

Ewen Farm Preserve

Orange, Connecticut

Connecticut Environmental Review Team Report



Connecticut Resource Conservation & Development Area, Inc.

October 2015

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Environmental Review Team Report

**Prepared by the
CT Environmental Review Team**

**A Program of the
CT Resource Conservation & Development Area, Inc.**

**For the
Town of Orange
Orange, Connecticut**

Report #1002

October 2015

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ACKNOWLEDGEMENTS

This report is an outgrowth of a request from the Town of Orange to the Connecticut Environmental Review Team for their consideration and approval. The request was approved and the measure reviewed by the Connecticut Environmental Review Team (ERT).

The Connecticut Environmental Review Team would like to thank and gratefully acknowledge the following Team members whose professionalism and expertise were invaluable to the completion of this report.

The field reviews took place on May 6, May 19 and June 19, 2015.

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Special thanks to Sharon Ewen, Orange Conservation Commission Chair, the First Selectman of Orange, Jim Zeoli and former ERT coordinator, Elaine Sych for their cooperation and assistance during this environmental review.

Prior to the review days, each Team member received a summary of the proposed project with various maps. During the field review and after Team members received additional information. Some Team members made separate or additional field visits to the site. Following the reviews, reports from each Team member were submitted to the ERT for compilation and editing into this final report.

This report represents the Team's findings. It is not meant to compete with private consultants by providing site plans or detailed solutions to development problems. The Team does not recommend what final action should be taken on a proposed project - all final decisions rest with the town. This report identifies the existing resource base and evaluates its significance to the proposed use, and also suggests considerations that should be of concern to the land trust. The results of this Team action are oriented toward the development of better environmental quality and the long term economics of land use.

The Connecticut RC&D Council hopes you will find this report of value and assistance in providing information for plans to develop and manage this town-owned property.

If you require additional information please contact:

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INTRODUCTION

The CT ERT has approved a request from the Orange Conservation Commission for Environmental Review Team assistance in providing an environmental review of the town owned passive open space Ewen Farm Preserve.

The 44 acre site is located near the center of town on Lambert and Tyler City Roads. Prior to its acquisition by the town it was part of a larger property known as Meadowbrook Farms. There was an ERT conducted on Meadowbrook Farms in 1985 in anticipation of it being offered for sale and it was considered a high priority for open space. As a result of probated estate settlements the amount of land able to be purchased by the town in 2010 was 44 acres. The site has farm fields, wetlands, 2 farm ponds, woodland and the Indian River flows through the eastern limits. Access is from Lambert Road (room for parking and there is a kiosk) and Tyler City Road, there is a kiosk and small asphalt parking area on St. John's Drive and there is an easement to Racebrook Road. Two of the farm fields are currently leased to a local farmer for hay. There are currently no marked trails but 2 wooden bridges have been constructed. Indian arrowheads have been found along the river.

Objectives

The town is requesting a comprehensive environmental review/natural resource inventory to have baseline information to develop plans on how to best protect and use the property. They are interested in identification, analysis and management guidelines of the natural resources present including soils, geology vegetation, wildlife, wetlands, ponds and rivers and recommendations for trail development and access. Information on archaeological and historical significance was also requested. They are especially interested in fishing opportunities, invasive plant control, dog access recommendations and educational and public interest programming. They have held an owl walk, and Audubon is scheduled to complete a survey for them as well.

The ERT Process

Through the efforts of the Town of Orange this environmental review and report was prepared for the town.

This report provides a natural resource inventory and a series of recommendations and guidelines which cover the topics requested by the town. Team members were able to review maps, plans and supporting documentation provided by the town.

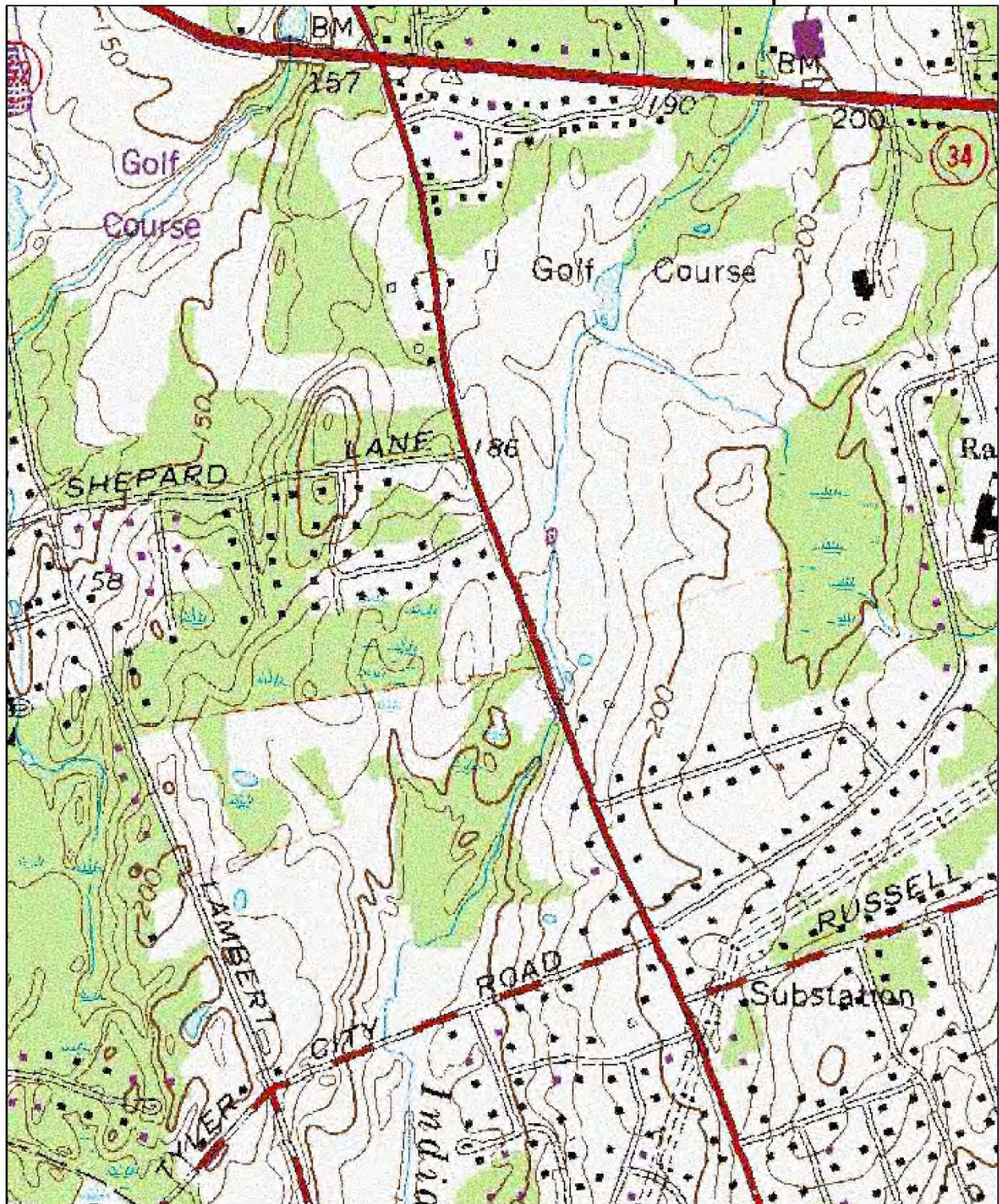
The review process consisted of four phases:

1. Inventory of the site's natural resources;
2. Assessment of these resources;
3. Identification of resource areas and review of plans; and
4. Presentation of education, management and land use guidelines.

The data collection phase involved both literature and field research. The field reviews were conducted on May 6, May 19, and June 19, 2015. Some Team members made separate and additional field visits on their own. The field review allowed Team members to verify information and to identify other resources.

Once Team members had assimilated an adequate data base, they were able to analyze and interpret their findings. Individual Team members then prepared and submitted their reports to the ERT Program for compilation into this final ERT report.

Ewen Farm Preserve NRI - Topo Map



The Connecticut Environmental
Review Team



This map was prepared by Amanda Fargo-Johnson for
the Connecticut Environmental Review Team.
This map is for educational use only.
It contains no authoritative data.
May 2015.



Orange, CT

0 212.5425 850 1,275
Feet

Ewen Farm Preserve NRI - B&W Aerial Map



The Connecticut Environmental
Review Team



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the Connecticut Environmental Review Team.
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Ewen Farm Preserve NRI - Aerial Map



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May 2015.

Image Courtesy of Google Maps



Orange, CT

Topography and Geology

Topography

Orange lies west of the Central Valley of Connecticut near the boundary between what Michael Bell (1985, p.7) refers to as the Western Uplands and the Coastal Slope. As such, the elevations of the Ewen Farm Preserve are not very high, reaching a maximum along Lambert Road of just greater than 200 feet above sea level (see topographic map in the Introduction). The lowest elevation, approximately 130 feet, occurs in the valley of the Indian River where the river flows southward off the property. Hence, the relief is just greater than 70 feet and most slopes on the property are gentle (Figure 1).



Figure 1. Examples of the slopes seen on the Ewen Farm Preserve. Most of the slopes are gentle as seen on the left image, taken in the northwestern portion of the parcel. Steeper slopes are seen in the southeastern and southwestern part of the parcel, as illustrated by image on right showing the farmhouse south west of the parcel.

The Indian River is no more than a brook as it flows diagonally across the Ewen Farm Preserve in a southwesterly direction. The headwaters of the Indian River are just north of CT Route 34, a couple of miles upstream; it flows into Gulf Pond and Long Island Sound in Milford. It has a gradient of about 40'/mile across the farm. It appears to be a perennial stream, maintained by groundwater seepage during periods of low rainfall. The Ewen Farm Preserve lies totally within the valley of the Indian River.

The topography of the eastern side of the valley is relatively smooth. The eastern slopes have slightly thicker glacial soils than the western slopes. The western valley slopes have thinner soils and the slopes are more irregular with knobs of bedrock poking through the soil in a number of places. In general the relief on the bedrock surface follows the surface topography, although not as closely on the eastern slopes as on the western slopes of the valley.

Bedrock Geology

The Ewen Farm Preserve lies within the Ansonia Quadrangle which was mapped by Fritts (1965). The geology of the preserve is shown in Figure 2. Bedrock crops out in the northwestern portion of the parcel and at the hilltop on Lambert Road that bounds the parcel on the west. The bedrock outcrops all consist of the Wepawaug Schist. In this area it is a greenish and gray layered metamorphic rock that appears to be bedded (Figure 3a). The rocks consist of phyllite which is a very fine-grained low-grade metamorphic rock composed of very fine-grained muscovite mica, chlorite, quartz, feldspar and a few trace minerals. It is so fine-grained that the individual minerals can only be seen with a microscope.



Figure 2. Geologic map (Rodgers, 1985) of the Ewen Farm Preserve and surrounding area. Area shown in yellow is underlain by Wepawaug Schist; area in red is underlain by basalt. Outcrops are not shown on this map. Outline of Preserve (blue line) very approximate.

Metamorphic rocks are rocks that have been changed from its original form by extreme heat and pressure. The originally formed rock is called the protolith. In this case the protolith was shale or mudstone, a sedimentary rock deposited on the floor of a long vanished ocean millions of years ago. During metamorphism, rocks are subjected to increased heat and pressure and in some cases to hot reactive fluids. This causes the original minerals of the shale or mudstone to recrystallize to new minerals and to grow in size. Phyllite is the term given to the initial recrystallized metamorphic rock formed from shale protolith. To the west of the Ewen Farm Preserve rocks of the Wepawaug consist of schist, indicating a higher grade of metamorphism. They also contain different metamorphic minerals, garnet, biotite, and staurolite, which indicate higher metamorphic temperatures and pressures. The schist contains scattered quartz veins, some of which are quite large.

During the metamorphism the rocks were subjected to compressive stresses that caused the original near horizontal beds of shale to be tilted and folded. Bedding layers in the outcrop along Lambert Road are steeply dipping (tilted) toward the northwest. In addition they have been folded into tight folds (Figure 3b) that suggest a fold-structure larger than the scale of the outcrop. The elevated

temperatures, pressures and stresses that these rocks experienced occurred during the plate-tectonic events that built the Appalachian Mountain chain between 450-250 million years ago.

About 200 million years ago a more recent rock-forming event occurred: basaltic lava was erupted over much of what would become Connecticut. The lava flows have been eroded everywhere except in the Connecticut River valley where they form the trap-rock ridges (Meriden Mountain, Talcott Mountain, etc.). One of the fissures through which the magma¹ rose up to the surface passes through Orange.

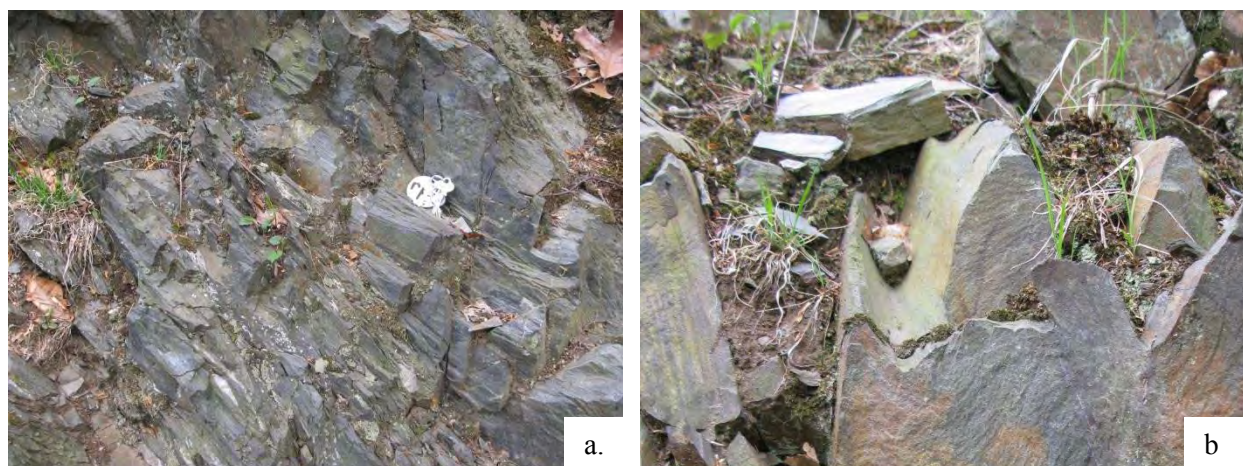


Figure 3. a. Outcrop of phyllite mapped as the Wepawaug Schist by Fritts (1965). Layers are tilted toward the northwest. Disc on key-chain in right-center is 2" (5 cm) in diameter. b. Fold in layering. Small tufts of grass are about 1" (2-3 cm) for scale.

The fissure is concealed beneath the glacial soil in the northeast part of the parcel (it is exposed on land west of Lambert Road; see Figure 2) It is evidenced only by the basalt glacial erratics (Figure 4a) that are most abundant in the northeastern portion of the parcel. The magma intruded into the preexisting metamorphic rocks through fractures in the rock. Magma left in the fracture after eruption at the surface cooled and solidified, forming what geologists refer to as a dike. The basalt dike has been mapped by Rodgers (1985) based on regional magnetic anomalies in the area.

¹ Magma is the term given to molten rock that does not erupt at the surface; once magma reaches the surface it is referred to as lava.

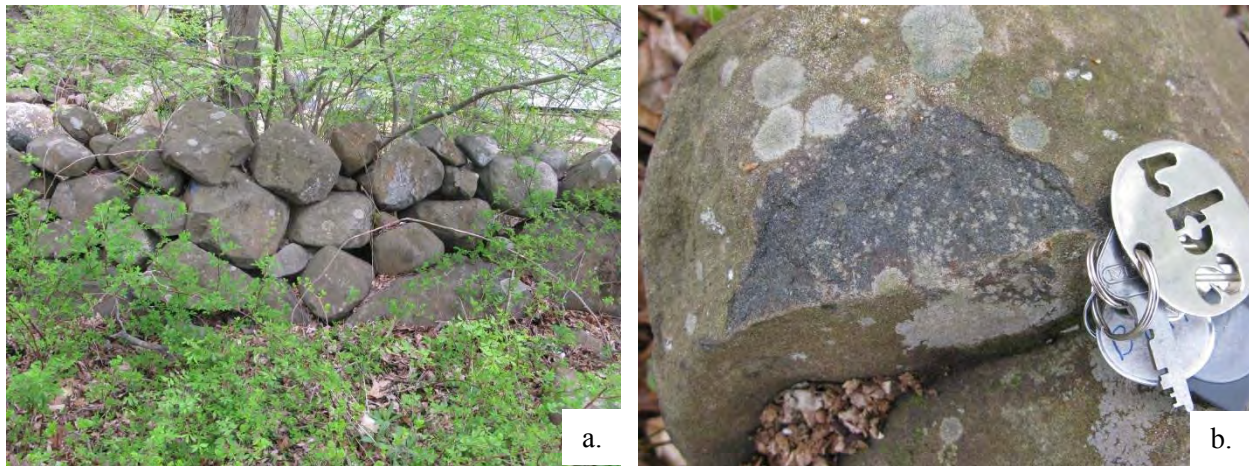


Figure 4. a. Stone fence composed of erratics of basalt in northern portion of parcel. Each erratic boulder is 1-3 feet (.40-100 cm) in diameter. Fence at this location is composed entirely of basalt erratic boulders. b. Broken surface of basalt showing dark gray fresh surface and brownish weathered outer surface. Disc on key-chain is 2" (~5 cm) in diameter.

Basalt, also called dolerite and/or diabase is an igneous rock that formed by cooling and solidification of once molten rock. It is finely crystalline (crystals are about 0.25 mm in length or smaller), composed of plagioclase feldspar and pyroxene and magnetite; the latter two are iron bearing minerals that, during weathering, produce a brownish color to the outside of boulders (erratics) seen in the stone fences on the property. A broken surface of the basalt boulders is dark gray (Figure 4b).

Surficial Geology. Surficial materials (excluding soils) are mapped by Flint (1968) and Stone and others (2005). Both maps show the Ewen farm area to be covered with glacial till exclusively (Figure 5 shows interpretation of Stone and others). Glacial till consists of the unsorted debris carried by the Ice Age glaciers and left covering the ground after the ice melted.

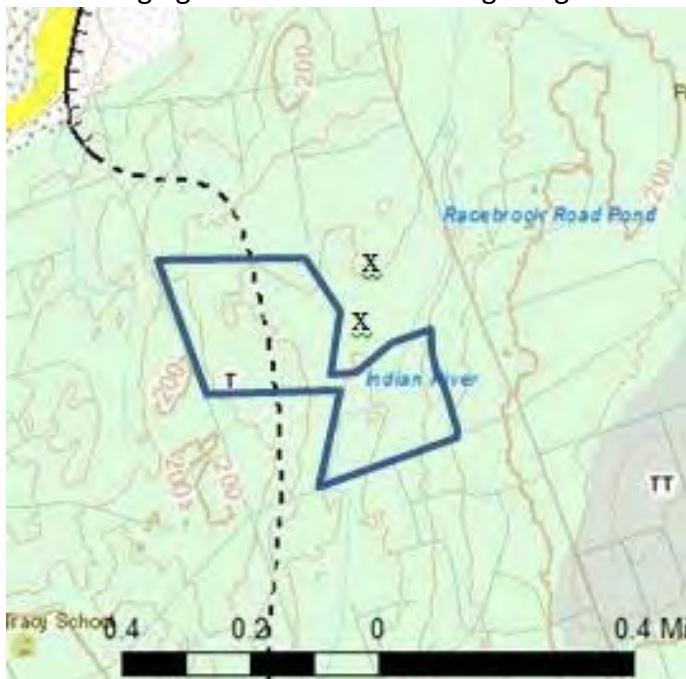


Figure 5. Surficial geologic map of the Ewen Farm Preserve and surround area (Stone, and others, 2005). Pale green area covered by glacial till less than 30' thick; gray area covered by thick till, pale yellow area covered by sand and gravel, bright yellow area covered by Recent alluvium. Dashed line = approximate edge of melting glacier. Outline of Preserve (blue line) very approximate. X is the approximate location of gravel observed on field excursion.

Warzecha (1985, p.7), however, believed that sand and gravel was deposited by post-glacial meltwater streams along the valley axis. This is supported by the occurrence of Woodbridge (sandy) soils along parts of the lower valley slopes. No other evidence of the valley sand deposits were seen in the field. However, during our field visit, a ridge of gravel (Figure 6) was observed just north of the parcel boundary west of the Indian River (indicated by x's on Figure 5). The origin of this ridge was not interpretable due to lack of exposure (it is mostly soil covered). The extent of the deposit was not determined during the field visit. Excavation in the nearby housing subdivision exposed the gravel.

Glacial erratics are widely distributed over the parcel (see Figure 4). Most in the northeastern are composed of basalt. In the northwestern portion of the area some erratics are composed of phyllite, but notably many are composed of quartz vein material that presumably was formed within the Wepawaug Schist.



Figure 5. a. Surface evidence for sand and gravel deposit just north of Preserve boundary on west side of Indian River. b. Gravel deposit has shape of mound. c. Excavation in gravel north of Preserve in sub-division.

References:

- Bell, Michael, 1985, *The Face of Connecticut*. State Geological and Natural History Survey, Bull. 110, 196p.
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- Stone, J.R., Schafer, J.P., London, E.H., DiGiacomo-Cohen, M.L., Lewis, R.S., and Thompson, W.B., 2005, *Quaternary Geologic Map of Connecticut and Long Island Sound Basin* (1:125,000). U.S. Geol. Surv. Sci. Invest. Map # 2784.
- Warzecha, William, 1985, Geology, in *Meadowbrook Farms, Orange, Connecticut*. King Mark Environmental Review Team Report, Feb. 1985, 34p.

SOILS REVIEW

The soils on the Ewen Farm are a combination of Glacial Tills in the southeast and northwest corners and Glaciofluvial (outwash) deposits in the slightly lower elevation portion in the middle. A map from the National Cooperative Soil Survey of Connecticut is included along with brief descriptions of the map units. The soil survey was mapped at a 1:12000 scale (1" equals 1000'). Map units may contain inclusions of similar or dissimilar soils. An on-site is always recommended before any type of construction is done.

Charlton and Canton soils are well drained, stony glacial till soils. They have sandy loam textures and generally no restrictive layers within 60 inches. Chatfield soils are also well drained, stony, glacial till soils, but have bedrock within 20 -40 inches of the surface. Sutton soils are similar to Charlton except they are moderately well drained. They may have a seasonal high water table within 24 inches of the soil surface from late fall to early spring. Wetlands in the glacial till areas are made up of a combination of Ridgebury, Leicester and Whitman soils. They are rocky, poorly and very poorly drained soils and may have a dense till restrictive layer.

Agawam and Ninigret soils consist of loamy wind-blown surface materials over glaciofluvial sands and gravels. Agawam is a well drained soil and Ninigret is moderately well drained. Hinckley is an excessively drained soil derived from sandy and gravelly glaciofluvial deposits. Hinckley soils lack the thick loamy cap found on Agawam and Ninigret soils. Wetlands in the glaciofluvial area of the farm are mapped as Raypol silt loam. It is a poorly drained soil of loamy wind blown deposits over glaciofluvial sands and gravels.



Wetland boundaries were refined on a 2007 survey at a scale of 1" = 100'. This map was provided by the town.

Land use on the farm, a combination of woodland and hayland, is in keeping with the soil suitability. Rocky, shallow, or steep areas remain in trees. Wetlands are either wooded or in grass. Long Meadow could be cleared and renovated to more productive hayland again. The wetland boundary to the north should be flagged before any work is done. No stumping, filling or draining should take place in the wetland. Some portions of Long Meadow and Ox Lot are level enough for cropping. Many of the open areas would be suitable for fruit trees or berry bushes. Any vegetable or fruit crops would need supplemental water for irrigation. A conservation plan should be developed before converting hayland into another crop. Erosion control measures and other practices to protect soil health and water quality should be included. (See Conservation District section for further information).

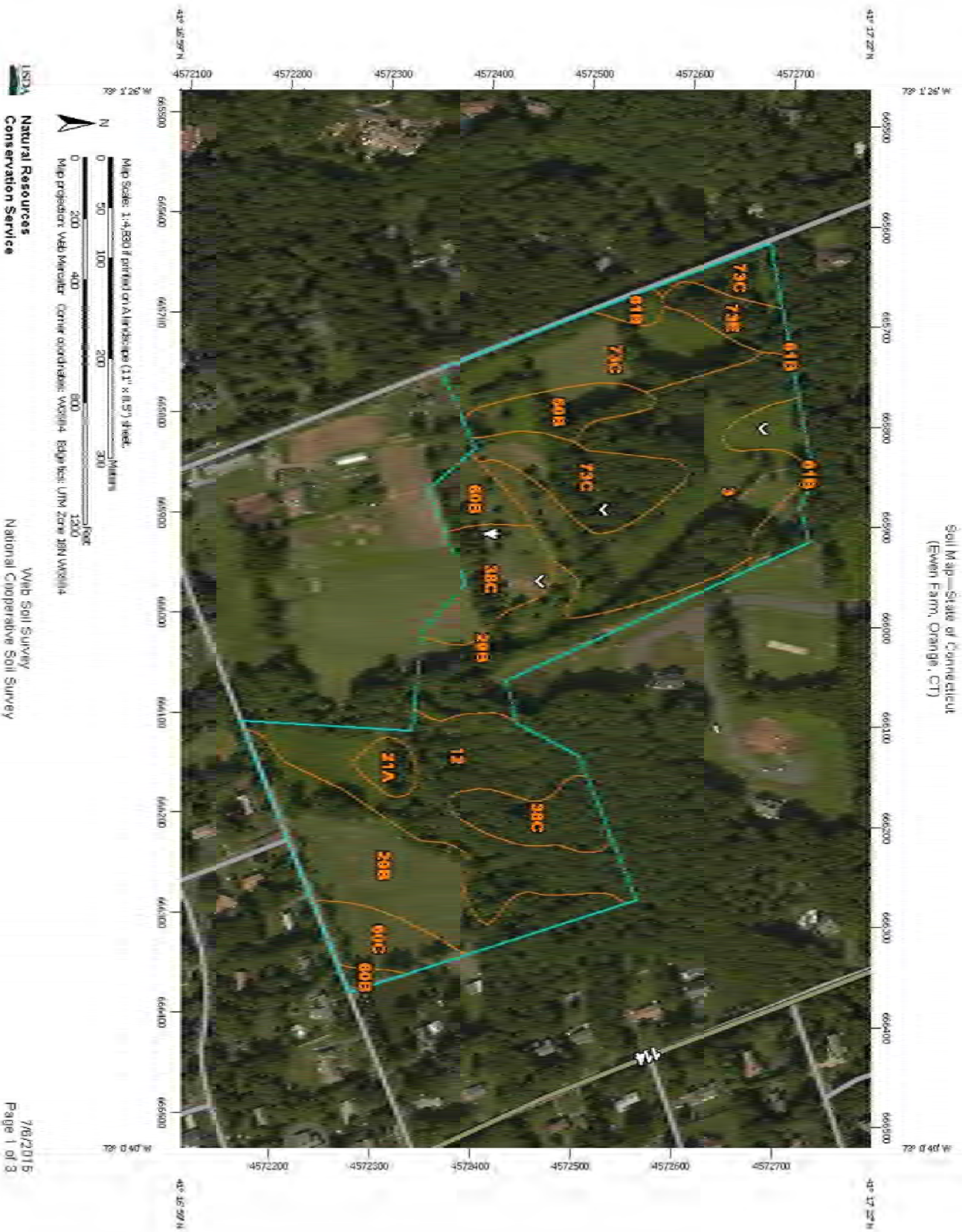


The Ox Lot hayfield on May 6, 2015



Long Meadow with remnants of the Christmas tree farm on May 6, 2015.

Soil Map—State of Connecticut
(Ewen Farm, Orange, CT)



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

MAP LEGEND

- | | |
|--|---|
| <p>Area of Interest (AOI)</p> <ul style="list-style-type: none"> Area of Interest (AOI) <p>Soils</p> <ul style="list-style-type: none"> Soil Map Unit Polygons Soil Map Unit Lines Soil Map Unit Points <p>Special Point Features</p> <ul style="list-style-type: none"> 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 | <p>Special Line Features</p> <ul style="list-style-type: none"> Spill Area Stony Spot Very Stony Spot Wet Spot Other <p>Transportation</p> <ul style="list-style-type: none"> Rails Interstate Highways US Routes Major Roads Local Roads <p>Background</p> <ul style="list-style-type: none"> 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 or 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: <http://websoilsurvey.nrcs.usda.gov>
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 13, Oct 28, 2014

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

Date(s) aerial images were photographed: Jun 27, 2014—Jul 22, 2014

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

State of Connecticut (CT600)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	9.0	19.4%
12	Raypol silt loam	7.3	15.7%
21A	Ninigret and Tisbury soils, 0 to 5 percent slopes	0.6	1.4%
29B	Agawam fine sandy loam, 3 to 8 percent slopes	9.8	21.0%
38C	Hinckley gravelly sandy loam, 3 to 15 percent slopes	4.2	9.0%
50B	Sutton fine sandy loam, 3 to 8 percent slopes	1.6	3.5%
60B	Canton and Charlton soils, 3 to 8 percent slopes	1.4	2.9%
60C	Canton and Charlton soils, 8 to 15 percent slopes	1.6	3.5%
61B	Canton and Charlton soils, 3 to 8 percent slopes, very stony	1.9	4.1%
73C	Charlton-Chatfield complex, 3 to 15 percent slopes, very rocky	8.0	17.1%
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	1.2	2.5%
Totals for Area of Interest		46.6	100.0%

CONSERVATION DISTRICT REVIEW

Soils Resources

The soils information in this report is based on the historical soils series descriptions, the USDA Web Soil Survey, and field observations.

Mapping Units - Exhibit #1 – Web Soil Survey Map

Wetland Soils

1) USDA Soil #3 - Ridgebury, Leicester and Whitman extremely stony fine sandy loams.

This unit consists of nearly level to gently sloping, poorly drained soils in drainageways and depressions on glacial uplands. Ridgebury soils are very deep and derived mainly from gneiss and schist. Stones and boulders cover 5 to 35 percent of the surface.

The permeability of this soil is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. This soil has a seasonal high water table at or near the surface from late fall through spring. The slow or very slow permeability in the substratum and the seasonal high water table make this soil poorly suited to community development.

This mapping unit is approximately 9.1 acres in size and runs through a significant portion of “North Lot” that borders the subdivision development on St. Johns Drive and also “Long Meadow.”

2) USDA Soil #12 - Raypol silt loam.

This nearly level, poorly drained soil is in depressions or low areas of terraces and outwash plains. Slopes range from 0 to 3 percent but are dominantly less than 2 percent. This soil has a seasonal high water table at or near the surface from late fall through mid-spring. Most areas of the soil are wooded, but the soil is poorly suited to trees. The main limitation is wetness. The seasonal high water table makes this soil poorly suited to community development.

This mapping unit is approximately 7.6 acres in size and makes up a significant portion of the forested and open section of “Brook Lot” along Tyler City Road.

Wetland Crossings and Trails – Upland trails leading to the wetlands require greater buffering distances, erosion and siltation control, and less intrusive, raised walkways across wetland areas. Utilize composite wood that won’t leach toxins.

Active recreation should be relegated to specific areas to cross any wetlands or watercourses on site. Minimize the size of the crossing, provide hard armoring of the crossing and stabilize the upslope area leading to these crossings.

- Both sides of the stream crossing between “Barn Meadow” and “Brook Lot” are eroding when water backs up behind the culverts at a time of high flow and flows around it. Re-vegetate the eroded areas to curtail further soil loss and consider using larger 24 inch culverts.



Looking at culvert crossing of the Indian River
between Barn Meadow and Brook Lot.



Looking back toward culvert crossing area
from Brook Lot side, area in foreground floods.

Non-wetland Soils

3) **USDA Soil #21A - Ninigret and Tisbury soils, 0-5 percent slopes.**

This is a nearly level, moderately well drained soil that can be found in slight depressions of broad outwash terraces and narrow stream valleys. Permeability is moderately rapid in the surface layer and subsoil and rapid in the substratum. It has a seasonal high water table at a depth of 20-24 inches from late in the fall until mid-spring.

Ninigret and Tisbury soils have fair to poor potential for community development. Runoff and erosion will be slow and easy to control with simple conservation measures.

This mapping unit is approximately half an acre in size and makes up a small lobe inside of the Raypol soil on the southern end of "Brook Lot."

4) **USDA Soil #29B - Agawam fine sandy loam, 3-8 percent slopes.**

This gently sloping, well-drained soil is on outwash terraces of stream valleys. Permeability is moderately rapid in the surface layer and subsoil and rapid in the substratum. Runoff is medium.

Agawam soil has a good potential for community development and landscaping, however, the rapidly permeable substratum requires caution be taken in some areas to prevent pollution of ground water. Conservation measures are needed during any development to prevent excessive runoff, erosion, and siltation.

This mapping unit is approximately 8.6 acres in size and is located mainly in the "Barn Meadow" section that bridges the two halves of the Ewen Farm Preserve.

5) **USDA Soil #38C- Hinckley gravelly sandy loam, 3-8 percent slopes.**

This soil type is gently sloping, excessively drained, and found on outwash terraces of stream valleys. Permeability is rapid in the surface layer and subsoil and very rapid in the substratum. Runoff is medium.

Hinckley soils have a good potential for community development, though the droughtiness of this soil is a major concern in landscaping. The very rapid permeability requires that caution be taken to prevent pollution of ground water. Simple conservation measures are generally adequate to prevent excessive runoff, erosion, and siltation.

This mapping unit is approximately 4.4 acres in the northern, forested section of “Brook Lot.”

6) USDA Soil #50B - Sutton fine sandy loam, 3-8 percent slopes.

This gently sloping, moderately well drained soil is in slight depressions on glacial till plains and near the base of slopes on glacial uplands where the relief is affected by the underlying bedrock. In a few areas, stones and boulders cover up to 3 percent of the surface. It is often used to grow hay or corn, but wetness is the major limiting factor.

The seasonal high water table is at a depth of about 20 inches from late in the fall until mid-spring. Permeability is moderate or moderately rapid. Runoff is medium. The soil has a fair potential for community development, but conservation measures are needed to prevent excessive runoff, erosion and siltation. It is well suited to landscaping but remains wet and soggy for several days after heavy rain.

This mapping unit is approximately 1.6 acres in size and runs through a piece of “Square Lot” as well as “Long Meadow.”

7) USDA Soil # 60B - Canton-Charlton fine sandy loam, 3 to 8 percent slopes.

USDA Soil # 60C - Canton-Charlton fine sandy loam, 8 to 15 percent slopes.

This sloping, well-drained soil can be found on the sides of hills and ridges. The permeability is moderate or moderately rapid, runoff is rapid, and available water capacity is moderate. The erosion hazard is moderate to severe, depending on the steepness of the slope, and if developed, is a major management concern and will require conservation measures to prevent excessive runoff, erosion, and siltation.

This mapping unit approximately 2.8 acres and can be found on the eastern edge of “Brook Lot” and in “Long Meadow.”

8) USDA Soil # 61B - Canton-Charlton soils, very stony, 3 to 8 percent slopes.

This gently sloping, well-drained soil is coarse-loamy over sandy and gravelly melt-out till derived from granite and/or schist and/or gneiss, and can be found on hills on uplands. Most areas are in residential development or woodlands, some in pasture. Stones and boulders cover up to 3 percent of the surface and are commonly below the surface, which can be a limitation for landscaping.

Permeability is moderately rapid to very rapid and runoff is medium. The depth to seasonally high water table is greater than 6 feet. There is a hazard of ground water pollution because the rapidly permeable substratum does not adequately filter effluent. The erosion hazard is moderate, which will require conservation measures if developed.

This mapping unit is approximately 3 acres in size and can be found at the Lambert Road entrance to “Rock Lot” and the northern portion of “North Lot.”

9) USDA Soil #73C - Charlton-Chatfield very rocky soil, 3 to 15 percent slopes.

USDA Soil #73E - Charlton-Chatfield very rocky soil, 15 to 45 percent slopes.

This complex consists of sloping to very steep well-drained soils located on uplands where the relief is affected by underlying bedrock. They have an undulating topography marked with bedrock outcrops, a few drainageways, and a few small wet depressions. Most areas are wooded. Stone and boulders cover 1 to 5 percent of the surface. The Charlton component has moderate or moderately rapid permeability. Runoff is medium to rapid. The Chatfield component has moderate to moderately rapid permeability above the bedrock.

This mapping unit is 10 acres in size and is located in the western section of the Ewen Farm Preserve, along Lambert Road in both “Rock Lot” and the majority of “Square Lot.”

Concern

Enhanced conservation measures are needed with the increase in steepness of slope. The fine particulates of schist and gneiss associated with these soils stay in suspension for extended periods. Limiting land disturbances atop of these soils, which requires the rerouting of trails and limiting public access to these steeper areas, can avoid contamination from siltation.

To reduce runoff volume and velocities, provide a runoff diversion at the top of slope and install water bars across trails at intervals dictated by slope angle at length shown (2002 CT E&S Guidelines).

Water bar Spacing along Steeper Trails:

1% slope @ 440'	2% slope @ 245'	5% slope @ 125'
10% slope @ 78'	15% slope @ 58'	

Land Use Planning Opportunities

- **Land Trust**

Consideration should be given to transferring the land to Land Trust control as a conservation easement. Land Trusts have an ongoing responsibility to manage and protect the land under their care. As 501(c)3 non-profit organizations, they can receive additional funding opportunities, including Federal funds, which are not available to Municipalities.

- **Conservation / Forest Management Plan**

The property needs to have a long-term natural resource conservation / forest management plan, which encompasses goals and objectives for increasing and maintaining soil health, biodiversity, integrates year round passive recreational uses that can provide a platform for education that showcases and preserves its natural resources, provides public access, and serves the citizenry of the Town of Orange while advocating for all environs on and abutting this site.

EQIP - Environmental Quality Incentive Program - USDA NRCS

Municipalities and Private Landowners are eligible to participate in a cost-share program for cities and towns in implementing practices to maintain or establish wildlife habitats. These practices include invasive plant control, early successional woodlands, riparian areas; state identified imperiled habitats plus streams and rivers. Contact:

Diane Blais, District Conservationist
USDA, Natural Resources Conservation Service
51 Mill Pond Road
Hamden, CT 06514-1703
(203) 287-8038 (phone)

- **Farming - Best Management Practices**

It would be beneficial to include a list of best management practices, recommended through an NRCS conservation plan (see above), into the farming lease agreements to ensure good stewardship of the land.

Recommendations from NRCS on the usage of highly erodible land (HEL) can help determine which crop is best suited for lots that are designated for farming use.

- **Environmental Education**

Trails are a great way to bring people face to face with nature. Establish a trail system guided by the protection and preservation of critical habitats, promotes the minimization of land disturbance, which ultimately reduces potential impacts from erosion and siltation of sensitive habitats from horticultural and recreation activities.

Specific habitats on site could utilize strategically placed pavilions on the trail that could serve as staging areas for outdoor living classrooms throughout the property. This would expand and enhance all grade level science based curriculums in the Orange school system, its citizens and other associated environmental groups.

(Guidance and assistance on the development and maintenance of trail systems can be found through the CT Forest & Park Association)

Connecticut Forest & Park Association
(CFPA)

16 Meriden Road
Rockfall, CT 06481-2372
(860) 346-TREE



Pond Science

The pond located on “North Lot”, just east of the stone wall from “Rock Lot”, is an excellent resource and opportunity for hands-on science and learning about freshwater ecology. This could be anything from collecting samples for simple water chemistry tests and viewing microorganisms

through a microscope, observing aquatic and terrestrial wildlife up close in their natural habitat, to learning about native and invasive plant species associated with ponds. An observation deck that extends out into the pond is something to consider, as it will give groups of students or classes easier access to view the habitat up close.

The development of a comprehensive land use management plan for this property will greatly ensure the protection and preservation of the area's water quality, wildlife habitat enhancement and provide open space access to the community while promoting greater environmental awareness.

WETLANDS REVIEW

Introduction:

Two large wetland systems, referred to as Wetlands 1 and 2 in this section of the report, flank the east and west lower slopes of the drumlin hill located in the center of the LaSalette Open Space property (Figure 1). A description and functional assessment of these wetland systems is provided below, along with recommendations to maintain and enhance their functional values.

Area #1:

This seasonally flooded deciduous wooded swamp is crossed by a dirt road. Surface water discharges from the swamp through a culvert below the road. This constriction causes water to be retained in the swamp for extended periods of time. The former owners of the property indicated that the swamp holds water throughout most of the year, and that spotted salamanders can be found there. If this is true, then the swamp may provide vernal pool habitat. On the inspection date the swamp contained an extensive amount of inundation (Photo 1).

Area # 2:

This former farm pond lies immediately east of Area #1, across a dirt road (Photo 2). Green frogs, bullfrogs and red-winged blackbirds were all vocalizing from the pond. According to the former property owners, this small pond develops a lot of algae in the summer months.

Area # 3:

This area is the location of a former farm road crossing of the Indian River and its associated riparian wooded swamp (Photo 4). Small twin culverts below this farm road restrict the flow of the river, and may serve as a barrier to the movement of finfish and other aquatic life (Photo 3). Pickerel frogs, yellow warblers and red-wing blackbirds were observed at this location. Red maple, silky dogwood, spotted alder, skunk cabbage and jewelweed grow in the swamp near this crossing.

Area # 4:

A wooden bridge (Photo 5) crosses the Indian River at this location, upstream of Area #3. This segment of the river contains rocky riffle and run habitats (Photo 6). The riparian swamp shades the channel and stabilizes its banks. Areas with a moderate amount of bank undercutting provide cover habitat for finfish.

Area # 5:

In order to create a loop trail system, a boardwalk crossing of a deciduous wooded swamp is being considered at this location (Photo 7). The swamp supports red maple, spicebush, cinnamon fern, sensitive fern, skunk cabbage and marsh violet. A shallow, very low gradient seasonal watercourse flows through this swamp (Photo 8). A wood frog was observed in this watercourse (Photo 9), and a pair of juvenile garter snakes were found beneath a cover object in the adjacent upland forest (Photo 10).

Area # 6:

This small former farm pond (Photo 11) is similar in character to Area #2. Green frogs were vocalizing there, and the former property owners reported observing herons and ducks in the pond. Filamentous green algae covered approximately one third of the pond surface on the inspection date.

Wetland Functions and Values

The large, interconnected wetland system on the property provides a variety of functions/ecological services:

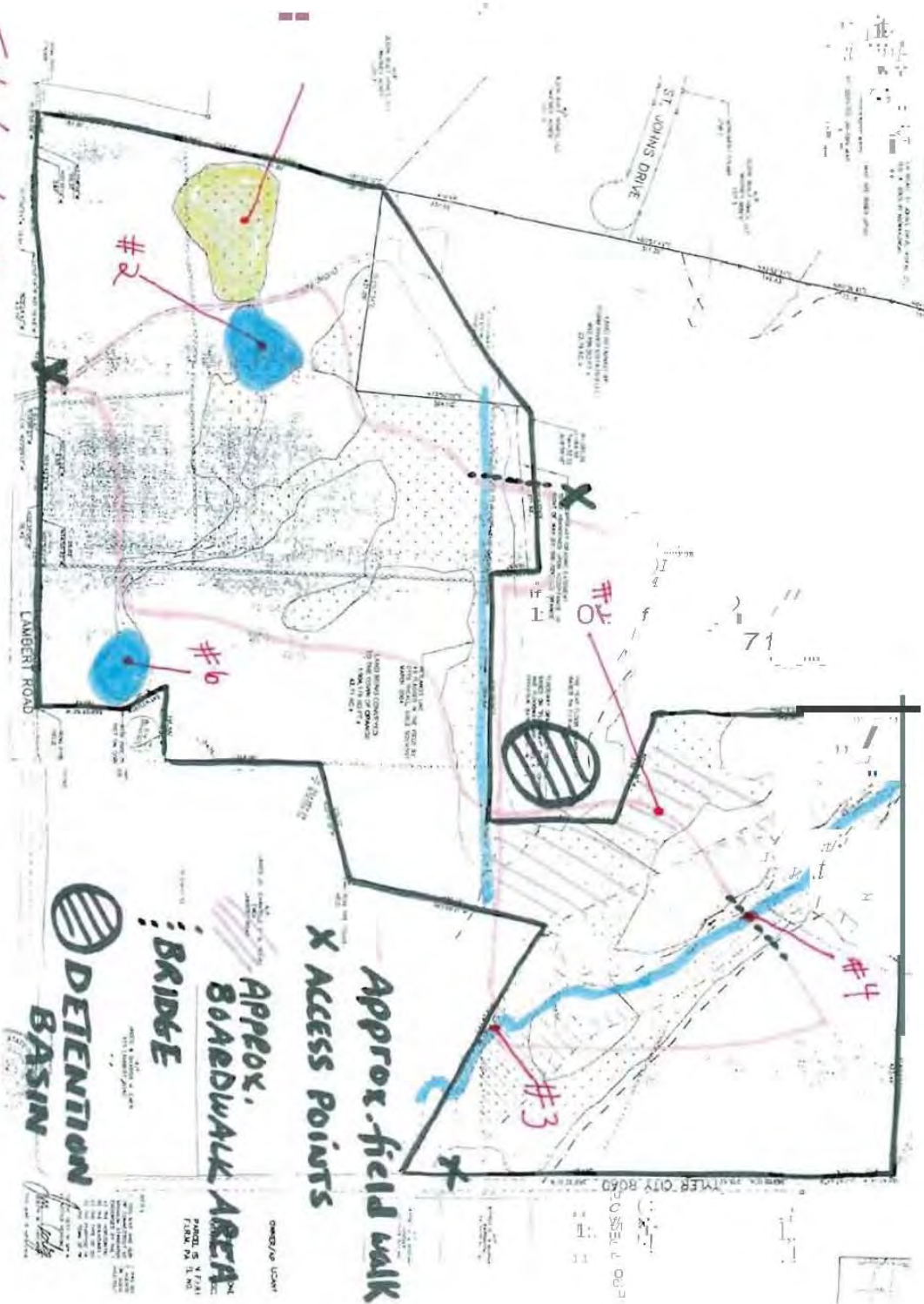
- **Groundwater Discharge and Recharge** - Active groundwater discharges were observed at several locations in the wetland during the site inspection. These discharges support the baseflow of the Indian River. Groundwater recharge likely occurs in the wetland during the drier summer months, when the groundwater table is lower and does not preclude infiltration.
- **Floodflow Alteration** - The gently sloping, densely vegetated riparian swamps, wet meadows and small ponds detain and slowly release a significant amount of stormwater runoff.
- **Pollutant Removal** - The gentle slopes and dense vegetation that characterize the wetland allow it to remove a variety of solid and dissolved pollutants from stormwater runoff.
- **Production Export** - Biomass generated by the dense vegetation in the wetland decomposes and is seasonally exported into the Indian River, supporting the biota in the river and in downstream aquatic systems.
- **Wildlife Habitat** – The large wetland on the property provides a diversity of habitats: riparian wooded swamp, perennial and seasonal watercourses, wet meadow and open water. These habitats have the capacity to support a diverse and abundant wildlife community, some of which was observed during the site inspection, as described above.
- **Finfish Habitat (Ponds and Lakes; Streams and Rivers)** - The two constructed ponds likely sustain a warm water finfish community (sunfish, etc.). Due to its instream habitat diversity (riffle, run), shaded channel, stable banks, cover habitat (undercut banks, instream rocks), the Indian River very likely supports a diverse finfish community.
- **Recreation** – The Ewen Farm Preserve offers excellent recreation opportunities, in large part due to its wildlife resources. Fishing is available at the two small ponds, and a variety of avians, reptiles and amphibians can be observed in and near the wetlands.
- **Educational/Scientific Value** - The small ponds in the Indian River provide opportunities for a variety of aquatic studies. If in fact Area #1 is a vernal pool, this resource could provide the setting for investigations of this unique habitat.

Recommendations

1. The construction of a wooden boardwalk across the deciduous wooded swamp at Area #5 is being considered in order to create a loop trail system. This concept has merit because it would allow visitors to traverse the property without backtracking. However, the exact location of the crossing would require a detailed study to minimize wetland impacts. All necessary local, state and federal wetland permits would need to be obtained prior to any construction in the wetland.
2. As noted above, the farm road crossing of the Indian River at Area #3 is accomplished with small twin culverts, which constrict the flow and likely create barriers to the movements of aquatic life. Consideration should be given to removing this barrier by replacing these small twin culverts with an open bottom structure, such as a wooden bridge or arch/box culvert

Figures

Site Location Map

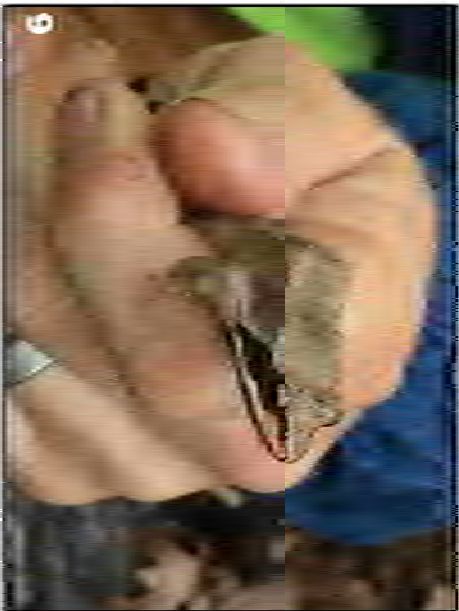




Ewen Farm Preserve Orange, CT 5/19/15 1. Vernal pool (Area #1) 2. Former farm pond (Area #2) 3. Twin culverts at farm road crossing of Indian River (Area #3) 4. Indian River (Area #4)



Ewen Farm Preserve Orange, CT 5/19/15 5. Wooden bridge over Indian River (Area #4) 6. Indian River (Area #4)
7. Deciduous wooded swamp where boardwalk crossing is proposed (Area #5) 8. Seasonal watercourse in Area #5



9



11



10



12

Ewen Farm Preserve Orange, CT 5/19/15 9. Wood frog in Area #5 10. Juvenile garter snake in upland near Area #5
11. Former farm pond (Area #6) 12. Wet meadow

LANDSCAPE ECOLOGIST REVIEW

The Ewen Farm Preserve has many habitat features that make it the kind of open space that contributes to people's quiet enjoyment of nature as well as providing food and shelter to a diversity of wildlife species. The large trees in the forested area bordering the Indian River provide valuable habitat for birds and bats as well as forest understory plants. Large trees when they die standing or fall to the ground also provide desirable wildlife habitat for birds and mammals. While the forested tract itself is not of a size to be valuable for species that require large, *unbroken* forest tracts, there is perhaps some connectivity via the Indian River to the Shelton Reservoir area to the north for species with large home ranges.

The overall landscape pattern of forest edges, ponds, hedgerows, and hay fields is the type of habitat that can support a variety of wildlife species that thrive in places where there is both wooded cover and open area. The presence of water (ponds, temporary pond near the Rock Lot, the Indian River, and even the ditch east of Long Meadow) is a bonus.

Plants

There have been multiple plant lists made for the property. The information from the 1985 Environmental Team Meadowbrook Farms Report, a recent list, and a list based on an ERT walk-through of the property in May 2015 have been combined into a single list included in this report that can be found in the Appendix. Forty-eight native species have been reported for the property (including Ground Pine, and Wild Geranium from the 1985 survey which included a larger area). Of those, 34 were noted in the May 2015 walk through. The number of natives is likely higher than 48 in that the property was not systematically surveyed; some plants were not able to be identified as to species early in the season; and, additional species recorded just outside the boundary are likely also present on the property.

The following ***invasive plant species*** were observed on or adjacent to the property:

Common Name	Scientific Name
Autumn-Olive	<i>Elaeagnus umbellata</i>
Black Swallow-wort	<i>Cynanchum louiseae</i>
Garlic Mustard	<i>Alliaria petiolata</i>
Gill-over-the ground	<i>Glechoma hederacea</i>
Japanese Barberry	<i>Berberis thunbergii</i>
Japanese Honeysuckle	<i>Lonicera japonica</i>
Japanese Knotweed	<i>Fallopia japonica (Polygonum cuspidatum)</i>
Moneywort; Creeping Yellow Loosestrife	<i>Lysimachia nummularia</i>
Multiflora Rose	<i>Rosa multiflora</i>
Oriental Bittersweet	<i>Celastrus orbiculatus</i>
Privet sp.	<i>Ligustrum sp.</i>
Reed Canary Grass	<i>Phalaris arundinacea</i>
Winged Euonymus	<i>Euonymus alatus</i>

Recommendations for Additional Natural Resources Investigations

1. The pool north of the cart path that runs through the Rock Lot towards St. Johns Drive should be examined for the presence of vernal pool obligate species. In Connecticut, these species are Wood Frog, Spotted Salamander, Marbled Salamander, Fairy Shrimp, Blue-spotted Salamander, and Jefferson Salamander.

The most likely species would be (1) Spotted Salamanders which have cohesive egg masses (each group of eggs is enclosed in a cohesive jelly that holds together – often with the general shape of a tennis ball) and (2) Wood Frogs whose egg masses, unlike those of Spotted Salamanders, have many eggs and are not cohesive. Female wood frogs tend to lay their egg masses with those of other females, creating large, loose, jelly-like egg masses. Look for Spotted Salamander and Wood Frog egg masses in early spring along with Fairy Shrimp in very early Spring.

Obligate and non-obligate (facultative) vernal pool species are depicted in the book *A Field Guide to the Animals of Vernal Pools* by Leo Kenney and Matthew R. Burne which is a publication of the Massachusetts Natural Heritage and Endangered Species Program.

<http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/publications-forms/publications/>

The Massachusetts vernal pool certification guidelines provide a good description of what species and conditions determine if you have a vernal pool.

<http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/vernal-pools/vernal-pool-certification.html> (click on the button for Vernal Pool Certification Guidelines)

The Berkshire Environmental Action Team provides an additional source of vernal pool photos.

<http://www.thebeatnews.org/BeatTeam/vernal-pool-species/>

<http://www.thebeatnews.org/BeatTeam/vernal-pool-photos/>



Wetland pool area north of cart path that runs from Rock Lot to St. Johns Drive in early May.

2. It would be worth being on the alert for Eastern Box Turtles in the Ewen Farm Preserve.

Eastern Box Turtles, which may be recognized by their high, dome-shaped shells, are a Connecticut Species of Special Concern that is reported from Orange north of the Ewen Farm Preserve. They may be found in field, edges, woodlands, thickets, marshes, bogs, and streambanks. They are typically found in well-drained bottomlands and open

deciduous forests. The females will lay eggs in hay fields, roadsides, cultivated gardens, beach dunes, woodlands, and around house foundations. They are of special concern because their numbers are reduced because of illegal collection as pets and habitat fragmentation which deprives turtles of places to go for food, shelter, nesting, and hibernation (and can cause death directly when individuals crossing roads are hit by cars). (See the Appendix for a fact sheet on Eastern Box Turtles.)

3. Continue to maintain records of plant and animal sightings on the property.

Management Considerations

1. Without mowing, the fields will not remain open.
2. There is some wildlife value in mowing the field edges infrequently (say every three to five years) to create shrubby habitat; there also is risk of establishment of undesirable, invasive shrubs.
3. Mowing currently is preventing the tall growth of Poison Ivy in the open areas. However, where foot traffic is expected and desired (for example, the stone bridge across the Indian River), control of the Poison Ivy by grubbing or herbicide is recommended.
4. If there is a farmer interested in the hay, it might be worth looking at the possibility of improving the quality and quantity of the hay through focused land management. One possible source of resources planning and conservation assistance is the USDA Natural Resources Conservation Service office in Hamden, Connecticut (203-287-8038) which works with private landowners (and people who have control of rented land).
5. If the boundaries between the St. Johns Drive subdivision and the Preserve are not clearly marked, this should be done, particularly where trails cross the boundary.
6. Garlic Mustard, an invasive biennial plant, is present on the property. The densest stand observed was adjacent to the Preserve in the open area east of Long Meadow and Barn Meadow. Garlic Mustard is shade tolerant and leafs out early in the season presenting the risk of its outcompeting the diverse array of delicate, native, understory herbaceous species in the forest and in riparian

areas. It spreads by seed and can develop dense stands.

In the forested tract (including associated wet areas), active searching and pulling is recommended. As a biennial, it does not flower until its second year, at which time it sends up a flowering shoot. Flowering plants when pulled often still have the strength to produce viable seeds and thus should be bagged rather than tossed aside.

Because some seeds may not sprout the year after they are



Dense stand of garlic mustard in early May.

produced, it is a good idea to repeatedly re-check areas where Garlic Mustard was pulled in previous years.

Other places recommended for Garlic Mustard control are at the parking area on Lambert Road and scattered trail side locations. The goal here is to prevent the spread of seed by people's shoes.

7. Japanese Knotweed is present in the open area east of the pond which borders the Rock Lot. Its spread appears to somewhat held in check by mowing, but it should be noted that this species has long, strong rhizomes and without a strong and frequently repeated control efforts, it will spread.

There are a variety of sources of information on control of Japanese Knotweed.

http://dnr.wi.gov/topic/invasives/documents/japanese_knotweed_control.pdf

<http://efotg.sc.egov.usda.gov/references/public/NH/KnotweedFS.pdf>

www.michigan.gov/documents/dnr/knotweed_BCP_372280_7.pdf

Note that when the tops are killed, the attached rhizome may sprout up a new stalk farther away than a person might have thought to look (e.g., 50 feet away or more). Thus, follow-up monitoring should include looking beyond the immediate area that was treated.



Japanese knotweed May 6, 2015



Japanese knotweed May 19, 2015



Japanese knotweed June 19, 2015

8. Multiflora Rose is present in a variety of places including Long Meadow. As a general rule, note that while mowing or grazing will keep it under control, these activities do not eliminate Multiflora Rose. Further, through time, large root systems may develop with the result that upon the cessation of mowing or grazing, the plants make rapid and expansive above-ground growth.
9. Black Swallow-wort was observed near the Rock Lot entrance to the Preserve just off of the mowed path. This vine is difficult to eradicate. If the population is thought to be small enough to eradicate, then it should be addressed soon as the plants will only spread if not controlled. If eradication is not



Black Swallow-wort in the Rock Lot

attempted, mowing will help somewhat keep it in check in the field. Studies have shown that when Milkweed-seeking Monarch Butterflies lay eggs on Black Swallowwort, the larvae do not survive after hatching. Monarch caterpillars will die when they start feeding on the swallow-wort. Some sources of information on management include:



Common milkweed growing adjacent to the Black Swallow-wort in the Rock Lot.

A USDA-NRCS Invasive Species Identification Sheet for Swallow-wort can be found in the Appendix.

10. Consider planting native shrubs for wildlife in Long Meadow. These may need to be enclosed with deer fence to allow for establishment. Watering in the first year is recommended.



Long Meadow looking easterly on May 6, 2015. The red arrow indicates the same tree in each photo.



Long Meadow looking easterly on June 19, 2015. The red arrow indicates the same tree in each photo.

Some species that have some resistance to deer browsing include:

Scientific Name	Common Name	Sun	Soil Moisture
<i>Alnus incana</i> ssp. <i>rugosa</i>	Speckled Alder	Sun to Part Shade	Moist to Wet
<i>Amelanchier laevis</i>	Alleghany Serviceberry	Sun to Part Shade	Moist
<i>Cephalanthus occidentalis</i>	Buttonbush	Sun to Part Shade	not dry
<i>Clethra alnifolia</i>	Summersweet	Sun to Shade	Moist to Wet; well-drained
<i>Cornus (Swida) racemosa</i>	Gray Dogwood	Sun to Shade	Dry to Wet
<i>Hamamelis virginiana</i>	Witch-hazel	Sun (best) to Shade	Moist
<i>Juniperus virginiana</i> var. <i>virginiana</i>	Eastern Red-cedar (tree)	Sun	Dry to Wet; well-drained
<i>Morella caroliniensis (Myrica pensylvanica)</i>	Northern Bayberry	Sun (best) to Part Shade	Dry to Wet; well-drained
<i>Spiraea alba</i> var. <i>latifolia</i>	Meadowsweet	Sun (preferred)	Dry to Wet
<i>Spiraea tomentosa</i>	Steeplebush	Sun (best) to Part Shade	Moist to Wet

FOREST AREA REVIEW

Overview:

A site assessment of the Ewen Farm Preserve was conducted on the morning of June 19th. ERT member present for the assessment included Nancy Marek, Certified Forester.



Although a complete forest inventory was not conducted (it was beyond the scope of this site assessment) the forested stands can be categorized as mixed-aged central hardwoods with the dominant class size being sawtimber (12"-24" inches in diameter at breast height or dbh). A small fragmented group of wooded pasture (totaling 5 acres) can be located along the northwest section of the preserve near Lambert Road, while a larger 10 acre parcel of central hardwoods can be found along the west side. The seedling stage (less than 1" dbh) in both patches was nearly absent along with only a slightly higher percentage of trees in the pole size or 5-11" dbh. The pole size tree species were mostly black birch, red maple, or sugar maple. No young oak trees – seedling or pole size - could be found during the assessment. Some parts of the understory were completely absent of vegetation. Small to large patches of ferns grew on the wetter soils (with skunk cabbage and jewelweed) while other

sections were heavily blanketed with Japanese barberry and multiflora rose. Several of the larger trees had cavities, which could act as wildlife dens. The larger trees also provide hard mast (acorns and other nuts) as a food source for migrating birds and year-round residents.

The sawtimber species (several measured above 18" dbh) consisted mainly of red oak, sugar maple, tulip, hickory and black birch. A small group of American beech was present (seedling to sawtimber size) near the new subdivision. Minor species observed in both stands included American elm, hophornbeam, spicebush, and musclewood.

Although no signs of disease or insect infestation were observed, the overall state of the plant condition is degraded due to the high percentage of invasive plants on the property. The dominant invasive plant species were oriental bittersweet, multiflora rose, Japanese barberry, and Japanese knotweed. A large group of Japanese knotweed was seen upon entering the field area called Rock Lot. Also, the stage of growth on some of the oriental bittersweet vines was a grave concern. A few vines had reached the top of several healthy specimens, including a small cluster of conifers. The vines will continue to grow like blankets over the tops of the branches blocking all light eventually killing the trees.



A small deer herd was seen at the beginning of the field walk. Although the client requested recommendations to enhance wildlife habitat, deer are known to consume native understory plants, especially young oak seedlings. Wildlife depends upon varying degrees of horizontal and vertical structure within the forest to provide different habitats that offer nesting, shelter and food. The growth stage of the majority of trees on this property is mature. Although this provides habitat for wildlife that depend upon mature canopies, it does not offer habitat for those species – like many neotropical migratory birds - that depend upon the young forest.

Since oak communities are in decline throughout the state, an oak management strategy should be developed for areas underneath the canopies of large oaks. With little rainfall this spring, a bumper acorn crop can be expected. Any oak seedling that sprouts this fall (white oak) or the following spring (red oak) should be protected from deer browse. Surrounding the oak seedlings with a hardware cloth cage until they reach 3' in height will suffice. Otherwise, the deer herd will continue to reduce or eliminate the desirable native plant populations. Girdling the undesirable overstory hardwoods around the oak component may also be an option.

The invasive plant species present were winged euonymus, multiflora rose, Japanese barberry, oriental bittersweet, Japanese knotweed, black swallow wort, Japanese honeysuckle, and garlic mustard. Invasive plants are a major threat to the survival of native species because they are so competitive and spread quickly. Mapping the areas of infestation would help as a first step. Subsequent steps should focus on an eradication management plan. Considering the hydric soils and water features throughout the property, the use of herbicides is strongly discouraged. Mechanical means, although slow and somewhat tedious, will accomplish the same goal over time.

Firewood is no longer harvested from this forest, according to the property manager, so a thinning operation is not possible on either stand.

Recommendations to Enhance Wildlife Habitat



1. Eradicate invasive plant communities.

Choose manual methods instead of using herbicides.

2. Protect any desirable oak acorn crop or seedlings with a hardware cloth cage – possibly an acre at a

time - to protect it from the deer population until the saplings reaches at least 3 ft. high. After 5 yrs., remove any young birch or red maple trees (with a handsaw) that are over-topping (and suppressing) the oak saplings.

3. Reducing the mature forest by converting sections to young forest would greatly enhance wildlife habitat. Undesirable trees (red maple, black birch, or other poorly formed hardwoods) could be girdled in place to become dead trees or snags. The opened canopy would allow light to hit the forest floor encouraging native seed germination or release seedlings already present but suppressed due to the low light conditions. The goal is to develop a thick, impenetrable understory of native trees and shrubs as desirable habitat for migratory birds and small mammals. *Only allow a forest or logging professional to girdle the trees.*
4. A selection of soft mast species could be planted at the path's edge or near the water features to attract wildlife such as highbush blueberry, serviceberry (*Amelanchier canadensis*), silky dogwood (*Cornus amomum*) and winterberry (*Ilex verticillata*). These native shrubs will provide a thicker cover for birds and other wildlife. Plant the young shrubs in groups of 3-5 per species. Protect from deer.
5. Preserve snag trees for wildlife dens, unless the snags are close to a walking path.
6. Create brush piles for wildlife where possible. Brush pile attachment from DEEP Wildlife can be found in the Appendix of this report.

THE NATURAL DIVERSITY DATA BASE

The Natural Diversity Data Base maps and files regarding the project area for Ewen Farm Preserve in Orange, CT have been reviewed. According to NDDDB records there are extant populations of State Special Concern *Terrapene carolina carolina* (eastern box turtle) in the areas where this work will occur.

Eastern box turtles inhabit old fields and deciduous forests, which can include power lines and logged woodlands. They are often found near small streams and ponds. The adults are completely terrestrial but the young may be semiaquatic, and hibernate on land by digging down in the soil from October to April. They have an extremely small home range and can usually be found in the same area year after year. Eastern box turtles have been negatively impacted by the loss of suitable habitat. Some turtles may be killed directly by construction activities, but many more are lost when important habitat areas for shelter, feeding, hibernation, or nesting are destroyed. As remaining habitat is fragmented into smaller pieces, turtle populations can become small and isolated. Attached in the Appendix of this report is a “Box Turtle” fact sheet for your files. This determination is good for one year. Please re-submit an NDDDB Request for Review if the scope of work changes or if work has not begun on this project by April 13, 2016.



Eastern Box Turtle

Terrapene carolina carolina

State Species of Special Concern

Natural Diversity Data Base information includes all information regarding critical biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection’s Natural History Survey and cooperating units of DEEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the Data Base should not be substitutes for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the Data Base as it becomes available. The result of this review does not preclude the possibility that listed species may be encountered on site and that additional action may be necessary to remain in compliance with certain state permits.

Please contact Dawn McKay if you have further questions at (860) 424-3592, or dawn.mckay@ct.gov.

Species List for NDDB Request

Scientific Name	Common Name	State Status
Vertebrate		
<i>Terrapene carolina carolina</i>	Eastern box turtle	Special Concern

CT DEEP fact sheet for the Eastern box turtle, may be found in the Appendix of this report.

TRAILS AND GREENWAYS REVIEW

Site Visit and Observations:

The town purchased the 44 acre Ewen Farm Preserve for passive open space in 2010. Recently, the Orange Conservation Commission (OCC) requested a comprehensive environmental review/natural resource inventory to have baseline information to develop plans on how to best protect and use the property. They are interested in recommendations for trail development as well as dog access recommendations.

There are currently no marked trails only mowed paths and 2 wooden bridges. This makes using the property a true adventure which is a valuable experience for some, however, design and blazing of a trail system for the property is encouraged.

The Square lot area near the pond may accommodate a good Universal Access trail project. The Town of Mansfield has a good recent example in their Bicentennial Park. For more information you could contact:

Jennifer S. Kaufman, Natural Resources and Sustainability Coordinator
 Mansfield Tomorrow Project Manager
 Town of Mansfield
 10 South Eagleville Road
 Storrs-Mansfield, CT 06268
 860-429-3015 x6204
 860-429-9773 (Fax)
KaufmanJS@MansfieldCT.org

Regarding access for dogs, the Shelton Dog Park adjacent to the Shelton Rec Path provides a good example of an installation of a fenced in area with direct access to a recreational trail. The OCC can also install dog waste stations with bags which may be eligible for grants from DEEP OLISP. Contact information for Shelton:

Teresa Gallagher
 Conservation Agent
 City of Shelton
 54 Hill Street, Shelton, CT
 (203) 924-1555 x315
conservation@cityofshelton.org
www.sheltonconservation.org

The OCC has done a good job with entrance signage and posting prohibited uses for the property.

Pet waste, water quality & your health brochure can be found in the Appendix of this report.

The cul-de-sac area may hold potential to become the property gateway. Formal parking might be established. It seemed feasible to run a trail along the stone wall and between the drainage ditch (see photo) to connect with existing mowed paths as a way to bring folks through most of the property.



Recommendations

The Recreational Trails & Greenways Program encourages the Orange Conservation Commission to:

- Develop a trail plan that might consider the needs of intended users as well as some of the beautiful vistas and interesting flora and fauna on site. American Trails has good trail planning resources and model trail plans. Visit: <http://www.americantrails.org/resources/trailbuilding/index.html> A copy of their bridge information is included in the Appendix of this report.
- It may be worthwhile to contact UConn Landscape Architect school for opportunities to have student designs prepared;
- Establish a trail maintenance plan and associated program that could include volunteers from user groups, neighbors, Town public works, and the local land trust.

- Develop a property website that would include information on parking availability, allowed uses and any amenities, bathrooms, etc.

A request was made for information regarding liability of land owners with recreational trails. A concise description and a link to the updated CT law can be found at:

<http://www.ctwoodlands.org/public-policy/recreational-liability> A copy of this is included in the Appendix of this report.

The Recreational Trails & Greenways Program is available upon request to further assist The Town.

ARCHAEOLOGICAL AND HISTORICAL REVIEW

The town of Orange has requested a comprehensive environmental review/natural resource inventory to have baseline information to develop plans on how to best protect and use the Ewen Farm Preserve. The Office of State Archaeology has reviewed the property in terms of its historical and archaeological resources and their sensitivity.

The glacial geology of the project area indicates that most sediments in the Preserve are derived from till deposits, with a stony inferred ice-margin position bisecting the western portion of the property from north to south. Soils within the project area are primarily classed as very stony, and hand cores taken during the walkover most often indicated stony poorly-drained conditions. However, areas of glacio-fluvial Agawam fine sandy loam are present in the eastern portion of the property. Generally, these primarily till-derived sediments are not considered to indicate a high probability of association with ancient Native American archaeological sites. One exception may be the sandy rise overlooking the drainage of the Indian River northwest of the “Ox Lot” (Figure 3). The nearby “Ox Lot” pasture itself consists of well-drained Agawam fine sandy loam and is also considered to have moderate-to-high archaeological sensitivity. It is also worth noting that dense clays were noted in soil probes in the North Lot. These sediments (possibly displaced by nearby historic-period trenching) could have been sought after by Native American potters.



Dense clay soils found in the North Lot.

The Ewen family has noted that artifacts have been found along the Indian River in the vicinity of the Preserve and provided a photograph of their collection (Figure 4). Information associated with the artifacts suggests that they were collected by James Ewen primarily on the Meadowbrook Farm along the middle fork of the Wepawaug River about a mile and a half to the west. Most of the projectile points and tools are typical of the types of artifacts recovered in the region. The small quartz stemmed points date primarily to the Late Archaic period (ca. 4500 years ago), while the tapered-stem variants are more likely to be Early Woodland in age (ca. 2500 years ago). The large gray chert corner notched point in the upper left of the photograph is similar to the Palmer type (rare in New England and more commonly found in the Southeast) and could date to as early as 9,000 years ago. The large dark gray chert point in the top center is likely a Meadowood type associated with the Early Woodland period (ca. 2500 years ago), while the black chert point at the bottom center is a Terminal Archaic Snook Kill point of the Terminal Archaic period (ca. 3500 years ago).

No archaeological sites are documented in the state site files within the Ewen Preserve, but a number of Native American sites are located in the vicinity. These include the Indian River Site (107-7), located less than a half-mile to the southwest. This site produced evidence of Late Archaic (ca. 4500 year old) activity along Tylor City Rd. The Treat Site (107-4) is located on the Wright Farm about a mile west of the Ewen Preserve. This site is represented by over a hundred artifacts collected on the farm by the Wright family. The artifacts reflect roughly 6000 years of Native American activity on the area. The Orange Hills Site (107-5) is located at the golf course about a mile southeast of the Ewen Preserve. Artifacts from the site indicate a possible Late Archaic base camp. In general, documented sites in the vicinity of the Ewen Farm Preserve and the family's own artifact collection indicate a rich history of Native American use of the Wepawaug and Indian River drainages for the past 6000 or more years.

Historically, the property is associated with the farm of Merwin Andrew who purchased the land in 1838 (Figure 1). In the Whiteford County map of 1852, the land is shown as partially forested, but was known to have been used for cattle pasturage. No residential structures or outbuilding are noted on the map in the area of the Ewen Preserve. A similar pattern of land-use can be seen on the Fairchild aerial photograph of 1934, with areas of open pasture and hay fields and denser vegetation in wetland areas (Figure 2). No structures appear in the early 20th century maps or imagery that might denote specific areas of historical archaeological concern.

In sum, historical resources associated with the use of the property are likely clustered around the existing farm house at the corner of Lambert and City Roads, outside of the Ewen Preserve. Nonetheless, the Ewen Preserve has a rich history associated with well-documented families in the town and reflects an increasingly uncommon opportunity to experience Orange's rural farming past. Much of the preserve itself consists of rather poorly-drained stony sediments that are not expected to have a high Native American archaeological sensitivity. Two exceptions were noted – the small landform above the Indian River and the nearby Ox Lot. Should trails or bridges be constructed in these areas, archaeological testing is recommended to be sure that sites are not impacted. If archaeological sites are some day identified in either of these locations, opportunities for supervised public educational digs could be explored, but the recommended course of action is to keep these areas protected for the future.



Wooded area above the Indian River that may have Native American archaeological

APPENDICES

Bridges and structures for trails

Ewen Farm Preserve Plant List

Invasive Species Sheet – Swallow-wort

CTDEEP Information Sheets:

Brush Piles for Wildlife

Eastern Box Turtle

Pet waste, water quality & your health

Recreational Liability

Landowner Liability Statute

Meadow Brook Farms ERT Report (1985)

Recreational Planner Report

RECREATIONAL PLANNER REVIEW

In developing use plans for town-owned properties, a community's decisions will be guided both by the physical character of individual tracts and by civic needs as well as local sentiment. Orange is fortunate in owning a large number of open space properties of varying sizes and land types totaling nearly 1,000 acres. As stated by the First Selectman James Zeoli, Orange is pleased to offer a broad range of outdoor opportunities for its citizens, ranging from ballfields and playground areas to largely natural areas available for passive recreation and scenic preservation. Furthermore it appears that this broad gauge philosophy will continue to direct the town's management approach.

The purpose of this ERT is to suggest appropriate management options for the Town's Ewen Farm Preserve. It is a 44 acre tract located northeast of the town center and consists of the remaining portion of a once larger historic farm. As seen in a 1934 aerial photo, it was an integral part of an active agricultural area which has since been transformed into a largely suburban landscape.

The Ewen Farm Preserve consists of gently rolling countryside, including till-based upland soils to the west and fluvial soils along the Indian River corridor to the east. The till based soils are mixed in quality, the Rock and North lots in particular have rock outcroppings and wetland soils which are not considered prime and important farmland soil of statewide significance. However an area of Canton & Charlton soil of better quality is located in the Long Meadow Lot. Interestingly the Square Lot, one of the two actively farmed lots and presumably considered having a high quality soil; falls within an area of Charlton-Chatfield soil which is classified as "not prime soil". (The field is either more Charlton in type or "sweat equity and rock removal have improved its quality").

The Fluvial soils are listed as being of better quality including in particular the Ox Lot, the other actively farmed field. Farmland of statewide significance includes considerable areas of Hinckley soil (usually considered a source of sand and gravel) and Raypol soil (despite its low somewhat wet nature), with a limited amount of prime land also found.

Much of the property is now or was formerly open from its earlier active farming period, with the exception of the wooded Indian River corridor, a continuing condition as seen in the 1934 aerial photo. This seems to indicate the area has soil limitations (too wet) or is flood prone within this riverine corridor.

With these site factors in mind, one can then evaluate the property's assets and limitations. Although preserving a portion of the former agricultural landscape is desirable from a scenic and historical standpoint, this property has a number of limitations which can constrain future uses. The first includes the property's shape, being nearly divided into two separate areas. A second factor is the substantial extent of wetland, which in combination with Preserve shape limits opportunity for a trail network. The floodway along Indian River poses another limitation

to any potential development or usage. Also any public use could conflict with the ongoing and desirable active farming activity on the Square & Ox Lots.

Thus the Ewen Farm Preserve can be considered a town asset in preserving a piece of its historical heritage. It is desirable in offering a continuing sample of a rural landscape with a variety of habitat types with scenic ecological value. At the Ewen Preserve can be seen active farmland, rolling meadow, wooded meadow, woodlots, wetlands, farm ponds and an attractive stream.

This reviewer feels that the Town of Orange was correct in classifying the Ewen Farm Open Space as a preserve and further feels “that a continuation of this general management would be most appropriate in view of its size, physical character and history”. Therefore informal, casual, low volume use is recommended for this property.

Specific recommendations for future consideration for the Ewen Farm Preserve include:

- 1) Continued leasing of the Square & Ox lots to help maintain some agricultural base in an increasingly suburban town.
- 2) Mow the meadows in Rock Lot, North Lot and Long Meadow to maintain the rural flavor of the property.
- 3) Maintain present varied wildlife habitats in woodland, meadow, wetland, pond and stream corridor.
- 4) Control Japanese Knotweed infestation in the North Lot meadow.
- 5) Consider a limited trail network if not in conflict with site limitations or with abutting activities such as farming or neighbors. However limited access and access point parking along with the Preserve’s own constraints restricts the level of use that is both desirable and feasible.
- 6) Prohibition of motorized and non-motorized vehicles within the Preserve except for those that are incidental to the Preserve’s management including farming and mowing.

Nighborhood Change in Connecticut, 1934 to Present

Want to compare 1934, 1990, 2004, 2006, 2008, and 2012 using a transparency tool? [Check out our Connecticut Aerial Photography Interactive Map Interface](#)



Attention ArcGIS and other GIS software users! The 1934 Aerial Photography layer is available via [MAGIC's WMS](#).

Use the search box below to locate an address in Connecticut.

Find Address

Toggle map layers

☐ CT Towns



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Chicago 16th edition [author-date]

MLA 7th edition

Aerial Photography Imagery Provided by the following map services



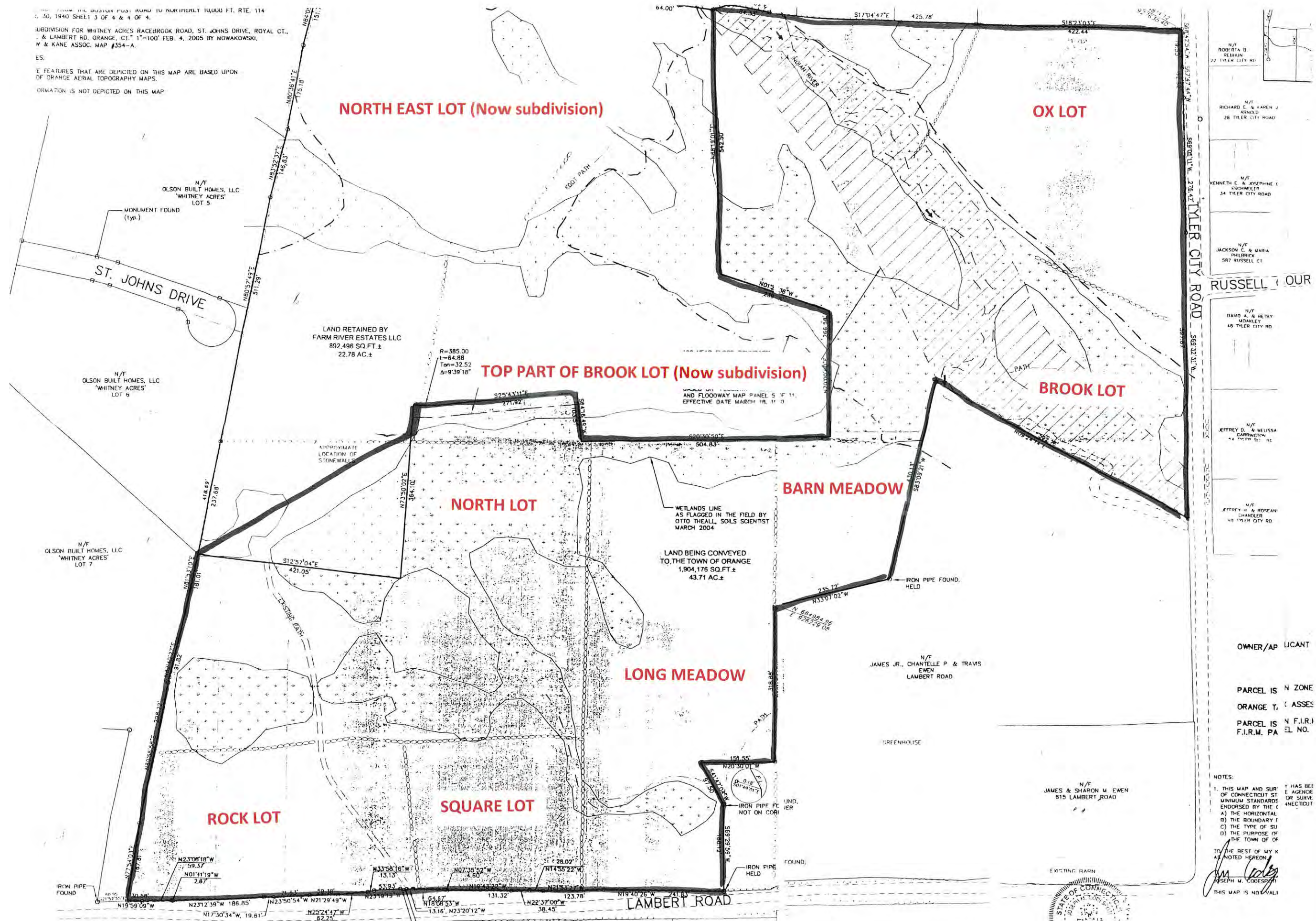
FROM THE BOSTON POST ROAD TO NORTHERLY 10,000 FT. RTE. 114
S. 30, 1940 SHEET 3 OF 4 & 4 OF 4.

SUBDIVISION FOR WHITNEY ACRES RACEBROOK ROAD, ST. JOHNS DRIVE, ROYAL CT.,
& LAMBERT RD. ORANGE, CT. 1"=100' FEB. 4, 2005 BY NOWAKOWSKI,
W & KANE ASSOC. MAP #354-A.

ES.

THE FEATURES THAT ARE DEPICTED ON THIS MAP ARE BASED UPON
ORANGE AERIAL TOPOGRAPHY MAPS.

FORMATION IS NOT DEPICTED ON THIS MAP.



N/F
ROBERTA B.
REHUN
22 TYLER CITY RD.

N/F
RICHARD E. & KAREN J.
ARNOLD
28 TYLER CITY ROAD

N/F
KENNETH E. & JOSEPHINE C.
ESCHMEYER
34 TYLER CITY ROAD

N/F
JACKSON C. & MARIA
PHILBRICK
587 RUSSELL CT.

N/F
DAVID A. & BETSY
MOANLEY
48 TYLER CITY RD.

N/F
JEFFREY D. & MELISSA
CARRINGTON
44 TYLER CITY RD.

N/F
JEFFREY H. & ROSEAN
CHANDLER
50 TYLER CITY RD.

OWNER/APPLICANT

PARCEL IS IN ZONE

ORANGE T. (ASSESSED)

PARCEL IS IN F.I.R.M. PA
EL. NO.

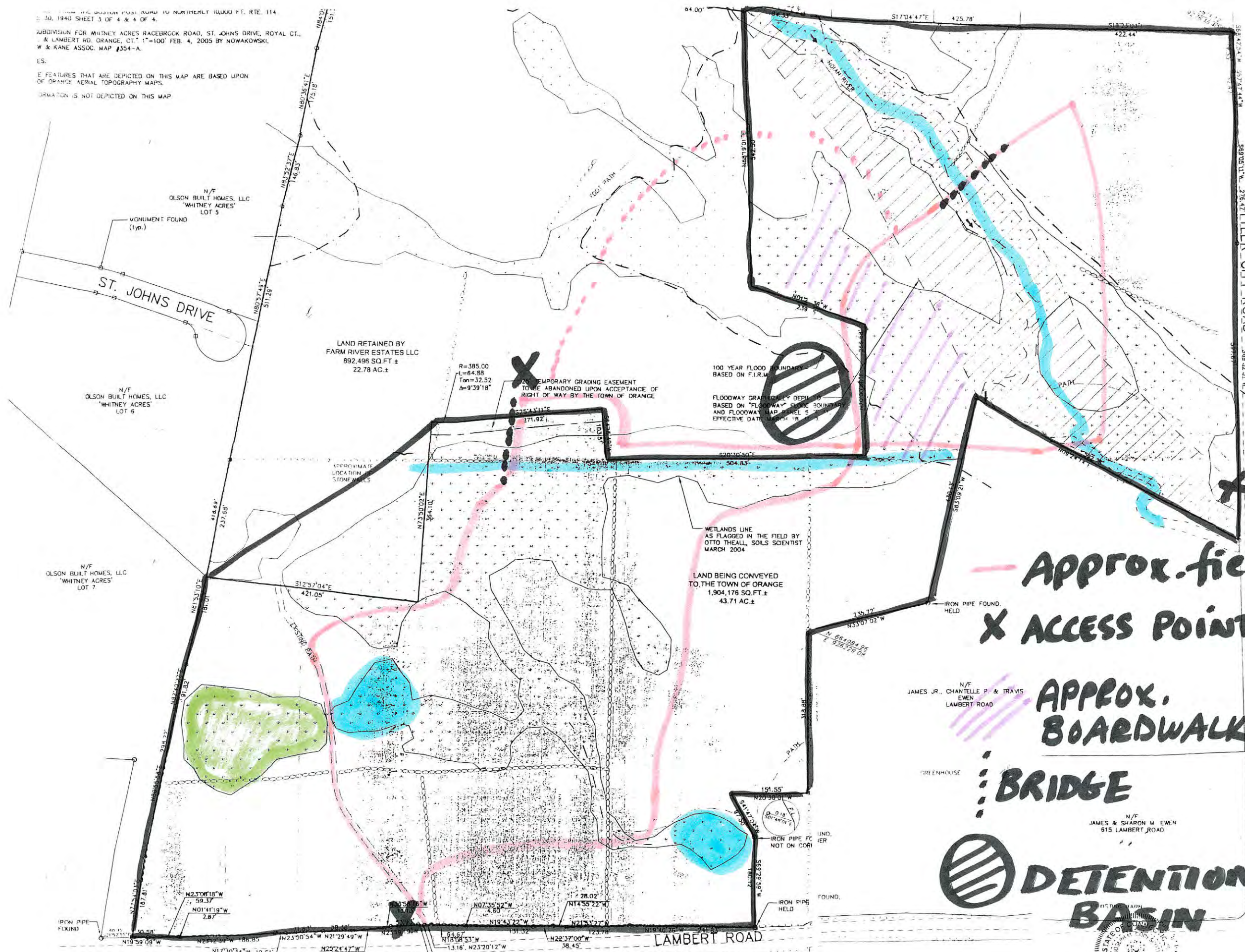
NOTES:

1. THIS MAP AND SURVEY HAS BEEN PREPARED IN ACCORDANCE WITH THE MINIMUM STANDARDS ENDORSED BY THE (A) THE HORIZONTAL (B) THE BOUNDARY (C) THE TYPE OF SURVEY (D) THE PURPOSE OF THE TOWN OF ORANGE, CT.

TO THE BEST OF MY KNOWLEDGE AND BELIEF, THIS MAP IS NOT VALID.

JOSEPH M. COOPER
REGISTERED PROFESSIONAL SURVEYOR
STATE OF CONNECTICUT
No. 12345

FROM THE BOSTON POST ROAD TO NORTHERLY 10000 FT. RTE. 114
30, 1940 SHEET 3 OF 4 & 4 OF 4.
SUBDIVISION FOR WHITNEY ACRES RACEBROOK ROAD, ST. JOHNS DRIVE, ROYAL CT.,
& LAMBERT RD. ORANGE, CT. 1"=100' FEB. 4, 2005 BY NOWAKOWSKI,
W & KANE ASSOC. MAP #354-A.
ES.
E FEATURES THAT ARE DEPICTED ON THIS MAP ARE BASED UPON
OF ORANGE AERIAL TOPOGRAPHY MAPS.
FORMATION IS NOT DEPICTED ON THIS MAP



- N/F ROBERTA B. BLEDHUN 22 TYLER CITY RD.
- N/F RICHARD E. & KAREN J. ARNEOLD 28 TYLER CITY ROAD
- N/F KENNETH E. & JOSEPHINE C. ESCHMEIER 34 TYLER CITY ROAD
- N/F JACKSON C. & MARIA THILBRICK 587 RUSSELL CT.
- N/F DAVID A. & BETSY MOAKLEY 48 TYLER CITY RD.
- N/F JEFFREY D. & MELISSA CARRINGTON 44 TYLER CITY RD.
- N/F JEFFREY W. & ROSANNE CHANDLER 50 TYLER CITY RD.

Approx. field walk
X ACCESS POINTS

APPROX. BOARDWALK AREA

BRIDGE

DETECTION BASIN

OWNER/APPLICANT
PARCEL IS IN ZONE
ORANGE T. ASSES
PARCEL IS IN F.I.R.M. PA
EL. NO.

NOTES
1. THIS MAP AND SURVEY OF CONNECTICUT STANDARDS ENDORSED BY THE (A) THE HORIZONTAL (B) THE BOUNDARY (C) THE TYPE OF SURVEY (D) THE PURPOSE OF THE TOWN OF ORANGE
TO THE BEST OF MY KNOWLEDGE AND BELIEF
JOSEPH M. CODESCHI
THIS MAP IS NOT VALID

Bridges and structures for trails

Hosted by AmericanTrails.org

Shenandoah River State Park, VA develops a boardwalk

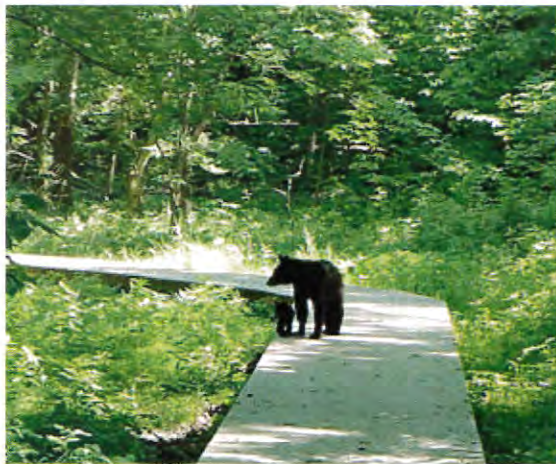
Park Manager Tony Widmer was project manager for the Bluebell Loop boardwalk trail.

From Virginia Department of Conservation and Recreation
By Jeff Foster, November 2008

Raymond "Andy" Guest Jr. Shenandoah River State Park is located in Warren County, Virginia. The park encompasses 1,604 acres with over five miles of river frontage along the South Fork of the Shenandoah River. Nestled between the Massanutten Mountains to the west and the Blue Ridge Mountains to the east, the unique location of the park offers an enticing variety of terrain as well as breathtaking scenery and abundant wildlife.

As part of the Chesapeake Bay watershed, the park is a significant resource and offers numerous opportunities for environmental education as well as recreation. Since opening in 1999 the parks annual attendance has continued to grow and a record 116,000 visitors visited in 2007. Campers utilize the hike or canoe-in campground along the river for extended visits.

The Bluebell Loop Trail is located just north of the campground near the Shenandoah River. The trail meanders through a wooded floodplain that contains about thirty vernal pools.



Park residents taking a closer look at the new boardwalk



The boardwalk under construction at Shenandoah River State Park

Vernal pools are seasonally flooded wetlands that are often overlooked in our forests. Spring rains and snow melt help create these important eco-systems which improve water quality, are an excellent educational tool, and provide habitat to hundreds of species. They are also extremely sensitive to disruption and are increasingly threatened, primarily by development. Because of the susceptible nature of the environment and very wet surface area visitor access to the trail is limited from February through June.

A trail was desired that would get park visitors safely to this sensitive area where they could enjoy bird watching or take a quiet hike to see what is going on in the vernal pools. This trail could also be used to bring school groups in and teach them the importance of the wooded floodplain, vernal pools, riparian areas and how they all tie directly into the health of the Chesapeake Bay. In 2006, Park Manager, Tony

Widmer came up with an idea to build an elevated boardwalk trail.

Tony visited boardwalks at parks in Ohio, Pennsylvania and Virginia. He attended trail conferences

▶ [See more articles on boardwalks](#)

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[Management](#)
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▶ For more [opportunities for training](#) on trail design, construction, and management see the [National Trails Training Partnership](#) area.



and workshops to gain the knowledge needed to initiate the project. Construction of the boardwalk was challenging due to the wetness of the area. Most of the work was completed during the winter months when the ground was frozen.

The staff used round fence posts and salt treated lumber to construct the supports and framing. The round fence posts were set in cement, 2" X 8" were used for cross ties and Choice decking was attached on top of 2" X 6" stringers. Choice decking is a more environmentally friendly type of decking composed mainly of recycled plastics. Using this type of decking prevents the use of additional treated wood products and all but eliminates the need to replace boards due to weathering.

The Bluebell Loop boardwalk trail was completed in June 2008 with funding from the Virginia State Parks Trail Funding Project. The finished trail is over a mile and half in length. It will provide year long enjoyment and increased educational opportunities for park visitors, as well as protection for the sensitive vernal pools and the many species that inhabit them.



Fence posts and salt treated lumber were used to construct the supports and framing for the boardwalk

For more information:

Shenandoah River State Park
350 Daughter of Stars Drive
Bentonville, VA 22610
Phone: (540) 622-6840
http://www.dcr.virginia.gov/state_parks/and.shtml

- ▶ Need trail skills and education? Do you provide training? Join the [National Trails Training Partnership!](#)
- ▶ The [NTTP Online Calendar](#) connects you with courses, conferences, and trail-related training
- ▶ Promote your trail through the [National Recreation Trails Program](#)



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Updated December 21, 2008



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EWEN FARM PRESERVE PLANT LIST -- compiled Spring 2015					
Note: the plant lists for the three time periods represent observed plants, not a systematic survey					
CT Native: Y = Yes; N = No; I = non-native Invasive					
Scientific Names from <i>Native and Naturalized Vascular Plants of Connecticut Checklist</i> (CT Botanical Society 2014)					
except for genus <i>Lycopodium</i>					
Common Names often from <i>Newcomb's Wildflower Guide</i> (Lawrence Newcomb)					
Scientific Name	Common Name	CT Native	1985	Recent	NOTES
TREES and SHRUBS					
<i>Acer rubrum</i>	Red Maple	Y	x	x	Common in many habitats
<i>Acer saccharum</i>	Sugar Maple	Y		x	failed to write it down 2015
<i>Alnus</i> sp.	Alder species			x	seen along ditch
<i>Berberis thunbergii</i>	Japanese Barberry	I	x	x	
<i>Betula alleghensis</i>	Yellow Birch	Y		x	forest
<i>Betula lenta</i>	Black Birch	Y	x	x	forest
<i>Betula nigra</i>	River Birch	N		x	
<i>Betula populifolia</i>	Gray Birch	Y		x	
<i>Carpinus caroliniana</i>	Musclewood	Y	x	x	
<i>Carya glabra</i>	Pignut Hickory	Y		x	
<i>Carya ovata</i>	Shagbark Hickory	Y		x	forest
<i>Carya</i> sp.	Hickory	Y	x		forest
<i>Castanea dentata</i>	American Chestnut	Y		x	presumably sprouts
<i>Celtis occidentalis</i>	Hackberry	Y		x	
<i>Elaeagnus umbellata</i>	Autumn-Olive	I		x	forest edges
<i>Fagus grandifolia</i>	Beech	Y	x	x	forest
<i>Fraxinus americana</i>	White Ash	Y		x	
<i>Fraxinus</i> sp.	Ash sp.	Y		x	forest
<i>Hamamelis virginiana</i>	Witch-hazel	Y		x	forest
<i>Ilex opaca</i>	American Holly	Y		x	
<i>Juniperus virginiana</i> var. <i>virginiana</i>	Eastern Red-cedar	Y	x	x	open areas
<i>Larix decidua</i>	European Larch	N		x	Long Meadow
<i>Larix</i> sp.	Larch			x	<i>Larix laricina</i> IS native
<i>Lindera benzoin</i>	Spicebush	Y	x	x	forest -- moist to wet soil
<i>Malus pumila</i>	Apple	N		x	Long Meadow
<i>Malus</i> sp.	Crabapple species	N		x	Long Meadow
<i>Picea</i>	Spruce sp.			x	some species native
<i>Picea abies</i>	Norway Spruce	N	x		
<i>Picea glauca</i>	White Spruce	N		x	Long Meadow
<i>Pinus strobus</i>	Eastern White Pine	Y	x	x	noted in forest, but also colonizes open places
<i>Platanus</i> sp.	Sycamore			x	<i>P. occidentalis</i> (American Sycamore) is native

Scientific Name	Common Name	CT Native	1985	Recent	2015	NOTES
<i>Pseudotsuga menziesii</i>	Douglas Fir	N		x		
<i>Quercus alba</i>	White Oak	Y	x	x	x	forest
<i>Quercus coccinea</i>	Scarlet Oak	Y		x		
<i>Quercus montana</i>	Chestnut Oak	Y		x		{could this have been based on a peculiar beech leaf?}
<i>Quercus rubra</i> var. <i>borealis</i>	Red Oak	Y	x	x	x	forest
<i>Quercus velutina</i>	Black Oak	Y		x		
<i>Rosa multiflora</i>	Multiflora Rose	I	x		x	species of old pastures, etc., and on wetland hummocks
<i>Salix</i> sp.	Willow species				x	noted tree-like and shrub-like individuals
<i>Swida (Cornus) amomum</i>	Silky Dogwood	Y			x	downstream of Indian River stone bridge
<i>Tsuga canadensis</i>	Eastern Hemlock	Y		x		
<i>Ulmus americana</i>	American Elm	Y		x		
<i>Vaccinium corymbosum</i>	Highbush Blueberry	Y			x	
<i>Viburnum acerifolium</i>	Maple-leaved Viburnum	Y	x		x	forest
<i>Viburnum</i> sp.	Viburnum sp.		x			reported from Wetland
VINES						
<i>Celastrus orbiculatus</i>	Bittersweet	I			x	
<i>Cynanchum louiseae</i>	Black Swallow-wort	I			x	Rock Lot and {?} elsewhere
<i>Lonicera japonica</i>	Japanese Honeysuckle	I			x	on NW edge of Ox Lot
<i>Toxicodendron radicans</i>	Poison-Ivy	Y			x	
<i>Vitis</i> sp.	Grape				x	likely a native species
WILDFLOWERS, FERNS, ETC						
<i>Achillea millifolium</i>	Yarrow	Y			x	grassy area
<i>Alliaria petiolata</i>	Garlic Mustard	I			x	large amount off preserve east of Long Meadow
<i>Anemone quinquefolia</i>	Windflower	Y			x	
<i>Arisaema triphyllum</i>	Jack-in-the-Pulpit	Y		x	x	noted as "rare" in the Preserve
<i>Athyrium</i> sp. ??	Lady Fern ??				x	
<i>Chimaphila maculata</i>	Spotted Wintergreen	Y			x	forest
<i>Equisetum</i>	Horsetail (one of the leafy ones)	Y			x	seen in drainage ditch
<i>Erythronium americanum</i>	Trout Lily	Y			x	
<i>Eurybia {Aster} divaricata</i>	White Wood-Aster	Y			x	
<i>Fallopia japonica</i> (<i>Polygonum cuspidatum</i>)	Japanese Knotweed	I			x	
<i>Galium</i> sp.	Galium {Bedstraw} sp.				x	grassy areas
<i>Geranium maculatum</i>	Wild Geranium	Y	x			
<i>Houstonia caerulea</i>	Bluets	Y			x	grassy area

Scientific Name	Common Name	CT Native	1985	Recent	2015	NOTES
<i>Iris</i> sp. ??	Iris (apparently an Iris)	?			x	adjacent to drainage ditch
<i>Laportea canadensis</i>	Wood Nettle	Y	x		x	
<i>Lycopodium</i>	Ground Pine	Y	x			
<i>Lycopodium?</i>	Princess Pine	Y		x		noted as "rare" in the Preserve
<i>Lycopodium ?</i>	Creeping Pine	Y		x		noted as "rare" in the Preserve
<i>Maianthemum canadense</i>	Canada Mayflower	Y			x	seen in forest -- also grows in sun
<i>Onoclea sensibilis</i>	Sensitive Fern	Y			x	
<i>Osmundastrum cinnamomeum</i>	Cinnamon Fern ??	Y			x	in fiddlehead stage
<i>Panax trifolius</i>	Dwarf Ginseng	Y			x	
<i>Phalaris arundinacea</i>	Reed Canary Grass	I			x	invasive that does well in wet soil
<i>Polystichum acrostichoides</i>	Christmas Fern	Y			x	
<i>Pyrola americana</i> { <i>P. rotundifolia</i> }	Roundleaf Pyrola	Y			x	
<i>Solidago</i> sp.	Goldenrod species	Y			x	
<i>Symplocarpus foetidus</i>	Skunk Cabbage	Y	x		x	wetlands and red maple swamps
<i>Taraxacum officinale</i>	Dandelion	N			x	open areas
<i>Trifolium</i> sp.	Clover				x	open areas
<i>Viola</i> {not sure what species was meant}	Wood Violet			x		
<i>Viola cucullata</i>	Marsh Blue Violet	Y			x	open area around pond near Rock Lot cart path
<i>Viola</i> sp.	Violet sp.		x		x	
SPECIES NOTED OUTSIDE OF PRESERVE BOUNDARIES -- LIKELY INSIDE TOO						
<i>Euonymus alatus</i>	Winged Euonymus	I			x	
<i>Ligustrum</i> sp.	Privet sp.	I			x	
<i>Vaccinium angustifolium</i>	Lowbush Blueberry	Y			x	
<i>Carex</i> sp.	Sedge				x	
<i>Glechoma hederacea</i>	Gill-over-the ground	I			x	
<i>Impatiens</i> sp.	Jewelweed sp.	Y			x	
<i>Lysimachia nummularia</i>	Moneywort; Creeping Yellow Loosestrife	I			x	
<i>Rubus</i> sp.	Bramble				x	



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Invasive Species Sheet - Swallow-wort

Invasive Species Identification Sheet

Black Swallow-wort (*Cynanchum louiseae* Kartesz & Gandhi)
European Swallow-wort (*Cynanchum rossicum* (Kleo.) Borhidi)

Alternate Latin names: **Black** = *Cynanchum nigrum* (L.) Pers., *Vincetoxicum nigrum* (L.) Moench;
European = *Vincetoxicum medium* (R. Br.) Decne., *V. rossicum* (Kleo.) Barb., *Cynanchum rossicum* Kleo.,
Antitoxicum rossicum (Kleo.) Pobed.

twining, herbaceous, perennial vines; 3'-9' long, spiraling around self and up other plants
 leaves opposite; base never heart-shaped; color dark, glossy green, drying to bright yellow
 fruit resembles smooth, slender Milkweed pods 1 1/2"-3" long; surface is never warty
 pods change from green to yellow to brown then split on one side to release windblown seeds
 flowers about 1/8" across; flat, star-shaped, light pink to dark purple with yellow centers

Swallow-wort flowers have the petals united to form a short tube at the base of the flower while the outer ends of the petals form a flat, 5-parted star. Petal color and shape distinguish our 2 species of Swallow-worts: Black Swallow-wort = dark purple, triangular (with microscopic hairs); European Swallow-wort = light purple, maroon, or pinkish, longer than broad (and yellow center does not stand out). The 2 invasive Swallow-worts in North America have a confusing history of name changes. European Swallow-wort (also called Pale Swallowwort) sometimes has been lumped with White Swallow-wort (under *V. hirundaria* Medik. or *Cynanchum medium* R. Br.). However, White Swallow-wort lacks a twining stem and, although it has escaped from gardens, it has not been found to be invasive in North America.

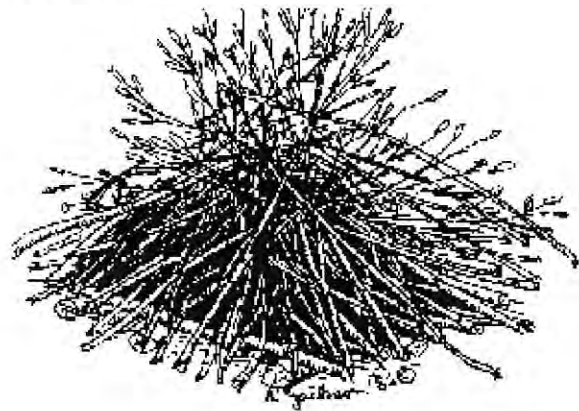
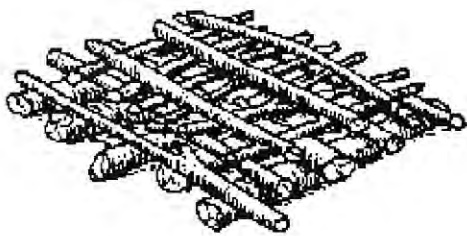
Black and European Swallow-worts grow in uplands under a wide variety of moisture and light conditions. They readily choke out native plants. If incompletely removed, they sprout from fibrous, spreading root systems (Black) or directly from the base (European). When Milkweed-seeking Monarch Butterflies lay eggs on Black Swallowwort, the larvae do not survive after hatching.

WILDLIFE IN CONNECTICUT

WILDLIFE HABITAT SERIES

No. 2

Brush Piles for Wildlife



General Information

Wildlife have four basic requirements: cover, food, water and living space. Each must be present in an animal's habitat. Cover is the protective element within the habitat which may come in different forms for various wildlife species. It may be a hedgerow for rabbits, a young hemlock thicket for deer, a spruce tree for a golden-crowned kinglet or a brush pile for small mammals and birds. Whatever form cover takes, it contributes to one or more of the necessary functions in the lives of animals: breeding, nesting, hiding, resting, sleeping, feeding and traveling.

When natural cover is limited in wildlife habitat, brush piles may be provided. If possible, brush piles should be a by-product of other land management activities, rather than a specific practice. Timber harvest, timber stand improvements, pasture or cropland clearing, and firewood cutting all provide woody limbs suitable for brush piles.

Location of Brush Piles

Brush piles benefit wildlife most when they are located at the edges of forest openings. They should not be further than 10 feet from the woodland border. Other suitable locations for

brush piles are along road edges, streams, marshes and yard borders within or next to woodlands.

Four to eight brush piles per acre, spaced 100 to 150 feet apart, is a sufficient amount and will supply the needed cover requirements for most wildlife species.

Construction of Brush Piles

Materials used in brush piles will depend largely on what is available. Oak, locust and other hardwoods which are rot resistant make durable bases. Other suitable materials include large stumps, cull logs, old fence posts and stones. The largest material should form the base and layers of smaller limbs and branches should be added as filler.

Brush piles are usually mound- or tepee-shaped. Ideally, they should be six to eight feet high and 15 feet in diameter. An alternate method of providing cover is to windrow the brush along a stone wall or woods' edge. In this case, brush should be piled in one direction with the tops facing the edge of the woods. Covering brush piles and windrowed brush with evergreen boughs will provide wildlife with additional cover.

Brush piles are short lived (six to eight years). In order to provide continual cover, new ones should be developed periodically.

Benefits

When properly constructed and located, brush piles can benefit many species of wildlife, including bobwhite quail, cottontail rabbits, ruffed grouse, wild turkeys, skunks, raccoons, opossums, woodchucks, chipmunks, mockingbirds, white-throated sparrows and juncos. Predators such as foxes, bobcats, hawks, owls and coyotes benefit from the small mammal and bird populations found in or around brush piles.

Grasses, forbs and vines, which are highly valuable to wildlife, will grow up through brush piles and add density and permanence to the piles.

Caution should be taken when creating brush piles in densely populated areas, for they may lead to nuisance wildlife problems. Skunks, opossums and raccoons will, on occasion, live in or under these brush piles and may cause a nuisance situation for nearby homeowners.

Glossary

Cull trees, logs or lumber which have been rejected because they do not meet certain specifications.

Forb any herbaceous plant species other than those in the grass, sedge and rush families; fleshy leaved plants.

Stand plant communities, particularly of trees, sufficiently uniform in composition, constitution, age, spatial arrangement or condition to be distinguishable



from adjacent plant communities; may delineate a silvicultural or management entity.

Timber stand improvement the use of methods, such as thinning, firewood cutting and selection cutting, to improve the growth and condition of a stand of timber.

References and Further Reading

Martin, C. O. and J. L. Steele, Jr. 1986. Brush piles, Section 5.3.1, U.S. Army Corps of Engineers wildlife resources management manual. 19 pp.

Yoakum, J., W. P. Dashmann, H. R. Sanderson, C. M. Nixon and H. S. Crawford. 1980. Habitat improvement techniques. Pages 329-403 in S. D. Schemnitz, ed., Wildlife management techniques manual, 4th ed. The Wildlife Society, Washington, D.C. 686 pp.

Illustrations by Steve Jackson and Paul Fusco



The Technical Assistance Informational Series is 75 percent funded by Federal Aid to Wildlife Restoration—the Pittman-Robertson (P-R) Program. The P-R Program provides funding through an excise tax on the sale of sporting firearms, ammunition and archery equipment. The remaining 25 percent of the funding is matched by the Connecticut Wildlife Division.

Connecticut Department of Energy & Environmental Protection

Eastern Box Turtle

Terrapene carolina carolina

State Species of Special Concern



Description

The eastern box turtle is probably the most familiar of the 8 species of turtles found in Connecticut's landscape. It is known for its high-domed carapace (top shell). The carapace has irregular yellow or orange blotches on a brown to black background that mimic sunlight dappling on the forest floor. The plastron (under shell) may be brown or black and may have an irregular pattern of cream or yellow. The length of the carapace usually ranges from 4.5 to 6.5 inches, but can measure up to 8 inches long. The shell is made up of a combination of scales and bones, and it includes the ribs and much of the backbone.

Each individual turtle has distinctive head markings. Males usually have red eyes and a concave plastron, while females have brown eyes and a flat plastron. Box turtles also have a horny beak, stout limbs, and feet that are webbed at the base. This turtle gets its name from its ability to completely withdraw into its shell, closing itself in with a hinged plastron. Box turtles are the only Connecticut turtle with this ability.

Range

Eastern box turtles are found throughout Connecticut, except at the highest elevations. They range from southeastern Maine to southeastern New York, west to central Illinois, and south to northern Florida.

Habitat and Diet

In Connecticut, this terrestrial turtle inhabits a variety of habitats, including woodlands, field edges, thickets, marshes, bogs, and stream banks. Typically, however, box turtles are found in well-drained forest bottomlands and open deciduous forests. They will use wetland areas at various times during the season. During the hottest part of a summer day, they will wander to find springs and seepages where they can burrow into the moist soil. Activity is restricted to mornings and evenings during summer, with little to no nighttime activity, except for egg-laying females. Box turtles have a limited home range where they spend their entire life, ranging from 0.5 to 10 acres (usually less than 2 acres).

Box turtles are omnivorous and will feed on a variety of food items, including earthworms, slugs,

snails, insects, frogs, toads, small snakes, carrion, leaves, grass, berries, fruits, and fungi.

Life History

From October to April, box turtles hibernate by burrowing into loose soil, decaying vegetation, and mud. They tend to hibernate in woodlands, on the edge of woodlands, and sometimes near closed canopy wetlands in the forest. Box turtles may return to the same place to hibernate year after year. As soon as they come out of hibernation, box turtles begin feeding and searching for mates.

The breeding season begins in April and may continue through fall. Box turtles usually do not breed until they are about 10 years old. This late maturity is a result of their long lifespan, which can range up to 50 to even over 100 years of age. The females do not have to mate every year to lay eggs as they can store sperm for up to 4 years. In mid-May to late June, the females will travel from a few feet to more than a mile within their home range to find a location to dig a nest and lay their eggs. The 3 to 8 eggs are covered with dirt and left to be warmed by the sun. During this vulnerable time, skunks, foxes, snakes, crows, and raccoons often raid nests. Sometimes, entire nests are destroyed. If the eggs survive, they will hatch in late summer to early fall (about 2 months after being laid). If they hatch in the fall, the young turtles may spend the winter in the nest and come out the following spring.

As soon as the young turtles hatch, they are on their own and receive no care from the adults. This is a dangerous time for young box turtles because they do not develop the hinge for closing into their shell until they are about 4 to 5 years old. Until then, they cannot entirely retreat into their shells. Raccoons, skunks, foxes, dogs, and some birds will prey on young turtles.

Conservation Concerns

The eastern box turtle was once common throughout the state, mostly in the central Connecticut lowlands. However, its distribution is now spotty, although where found, turtles may be locally abundant. Because of the population decline in Connecticut, the box turtle was added to the state's List of Endangered, Threatened, and Special Concern Species when it was revised in 1998. It is currently listed as a species of special concern. The box turtle also is protected from international trade by the 1994 CITES treaty. It is of conservation concern in all the states where it occurs at its northeastern range limit, which includes southern New England and southeastern New York.

Many states have laws that protect box turtles and prohibit their collection. In Connecticut, eastern box turtles cannot be collected from the wild (DEP regulations 26-66-14A). Another regulation (DEP regulations 26-55-3D) "grandfathers" those who have a box turtle collected before 1998. This regulation limits possession to a single turtle collected before 1998. These regulations provide some protection for the turtles, but not enough to combat some of the even bigger threats these animals face. The main threats in Connecticut (and other states) are loss and fragmentation of habitat due to deforestation and spreading suburban development; vehicle strikes on the busy roads that bisect the landscape; and indiscriminate (and now illegal) collection of individuals for pets.

Loss of habitat is probably the greatest threat to turtles. Some turtles may be killed directly by construction activities, but many more are lost when important habitat areas for shelter, feeding, hibernation, or nesting are destroyed. As remaining habitat is fragmented into smaller pieces, turtle populations can become small and isolated.

Adult box turtles are relatively free from predators due to their unique shells. The shell of a box turtle is extremely hard. However, the shell is not hard enough to survive being run over by a vehicle. Roads bisecting turtle habitat can seriously deplete the local population. Most vehicle fatalities are pregnant females searching for a nest site.

How You Can Help

- Leave turtles in the wild. They should never be kept as pets. Whether collected singly or for the pet trade, turtles that are removed from the wild are no longer able to be a reproducing member of a population. Every turtle removed reduces the ability of the population to maintain

itself.


- Never release a captive turtle into the wild. It probably would not survive, may not be native to the area, and could introduce diseases to wild populations.
- Do not disturb turtles nesting in yards or gardens.
- As you drive, watch out for turtles crossing the road. Turtles found crossing roads in June and July are often pregnant females and they should be helped on their way and not collected. Without creating a traffic hazard or compromising safety, drivers are encouraged to avoid running over turtles that are crossing roads. Also, still keeping safety precautions in mind, you may elect to pick up turtles from the road and move them onto the side they are headed. Never relocate a turtle to another area that is far from where you found it.
- Learn more about turtles and their conservation concerns. Spread the word to others on how they can help Connecticut's box turtle population.





The production of this Endangered and Threatened Species Fact Sheet Series is made possible by donations to the Endangered Species-Wildlife Income Tax Checkoff Fund.


(5/08)

What is grosser than picking up dog poop? Stepping in it! What is even grosser than that? Swimming in, fishing from or drinking water with dog poop in it.

 Cleaning up after your pet is good for both you and your local environment!

 Nutrients in pet waste can promote the growth of algae and aquatic plants in streams, rivers, ponds and lakes.

 Pet waste contains bacteria, parasites and viruses that can make swimming, boating or drinking unsafe.

 Pet waste left on the road, sidewalk or even in the woods can harm water quality and human health.

Connecticut River Coastal Conservation District
deKoven House Community Center
27 Washington Street
Middletown, CT 06457
(860) 346-3282



Important
Pet Waste
Information
Inside



Pet Waste, Water Quality & Your Health

Pet Waste is...

POLLUTION!

Uncollected pet waste can end up in nearby water resources

AN ENVIRONMENTAL RISK!

Pet waste contains nutrients that can degrade water quality

A HEALTH RISK!

Microorganisms in pet waste can make people or pets sick



*Prevent Water Pollution
Protect Your Health
Clean Up After Your Pet*

Pet Waste, Water Quality & Your Health: Why You Should Give a Bark

When rain or snow melt runs over the land it can carry pollutants like uncollected pet waste directly or by way of



a storm drain into nearby streams, lakes, ponds or wetlands. This polluted stormwater runoff, also called *Nonpoint Source Pollution*, can degrade water quality, impair aquatic health, and make waters unsuitable for recreation.

Why is Pet Waste Pollution?

Pet waste is the source of two types of pollutants: pathogens and nutrients. *Pathogens* are disease causing microorganisms that can contaminate water resources, making them unsafe for swimming or drinking. *Nutrients*, such as nitrogen and phosphorous, can cause runaway growth of algae and aquatic weeds, making the water murky, green and smelly.

When the excess growth of algae and aquatic plants, or even the pet waste itself, decomposes in the water it uses up dissolved oxygen needed by fish to survive, and releases compounds such as ammonia that can harm aquatic life.

Why is Pet Waste a Health Risk?

Pathogenic bacteria, parasites and viruses in pet waste are a health risk to both people and animals. Leaving pet waste on the ground in your yard or in public areas may expose children, adults and even other pets to diseases. There is also a real risk of getting sick from drinking or swimming in waters contaminated by pet waste.

Is Your Pet the Problem?

It may seem that your pet does not have much of an impact, but consider all the other pets in your neighborhood, town, and even in the state. That is a lot of pets doing their daily business! Even if only a fraction of pet waste is not picked up it can really add up.

But isn't animal waste natural? It is, but in developed areas, where there are paved surfaces and lawns, pet waste can be carried by runoff directly into nearby water resources. In naturally vegetated areas pollutants from decomposing waste

can be captured by the underlying soils; however, in parks and open spaces popular with dog walkers, waste can build up, becoming a serious problem.



WHAT TO DO WITH PET POO

Always bring a plastic bag or two when you walk your dog.

Use the bag like a glove, **scoop the poop**, then turn the bag inside out and seal.

Put the **bagged waste** in a **trash can** or flush unbagged waste down the toilet.

Never throw dog waste down a storm drain. They lead directly to a water resource such as a stream, lake, pond or wetland.



To learn more, visit
www.conservect.org/ctrivercoastal

Published by the Connecticut River Coastal Conservation District with funding provided, in part, by a US EPA Clean Water Act Section 319 Grant administered by the Connecticut Department of Environmental Protection



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Recreational Liability

CFPA has advocated for protecting all landowners against liability if they make their land available for recreational purposes.

Since 1971, our state's Recreational Liability Statute has been extremely successful at protecting private landowners (individuals, corporations, nonprofits, and private utilities) against liability as long as they do not charge a fee to access their land. This Statute is essential to the many private landowners who graciously host Blue-Blazed Hiking Trails on their properties.

In 2010-2012, CFPA fought to ensure municipalities would also have protections that private landowners enjoy against liability on their lands. A case that served as a wake-up call to Legislators was the May 2010 jury verdict of \$2.9 million for a mountain biker who was injured at the Metropolitan District Commission (MDC) Reservoir in West Hartford. CFPA worked with a number of groups to ensure the MDC Reservoir, other recreational lands owned by the MDC, and other municipal recreational lands would not be closed as a result of the verdict.

On June 8, 2011, the Connecticut General Assembly passed a recreational liability bill ([H.B. 6557](#)), which was signed by Governor Dannel P. Malloy into law (P.L. 11-211) on July 13, 2011. This law extends the recreational liability protection enjoyed by individuals, businesses, and utilities to municipalities with some exceptions.

Representative David Baram (D-Bloomfield) served as the steward for this bill and deserves great accolades and our thanks for making common-sense improvements in the law for municipalities. We hope that this important new law will encourage municipalities to both open more lands to public recreation and more actively pursue the protection of additional lands that may support increased recreational activities for the public's enjoyment and well-being.

[Select here to see the updated Recreational Liability statute.](#)



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CHAPTER 925

STATUTORY RIGHTS OF ACTION AND DEFENSES

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[Sec. 52-557f. Landowner liability for recreational use of land. Definitions.](#)

[Sec. 52-571d. Action for discrimination by golf country club in membership or access to facilities or services.](#)

Sec. 52-557f. Landowner liability for recreational use of land. Definitions. As used in sections 52-557f to 52-557i, inclusive:

(1) "Charge" means the admission price or fee asked in return for invitation or permission to enter or go upon the land;

(2) "Land" means land, roads, water, watercourses, private ways and buildings, structures, and machinery or equipment when attached to the realty, except that if the owner is a municipality, political subdivision of the state, municipal corporation, special district or water or sewer district: (A) "Land" does not include a swimming pool, playing field or court, playground, building with electrical service, or machinery when attached to the realty, that is also within the possession and control of the municipality, political subdivision of the state, municipal corporation, special district or water or sewer district; and (B) "road" does not include a paved public through road that is open to the public for the operation of four-wheeled private passenger motor vehicles;

(3) "Owner" means the possessor of a fee interest, a tenant, lessee, occupant or person in control of the premises. "Owner" includes, but is not limited to, a municipality, political subdivision of the state, municipal corporation, special district or water or sewer district;

(4) "Recreational purpose" includes, but is not limited to, any of the following, or any combination thereof: Hunting, fishing, swimming, boating, camping, picnicking, hiking, pleasure driving, nature study, water skiing, snow skiing, ice skating, sledding, hang gliding, sport parachuting, hot air ballooning, bicycling and viewing or enjoying historical, archaeological, scenic or scientific sites.

(1971, P.A. 249, S. 1; 440, S. 2; P.A. 77-393; Oct. Sp. Sess. P.A. 79-12, S. 2, 3; P.A. 82-160, S. 227; P.A. 88-204; P.A. 90-310, S. 3; P.A. 11-61, S. 139; 11-141, S. 19; 11-211, S. 1.)

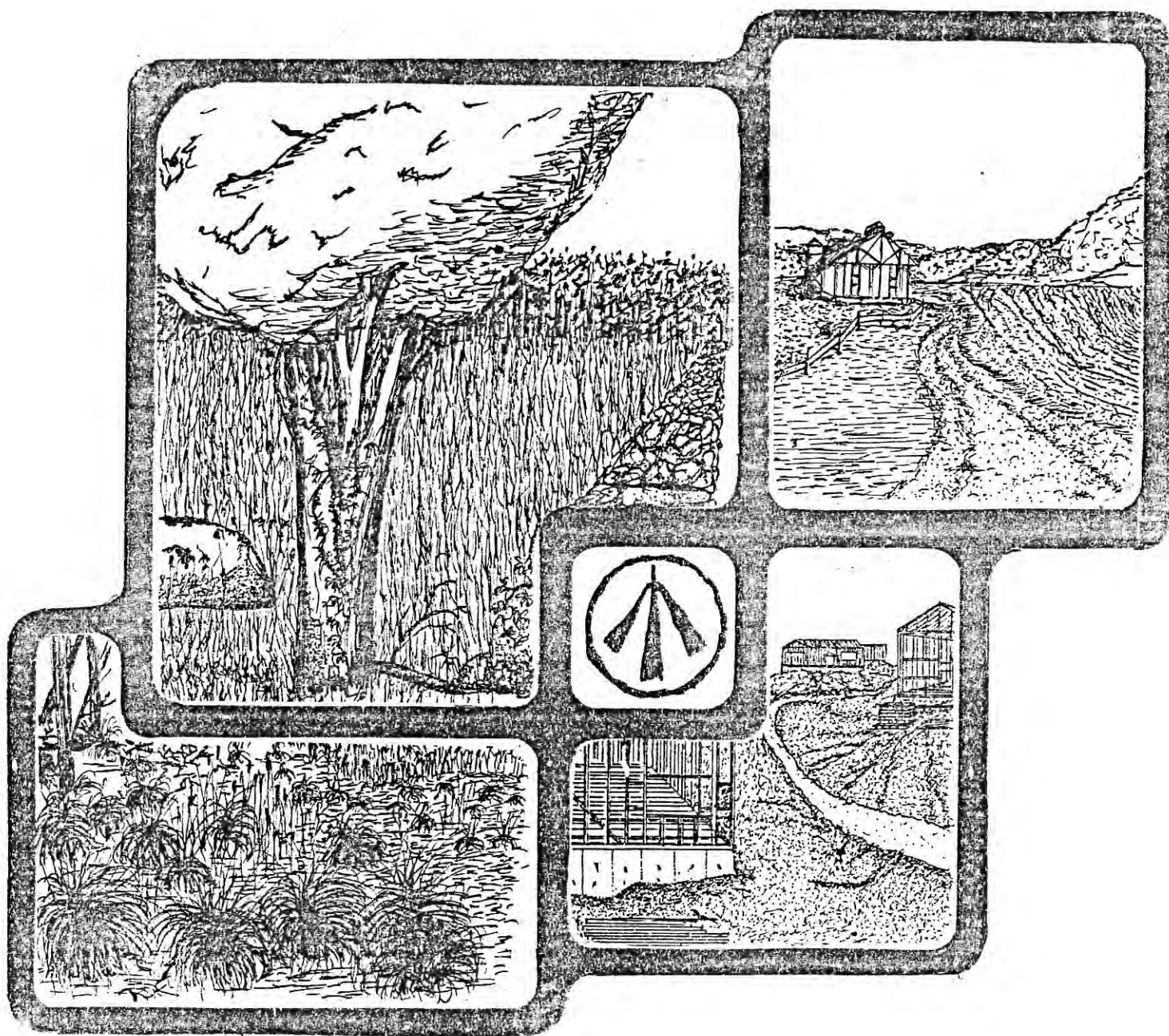
History: Later 1971 act (P.A. 440) removed snowmobiling from definition of "recreational purpose"; P.A. 77-393 included cutting and removing wood in definition of "recreational purpose"; October, 1979, P.A. 79-12 removed cutting and removing wood from definition of "recreational purpose"; P.A. 82-160 alphabetized the defined terms; P.A. 88-204 included hang gliding and hot air ballooning in definition of "recreational purpose"; P.A. 90-310 in Subdiv. (4) added sport parachuting to the definition of "recreational purpose"; P.A. 11-61 redefined "charge" in Subdiv. (1) and "owner" in Subdiv. (3); P.A. 11-141 redefined "charge" in Subdiv. (1) and "owner" in Subdiv. (3); P.A. 11-211 redefined "land" in Subdiv. (2), "owner" in Subdiv. (3) and "recreational purpose" in Subdiv. (4).

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ENVIRONMENTAL REVIEW TEAM REPORT



**MEADOWBROOK FARMS
ORANGE, CT**

**KING'S MARK
RESOURCE CONSERVATION & DEVELOPMENT AREA**

**KING'S MARK
ENVIRONMENTAL REVIEW TEAM REPORT**

**MEADOWBROOK FARMS
ORANGE, CT
FEBRUARY 1985**



King's Mark Resource Conservation and Development Area
Environmental Review Team
Sackett Hill Road
Warren, Connecticut 06754

ACKNOWLEDGMENTS

The King's Mark Environmental Review Team operates through the cooperative effort of a number of agencies and organizations including:

Federal Agencies

U.S.D.A. Soil Conservation Service

State Agencies

Department of Environmental Protection

Department of Health

University of Connecticut Cooperative Extension Service

Department of Transportation

Local Groups and Agencies

Litchfield County Soil and Water Conservation District

New Haven County Soil and Water Conservation District

Hartford County Soil and Water Conservation District

Fairfield County Soil and Water Conservation District

Northwestern Connecticut Regional Planning Agency

Valley Regional Planning Agency

Central Naugatuck Valley Regional Planning Agency

Housatonic Valley Council of Elected Officials

Southwestern Regional Planning Agency

Greater Bridgeport Regional Planning Agency

Regional Planning Agency of South Central Connecticut

Central Connecticut Regional Planning Agency

American Indian Archaeological Institute

Housatonic Valley Association

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FUNDING PROVIDED BY

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Jamie Whitman, ERT Cartographer

Jamie Whitman, Secretary

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LOCATION OF STUDY SITE



Scale 1" = 10 miles

10 0 5 10 miles

MEADOWBROOK FARMS

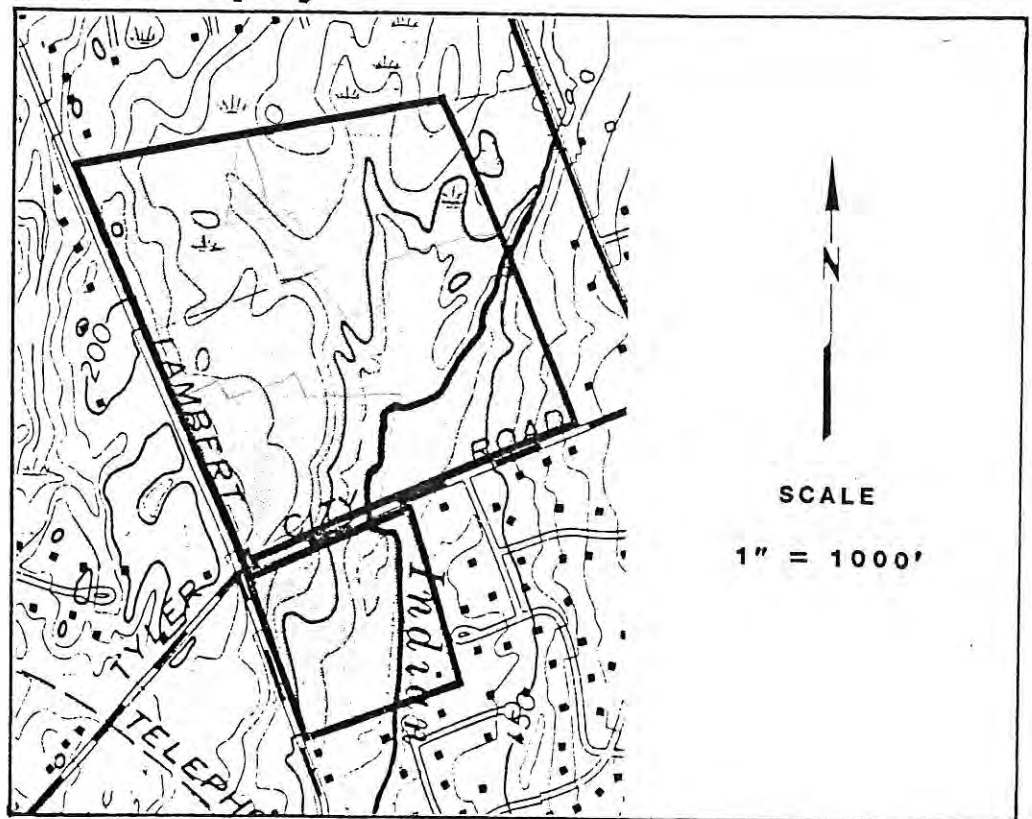
I. Introduction

The preparation of this report on "Meadowbrook Farms" was requested by the Orange Conservation Commission.

Meadowbrook Farms is a +102 acre tract of land located near the center of town off Lambert Road and Tyler City Road. The site consists primarily of open farm land, which slopes gently or moderately towards Indian River (see Figure 1). Indian River flows southward through the eastern limits of the property.

Figure 1

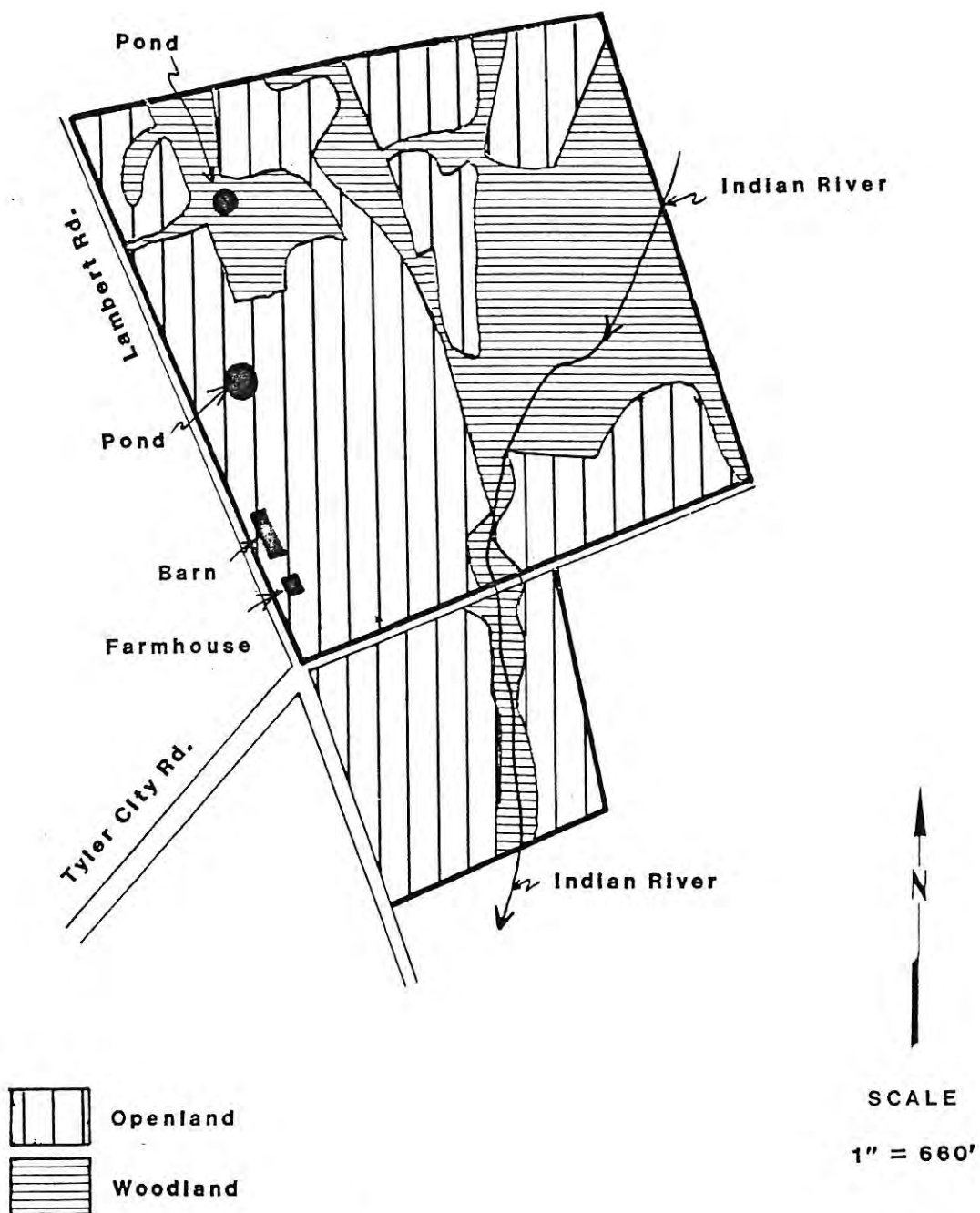
Topography



As reflected in its name, the Meadowbrook Farms property has a history of agricultural use. As shown in Figure 2, the property consists primarily of hayland, pasture, and woodland. The Helen Ewen farmhouse and barn, located on the property at the intersection of Tyler City and Lambert Roads, are the only structures present on the property.

The owner of "Meadowbrook Farms" may be interested in selling the property in the near future. In light of this, the Town Conservation Commission is interested in exploring opportunities available for protection of the open space and

Figure 2
Land Use



agricultural value of the property. As one of the few remaining farms in Orange, and due to the close proximity of the property to the center of town, Meadowbrook Farms is viewed as a valuable and unique natural resource. One of the options being considered by the Conservation Commission is town purchase of the property. The town has the right of first refusal on the purchase of the land. Another option being explored is the state purchase of development rights of the property.

The Orange Conservation Commission requested this environmental review to assist them in their deliberations on the land. Specifically, the ERT was asked to identify the natural resource base of the property and to discuss opportunities and limitations of the site for farm management, recreation and open space use, wildlife management, and vegetation management.

If the property is not purchased by the town, it may be developed for residential use. For comparative purposes, therefore, the town has also requested information on the development potential of the property and an analysis of the probable environmental impact if the property is developed for residential purposes rather than protected for open space or agricultural use.

The King's Mark Executive Committee considered the Town of Orange's request for an ERT study, and approved the project for review by the Team.

The ERT met and field reviewed the site on October 24, 1984. Team members participating on this project included: Marc Beroz, Soil Scientist, U.S.D.A. Soil Conservation Service; Randi Lemmon, Land Planner, Housatonic Valley Association; Richard Lynn, ERT Coordinator, King's Mark RC&D Area; Don Smith, Forester, CT Department of Environmental Protection; William Warzecha, Geohydrologist, CT Department of Environmental Protection; Irene Winkler, Soil Conservationist, U.S.D.A. Soil Conservation Service.

Prior to the review day, each team member was provided with a summary of the proposed study, a checklist of concerns to address, a topographic map, a soils map, and a soils limitation chart. During the ERT's field review, team members met with representatives from the Town of Orange and walked the property. Following the field review, individual reports were prepared by each team member and forwarded to the ERT Coordinator for compilation and editing into this final report.

This report presents the Team's findings. The report identifies the natural resource base of the site and discusses opportunities and limitations for alternate land uses. It is hoped the information contained in this report will assist the Town of Orange and the landowner in making environmentally sound decisions.

If any clarification of the report is required, please contact Richard Lynn (868-7342), Environmental Review Team Coordinator, King's Mark RC&D Area, Sackett Hill Road, Warren, Connecticut, 06754.

II. Highlights

1. Approximately 35 acres or one-third of the site consists of inland wetland soils. These wetlands perform important hydrological and ecological functions. In preparing plans for the future use of this property, consideration should be given to protecting the character and functions of these wetland areas. (p. 7)
2. Development of the property for residential use will lead to increases in stormwater run-off. Assuming a moderate density of development (i.e., 30-one acre lots), these increases are expected to be comparatively small (3-4%). However, since a flooding problem is already known to exist along Indian River, any increases could further aggravate flooding conditions. Therefore, if the property is developed for residential purposes, it is recommended that a detailed stormwater management plan and erosion and sediment control plan be prepared. (p. 11)
3. This property, with the exception of the wetland areas, has good potential for hiking, picnicking, sledding, cross country skiing, etc. All the soils including the wetlands also provide opportunities for observing wildlife and studying ecology. The latter activities could supplement the school system's science program. (p. 17)
4. The Meadowbrook Farms site currently contains about 44 acres of prime and important farmland soils. If stones and boulders were removed from two areas on the site, an additional 16 acres would qualify for a total of about 60 acres of prime and important farmland soils. (p. 17)
5. The Meadowbrook Farms site currently provides a healthy diversity of wildlife habitat types which can be expected to be utilized by a variety of wildlife species. Development of the property for residential purposes would diminish the present wildlife value of the property. Preservation of the property for agricultural or open space use on the other hand, would help protect the present value of the property from a wildlife standpoint. (p. 19)
6. The hayland on this site has the potential to be managed more intensively than it is at the present time to increase production. Opportunities also exist for producing other crops that are marketable in the regional area including fruit trees, strawberries, and vegetables. (p. 20)

7. The forest land on this property may be divided into four distinct forest stands. Selective thinning, as proposed in two of the stands, would not only provide a crop (i.e., firewood), but would also serve to improve the health and vigor of the residual trees. Any trails constructed in the woodland as part of this thinning operation could serve in the future as recreational trails. (p. 21)
8. A pond of one acre or more created on the property could provide significant fishing recreation for both children and adults. The pond could be stocked with largemouth bass, bullhead, golden shiner, and possibly bluegill sunfish. (p. 23)
9. Meadowbrook Farms represents a unique natural resource for the Town of Orange. Protection of the prime and important farmland on the property would be particularly desirable. To facilitate protection of the prime and important farmland, the town and landowner are encouraged to seek the state purchase of development rights. In the event this effort is not successful and the property does go on the market, the town is encouraged to explore fee purchase of all or part of the property by either the town or a conservation land trust. This would facilitate protection of the farmland and open space value of the property. Should town or land trust purchase not prove feasible, flexibility in land development patterns (e.g., clustering) should be promoted by the town to protect the farmland and other valuable resources of the property. It would be desirable to explore all three of the above options simultaneously to help ensure the protection of the important resources of the property. (p. 24)

III. Geology

The property is located within the Ansonia topographic quadrangle. The U.S. Geological Survey has published a bedrock geologic map (Map GQ-426) which was prepared by Crawford E. Fritts. A surficial geologic map (QR-23) prepared by Richard Foster Flint has been published by the Connecticut Geological and Natural History Survey.

BEDROCK GEOLOGY

Numerous bedrock exposures are visible, mostly in the northwest corner of the property. Fritts classifies the rock underlying or cropping out on the site as a subunit of Wepawaug Schist. It consists of a medium to dark gray, medium-to-fine-grained, well layered phyllite composed of the minerals quartz, muscovite, chlorite, and albite. Minor minerals include pyrite, rutile, tourmaline, apatite, zircon and dustlike carbon. The term "phyllite" refers to a metamorphic rock (rock altered by heat and temperature) which is composed mainly of mica minerals such as muscovite and chlorite. The presence of these minerals gives the surface of this rock a silky sheen. Phyllite rocks found on the site part relatively easily and have a slightly greasy feeling. As phyllite rocks are subjected to increased metamorphism, they grade into a schist rock.

According to GQ-426, a very small area on the north-central boundary of the property is underlain by an igneous rock (rock formed from molten magma) called diabase. It is a dark gray to dark greenish-gray rock composed of the minerals calcic labradorite, augite, pigeonite and magnetite. These rocks intruded the surrounding rocks (Wepawaug Schist) after their formation and, therefore, are younger in age.

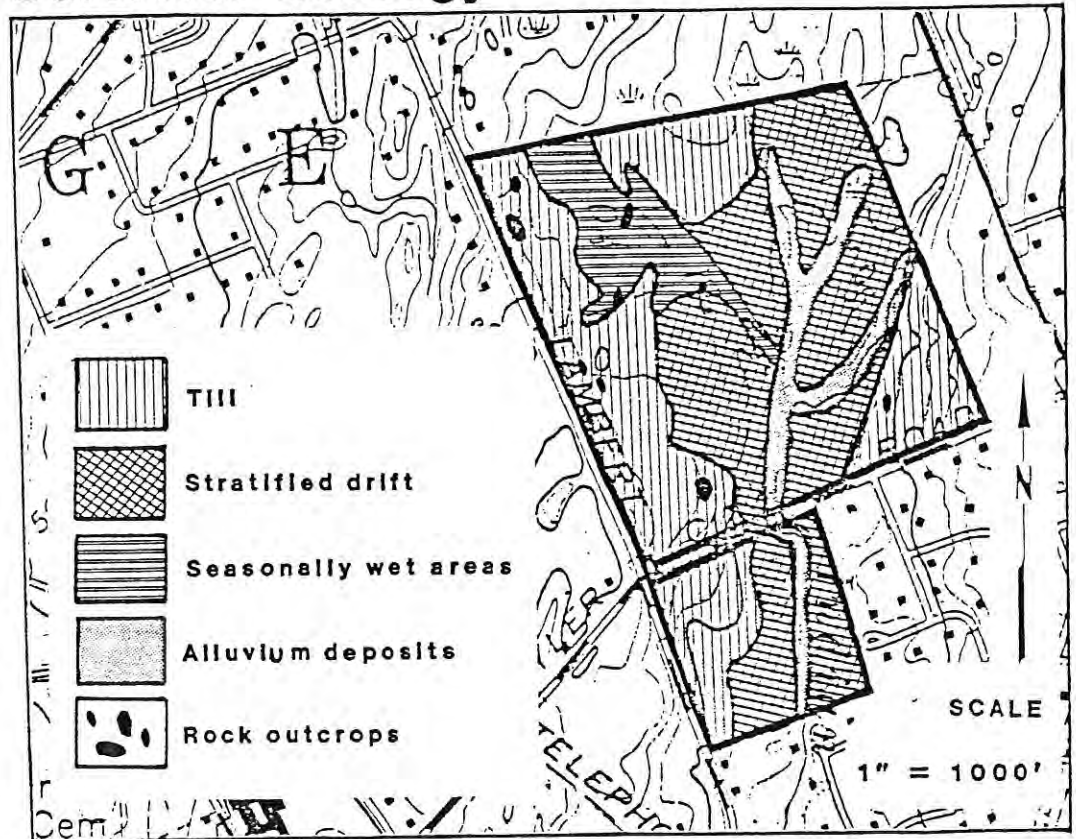
SURFICIAL GEOLOGY

Surficial geologic materials are those unconsolidated mineral and organic materials that overlie bedrock. On this parcel, the surficial deposits may be divided into four groups: till, stratified drift, alluvium, and swamp deposits (see Figure 3). Two types of glacial sediments predominate: till and stratified drift. As glacier ice moved through the region, it collected and transported rock particles and pre-existing overburden. Much of this transported debris was redeposited directly from the ice, either by being plastered onto the land from beneath the ice mass or by being let down gently as the ice wasted away. The resulting deposit was till. Because of its mode of deposition, till contains a nonsorted mixture of particles ranging in size from clay to large boulders. The till may be sandy, stony and loose, or silty, less stony and tightly compact. The thickness of the till is probably not more than 10 feet on this site. The shallowest soil cover is in the northwest corner of the parcel.

When the glacier ice began to melt, it sent forth streams of meltwater, often with torrential flows. These streams were filled with rock debris from the ice, and they

Figure 3

Surficial Geology



redeposited this debris in well-sorted to poorly sorted layers. Sand and gravel were commonly deposited near the ice, while silt and clay were washed further downstream to be deposited in lakes or in the sea. The resulting deposits are known as stratified drift. Based on the Map OR-23 and the soil survey for New Haven County, stratified drift covers the stream valley in the central and eastern parts of the property. Thickness of the stratified drift ranges from zero where bedrock outcrops to probably not more than 10 feet.

Alluvium, is a more recent surficial geologic deposit consisting of sand, silt and gravel. On the site, it occurs as a thin cover along the Indian River.

Overlying till or stratified drift in the northwest corner of the property are seasonally wet areas. These areas are delineated by the symbol Rn (Ridgebury, Leicester and Whitman soils) on the Soils Map accompanying this report (see Figure 6). These soils as well as the soils comprising the alluvium deposits are regulated inland-wetland soils.

Inland wetland areas perform important positive hydrological functions such as: (1) serving as a flood and stormwater retention area, which reduces downstream flood flows during periods of heavy precipitation; (2) improving surface water quality through various biochemical processes; and (3)

trapping sediments from upstream areas. From an ecological standpoint, they provide habitats for a wide diversity of plant and animal species. Wetlands can be used as valuable resource areas for educational purposes, passive recreational uses and scientific research. In preparing plans for the future use of this property, consideration should be given to protecting the character and functions of these wetland areas.

GEOLOGIC DEVELOPMENT CONCERNS

Town officials stated that if the property is not purchased by the town, it may be developed for residential use. Even if the town purchases the land for open space use and/or agricultural land preservation, there is a chance that parts of the property would be sold for residential development. The purpose of this would be to help offset the cost of purchasing the property. If residential development does occur under a town acquisition plan, it was indicated that it would probably not take place on the prime farmland.

The principal geologic limitations on the use of the property will be the following: (1) shallow depths to rock in the northwest corner of the parcel; (2) locally moderate to steep slopes; and (3) permanent and seasonally wet areas. In addition, the presence of till-based soils on the site may also be a limiting factor in terms of residential development. The reason for this is that these soils commonly have elevated groundwater tables, contain numerous stones, and have slow percolation rates. Since public sewers are not available, potential homes constructed within the parcel will require the installation of on-site sewage disposal systems. The above mentioned limitations will weigh heaviest on the ability to provide adequate subsurface sewage disposal systems. These limitations will require special engineering design in order to be surmounted. Wetland areas hold low potential for any type of development and should be avoided where possible.

Keeping in mind the prime farmland soils on the property, the most likely areas for residential development appears to be the land fronting Lambert Road in the northwest corner. It should be pointed out that in order to determine whether or not a septic system can be constructed on a particular lot, detailed soil testing which includes percolation tests and deep test holes will be necessary.

The sand and gravel soils (HkB, HkC and AfB) on the site should not present a major problem for septic system effluent to leach into the ground, depending on the system location. However, because of the highly permeable nature of these types of soils, a leaching system may have an adverse effect on groundwater and/or surface water. The soil may not adequately filter and renovate the sewage effluent as it moves through the soil, particularly where the groundwater level tends to be high and where bedrock is at shallow depths. Based on visual observations, the latter condition may occur in the central parts of the property.

IV. Water Supply

Currently the municipal water supply services dwellings on Lambert Road and Tyler City Road. Therefore, if residential development does occur, the availability and proximity of the water service to potentially developed parts of the property would appear to be feasible and appropriate. Connection to the public water line would also provide maximum protection and afford greater flexibility when considering means for on-site sewage disposal.

If there is a desire to drill a well(s), bedrock underlying the site appears to be the only other practical source of water for the site. Depending on its thickness as well as other hydrogeologic characteristics, sand and gravel deposits may yield small to large amounts of groundwater to wells. However, the sand and gravel on the site appears to be too thin for a water supply source.

Bedrock is commonly capable of providing small but reliable yields of groundwater to individual wells. A survey of bedrock wells in the Quinnipiac River basin (see Connecticut Water Resources Bulletin No. 27) indicates that more than 80 percent of those wells that were drilled into a rock type similar to that found on the site yielded 4 gallons per minute, while 10 percent yielded 25 gallons per minute or more. A yield of 3 gallons per minute should adequately serve most domestic uses.

The natural quality of the groundwater should be good. There is a chance that elevated levels of iron and/or manganese may be encountered in well water. Depending upon the levels, it may be necessary to treat the water drawn from potential wells with an appropriate filtering device.

V. Flood Hazard Areas

A Flood Boundary and Floodway Map for the town of Orange has been prepared by the Federal Emergency Management Agency. This study includes maps which identify areas throughout the town that are subject to flooding during the 100 and 500 year storms. The map also shows the Indian River floodway. A '100' year flood is a flood with a one chance in 100 or a 1 percent chance that it will happen in any year. A '500' year flood would have a one chance in 500 or a 0.2 percent chance of occurring in any given year. It should be pointed out that this does not mean a flood of the magnitude mentioned above will occur only once in a 100 or 500 year period. The probability of occurrences remains the same each year regardless of what happened the year before.

According to the map, the '100' year flood boundary parallels the Indian River in the eastcentral parts of the property. Also, the boundary extends along a tributary to Indian River in the northern parts of the property. The '500' year flood boundary fringes the outer limits of '100' year flood boundary on the west side of the river north

of Tyler City Road. South of Tyler City Road, the '500' year flood fringes the '100' year flood boundary on both sides of the river. Figure 4, which was adapted from the FEMA map for Orange, identifies the floodprone areas on the site.

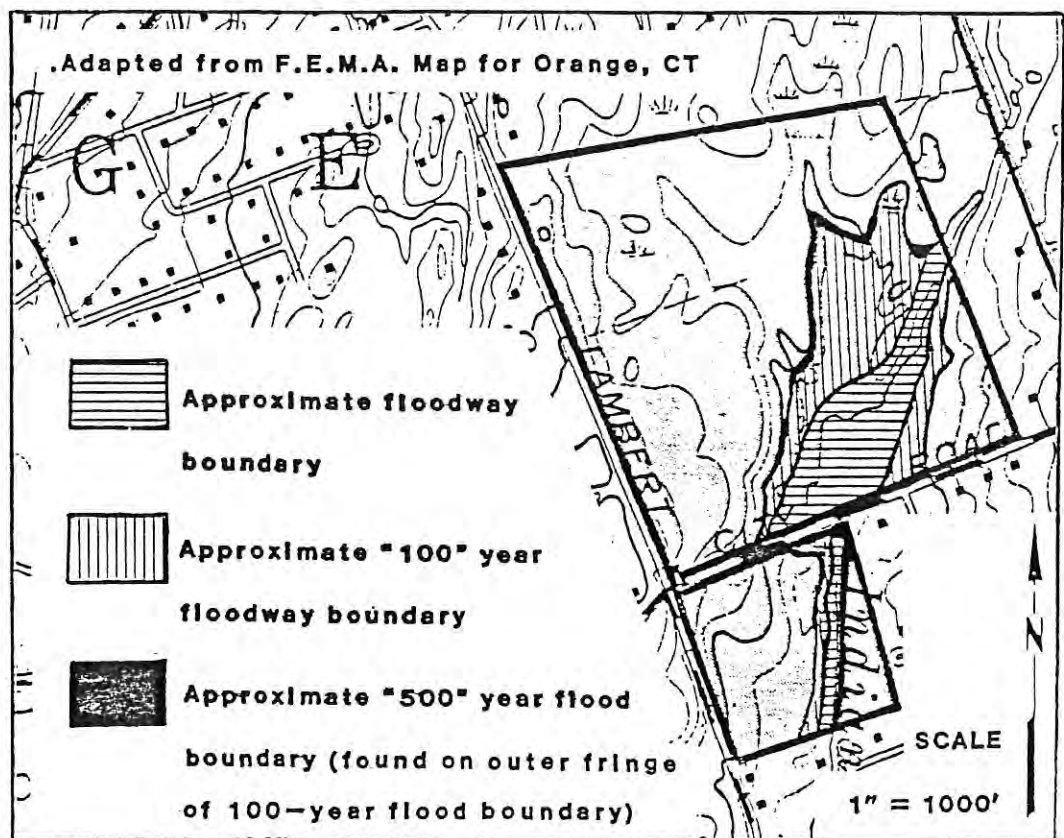
There may be swampy or topographic depressions within the site subject to wetness and perhaps flooding during periods of particularly heavy rain. One such area may be in the northwest corner of the property in the area delineated as Rn (Ridgebury, Leicester and Whitman soils) on the accompanying soils map (see Figure 6).

VI. Hydrology

The "Meadow Brook Farms" site lies within the Indian River watershed (see Figure 5). Surface water on the property flows downslope into Indian River or is intercepted by any

Figure 4

Flood Hazard Areas



of the intermittent streamcourses traversing the site. These streamcourses ultimately route the water into Indian River. Indian River empties into Indian Lake south of the property.

As mentioned earlier, if the town does not acquire the farm, there is a possibility that the land may be sold for residential development. Depending upon the density of

dwellings and more importantly the amount of impervious surface created, development of the land for residential use will cause increases in peak flows to Indian River. These increases will also arise from the removal of vegetation.

It is possible to estimate the increases in runoff and peak flows for existing conditions and for the increases that might be experienced following residential development. The Team's geologist has prepared such estimates, not only for present conditions but also for a conceptual subdivision of 30-one acre lots for single family dwellings constructed on the site.* It was assumed that construction of the homes would front on the existing town roads (i.e., Tyler City Road and Lambert Road). These estimates do not account for possible drainage re-routing through man-made structures. The method used to make these estimates is outlined in the Soil Conservation Services' Technical Release No. 55. Estimates were made for the 10 year storm, 25 year storm, 50 year storm and 100 year storm. These storms occur on a statistical average of once every 10, 25, 50 and 100 years, respectively, but any of the storms have a chance of occurring in any given year. Peak flows were calculated for the point at which Indian River passes underneath Porter Lane, south of the site. The watershed for that point is shown in Figure 5. Runoff increases were calculated as average depths of runoff for the drainage area as a whole. Results are given in the following tables. It must be remembered that the figures below are meant only to indicate the prospective magnitudes of the increases; they are not designed to indicate absolute flow rates (which may be greater or less than the corresponding estimates) nor should they be used for engineering design purposes.

*This intensity of development was chosen for discussion and comparative purposes only. More intensive development would likely result in greater hydrological impacts, less intensive development would result in lesser impacts.

TABLE I

Estimated average runoff depths (inches) for the
drainage area as a whole.

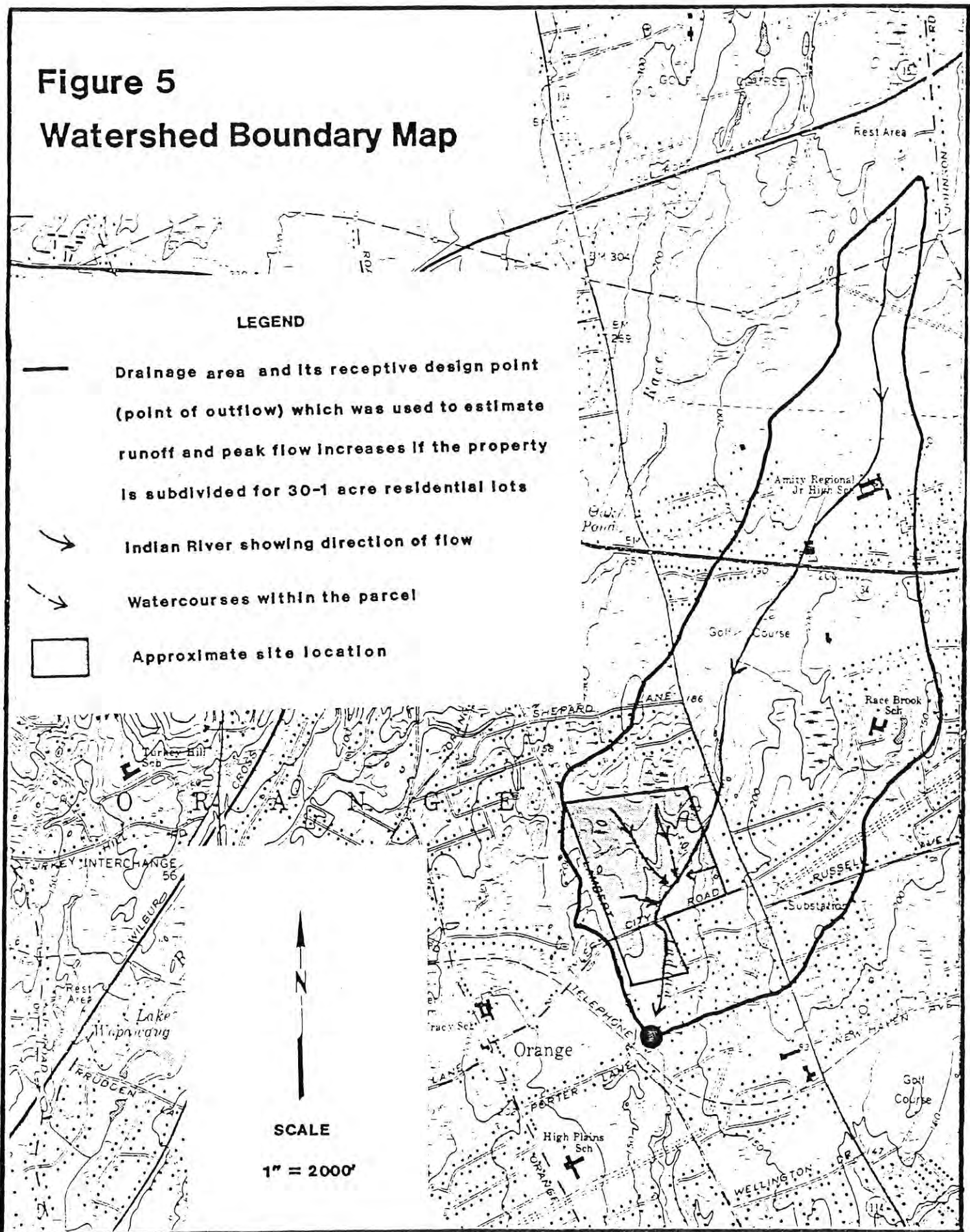
	<u>10 yr storm</u>	<u>25 yr storm</u>	<u>50 yr storm</u>	<u>100 yr storm</u>
Present Conditions	1.96"	2.40"	2.95"	3.60"
Post Development (30-1 acre lots with 20% imperviousness)	2.04"	2.49"	3.04"	3.70"
% Increases	4%	4%	3%	3%

TABLE II

Estimated peak flows (cubic feet per second) where
Indian River passes under Porter Lane.

	<u>10 yr storm</u>	<u>25 yr storm</u>	<u>50 yr storm</u>	<u>100 yr storm</u>
Present Conditions	345 cfs	447 cfs	582 cfs	738 cfs
Post Development (30-1 acre lots with 20% imperviousness)	359 cfs	464 cfs	599 cfs	759 cfs
% Increases	4%	4%	3%	3%

Figure 5
Watershed Boundary Map



As the figures in Table II indicate, peak flow increases to Indian River following development of a 30-1 acre lot subdivision on the site may be expected to be slight. However, since a flooding problem is already known to exist in the area of the design point (a town Commission member indicated to the Team that flooding problems occur at the culvert passing under Porter Lane during heavy rainstorms) any increases could further aggravate flooding conditions in the area as well as other downstream areas. Therefore, if the property is developed for residential use, it is recommended that a detailed storm water management plan, which includes hydraulic calculations, be devised for town review. In this regard, a detention pond may be a likely resolution for handling post development flows. If only one or two homes were constructed on the parcel, it does not appear that peak flows would be increased enough to significantly aggravate existing flooding problems to Indian River.

The runoff volumes in Table I suggest that increases will be less than 5 percent for development of a 30 one acre lot residential subdivision. The increased runoff volumes are important in terms of the additional sediment that could be carried away from the watershed. In view of the moderate slopes at various points on the parcel, it is recommended that a comprehensive erosion and sediment control plan be developed if the land is subdivided. Erosion and sediment control measures should be shown on the subdivision site plan.

VII. Soils

Figure 6 and the following narrative are a revision of data contained in the Soil Survey of New Haven County, Connecticut. The symbols on the map identify map units. Each map unit has a unique composition of soils. Areas with the same symbol have the same composition.

SOIL DESCRIPTIONS

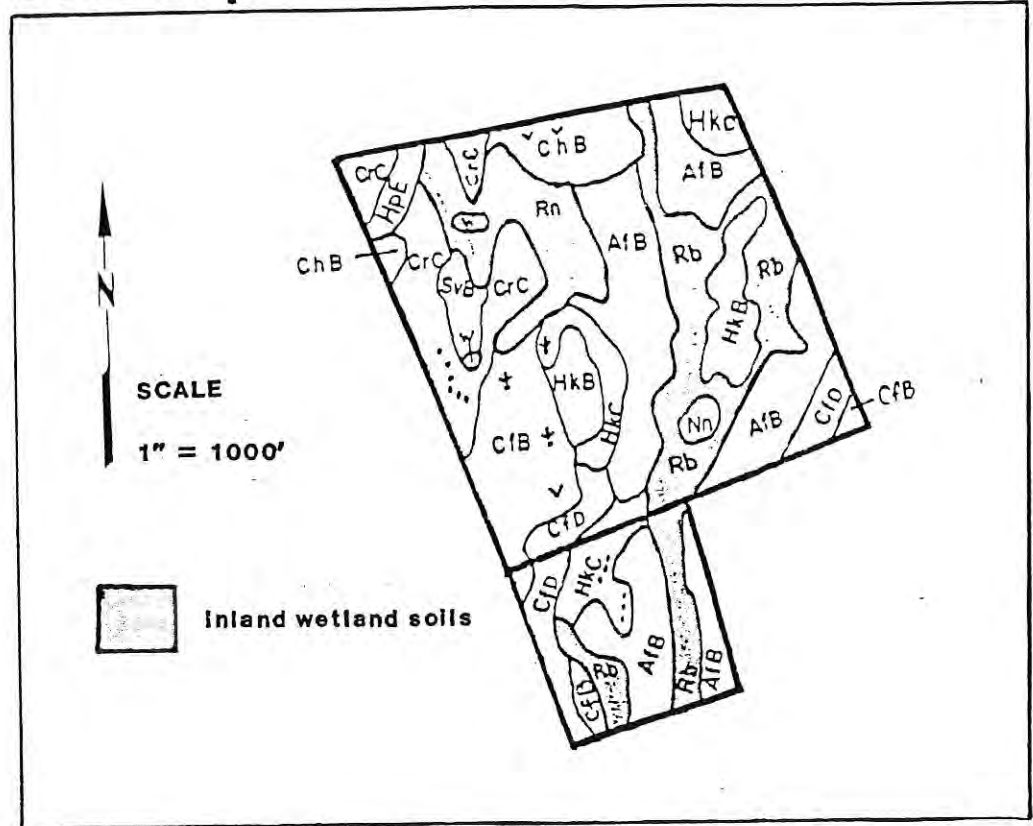
Map Unit AfB - This map unit is composed primarily of Agawam soils on 3 to 8 percent slopes. These soils are very deep and well drained. Typically they have a fine sandy loam surface layer over stratified sands and gravels to a depth of 60 inches or more.

These soils are well suited for passive recreational use but some land leveling would be required to develop ballfields. Should this area be developed for ballfield use, the depth of cuts in the leveling operation should not exceed 20 to 30 inches since this may expose the coarse substratum materials. This coarse material results in droughty conditions for plant growth.

The Agawam soils are well suited for roads and buildings. These soils have a fast percolation rate however. Hence, there is a danger that septic systems installed in these soils may pollute the ground water as the soils may not adequately filter the septic effluent. Large lot sizes generally lessen the dangers of ground water pollution.

Figure 6

Soils Map



Map Unit CfB - This map unit is composed primarily of Charlton soils on 3 to 8 percent slopes. These soils are very deep and well drained. Typically they have fine sandy loam textures to a depth of 60 inches or more.

Land leveling would be required to develop ballfields in this area. These soils are well suited for urban development. Roads, buildings and septic systems can be easily built.

Map Unit CfD - This map unit is composed primarily of Charlton soils. These soils are the same as those described above in the narrative for CfB except that these soils are on 15 to 25 percent slopes.

The steep slopes make these soils poorly suited for ballfields or homesite development.

Map Unit ChB - This map unit is similar to the CfB unit described above, except that up to 3 percent of the soil surface is covered by stones and small boulders. These soils are on 3 to 8 percent slopes.

Ballfields can be developed if the site is graded and rocks removed. The soils are also well suited for urban development.

Map Units CrC and HpE - These map units are composed of two soils that are so intermingled on the ground that they cannot be separated on the map. One kind of soil is named Hollis. These soils are shallow and somewhat ex-

cessively drained. Typically the Hollis soils have fine sandy loam textures over hard bedrock at a depth of 10 to 20 inches.

The other soil is named Charlton. The Charlton soils are very deep and well drained. Typically they have fine sandy loam textures to a depth of 60 inches or more.

The Hollis soils are poorly suited for ballfields and residential development due to their shallow depth to bedrock and slope.

The Charlton soils are poorly suited for ballfields due to slope. These soils provide good building sites on slopes of less than 15 percent.

The Charlton soils are dominant in the CrC map unit and the Hollis soils are dominant in the HpE map unit. Slopes are dominantly 3 to 15 percent on CrC and 15 to 35 percent on HpE.

Map Units HkB and HkC - These map units are composed of Hinckley soils. These soils are very deep and excessively drained. Typically the Hinckley soils have a gravelly sandy loam surface layer over sands and gravels to a depth of 60 inches or more.

These soils are poorly suited for ballfields. Extensive grading would be required to develop level playing surfaces. During grading operations the coarse substratum would be exposed. The exposed sands and gravels would provide a poor medium for plant growth.

These map units have good potential for residential development. There is a danger that septic systems installed in these soils may pollute the ground water, however. Large lot sizes generally take care of this problem.

Slopes are dominantly 3 to 8 percent on HkB and 8 to 15 percent on HkC. The Hinckley soils on the west side of the property adjacent to the Indian River have up to 3 percent of their surface covered by stones and boulders.

Map Unit Nn - This map unit is composed of Ninigret soils on 0 to 3 percent slopes. These soils are very deep and moderately well drained. Typically Ninigret soils have a fine sandy loam surface over sands and gravels to a depth of 60 inches or more. They have a seasonally high water table between the depths of 1.5 and 3.0 feet.

These soils have fair potential for ballfields. The playing surface will tend to remain soggy for extended periods during the spring and fall.

These soils have fair to poor potential for community development. The high water table can result in wet basements and failing septic tank absorption fields unless they are specially designed.

In addition, these soils have a fast percolation rate. Large lot sizes will be required to avoid contamination of the ground water by septic tank absorption fields.

Map Unit SvB - This map unit is composed of Sutton soils on 3 to 8 percent slopes. These soils are very deep and moderately well drained. Typically Sutton soils have fine sandy loam textures to a depth of 60 inches or more. These soils have a seasonally high water table between the depths of 1.5 and 3.0 feet.

The Sutton soils have fair potential for ballfields due to the seasonally high water table. The playing surface will remain soggy during the wetter periods of the year.

These soils have fair potential for residential development. The high water tables will cause wet basements and failing leach fields unless special design is used.

Map Units Rb and Rn - These map units are composed of poorly and very poorly drained soils that are inland wetlands. These soils are very deep and have a water table at or near the soil surface for much of the year.

The Rb unit is composed of Raypol soils on 0 to 3 percent slopes. Typically these soils have very fine sandy loam and silt loam textures overlying gravelly sand to a depth of 60 inches or more. In the wooded areas, the surface of these soils, is covered by up to 3 percent stones and boulders.

The Rn unit is composed of Leicester soils on 0 to 3 percent slopes. Typically these soils have fine sandy loam textures to a depth of 60 inches or more.

These Raypol and Leicester soils have poor potential for active recreation or community development due to their high water tables.

SPECIAL SYMBOLS

The following symbols have been used on Figure 6 to denote small areas contrasting with the surrounding soils.

<u>Symbol</u>	<u>Meaning</u>
.....	short 15 to 25 percent slopes
V	exposures of bedrock
✱	wet spot
W	pond

PASSIVE RECREATION

This property, with the exception of the wetland areas, (Rb and Rn), has good potential for hiking, picnicing, sledding, cross country skiing, etc. All the soils including the wetlands also provide opportunities for observing wildlife and studying ecology. The latter activities could supplement the school system's science program.

FARMLAND

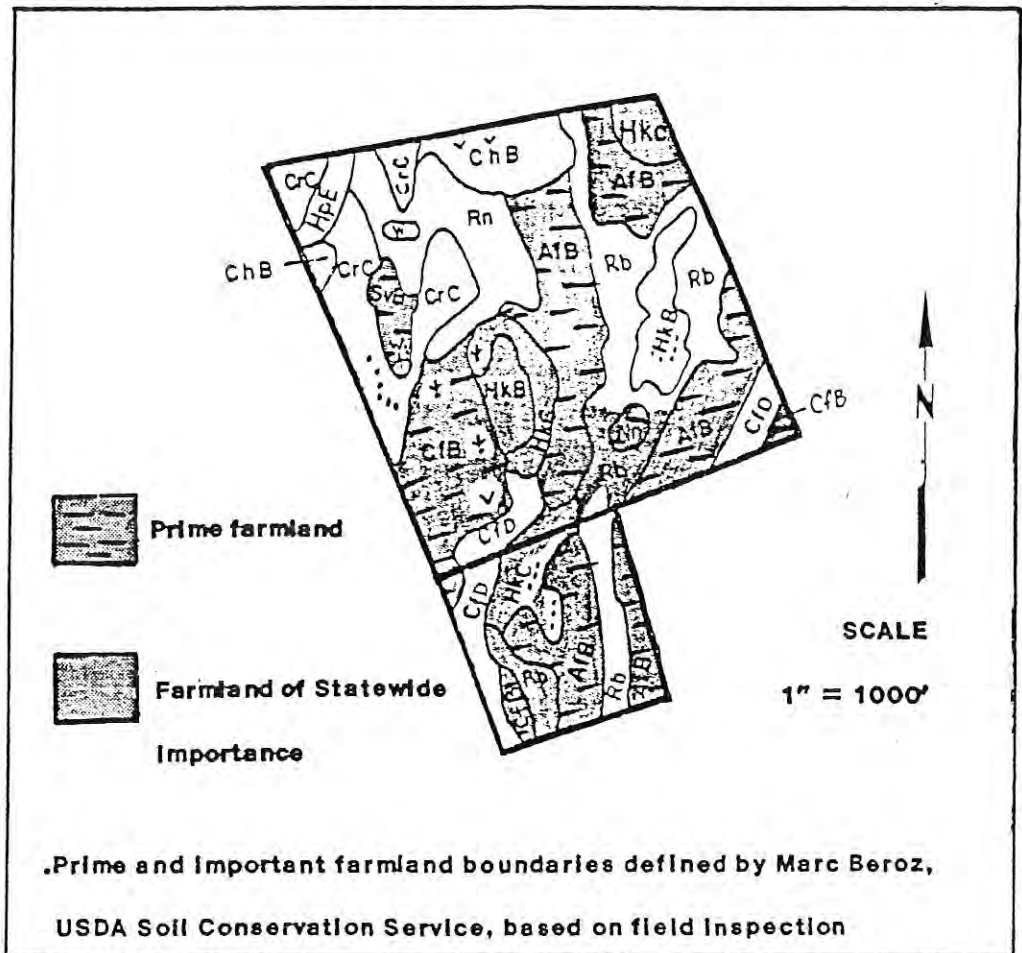
Prime farmland is land that has the best combination of physical and chemical characteristics for producing crops. The map units that qualify as prime on this property are: AfB, CfB, Nn and SvB. These map units cover approximately 32.4 acres of the site.

Farmlands of Statewide Importance is land that does not qualify as prime but that can economically produce high yields with proper management. The map units that are in this category are: HkB, HkC and Rb. Although these map units cover approximately 28 acres of the site according to the New Haven County Soil Survey, on-site inspection reveals that only about 11.7 acres of this area would truly qualify as Farmland of Statewide Importance in the opinion of the Team's Soil Scientist (see Figure 7).

The HkB map unit immediately adjacent to the Indian River on the west side of the property was not included in the acreage calculation because of the stones and boulders on its surface. The wooded areas of Rb were excluded from the acreage tally for the same reason. Should these stones and boulders be removed, the soils would qualify as important farmland.

Figure 7

Prime and Important Farmland Soils



VIII. Wildlife Habitat Management

Meadowbrook Farms is composed of three major wildlife habitat types: mixed hardwood forest, openland (pasture and hayland), and wetland.

The mixed hardwood habitat is composed predominantly of red maple, red and white oak, hickory, black birch and beech. Understory vegetation includes saplings, some spicebush, maple-leaved viburnum, some ironwood, skunk cabbage, ground pine and wood violet. Squirrels, rabbit, fox, deer, raccoon, ruffed grouse and several non-game species would utilize habitats of this type.

To create a diversity of habitat in the wooded areas and to increase the amount of edge, scattered openings could be created within the woodland. Openings approximately 1/4 to 1 acre in size, irregular in shape and oriented east to west will encourage fruit producing shrubs. Brush may be piled along the edges of these openings to provide wildlife cover for small mammals and birds.

The openland habitat consists of pasture and hay fields. Grasses predominate with some alfalfa and clovers. Some shrub and woody vegetation encroachment is occurring by hardwoods, cedar, and multiflora rose.

Open field borders in proximity to forested land provide vegetative diversity which benefits mourningdove, sparrows, robins, ruffed grouse, deer, raccoon and woodcock.

Open field habitat can be improved by increasing vegetative diversity and edge. An uncut border, approximately 15 feet in width could be left where the open field meets the forest. This border area, if created, should be mowed every 3 to 5 years (after August 1). Uncut field borders provide valuable food cover and shelter for many wildlife species. Some shrub components should be maintained and some fields should be cleared every three to five years to maintain an early vegetative successional stage for optimum wildlife management of the site.

The majority of the wetland habitat is wooded and composed of red maple. Grasses, rushes, sedges, skunk cabbage, viburnum, and spicebush also occupy the wetland areas. Many types and varieties of wildlife would frequent wetland areas such as this, including redwinged blackbirds, raccoons, various amphibians, reptiles and many other non-game species.

Wetland habitat can be improved by creating an open water environment. Ponds should be at least three to five feet deep to insure year round water. Wood duck boxes may be established within the wetland areas occupied by grasses and low shrubby vegetation.

According to the DEP's Natural Diversity Data Base, there are no records of rare or endangered species of either flora or fauna on this property. The wooded and wetland areas of this site have the potential for supporting such

species, however, and a thorough cataloging of the wildlife and vegetation on the site might identify such species.

The Meadowbrook Farms site currently provides a healthy diversity of wildlife habitat types which can be expected to be utilized by a variety of wildlife species. Development of the property for residential purposes would diminish the present wildlife value of the property. Preservation of the property for agricultural or open space use on the other hand, would help protect the present value of the property from a wildlife standpoint.

IX. Vegetation Management

A. OPEN LAND

The open land occupying the Meadowbrook Farms property is managed as hayland or as pastureland. A mixture of alfalfa and grasses compose the hayfields. One-cutting is usually taken off of these hayfields each year. This is not an intensive management program for the land.

Alfalfa is a first choice crop for protein, energy and yield. Alfalfa is the most productive and long-lived on deep, well drained, fertile fields having a pH of 6.5 or higher. To maintain high yields over many years, alfalfa must receive good fertility and cutting management. Alfalfa will yield well on a 2-cut, or even a 3-cut schedule.

Mixtures of grasses and legumes for perennial forage production are generally preferred to seeding either alone. Mixtures increase the productive stand life. Overall production is increased and harvest problems are minimized.

When grown with legumes, grasses will provide some protection to legumes against heaving injury and utilize nitrogen from legumes for growth. Generally the soils occupying what is presently managed for hay provide the proper depth and drainage to support an excellent alfalfa/grass (Timothy, Orchardgrass, Bromegrass) haycrop or pasture for foraging animals.

Approximately 5 acres of pasture land in the north central portions of the property are considered poorly drained. A different type of forage would be expected here. Clovers will grow on soils too poorly drained for alfalfa. Timothy associates well with clovers and will tolerate the poor drainage but will not survive intensive grazing.

While most of the fields are managed as hayland or pastureland, an attempt has been made at Christmas tree production. This is an alternative that allows the manager to diversify the farm operation and provide an income from a market different than that from production of beef cattle.

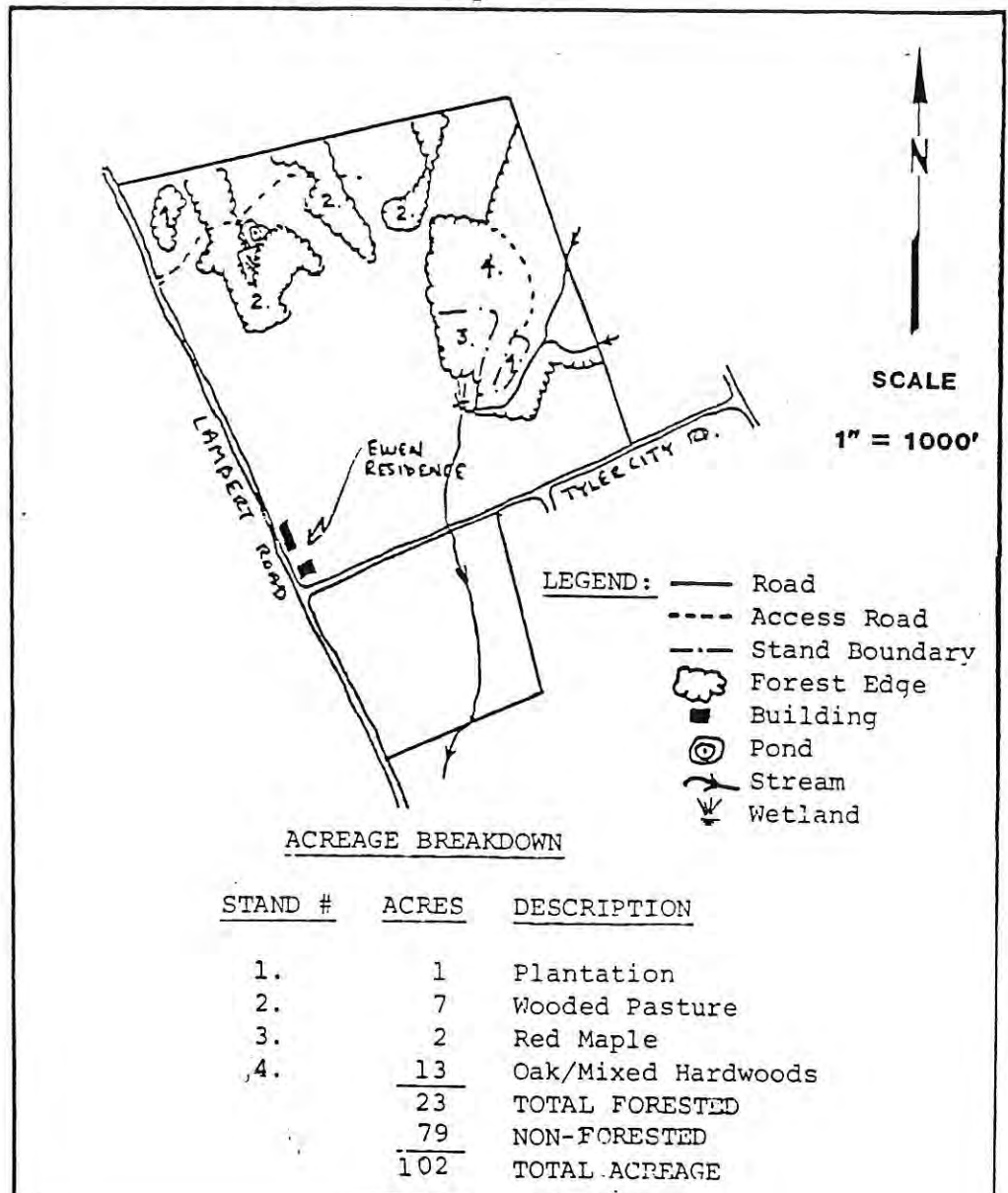
Alternatives exist for producing other crops that are marketable in the area. However, these alternatives are highly dependent on the willingness of the owner or operator to invest large sums of money to start-up production.

Production of fruit trees, strawberries, vegetables and even vineyards are alternatives. All, however, may require irrigation and more intense labor than is presently used.

B. WOODLAND

As shown in Figure 8, the forest land on this property may be divided into four distinct forest stands. Each of these stands is described below together with its potential for forest management. Selective thinning, as proposed in two of the stands, would not only provide a crop (i.e., firewood), but would also serve to improve the health and vigor of the residual trees. Any trail constructed in the woodland as part of this thinning operation could serve in the future as recreational trails.

Figure 8 Forest Stand Map



Stand #1. Plantation, 1 acre. This overstocked plantation is composed of fair quality, pole-sized* Norway spruce in the western parcel and white pine in the eastern parcel. These trees are growing at a fair rate on a medium quality growing site and are approximately 20 years old.

Due to heavy crown cover the understory and ground cover are spotty. Pastures of ground pine can be found in the eastern parcel.

Both parcels of this stand are in need of a thinning to promote active growth. Additionally, the white pine area should be released from competition with the surrounding hardwoods.

Stand #2. Wooded Pasture, 7 acres. This understocked stand is composed of fair quality, pole to sawlog-sized white oak, red oak, hickory, black birch, and red maple. These trees are growing at a good rate on a medium quality growing site and are approximately 40-60 years old.

The understory is primarily composed of patches of heavy barberry and multiflora rose. Due to heavy grazing little else has been able to become established.

The ground cover here is composed almost exclusively of grasses.

No forest management of this area is envisioned.

Stand #3. Red maple, 2 acres. This wellstocked stand is composed of fair quality, pole to sawlog-sized red maple with scattered red oak and hickory on the drier margins. These trees are growing at a fair rate on a good quality growing site and are approximately 40-60 years old.

The understory species encountered include saplings and spicebush.

The ground cover here includes wood nettle, violet, and skunk cabbage.

Due to past thinning and salvage activity, no management activity is necessary for a period of 10 years.

Stand #4. Oak/Mixed Hardwoods, 13 acres. This wellstocked stand is composed of good quality, pole to sawlog-sized red oak, white oak, black birch, beech, red maple, and hickory. These trees are growing at a medium rate on a good quality growing site and are approximately 50-70 years old.

The understory species encountered include sapling to pole growth of beech, black birch, and red maple; maple-leaved viburnum; scattered spicebush; and scattered ironwood.

*seedling size - less than 1" in diameter at breast height
(d.b.h.)

sapling size - 1-5 inches in d.b.h.

pole size - 5-11 inches in d.b.h.

sawlog size - 11 inches and larger in d.b.h.

The ground cover here includes wood violets, patches of ground pine, and wild geranium.

Although wood cutting has been occurring in the stand in the last 5 years, there appears to be room for removal of additional poorly formed pole-sized trees. Products from this thinning and weeding would be almost exclusively firewood.

X. Fisheries

Indian River is likely to be inhabited by black nose dace, fallfish, creek chub, common shiner, and white sucker. Some warmwater pond species such as common sunfish and largemouth bass may be present as juveniles, having entered the stream as young-of-the-year during annual spring flooding. It is unlikely, however, that these species survive through the winter in the stream. Small numbers of brook trout may also inhabit the stream. They would be limited to the few pockets of water capable of providing acceptable habitat (four ppm oxygen, $\leq 68^{\circ}\text{F}$, cover from predators). Most likely this would be where a small volume of spring water enters the brook through the substrate. This is a typical situation in the many small brooks and streams across the State of Connecticut having very marginal trout habitat. Their population density is low, size of the trout is small (generally 3-4.5 inches), and they do not provide for any significant recreational fishing.

A pond created on the property may provide significant fishing recreation for both children and adults. It is recommended that the pond be at least one acre in size and that much of its depth be greater than 10 feet. This will help prevent the extensive growth of aquatic vegetation and the winterkill of fish. The creation of extensive shallow shoreline areas should be avoided. It is also recommended that the dam be equipped with a drain pipe and valve capable of completely draining the pond. The pond should be stocked with the following: largemouth bass adults, largemouth bass juveniles, bullhead, golden shiner, and possibly bluegill sunfish. The fisheries office of the DEP Western District (485-0226) should be contacted if recommended stocking densities of the various species are desired, and to obtain a listing of operating commercial fish hatcheries. It should also be noted that if the Indian River is to be dammed to create an impoundment, a diversion permit is required from the State DEP.

XI. Land Use and Planning Considerations

A. SITE DEVELOPMENT CONCERNS

The Meadowbrook Farms site represents a unique natural resource for the Town of Orange. Some of the unique attributes that this site exhibits are:

- . The property helps retain the Town of Orange's rural New England character;
- . The largest tract of open land still remaining in the town center;
- . One of the largest blocks of prime and important farmland remaining in close proximity to New Haven and Bridgeport;
- . One of the most, if not the most, diverse wildlife habitats in close proximity to the town center. (The site is home to fox, deer, grouse, squirrels, raccoon, opossum, etc.);
- . One of the most scenic open space parcels left in town;
- . An important watershed buffer for the Indian River;
- . One of the few remaining sites well suited for an array of educational and passive recreational pursuits.

Given the uniqueness of this site to the Town of Orange, any future change in ownership, management or development of the property should be undertaken with protection or enhancement of these attributes in mind. At a minimum, the following goals would be desirable:

1. Protection of the Indian River Flood Plain
2. Protection of as much of the prime and important farmland as possible
3. Retention of as much of the open space frontage along Lambert and Tyler City roads as possible.

This property is zoned for 1 acre residential lots. Conceivably, with the percentage of prime and important farmland soils present on this site, 60 or more one-acre house lots could ultimately be developed. Should such a scenario occur, most, if not all, of the natural resource attributes listed above would be destroyed or significantly altered.

B. GENERAL SITE
DEVELOPMENT
SUGGESTIONS

Given that the site may change ownership in the near future, the following general development criteria are suggested:

- . Minimize development of areas identified as prime and important farmland soils as identified in Figure 7 of this report.
- . Minimize strip development along Lambert and Tyler City roads.
- . Minimize development in close proximity to Indian River (< 100').
- . Identify areas suitable and appropriate for development and buffer them from the remainder of the site.
- . Concentrate or cluster development within areas suitable and appropriate for development in order to minimize road and utility development and impact.

C. CONSERVATION/
DEVELOPMENT
ALTERNATIVES

In Planning and Zoning Memorandum Number 5, prepared by Consultant Robert S. Bryan & Associates for the Orange Planning and Zoning Commission entitled "Farmland Current Status, Significance and Alternatives" October 15, 1983, the importance and plight of the Town of Orange's remaining farmland tracts is highlighted and several general alternatives for preserving them are offered. Two that merit special attention here are Flexibility in Land Development Patterns and Purchase of Development Rights. One more alternative that this report recommends for consideration is Direct Purchase in Fee Simple of All or Part of the Site by the Town of Orange or a Land Trust. These three alternatives will be presented individually as follows:

A. Flexibility in Land Development Patterns -

As this site is zoned for one acre residential lots, with the probability that most of these lots would ultimately be sited on the farmland acreage recommended herein as desirable for preservation, some type of inducement (development flexibility) is needed to shift development away from those areas of conservation importance.

For purposes of discussion only, assume 60 one acre lots could be legitimately developed on this site. In order to persuade a landowner/developer to preserve the lands of conservation importance (e.g., prime farmland), he/she must be given the opportunity to employ alternative development designs such as 60 units clustered on a smaller area of the property. In this manner, the landowner/developer merely shifts development away from the farmland without giving up value.

- B. Purchase of Development Rights (PDR) -
Memorandum #5 gave extensive coverage to this method of agricultural land protection. Essentially, a PDR program entails a government entity (in Connecticut, the State Department of Agriculture) acquiring the development rights from a farmland owner via a conservation easement. The easement prohibits development of the land under the easement. In exchange for this removal of development rights from the property, the landowner is paid the difference between the property's value before the restriction was placed on it and the land's value after its restriction.

For highly developable land in urbanizing areas, this "development rights value" can often exceed 90% of the property's total value. For instance, a \$15,000/acre property may have a value of only \$1,500/acre once the property's development rights have been removed. The \$13,500/acre value would be the costs of the development rights.

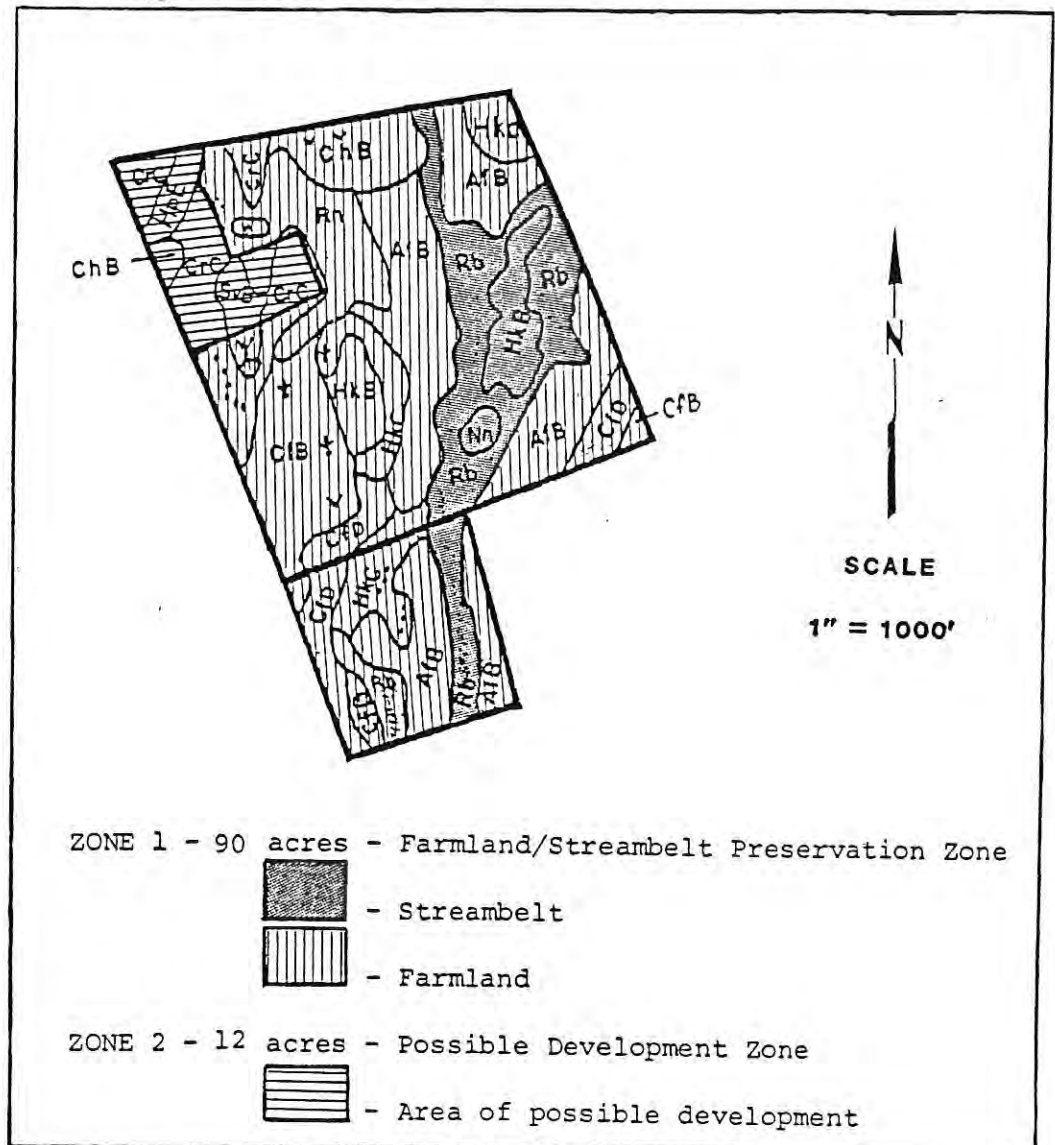
This method of land conservation appears at first to be expensive; but if a community evaluates the cost of purchasing the development rights to a key open space parcel versus the long term cost to the town in providing emergency, educational and other services to a housing development on such a property, then the initial cost of the development rights becomes more palatable.

- C. Fee Purchase of All or Part of the Property by the Town of Orange or a Conservation Land Trust -
Another alternative to be considered is outright purchase of the site by the Town of Orange or by a conservation land trust. Purchase of part or all of this site by the Town of Orange could serve to meet conservation, education and recreational short-term objectives while land banking the property for future synergistic town uses and needs.

Acquisition of part or all of the site by a land trust could serve many of the same objectives as town purchase, with the exception that a land trust would have greater flexibility and latitude in pursuing options for recouping some or all of this investment by means of limited development and resale.

Examples of such actions by a town can be seen in the Towns of Fairfield and Redding, and by local land trusts in Roxbury and Sherman.

In the event the Meadowbrook Farms should be placed on the market for sale, the following suggestions are offered for consideration. These suggestions are presented as "design zones" (see Figure 9) for visual reference.



Zone 1 - Farmland/Streambelt Preservation Zone - 90 acres -
As discussed in the soils section of this report, approximately 45 acres of prime and important farmland soils on this site are currently cleared and used for limited agricultural purposes. These acres represent some of the best agricultural lands remaining in Orange. An additional 45 acres consists of wetland, floodplain, and streambelt areas that would be desirable to protect. In the event the preservation of this 90 acre Zone cannot be achieved by purchase of its development rights or by full fee simple acquisition, this report recommends

that consideration be given to preservation by other methods such as clustering development on the remaining 12 acres of the site and placing this zone #1 in an open space category.

This report strongly encourages the Town of Orange, working in concert with the State Department of Agriculture, to acquire at least the development rights to this 90 acre Farmland/Streambelt Zone.

Zone 2 - Development Zone - This 12+ acre zone is located in the northwest corner of the site adjacent to Lambert Road. Development of this area would have the least negative impact on the agricultural and streambelt preservation goals as enumerated earlier in this report of any area on this site. If future development should occur on this property, it should be concentrated within this 12+ zone if possible. However, if more development is required than can be accommodated within this 12 acres, consideration should be given to expanding the development zone only enough to accommodate the required additional development.

The type of development that could be accommodated on this 12 acre tract might include conventional one acre house sites; smaller lot, single family detached (clustered) units; or higher density condominium/apartment units.

E. CONCLUSION

To conclude, Meadowbrook Farms represents a unique natural resource for the Town of Orange. Protection of the prime and important farmland on the property would be particularly desirable. To facilitate protection of the prime and important farmland, the town and landowner are encouraged to seek the state purchase of development rights. In the event this effort is not successful and the property does go on the market, the town is encouraged to explore fee purchase of all or part of the property by either the town or a conservation land trust. This would facilitate protection of the farmland and open space value of the property. Should town or land trust purchase not prove feasible, flexibility in land development patterns (e.g., clustering) should be promoted by the town to protect the farmland and other valuable resources of the property. It would be desirable to explore all three of the above options simultaneously to help ensure the protection of the important resources of the property.

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ABOUT THE TEAM

The King's Mark Environmental Review Team (ERT) is a group of environmental professionals drawn together from a variety of federal, state, and regional agencies. Specialists on the team include geologists, biologists, foresters, climatologists, soil scientists, landscape architects, recreation specialists, engineers, and planners. The ERT operates with state funding under the aegis of the King's Mark Resource Conservation and Development (RC&D) Area - a 47 town area in western Connecticut.

As a public service activity, the team is available to serve towns and developers within the King's Mark Area --- free of charge.

PURPOSE OF THE TEAM

The Environmental Review Team is available to help towns and developers in the review of sites proposed for major land use activities. To date, the ERT has been involved in the review of a wide range of significant activities including subdivisions, sanitary landfills, commercial and industrial developments, and recreation/open space projects.

Reviews are conducted in the interest of providing information and analysis that will assist towns and developers in environmentally sound decision-making. This is done through identifying the natural resource base of the project site and highlighting opportunities and limitations for the proposed land use.

REQUESTING A REVIEW

Environmental Reviews may be requested by the chief elected official of a municipality or the chairman of an administration agency such as planning and zoning, conservation, or inland wetlands. Requests for reviews should be directed to the Chairman of your local Soil and Water Conservation District. This request letter must include a summary of the proposed project, a location map of the project site, written permission from the landowner/developer allowing the team to enter the property for purposes of review, and a statement identifying the specific areas of concern the team should address. When this request is approved by the local Soil and Water Conservation District and the King's Mark RC&D Executive Committee, the team will undertake the review. At present, the ERT can undertake two reviews per month.

For additional information regarding the Environmental Review Team, please contact your local Soil Conservation District Office or Richard Lynn (868-7342), Environmental Review Team Coordinator, King's Mark RC&D Area, P.O. Box 30, Warren, Connecticut 06754.