to build a berm at the lower end (photo, right). If you are removing turf to install your garden, you can use some of the turf pieces on the berm so vegetation can be established quickly, and erosion potential can be reduced. When you are constructing the berm, try to make it the same level across the berm. If there is one area that is lower than the rest, overflow from the garden during a large storm may concentrate there, and cause erosion as water flows out. Keeping the water spread out is the best way to avoid erosion (see [figures 2 & 3 below](#)).

Take a shovel full of soil from the bottom, in the area where you will be planting. If the soil at the bottom looks the same as the top layer of topsoil that you removed, you can plant directly into it. If the subsoil is lighter in color, or appears compacted, you may need to loosen it and add an amendment like compost when planting (photo, right). A rototiller can be used to loosen the soil and integrate compost at the same time.

If your soils were slow to drain, it may mean that you have high clay content. If you have the means, you can make the garden a little bigger to account for the slower infiltration rate.

Alternatively, you can add some compost to the bottom of the garden when you are rototilling. If these things are not possible, don't worry. The garden will still infiltrate some water, and every little bit helps.

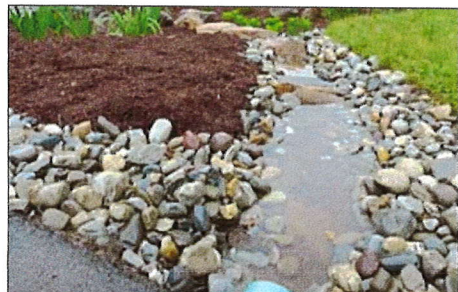
If you are using a pipe to get water to the garden, you may want to consider placing some stones in the area where the pipe or gutter enters the garden. During intense storms, water inflow from the gutters can wash out mulch and/or plants. The stones will help to dissipate this energy and prevent erosion.



A berm can be created using soil excavated from the rain garden to accommodate for a sloping lawn.



If the soil at the bottom of your rain garden is lighter than the top layer you will need to add an amendment like compost when planting.

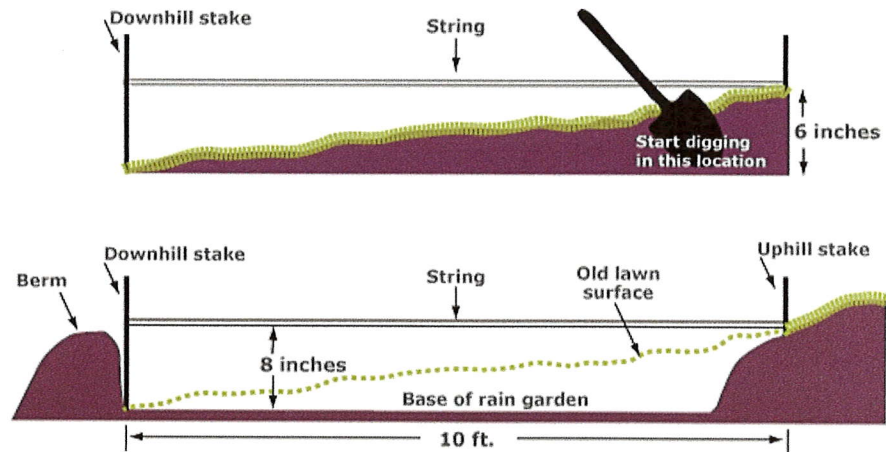


Adding stones to areas where water enters a rain garden from a pipe or gutter helps to dissipate water flow and prevent erosion.

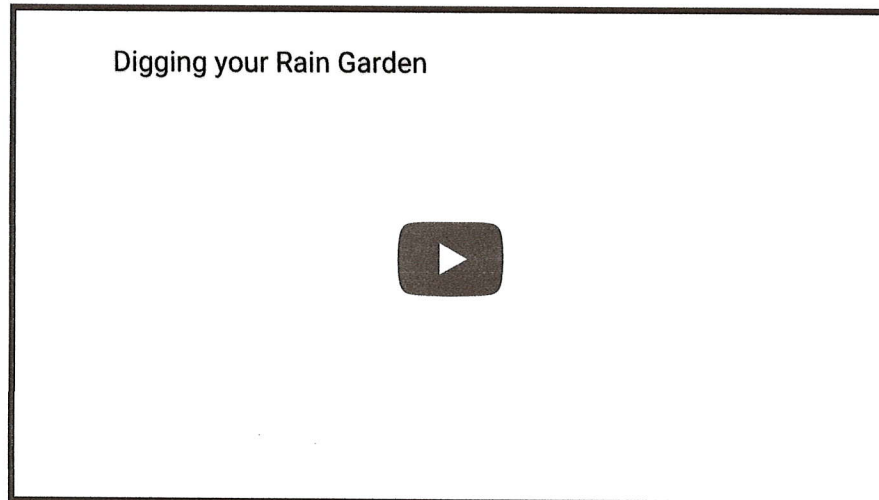
Figure 1: Rain Garden Dissection



Figures 2 & 3: Rain Garden on Slope



Diagrams above adapted from the University of Wisconsin-Extension, *Rain Gardens: A How-to Manual for Homeowners*.



[Back to Top](#)

Laying Out Your Plants

There are some general concepts that you can follow when planting to make your garden function well, and look pleasing to the eye.

1. Choose plants appropriate for your USDA hardiness zone. Natives already meet this criterion.
2. Assess how much sun your site gets. Not all rain garden plants will do well if the site is shady.
3. Plan for future growth. Plant descriptions will include the mature size, so don't over plant. However, if a "fuller" look is desired early on, it is OK to have plants a bit closer together.



4. Try to group plants in odd numbers, and avoid planting in straight lines (photo, top right).
5. Arrange plants so that taller ones won't block the view of shorter ones.
6. Using smaller plants such as plugs will save money, but it will take a bit longer for the plants to grow to full size.
7. Some plants will do better in different parts of the rain garden, like the bottom or the side slope. Many will do OK in any area in the garden. The plant database will specify this.
8. Have fun! You will be the one looking at this garden, so make it however feels right for you.

[Back to Top](#)

There are many factors to consider when designing the layout of your rain garden, but the most important is that it looks right for you.



Set the plants in the ground so its surface soil is level with the bottom of the rain garden. (If plants are root-bound, try to loosen up the roots before planting them.)



Once the plants are installed, mulch the area with 2-3 inches of mulch, being careful not to put the mulch too close the the plants base.

Planting

Once your soil is ready, you can begin planting.

1. Dig the holes for the plants. The holes should be at least twice as wide as the plant's root structure and deep enough so that the surface of soil in the pot is level with the soil in the bottom of the garden.
2. Amend the soil as needed (see Excavate the Rain Garden section above).
3. If the plants are root-bound, try to loosen up the roots before planting them (photo, middle right).
4. Once all the plants are installed, you are ready for mulching. Add about 2-3 inches of mulch, being careful not to put the mulch too close the the plants base (photo, bottom right).
5. Water your plants immediately after planting and one inch of water per week (unless it rains) until the plants are established.

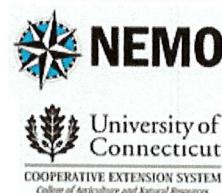
Rain Garden Plant Selection & Layout



[Back to Top](#)



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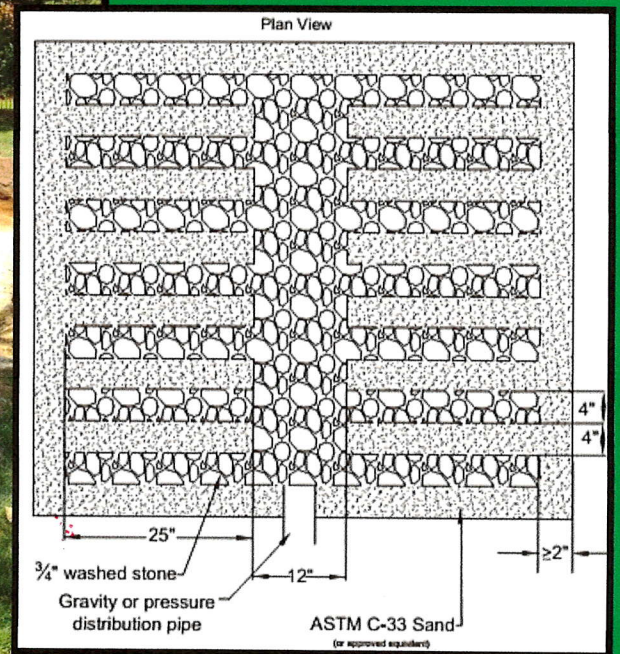
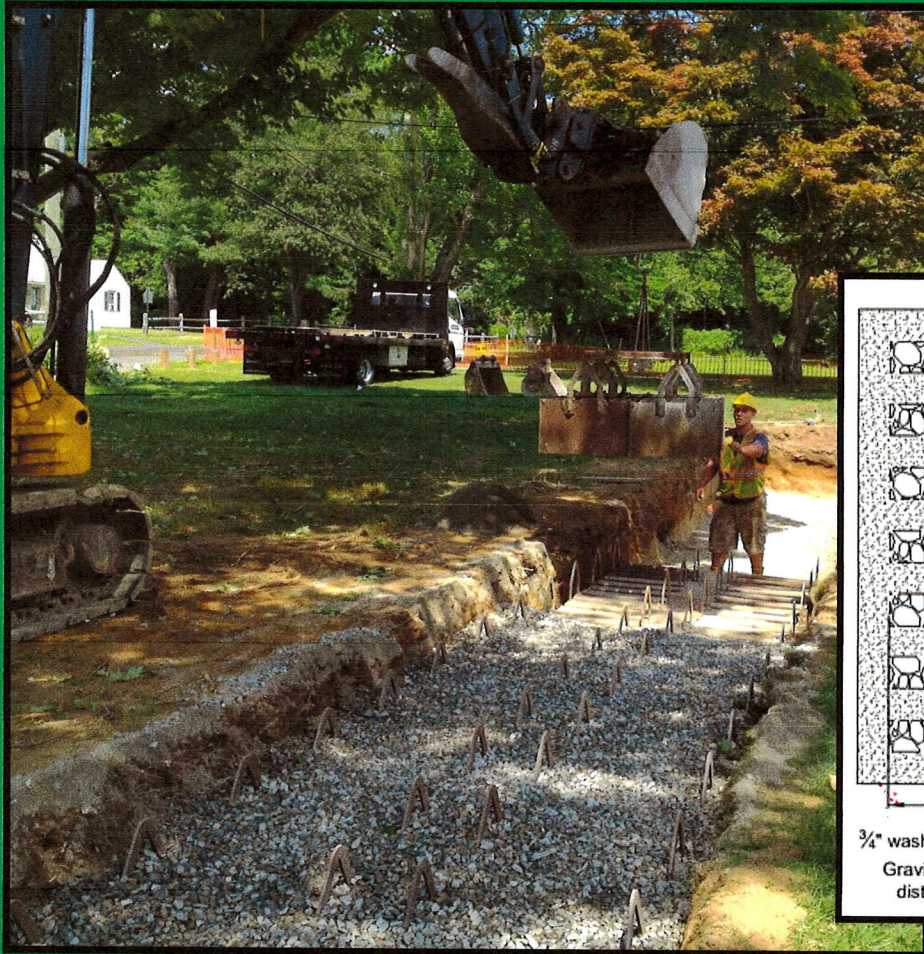


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EXHIBIT 4

GST™ Leaching System



A unique leaching system that delivers enhanced oxygen transfer in a shallow profile and a small footprint.

GEMATRIX

GST Leaching System (GST) is an adaptation of the time proven stone leaching trench. This traditional leaching system has been improved with the use of a removable form to accurately shape and construct leaching fingers along the sides of a central distribution channel. The fingers are constructed with 3/4" washed stone and are surrounded with ASTM-C-33 sand. These fingers serve to increase the sidewall surface area by more than six times that of a traditional stone leaching trench. Additionally, the narrow profile of the leaching fingers and central distribution channel, combined with the uniform profile of the sand treatment media, serve to enhance oxygen transfer efficiencies. Enhanced oxygen transfer results in better treatment of the wastewater pollutants and a leach field with a longer life-span. Certain leaching systems have cardboard forms that remain in place around the leaching system, inhibiting the transfer of wastewater from the leaching system to the soil, GST has direct stone to soil contact for enhanced long-term performance. This is the same design that the time proven stone leaching trench utilizes. GST can be configured with standard gravity, pressure and/or time dosed distribution.



GST Leaching System

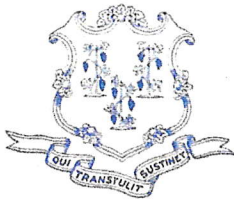
- Improvement over time-proven stone and pipe technology
- Greater surface area in less space
- Maximizes wastewater aeration
- 3rd party tested
- Central channel uniformly distributes wastewater
- Proven with high strength wastewater
- Fast and easy installation
- Uses local materials



www.geomatrixsystems.com
 Email: info@geomatrixsystems.com

Phone: 860-510-0730
 Fax: 860-510-0735
 114 Mill Rock Road East
 Old Saybrook, CT 06475

Patents: www.geomatrixsystems.com
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STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

February 7, 2008

David Potts
Geomatrix Systems, LLC
385 Roast Meat Hill Road
Killingworth, CT 06419

Re: Geomatrix GST Leaching System Product Approval

Dear Mr. Potts:

This Department has reviewed the documentation you submitted on the Geomatrix GST proprietary leaching systems. The installation of the GST leaching systems requires use of a removable form provided by Geomatrix. After placement of the form in a sand bedded trench excavation, No. 6 stone (Previously ¾" stone) and sand are placed within the form voids. The form is then removed leaving a series of stone and sand "fingers". The sand must minimally meet ASTM C-33 or select fill specifications. The No. 6 stone must meet the gradation requirements in DOT Form 816, and the #40 and #200 sieve gradation, hardness and soundness criterion included in the stone aggregate definition in the Technical Standards.

The standard width of the GST products is 62 inches. The product is placed in an excavation that is at least 66-inch wide to allow placement of sand on the sides of the product. The product is placed on at least a 2-inch deep bed of sand. Effluent is distributed into the product via at least a 3-inch perforated distribution pipe (for gravity systems) set along top of the product extending the entire product length. Stone is placed around the distribution pipe, and filter fabric is placed over the product and distribution pipe.

A total of six different GST products of various heights have been submitted for approval. The specified product heights do not include the height of the distribution pipe on top of the product. The calculated ELA credits for the Geomatrix GST leaching systems are as follows:

Product Name	Dimensions (W x H)	Effective Leaching Credit (SF/LF)	Center to Center Spacing (feet)
GST 6206	62" x 6"	5.9	12
GST 6212	62" x 12"	10.0	12
GST 6218	62" x 18"	14.0	13
GST 6224	62" x 24"	18.1	13
GST 6230	62" x 30"	22.1	13
GST 6236	62" x 36"	26.2	13

Phone:

(860) 509-7296



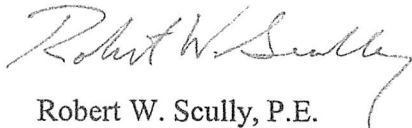
Telephone Device for the Deaf: (860) 509-7191
410 Capitol Avenue - MS # 51-SEW
P.O. Box 340308 Hartford, CT 06134

Affirmative Action / An Equal Opportunity Employer

Installation instructions were provided to this Department and are dated February 7, 2008. The installation instructions indicate that the GST products can be installed under vehicular wheel loading areas (H-20) as long as 12 inches of cover is provided over the product, and the use of a load distribution system is recommended to prevent compaction of the infiltrative surface. The installation instructions also stipulate that installations of GST products must be completed in the presence of an authorized Geomatrix representative or Geomatrix Systems, LLC, must certify the installer. Any changes to these instructions must be forwarded to this office for our files.

This Department hereby APPROVES the Geomatrix GST leaching system products with the noted ELA credits and center-to-center spacing. The Geomatrix GST proprietary leaching system products will be incorporated into the next revision of the Technical Standards. This letter may be reproduced in its entirety as a means of notifying local health departments, engineers and installers of the product approval. This Department will also be sending an electronic copy of this approval to all Local Directors of Health and our Code Advisory Committee. This approval should not be construed to be an endorsement of this product.

Sincerely,



Robert W. Scully, P.E.
Supervising Sanitary Engineer
Environmental Engineering Program

C: Suzanne Blancaflor, Chief, Environmental Health Section, RSB, DPH




C/bob/GeomatrixGSTapproval

EXHIBIT 5

Natural Diversity Data Base Areas

EAST LYME, CT

December 2019

-  State and Federal Listed Species
-  Critical Habitat
-  Town Boundary

NOTE: This map shows general locations of State and Federal Listed Species and Critical Habitats. Information on listed species is collected and compiled by the Natural Diversity Data Base (NDDDB) from a variety of data sources. Exact locations of species have been buffered to produce the generalized locations.

This map is intended for use as a preliminary screening tool for conducting a Natural Diversity Data Base Review Request. To use the map, locate the project boundaries and any additional affected areas if the project is within a hatched area there may be a potential conflict with a listed species. For more information, complete a Request for Natural Diversity Data Base State Listed Species Review form (DEP-APP-007), and submit it to the NDDDB along with the required maps and information. More detailed instructions are provided with the request form on our website.

www.ct.gov/deep/nddbrequest

Use the CTECO Interactive Map Viewers at www.cteco.uconn.edu to more precisely search for and locate a site and to view aerial imagery with NDDDB Areas.

QUESTIONS: Department of Energy and Environmental Protection (DEEP)
79 Elm St, Hartford, CT 06106
email: deep.nddbrequest@ct.gov
Phone: (860) 424-3011



Connecticut Department of
Energy & Environmental Protection
Bureau of Natural Resources
Wildlife Division

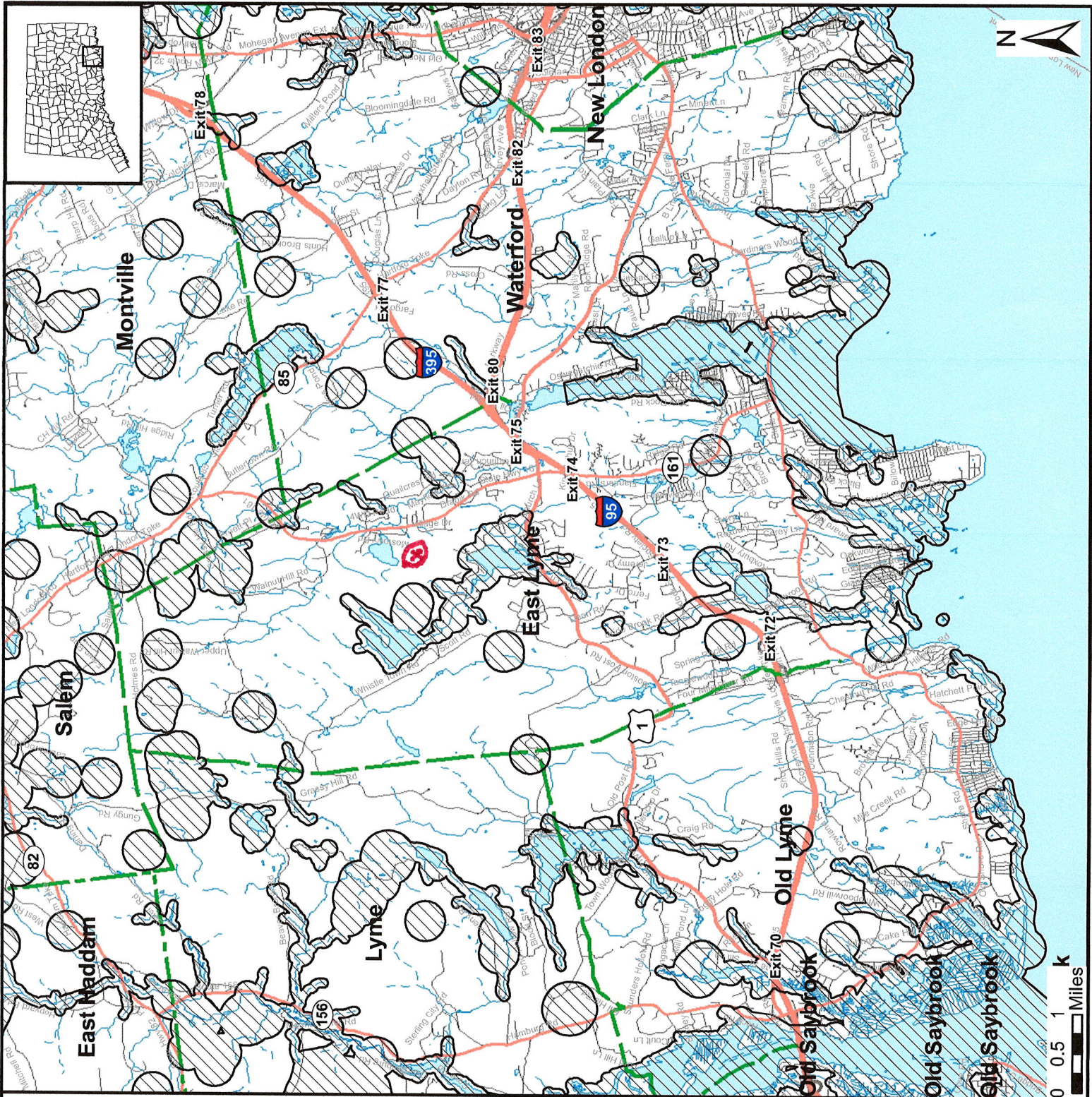


EXHIBIT 6

