Aquarion Water Company
Surplus Property Acquisition

Woodbury, Connecticut

King's Mark
Environmental Review Team Report

King's Mark Resource Conservation & Development Area, Inc.

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Surplus Property Acquisition
Woodbury, Connecticut

Environmental Review Team Report

Prepared by the King's Mark Environmental Review Team
of the King's Mark Resource Conservation & Development Area, Inc.

For the
Conservation Commission
Woodbury, Connecticut

April 2013

Report #360

Acknowledgments

This report is an outgrowth of a request from the Woodbury Conservation Commission to the Northwest Conservation District (NWCD) and the King's Mark Resource Conservation and Development Area (RC&D) Council/ERT Subcommittee for their consideration and approval. The request was approved and the measure reviewed by the King's Mark Environmental Review Team (ERT).

The King's Mark Environmental Review Team Coordinator, Elaine Sych, 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 Wednesday, December 5, 2012.

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**Report not yet received.*

I would also like to thank Dick Leavenworth, chairman, conservation commission, Gerald Stomski, first selectman, Virgian Mason, reservoir task force, Joel Serota, chair, open space and reservoir task force, Barbara Perkinson, board of selectman, James Belden and John Lacadie, Pomperaug River Watershed Coalition and Deborah Fuller, board of finance, for their cooperation and assistance during this environmental review.

Prior to the review day, each Team member received a summary of the proposed project with location and aerial photos. During the field review Team members received additional information. Some team members made additional or separate site visits. Reports from each Team member were submitted to the ERT coordinator 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 town. The results of this Team action are oriented toward the development of better environmental quality and the long term economics of land use.

The Kings Mark RC&D Executive Council hopes you will find this report of value and assistance in developing guidelines for preservation and management.

If you require additional information please contact:

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Introduction

Introduction

The Woodbury Conservation Commission has requested Environmental Review Team (ERT) assistance in providing a natural resource inventory and management guidance for a possible town purchase of excess water company lands.

The properties include two parcels of surplus Aquarion Water Company land in southeastern Woodbury. One parcel (181 acres) is located on Old Sherman Hill Road, Scuppo Road and the Southbury town line. The other parcel (62 acres) is on Route 64 close to the Middlebury town line. The 181 parcel contains a 10 acre pond in a predominantly forested area with active beaver dam lodges and habitat. Unused as a water supply for decades the site includes the railbed for the Woodbury trolley line and connects to existing Woodbury open space. The property would remain for passive recreation including hiking, fishing and trail bicycles. The smaller parcel connects to the Whittemore Sanctuary trails system (a 686 acre property managed by the Flanders Nature Center and Land Trust.

Objectives of the ERT Study

The town is requesting assistance from the ERT to provide a natural resource inventory and information for developing a plan for this municipal open space acquisition. The acquisition of these parcels was proposed by the Woodbury Conservation Commission for open space and trails back in 1965. The commission envisions a greenway walking trail, a possible connection of the Middlebury Trolley line with the Woodbury Main Street sidewalk system and a connection to the Whittemore Sanctuary trails.

Specific concerns and information requested include: soils, topography and geology-resource inventory, erosion & sediment control-identify problem areas and recommendations, water quality/water supply-serves as a recharge area for the Pomperaug Aquifer, wetlands/pond-resource inventory, habitat value & preservation, beaver dam controls, improvement to aquatic habitat and fisheries resources, forestry/vegetation- resource inventory and management, open space significance, traffic, access and crossings and historical and archaeological significance.

The ERT Process

Through the efforts of the Woodbury Conservation Commission this environmental review and report was prepared for the Town of Woodbury.

This report provides an information base and a series of recommendations and guidelines which cover some of the issues of concern to the town. Team members were able to review maps, plans and supporting documentation provided by the town and the applicant.

The review process consisted of four phases:

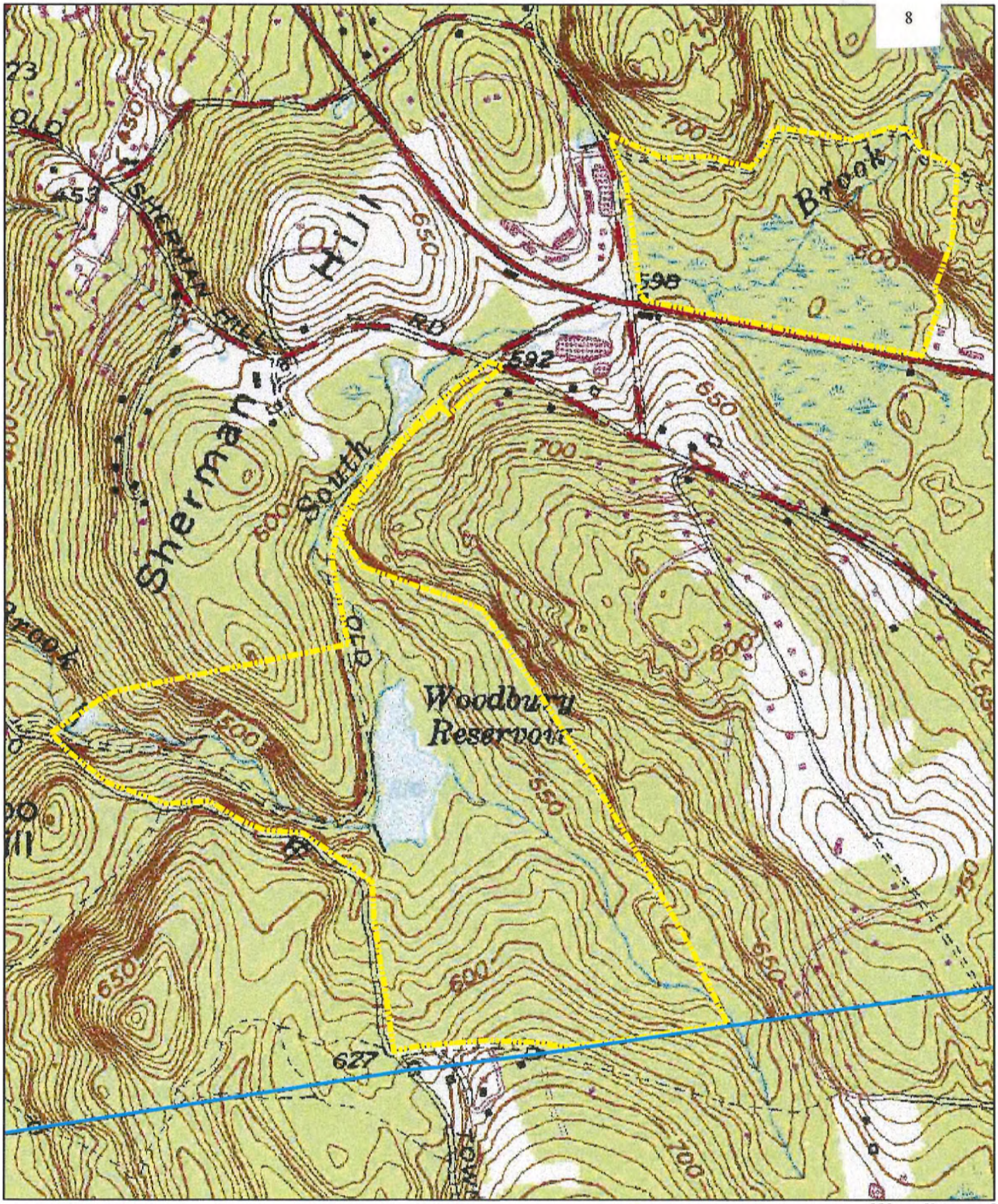
1. Inventory of the site’s natural resources;

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 review was conducted Wednesday, December 5, 2012. Several team members made additional field visits. The emphasis of the field review was on the exchange of ideas, concerns and recommendations. Being on site 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 coordinator for compilation into this final ERT report.

Aquarian Water Company Surplus Property Acquisition



The Connecticut Environmental Review Team

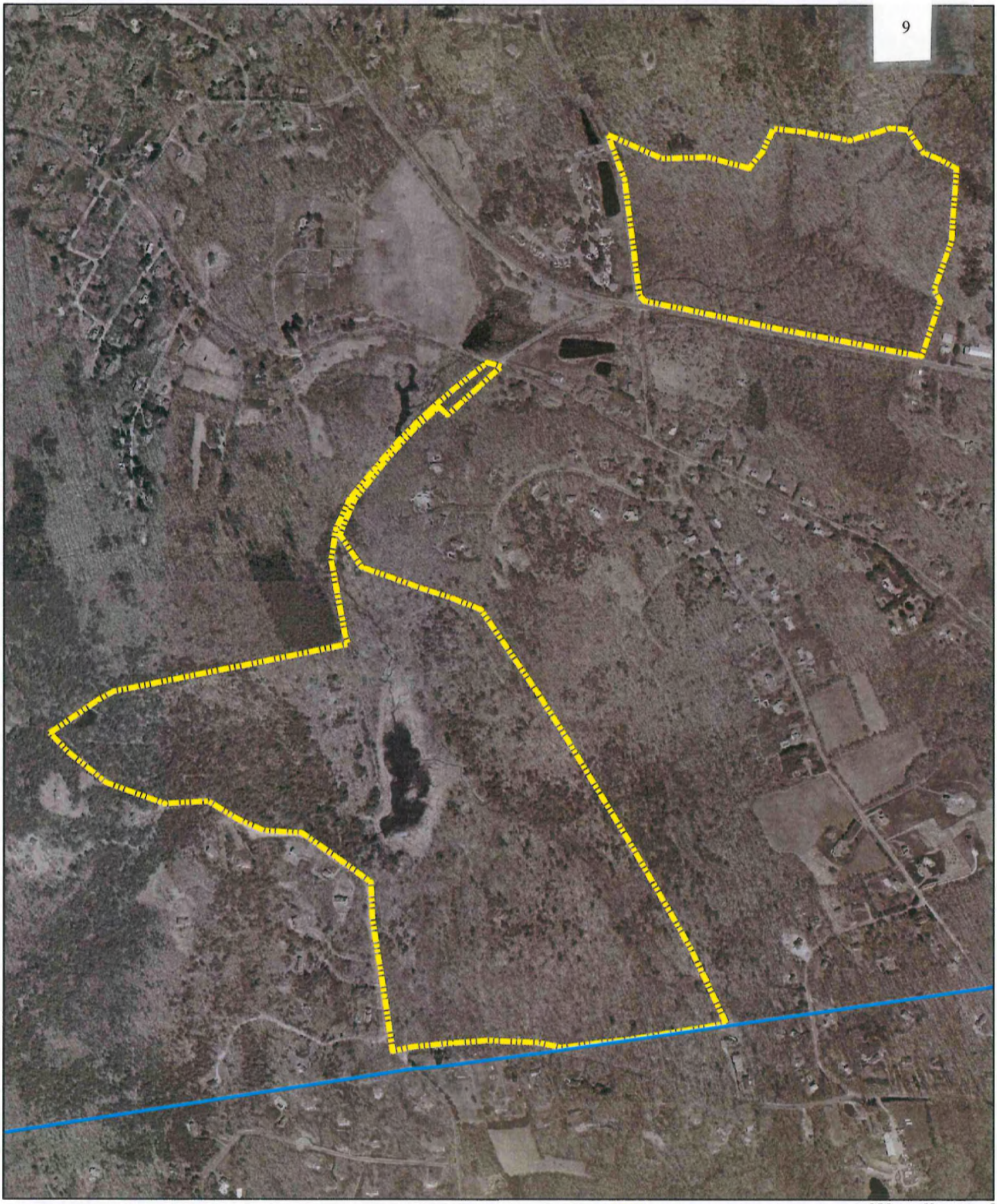
This map was prepared by Amanda Fargo-Johnson for the Connecticut Environmental Review Team.
This map is for educational use only.
It contains no authoritative data.
April 2013.

Aquarian Property Boundary Approximately

0 312.5 625 1,250 1,875 Feet

Woodbury, CT

Aquarian Water Company Surplus Property Acquisition



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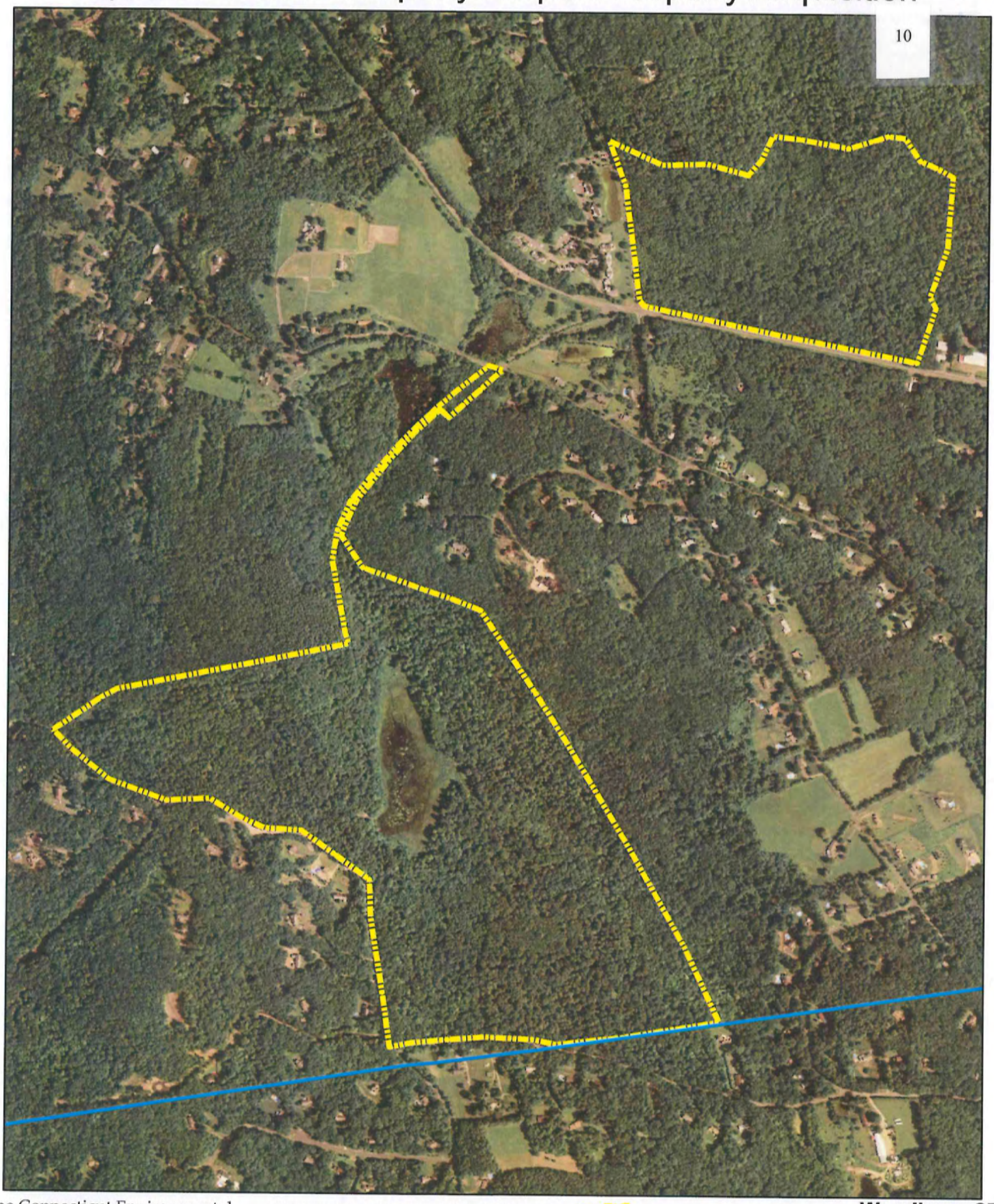

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Woodbury, CT

Topography and Geology

Two parcels of land formerly belonging to the United Water Company (now owned by Aquarion Water Company) are the subject of this Environmental Review Team assessment, The parcel containing the Woodbury Reservoir abuts, on its downstream end, town owned open space, which in turn abuts, on its downstream end, on property with a conservation easement. This section will discuss the geology and topography of all the adjoining open-space parcels, not just the Aquarian parcel. The northern parcel was not studied for this review and thus only a few general comments will be included.

Woodbury (and Southbury also) is part of the western uplands of Connecticut (Bell, 1985; Figure 1a), a Paleozoic metamorphic province, but upon which a sedimentary basin developed in Mesozoic time (Figure 1b). The eastern side of the sedimentary basin is fault

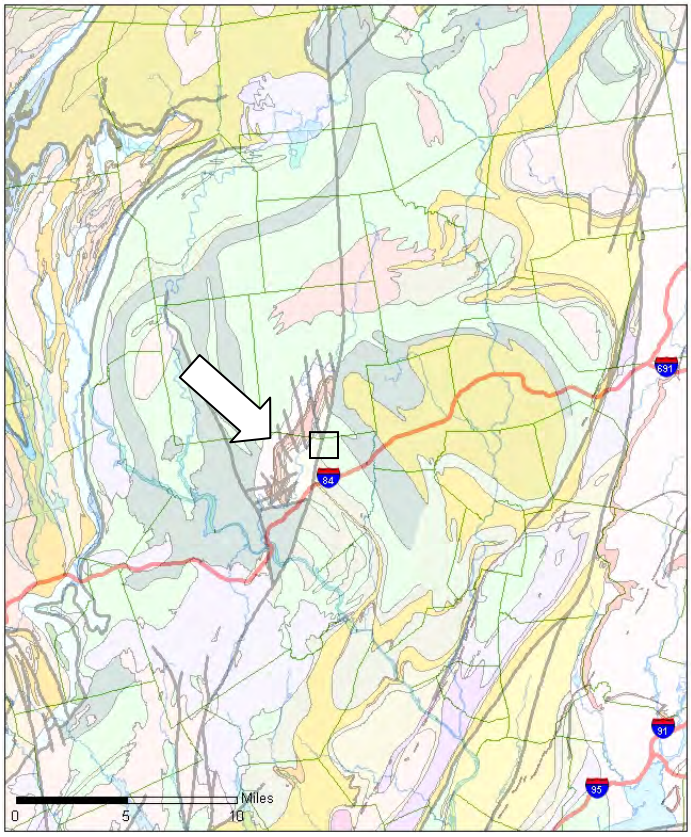

Figure 1a. Generalized bedrock geologic map of western uplands showing Mesozoic Pomperaug Basin (arrow). Small box approximate location of Figure 1b. Western uplands shown as area of swirled color pattern in western 90% of map. Central lowlands shown in muted yellow and pink colors along eastern border of map. Pomperaug Basin shown in same muted yellow and pink colors. Lite-gray lines are faults, brittle fractures that are mostly Mesozoic age and younger. Map from Rodgers, 1985.

bounded and that fault crosses the western part of the open space parcel that is contiguous with the Aquarian property (see discussion below).

The topography of the Aquarian and open space parcels is moderately rugged with hill slopes ranging from gentle to steep (Figure 2). The topographic map looks as though there should be some low cliffs locally, especially on the south and east sides of Sherman Hill; none however, were seen during the field observations. A perennial stream, South Brook, traverses the area roughly in a southwesterly direction to its confluence with the Pomperaug River just west of the parcels. The highest elevation on the southern parcel is about 680 feet (the northern parcel, however, reaches an elevation of about 750 feet); the lowest elevation, approximately 420 ft, is where South Brook leaves the parcels. The relief on the parcels is greater than 300 feet.

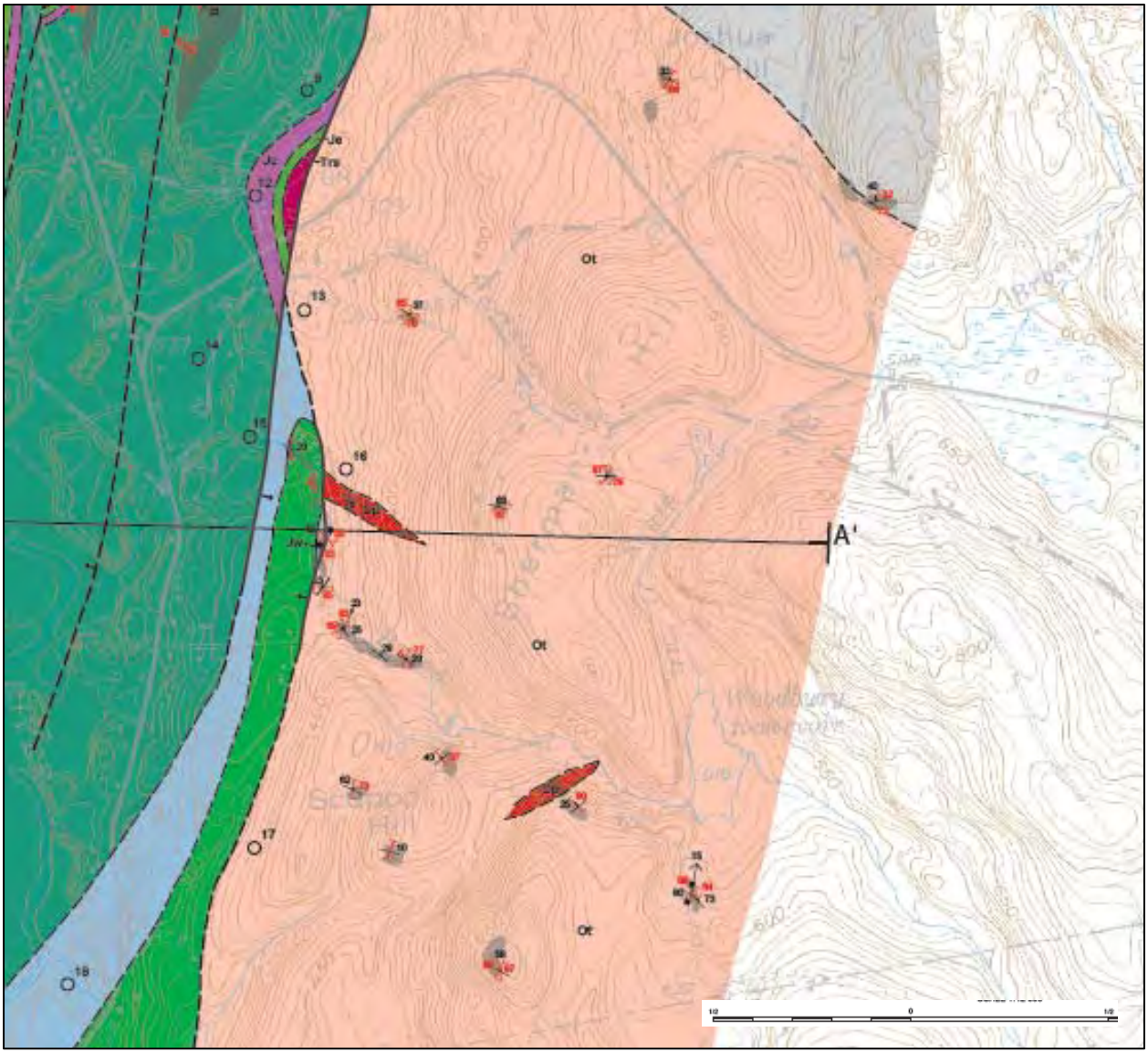

Figure 1b. Bedrock geologic map of the area on a topographic base (C.I.=10ft; scale: largest division = one mile). Woodbury Reservoir located just below the center of the map. Paleozoic metamorphic formations on the eastern ¾ of the map area are separated from Mesozoic sedimentary and volcanic rocks by a major fault (faults are delineated by heavy dashed and solid lines running roughly north-northeast across map. Area shaded pale red and lite- gray (Ot, Taine Mountain Formation) are underlain by Paleozoic metamorphic rocks. Areas shaded red (Dp) are Paleozoic igneous rocks (pegmatite). Areas of various shades of green are different Mesozoic basalt flows and areas of blue, purple and dark read are different Mesozoic sedimentary formations. Map (from Burton, 2006), was constructed (in cooperation with the *Pomperaug River Watershed Coalition*) at a scale of 1:12000.

South Brook (Figure 2c, d) flows generally south and westward through the parcels. The brook's gradient averages roughly 100 ft./mile. It flows through a valley with gentle to moderate slopes at the northern part of the parcel. The valley opens up in the middle portion of the parcel where a small impoundment, Woodbury Reservoir, was been created for water supply. The southern part of the parcel is a rather deep, steep-sided valley. The steepest gradient of the stream is found in the southern part of the parcel where it is almost 400 ft./mi. The watershed area for South Brook, of course, extends well beyond the bounds of any of the parcels.

Elevations in excess of 900 feet are reached in the northern part of the watershed. Thus the relief in the watershed is closer to 500 feet.

Bedrock Geology

Paleozoic rocks. The Aquarian parcels are both underlain by Taine Mountain metamorphic rocks. The rocks are mostly poorly foliated and fine grained schist and granofels. Most of the outcrops seen during the field observation did not contain enough mica to be considered schist. Individual minerals are difficult to identify without a microscope. Burton (2006) identifies muscovite, biotite, plagioclase feldspar and quartz. Rocks with sufficient biotite weather rusty (Figure 3a). These rocks are assigned an Ordovician Age (~500-450 million years ago). The rocks initially formed as sea bottom sediments that were lithified and later metamorphosed. The metamorphic events concluded by Devonian time because the Taine Mountain rocks were intruded by unfoliated Devonian pegmatite.

Figure 2. a. Moderate to gentle slopes in the middle part of the parcel. The impoundment is out of the picture to the right. South Brook can be seen running through the mid part of the picture. b. Steep to moderate slopes on the east side of southerly most spur of Sherman Mountain. Note outcrops of Taine Mountain Formation. c. Boulder strewn bed of South Brook immediately below Woodbury Reservoir dam. d. Steep slopes on sides of South Brook near the western boundary of the lower parcel.

Pegmatite is a coarse grained igneous rock that intruded into the granofels in Devonian time (~400 to 360 m.y. ago). The pegmatite is composed of plagioclase, microcline (K-

feldspar), quartz and mica. It is not foliated and was therefore intruded after the metamorphic events concluded, probably in late Devonian

The structure of the metamorphic rocks is complex, but in the immediate area the rocks tend to dip more-or-less uniformly toward the north-northeast and northeast. South of the immediate area, Burton mapped folds at several scales. Metamorphism was caused by at least two episodes of convergent plate tectonics that resulted in the formation of impressive mountains in what is now the Appalachian portion of North America. The plate tectonic processes also resulted in the formation of a huge continent by the end of Paleozoic time (275 m. y ago)

Judging from the faulted nature of the Mesozoic rocks, it is likely that there are numerous unrecognized faults that cut the metamorphic rocks. They are not recognized because of lack of distinctive mapable beds.

Figure 3. Rocks exposed on parcels. a. and b. Taine Mountain Formation is composed of fine grained biotite gneiss and gray granofels. Rocks that contain enough biotite tend to weather rusty; more feldspar rich granofels is gray colored. a. Prominent fractures are high angle and dip (tilt) toward the east-northeast. Compositional layering (foliation) is subtle but may be seen on the shoulder protruding closest to the camera as a slightly lighter gray layer that dips northeast (into the picture/away from the observer) at a relatively low angle. b. Gray granofels with indistinct foliation. c. Intrusive, unfoliated pegmatite-body composed of coarse-grained feldspar and quartz. d. Bedrock outcrops at bottom of stream are rubbly basalt, probably basalt breccia formed at the top of a lava flow. The outcrops were not examined. Outcrop located near west end of trail (near the trail head on Middle Quarter Road. It was identified as the South Brook Basalt by Burton, 2006 (Figure 1b).

Mesozoic rocks. Plate tectonic processes reversed themselves about 225 m.y. ago and the huge continent began to stretch and break up. This stretching caused the Earth's crust to sag in numerous places along what is now the eastern Seaboard, but notably in the Hartford-Springfield-New Haven area and the Pomperaug Valley. The sags produced low topographic areas that allowed the accumulation of sediments (gravel, sand and mud) deposited by streams and in lakes. In addition, when the stretching became sufficiently great, deep fractures developed which eventually reached the mantle. Basaltic magma (molten rock) generated in the mantle then oozed up the fractures and formed several lava flows (Figure 3d) that also filled the depressions (sags).

A great fault separated the Mesozoic rocks on the west from the metamorphic rocks on the east. The fault is not exposed, but occurs in a hundred foot zone just west of where the South Brook and the trail make the last major bend and head west toward the Pomperaug River. The fault dropped the west side down several thousand feet over its life (not all at once).

Surficial Geology

During the last million years the northern hemisphere has experienced numerous ice ages of varying intensity. At least two have been intense and spread ice as far south as Long Island. The last ice age ended about 15,000 years ago; during its height, ice more than a mile thick covered Woodbury. Ice that thick flows laterally toward areas where the ice is thinner, in this case, southward.

Flowing glacial ice is a powerful agent of erosion. The ice freezes soil and rocks into its base and uses those particles like sand paper to scrape and abrade the underlying bedrock. The result is to round off the hill tops and in the process, create a huge amount of sand, mud and gravel, essentially ground up bedrock. The ground-up debris is referred to as glacial till (or just plain till for short). Glaciers may deposit some of the ground-up material beneath the ice as it

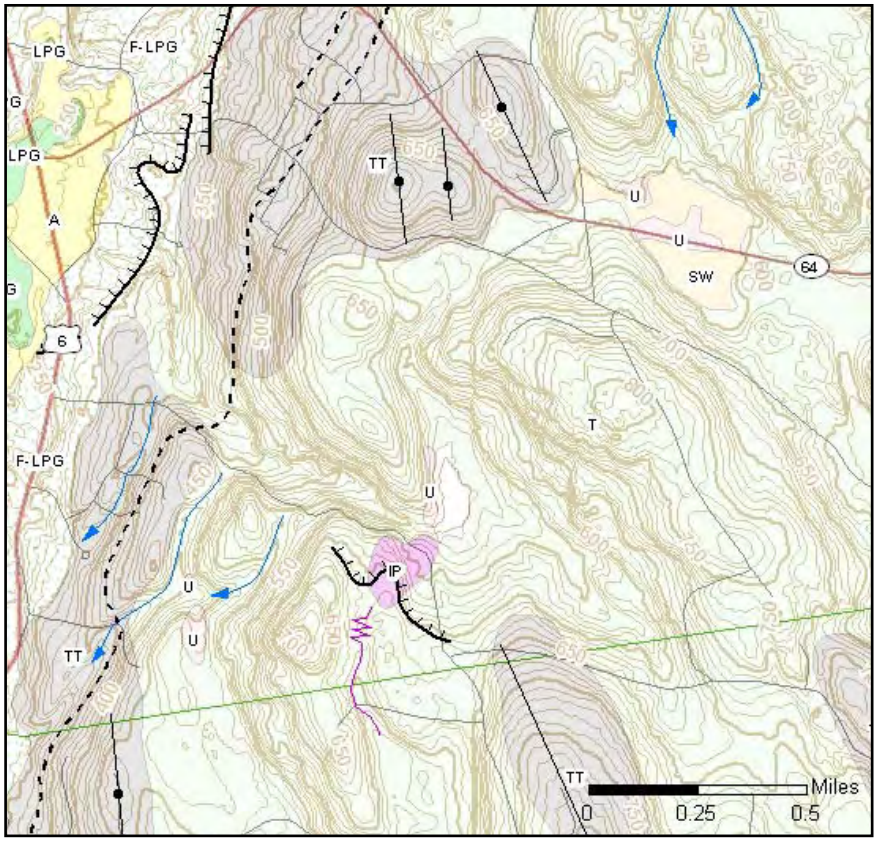

Figure 4. Map of area showing Quaternary deposits. Glacial till (pale green area) covers most of surface. Some areas of thick till (gray area) are oblong hills referred to as drumlins. Long black line drawn through some drumlins indicates the inferred direction of ice flow. Areas on map colored yellow, green or pink are sand and gravel deposits formed by modern streams (yellow) or glacial melt-water streams (green and pink). Blue lines with arrow are identified melt-water channels from the last ice age.

flows (compact or basal till). The rest of the debris is left behind when the ice melts at the end of the ice age (referred to as melt-out till or ablation till). Glacial till covers more than 95% of the ground surface on the parcels (Figure 4): rock exposures are rare.

At the end of an ice age the climate warms and all the ice melts, creating huge volumes of water during the summer and fall. The melt water flowed in streams and rivers on top of the glacier or in tunnels under the glacier. When the melt-water streams reached the southern end of the glacier (that melted progressively northward as the climate warmed) they flowed over the till and eroded channels in the underlying bedrock. Several melt-water channels are identified on Figure 4.

South Brook flows through a channel formed by melt-water from an ice age that occurred before the last ice age. Its oversteepened slopes and erosion scars (Figure 5) below the reservoir attest to past undercutting by a river. The valley bottom, however, is filled with glacial till. The till must have been deposited after the valley erosion (that is the evidence for the valley erosion being older than the last ice age). In addition, Mesozoic basalt and sandstone glacial erratics appear to be concentrated (compared to the abundance on the surrounding valley sides) in the lower reach of South Brook (Figure 2c, d). The erratics presumably were on top of the

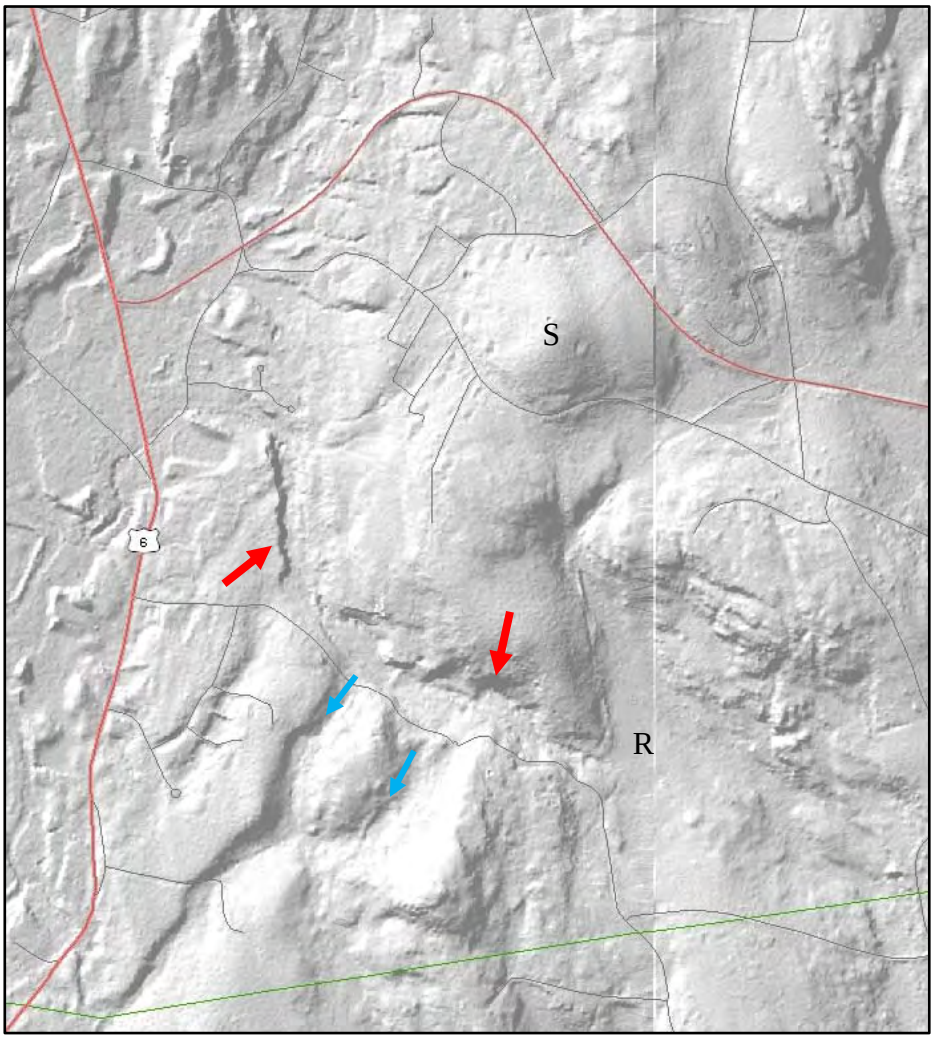

Figure 5. Hill-shaded relief map showing valley of South Brook. (red arrows). Over-steepened slopes, indicated by shadows on valley sides, and erosion scars (red arrows) attest to former significant river flow in South Brook. Blue arrows show melt-water channels cut during end of last ice age (compare with Figure 4). Note smooth hills just north of South Brook (Sherman Hills, marked "S" on the map). These are mapped as drumlins. The two eastern most are slightly elongate in a south south-easterly direction, the inferred direction of local ice movement. "R" is Woodbury Reservoir.

melting ice and either rolled into or were washed into the channels of melt-water on top of the ice. The melt-water torrents then transported the boulders into the valley of South Brook, possibly through a hole in the ice.

References

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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.

Soil Resources

This soil resources report applies to two parcels of surplus land owned by the Aquarion Water Company in southeast Woodbury totaling 243 acres. The Northern Parcel is 62 acres and the southern parcel is 181 acres. The soils information and soil map in this report are based on the USDA's National Cooperative Soil Survey. The Northwest Conservation District cartographer compiled the soil data in our GIS System to create a soil map and calculate the coverage of specific soil types. Given the proposed recreational use of the property, consider the following soil capability and limitation assessment as well as our comments and recommendations. A Soil Map of each parcel is included at the end of this section and each has a Soil Types Table that provides a brief description of the soil types. A more detailed technical description of all the soil types found on the property is included in the Soil Series Descriptions in the Appendix at the end of this report.

Wetland Soil and Open Water Resources
Wetland soils occupy approximately one quarter of the 243 acres (approximately 50% (31 acres) of the northern parcel and 18% (32 acres) of the southern parcel). The open water on the southern parcel covers 8.5 acres. The wetland soil types on the properties include:

(Soil Symbol #3 – 16.3 acres) Ridgebury, Leicester, and Whitman Poorly Drained Extremely Stony Soils
(Soil Symbol #13 – 4.7 acres) Walpole Poorly Drained Sandy Loam Soil
(Soil Symbol #15 – 7.6 acres) Scarboro Muck Soil
(Soil Symbol #18 – 30.4 acres) Catden and Freetown Muck Soils
(Soil Symbol #109 – 5.3 acres) Flood Plain Soil

The surface water quality standard/rating for all open water features on and down gradient of these properties is "AA". This classification is given to only the cleanest of CT streams and surface water features by the Connecticut Department of Energy and Environmental Protection. The water quality standard "AA" means the CT DEEP is potentially considering (or proposing) the watercourse to serve as a drinking water supply and/or, that it is a tributary to a drinking water supply as outlined in the Long Range Plan for the Management of Water Resources pursuant to Section 25-5b of the CT Statutes. No land use activities may take place in the watershed of "AA" rated streams that would potentially lower this water quality rating. The surface water runoff that passes through the forested headwater wetland systems on the properties is responsible for preserving the high water quality ratings both in the surface water and the down gradient public drinking water wells. Therefore, all wetland areas on both properties should be protected. If a trail network is constructed, raised walkways should be used where trails cross wetland soil areas.

If a timber harvest operation is proposed, the operation should follow best management practices. The CT Department of Energy and Environmental Protection has published a valuable guidance document titled **Best Management Practices for Water Quality While Harvesting Timber Products**, 2007. If timber harvesting is considered, the major management concepts described in the document should be applied to all timber harvesting activities on site. Best

management practices should also be implemented if a timber harvest is proposed on Highly Erodible Soils (see Highly Erodible Soil Section Below).

Highly Erodible Soils

The US Department of Agriculture defines a number of soil units on the property as highly erodible (see Table 1 and 2, Soil Types for Aquarion Property). There are approximately 44 acres classified by the USDA as being "Highly Erodible Lands" (HEL). Once vegetation is removed from these HEL soils, it is extremely difficult to control soil movement. HEL soils are excessively susceptible to sheet, rill and gully erosion and have the potential (if exposed and unprotected) to deposit large amount of sediments into surrounding wetland and water resources. If any land use activities are proposed on HEL soil types (trails, parking areas, picnic landings), rigorous soil erosion and sediment control practices should be implemented (see the Connecticut 2002 Guidelines for Soil Erosion and Sediment Control Published by the CT DEEP).

(Soil Symbol #60C, #62C and #62D - 20.4 acres) Canton and Charlton extremely stony soils, 8 to 35 percent slopes,
(Soil Symbol #34C - 10.7 acres) Merrimac sandy loam, 8 to 15 percent slopes
(Soil Symbol #84C, #84D and #86D – 12.8 acres) Paxton and Montauk fine sandy loams, 15 to 35 percent slopes

Prime Farmland Soil

The US Department of Agriculture classifies a select few soil series as "Prime Farmland Soil" and "Statewide Important Farmland Soil" (see Table 1 and 2, Soil Types for Aquarion Property). These prime agricultural soils have the best combination of physical and chemical properties for producing food and livestock feed. In general, they have an adequate and dependable moisture supply, favorable temperature and growing season, acceptable acidity and alkalinity and few rocks. Prime agricultural soils are also not saturated with water for long periods of time. These favorable soil characteristics, combined with local climatic conditions, make Connecticut's prime farmland soils ideal for agriculture, with some of the highest non-irrigated soil productivity rates in the world.

Because prime agricultural soils have such a high conservation value, the Northwest Conservation District has been actively working with farmland preservation organizations to conserve this valuable, dwindling, and non-renewable natural resource. Prime farmland soil areas have been attracting attention in Northwestern Connecticut because of negative trends in both national and global food production industries. More and more, we are looking to our "back yards" for food production because of uncontrolled and unresolved food contamination issues both in the US and from food imported from other countries. In addition, escalating energy and transportation costs make it more attractive to produce food locally. As fresh water resources in the western US keep declining, farmers and food producers are looking back to the prime farmland soil areas of the Northeast because our adequate natural rainfall supports farming that has very high un-irrigated crop production yields (Connecticut receives 40 to 50 inches of rain per year).

The combined coverage of "Prime Farmland Soil" and "Statewide Important Farmland Soil" types in Litchfield County is approximately 12% of the land area. These properties contain

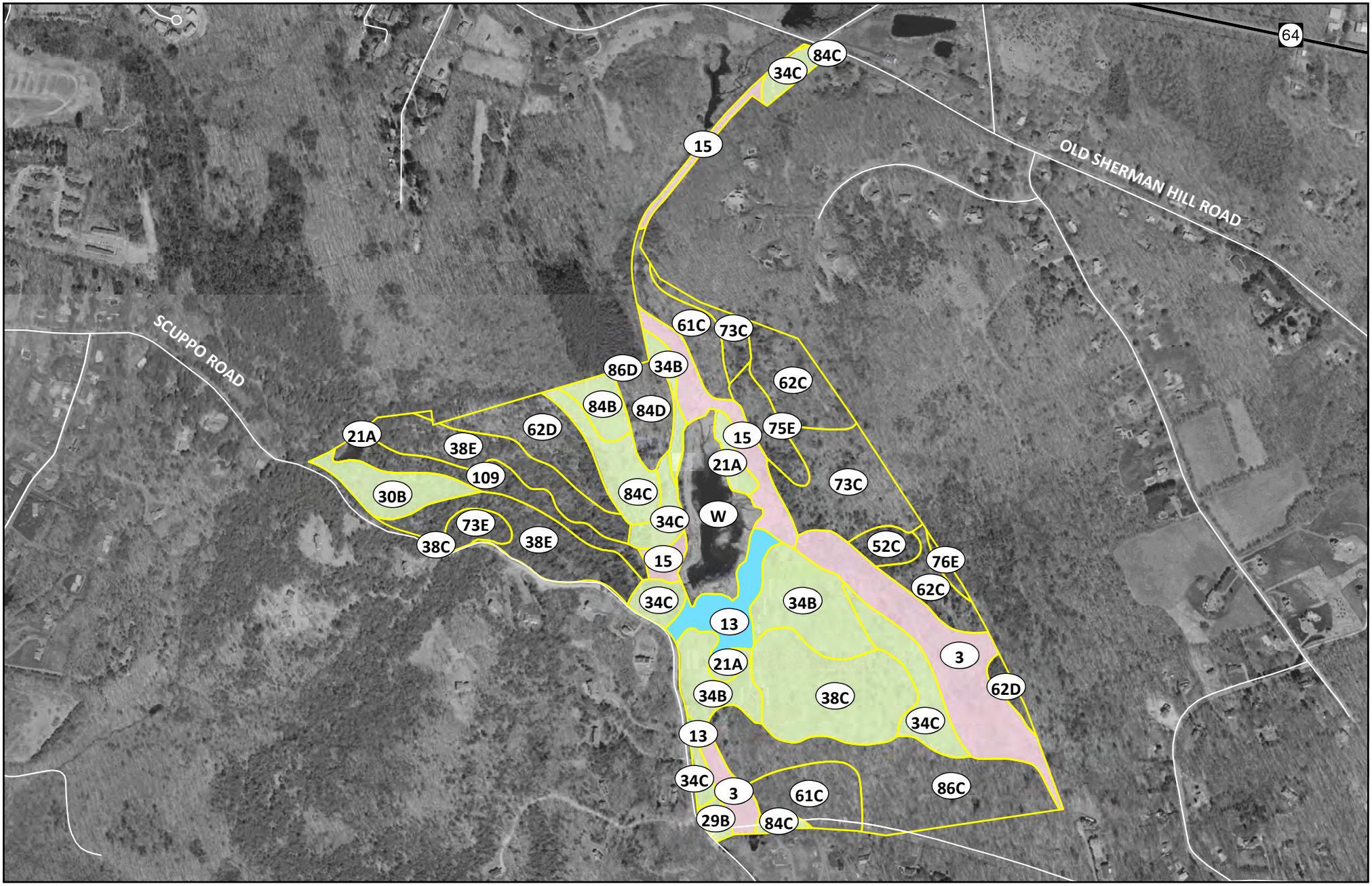
almost 70 acres or 29% prime agricultural soils, more than double the county average. Once prime agricultural soils have been disturbed and converted to an alternative use (ex. parking areas or ball fields), they will never again have the qualities that define them as USDA prime farmland. Once lost, the unique characteristics that define these soils for agricultural uses can never be recreated. Permanently protecting the prime agricultural soils will certainly benefit Woodbury and the surrounding communities. The Prime Farmland Soil and Statewide Important Farmland Soil on the properties include:

(Soil Symbol #29B – 0.9 acres) Agawam fine sandy loam, 3 to 8 percent slope
(Soil Symbol #30B - 4.2 acres) Branford silt loam, 3 to 8 percent slopes
(Soil Symbol #60B and #60C - 5.0 acres) Canton and Charlton soils, 3 to 15 percent slopes
(Soil Symbol #38C - 12.1 acres) Hinckley gravelly sandy loam, 3 to 15 percent slopes
(Soil Symbol #34B and #34C – 28.9 acres) Merrimac sandy loam, 3 to 15 percent slopes
(Soil Symbol #21A - 2.5 acres) Ninigret and Tisbury soils, 0 to 5 percent slopes
(Soil Symbol #84B and #84C – 11.8 acres) Paxton and Montauk fine sandy loams, 3 to 15 percent slopes
(Soil Symbol #13 – 4.7 acres) Walpole sandy loam – poorly drained

Stormwater and Erosion Considerations
The residential development associated with Scuppo Road did not implement major concepts outlined in 2004 Connecticut Stormwater Quality Manual, published by the CT DEEP. Therefore, uncontrolled stormwater runoff has caused erosion problems in intermittent watercourses that flow onto the property from Scuppo Road. There are no stormwater renovation measures in place to mitigate the negative impacts of stormwater from this abutting neighborhood. The erosion in the stream channels is depositing sediments and other water pollutants into the pond on the southern parcel. To stop the erosion and sedimentation problem, a feasability study should be accomplished to assess which stormwater retrofit measures would work best to minimize the impact of stormwater runoff that enters the property.

Conclusion
The conservation value of the 243 acre parcel described above is extremely high. After spending a day walking the property and reviewing all the publicly available natural resource information, it is clear that the purchase and permanent protection of the property will have enormous local and regional conservation value. These two Aquarion parcels, together with other surrounding permanently protected open space and greenways, would piece together an uninterrupted block of land with huge natural resource value located at the ever creeping fringe of development created by Interstate 84.

If there is anything the Northwest Conservation District can to do assist the Town of Woodbury with their goal of purchasing the property for open space and passive recreation please do not hesitate to contact them.



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Aquarion Water Company Surplus Property Acquisition
Southern Parcel
SOIL UNITS

0 200 400 800 1,200 1,600 Feet

N

CT farmland soils

CT wetland soils

CT farmland & wetland soils

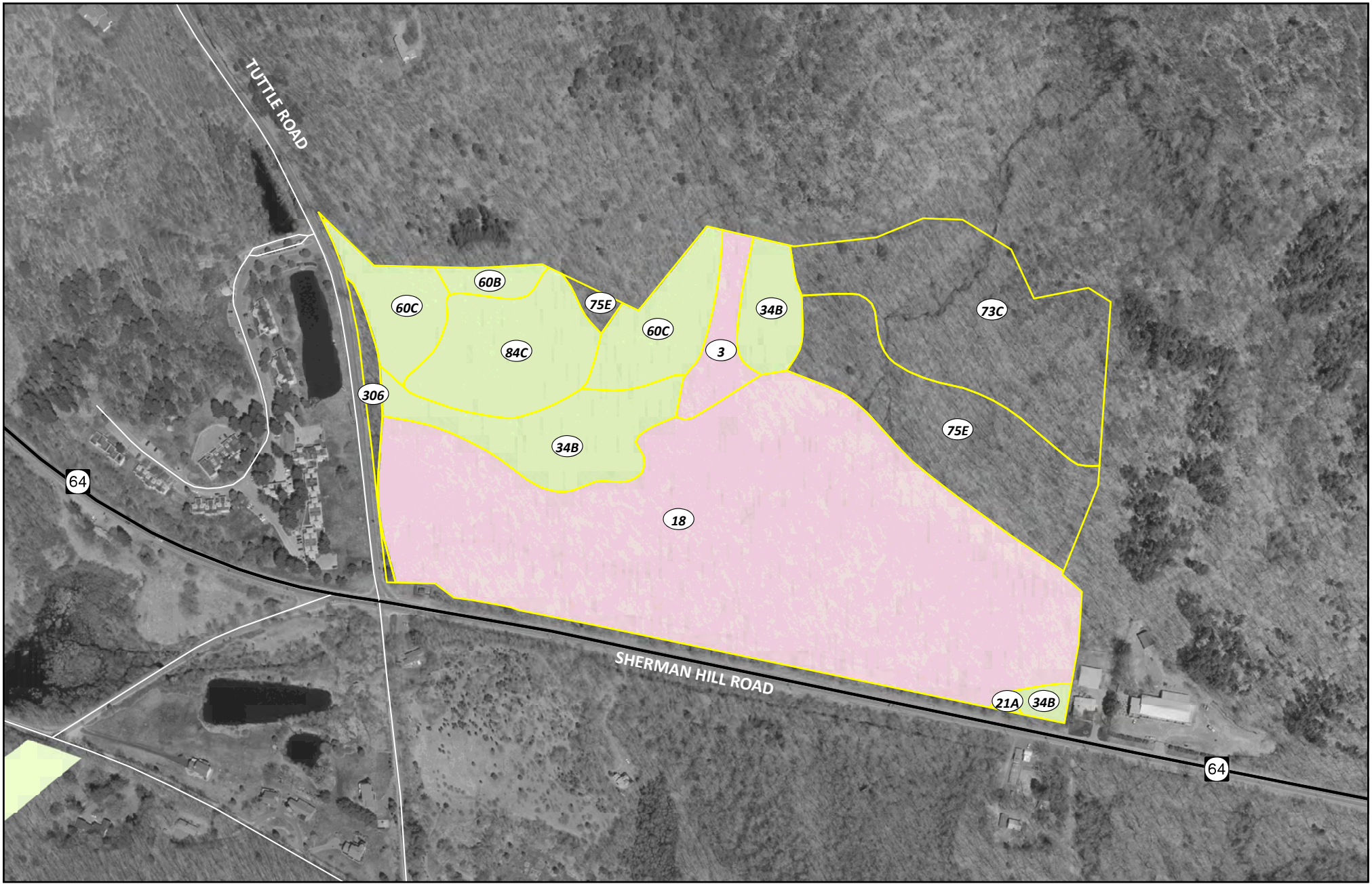
source data: USDA-NRCS, CT-DEEP
map document created by NCD GIS Center, 03.08.2013

Soil Types for Woodbury parcel # 017_040

Soil Symbol	Soil Name	Wetland Soils	Hydric Soils	Farmland Soils	Acres in Parcel
29B	Agawam fine sandy loam, 3 to 8 percent slopes	Non-wetland soils	No	All areas are prime farmland	0.85
30B	Branford silt loam, 3 to 8 percent slopes	Non-wetland soils	No	All areas are prime farmland	4.24
62D	Canton and Charlton soils, 15 to 35 percent slopes, extremely stony	Non-wetland soils	No	Not prime farmland	7.05
62C	Canton and Charlton soils, 3 to 15 percent slopes, extremely stony	Non-wetland soils	No	Not prime farmland	8.90
61C	Canton and Charlton soils, 8 to 15 percent slopes, very stony	Non-wetland soils	No	Not prime farmland	9.44
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	Non-wetland soils	No	Not prime farmland	1.76
73C	Charlton-Chatfield complex, 3 to 15 percent slopes, very rocky	Non-wetland soils	No	Not prime farmland	11.32
109	Fluvaquents-Udifluvents complex, frequently flooded	Alluvial and floodplain soils	Yes	Not prime farmland	5.33
38E	Hinckley gravelly sandy loam, 15 to 45 percent slopes	Non-wetland soils	No	Not prime farmland	15.07
38C	Hinckley gravelly sandy loam, 3 to 15 percent slopes	Non-wetland soils	No	Farmland of statewide importance	12.10
75E	Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes	Non-wetland soils	No	Not prime farmland	3.01
34B	Merrimac sandy loam, 3 to 8 percent slopes	Non-wetland soils	No	All areas are prime farmland	12.71
34C	Merrimac sandy loam, 8 to 15 percent slopes	Non-wetland soils	No	Farmland of statewide importance	10.72
21A	Ninigret and Tisbury soils, 0 to 5 percent slopes	Non-wetland soils	No	All areas are prime farmland	2.38
84D	Paxton and Montauk fine sandy loams, 15 to 25 percent slopes	Non-wetland soils	No	Not prime farmland	3.74
86D	Paxton and Montauk fine sandy loams, 15 to 35 percent slopes, extremely stony	Non-wetland soils	No	Not prime farmland	0.02
86C	Paxton and Montauk fine sandy loams, 3 to 15 percent slopes, extremely stony	Non-wetland soils	No	Not prime farmland	16.73
84B	Paxton and Montauk fine sandy loams, 3 to 8 percent slopes	Non-wetland soils	No	All areas are prime farmland	2.28
84C	Paxton and Montauk fine sandy loams, 8 to 15 percent slopes	Non-wetland soils	No	Farmland of statewide importance	4.99
3	Ridgebury, Leicester, and Whitman soils, extremely stony	Poorly drained and very poorly drained soils	Yes	Not prime farmland	14.69
76E	Rock outcrop-Hollis complex, 3 to 45 percent slopes	Non-wetland soils	Unranked	Not prime farmland	0.52
15	Scarboro muck	Very poorly drained soils	Yes	Not prime farmland	7.58
52C	Sutton fine sandy loam, 2 to 15 percent slopes, extremely stony	Non-wetland soils	No	Not prime farmland	1.76
13	Walpole sandy loam	Poorly drained soils	Yes	Farmland of statewide importance	4.65
W	Water	Water	Unranked	Not prime farmland	8.53

table key

	farmland soil
	wetland soil
	both farmland & wetland soil



mtm.aqparcel_north.pdf

Aquarion Water Company Surplus Property Acquisition
Northern Parcel
SOIL UNITS

N

Feet
0 200 400 800

CT farmland soils

CT wetland soils

source data: USDA-NRCS, CT-DEEP
map document created by NCD GIS Center, 03.08.2013

Soil Types for Woodbury parcel # 019_089

Soil Symbol	Soil Name	Wetland Soils	Hydric Soils	Farmland Soils	Acres in Parcel
60B	Canton and Charlton soils, 3 to 8 percent slopes	Non-wetland soils	No	All areas are prime farmland	0.61
60C	Canton and Charlton soils, 8 to 15 percent slopes	Non-wetland soils	No	Farmland of statewide importance	4.40
18	Catden and Freetown soils	Very poorly drained soils	Yes	Not prime farmland	29.62
73C	Charlton-Chatfield complex, 3 to 15 percent slopes, very rocky	Non-wetland soils	No	Not prime farmland	8.66
75E	Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes	Non-wetland soils	No	Not prime farmland	6.79
34B	Merrimac sandy loam, 3 to 8 percent slopes	Non-wetland soils	No	All areas are prime farmland	5.56
21A	Ninigret and Tisbury soils, 0 to 5 percent slopes	Non-wetland soils	No	All areas are prime farmland	0.08
84C	Paxton and Montauk fine sandy loams, 8 to 15 percent slopes	Non-wetland soils	No	Farmland of statewide importance	4.05
3	Ridgebury, Leicester, and Whitman soils, extremely stony	Poorly drained and very poorly drained soils	Yes	Not prime farmland	1.43
306	Udorthents-Urban land complex	Non-wetland soils	No	Not prime farmland	0.60

table key	
	farmland soils
	wetland soils

Forestry/Vegetation Resources

The ERT study area covers two parcels of Aquarian Water Company lands totaling 243 acres in the towns of Woodbury and Southbury. Parcel one totals 181 acres of which 175 acres are in Woodbury and six acres are abutting in Southbury. Parcel two contains 62 acres entirely in Woodbury.

A forest reconnaissance of the site was conducted during two field visits in December of 2012. This process entails laying out the properties boundaries on a recent aerial photo, dividing the property into forested and non-forested portions, visiting each area and noting the vegetation that occurs there. The forested portion of the property is further divided into forest stands. In each the stand the forest vegetation type, size and arrangement is noted. The physical characteristics of the land such as aspect, slope, terrain, drainage, accessibility from roads, operability of equipment, and evidence of past land use activities are also noted.

Parcel One is bounded by town roads on two sides, Scuppo Road in the west, Old Woodbury Road in the south. Town of Woodbury open space parcels make up the northwestern and northeastern boundary. Private property parcels make up the northern and eastern boundaries. The predominant land use of the private property is single family homes.

The aspect of the parcel is varied; along Scuppo Road and Old Woodbury Road it is northerly. Along the eastern boundary it is westerly. Along the northern boundary the aspect is southerly and easterly. The elevation on the parcel ranges from 400 feet at the northwest corner of the property to 670 feet at Old Woodbury Road.

The slopes on the property range from 5 to 20 percent. The steeper slopes are in the northwest portion of the property.

The property's drainage consists of two perennial watercourses and their associated wetlands. South Brook, in the northeast, flows southerly into the old Woodbury Reservoir located in central portion of the property. An unnamed perennial brook, in the southeast, flows northerly into the reservoir. South Brook flows westerly out of the reservoir and eventually drains into the Pomperaug River.

Access to the property is from several locations. There is a gated driveway off of Scuppo Road leading to the reservoir. An old trolley bed extends from the junction of Old Sherman Road and Trolley Bed Road through the northern portion of the property for 1.4 miles to the property's boundary with the Town open space land in the northwest. There is also access along Old Woodbury Road in the south.

The past land use of the property was agriculture, forest land, and a public drinking water supply watershed. There was one cellar hole observed east of Scuppo Road.

Parcel Two is bounded by town roads on two sides, Tuttle Road in the west and Sherman Hill Road in the south. In the north and east the parcel is bounded by open space lands owned by the

Flanders Nature Center, a local land trust. In the southeast the parcel is bounded by private property.

The aspect of the parcel is southerly and southwesterly. The elevation on the parcel ranges from 598 feet at the corner of Tuttle Road and Sherman Hill Road to 740 feet along the northeast boundary.

The slopes on the property range from 0 to 20 percent. The steeper slopes are in the northeast portion of the property.

The property's drainage consists of South Brook, an intermittent brook, and a wooded wetland. South Brook, in the northeast, flows southwesterly through the wetland and exit the property at the corner of Tuttle and Sherman Hill Roads. The intermittent brook, in the north, flows southerly into the wetland. The wetland occupies the southern half of the property.
Access to the property is by a gated woods road on the east side of Tuttle Road. The woods road runs along the northern boundary of the parcel. The past use of the property was residential, agricultural, forest land, and a public drinking water supply watershed. There were four cellar holes observed in the northwest portion of the property.

Vegetative Cover Type Description

Parcel One has 94 percent of its 181 acres covered by forest. The non forested portion is the 10 acre reservoir. The 171 acres of forest can be divided into two forest stands (see Vegetative Cover Map).

Stand One is a 41 acre mixed softwood stand **(MS)** located in the northwestern portion of the property.

The main canopy trees are of sawtimber size. The softwood species present are white pine, hemlock and scattered plantings of Norway spruce, European larch, and red pine. The hardwood species noted are black birch, yellow birch, black cherry, white ash, yellow poplar, red maple, sugar maple, and red oak.

Shrub species present in the understory are Japanese barberry, multiflora rose, winged euonymus, autumn olive, winterberry, witch hazel, and spicebush. The first four shrub species listed are invasive plants. Vine species present are poison ivy, Virginia creeper, grape, and oriental bittersweet. The last species is invasive. The stand's forest health concerns are the invasive plant species in the understory and the vines in the canopy. The presence of hemlock wooly adelgid and elongated hemlock scale was observed on the hemlocks. The infestation of these two exotic sap-sucking insects appears to be light at this time. The operability of the stand for forest management purposes is restricted by the steep slopes along both sides of the trolley bed and the stand's proximity to South Brook and its associated inland wetland soils.

Stand Two is a 130 acre mixed hardwood stand **(MH)** located in the eastern and southern portions of the property. The main canopy trees are of sawtimber size. The hardwood species present are white ash, beech, black birch, yellow birch, black cherry, hickory, red maple, sugar

maple, yellow poplar, black oak, chestnut oak, red oak, and white oak. The softwood species found in the main canopy are hemlock, white pine, and red pine. The red pine is not native to the area and was planted in an old agricultural field south of the reservoir. The mid and lower canopies are occupied by poletimber and saplings of black birch, red maple, sugar maple, beech, yellow poplar, and hemlock. Shrub species present in the understory are witch hazel, winterberry, spicebush, mountain laurel, Japanese barberry, winged euonymus, and multiflora rose. The last four shrubs are invasive plants. Vine species present in the canopy are grape, poison ivy, Virginia creeper, and oriental bittersweet. The last vine is invasive. The forest health concerns are the invasive plant species in the understory and canopy. The hemlocks are lightly infested by hemlock wooly adelgid and elongated hemlock scale. The operability of the stand is good in the southern portion of the property. The operability in the eastern portion is limited by the two perennial brooks and the inland wetland soils associated with the brooks and reservoir. The evidence of past timber harvest activities in the stand are old red pine stumps in the area south of the reservoir and 10 year old hardwood stumps in the eastern portion of the stand.

Parcel Two has all of its 62 acres covered by forest. The woodlands can be divided into three forest stands (see Vegetative Map).

Stand One is a 15 acre mixed hardwood stand (MH) located in the northwest portion of the property. The main canopy trees are poletimber and sawtimber sizes. The hardwood species present are white ash, black birch, yellow birch, black cherry, red maple, sugar maple, yellow poplar, black oak, red oak, scarlet oak, and white oak. The northern portion of the stand is occupied by poletimber sized trees. This area was a red pine plantation 30 plus years ago. The hardwood species seeded in as the red pine declined and was removed. The understory is Japanese barberry, an invasive exotic shrub. There is extensive vine growth in the main canopy. Vine species are grape, poison ivy, and oriental bittersweet. The last one listed is an invasive exotic species. The crowns of the main canopy were damaged by an early season snowstorm in 2011. Along the northern boundary of the stand are four cellar holes. Around these ruins are planted black walnut and sweet cherry sawtimber sized trees. The southern portion of the stand is occupied by sawtimber sized hardwood trees. This area appears to be an older forest and has a more developed understory. The understory is composed of saplings of black birch, beech, and sugar maple, and shrubs of spicebush, and winged euonymus. Vine species found here are grape, oriental bittersweet, poison ivy, and greenbrier. The operability of the stand is good, but the access to the stand is limited by the condition of the old woods road along the northern boundary of the property.

Stand Two is a 16 acre mixed hardwood stand located in the northeast portion of the property. The stand composition and tree size is similar to stand one. The operability is more limited than stand one because of steeper slopes and the presence of South Brook and the intermittent stream in Stand two. The access is more limited than in stand one because the old woods road is being utilized as a hiking trail by the Flanders Nature Center and there is an unimproved crossing of the intermittent drainage.

Stand Three is a 31 acre hardwood swamp (HS) located in the southern portion of the property. The main canopy trees are sawtimber size. The hardwood species present are white ash, yellow birch, elm, red maple, and scarlet oak. There is also scattered white pine present. The mid

canopy has poletimber of beech, yellow birch, black cherry, elm, and red maple. The understory contains shrubs of spicebush, sweet pepperbush, high bush blueberry, red-stemmed dogwood, arrow wood, and witch hazel. The operability of the stand is severely restricted by the high water table and poor drainage of the inland wetland soils present.

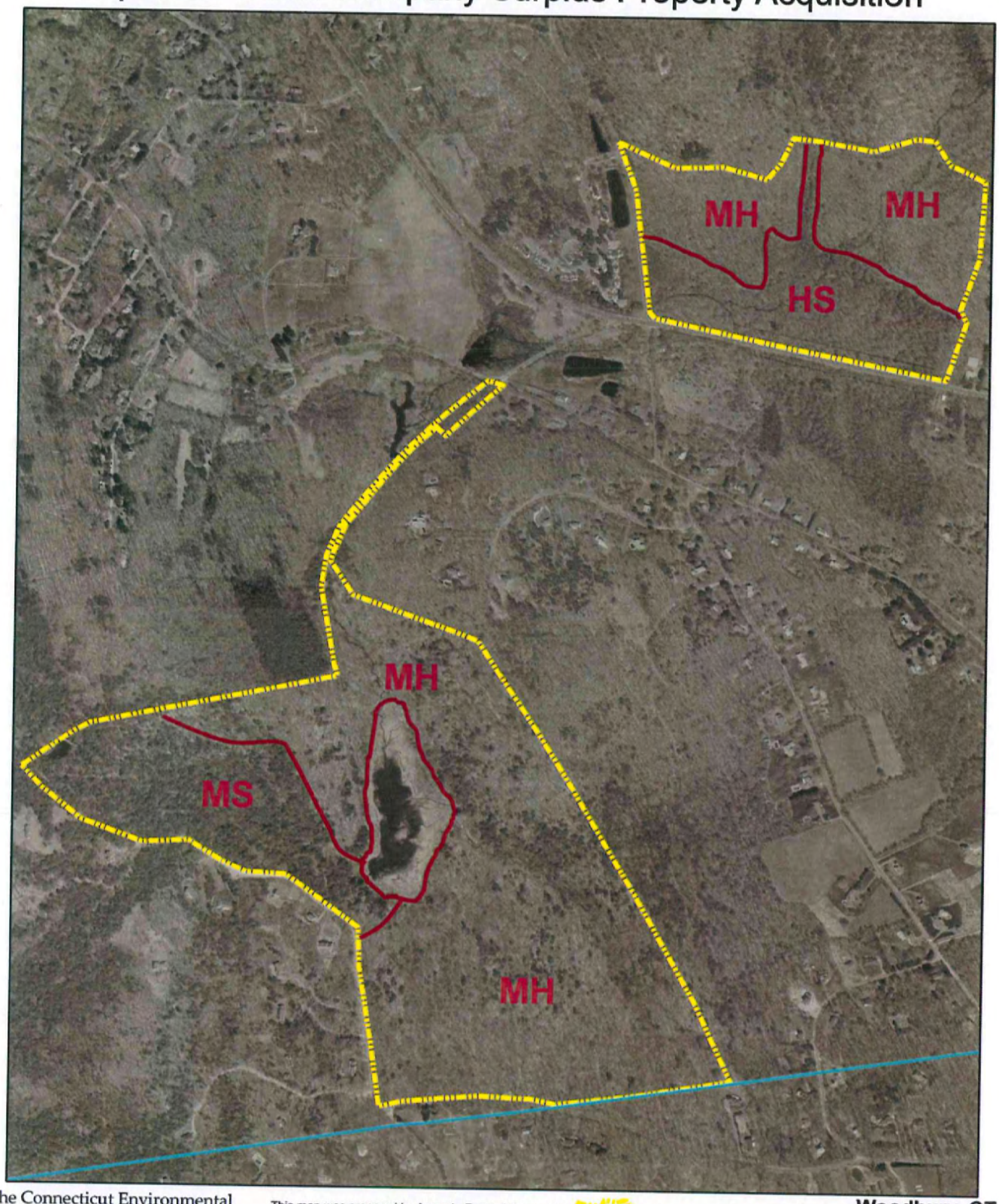
Management Considerations

The first rule in forest stewardship is that you can't manage your forest if you don't know where it is. This is the case for this property. The boundary lines were not marked on the ground and existing signage from abutting property owners were the only evidence of property lines. The property's boundaries should be located and marked on the ground before any other management activity take place or the area is opened to the public. Refer to the University of Connecticut Cooperative Extension System Forest Stewardship Fact Sheet Number Two," Knowing Your Boundaries" for instructions on boundary line location and maintenance. http://www.store.uconn.edu/available-downloads/cooperative-extension-publications/category/4-environment.html.

The development of a Forest Stewardship plan by a certified forester should be the next step in managing the property. Following is an outline of the components and definitions of a Forest Stewardship plan. The DEEP Division of Forestry's Private and Municipal Lands Program would be available to assist the Town of Woodbury in developing a Forest Stewardship plan for the properties once they are acquired. Contact Larry Rousseau, Service Forester, phone (860) 485-0226 or email Lawrence.rousseau@ct.gov for assistance.

Forest Vegetation Map

Aquarian Water Company Surplus Property Acquisition



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.
April 2013.

Aquarian Property Boundary Approximately

Woodbury, CT

0 295 590 1,180 1,770 Feet

MS- Mixed Softwood
MH- Mixed Hardwood
HS- Hardwood Swamp

FOREST STEWARDSHIP PLAN COMPONENTS AND DEFINITIONS

Identification

Plan Component	
Landowner information	Name, address, and phone number (not required if unlisted or owner does not have one) of forest owner (to be placed on the title page of the plan).
Plan preparer information	Name, address, and phone number of professional natural resource manager who prepared the plan (to be placed on the title page of the plan).
Plan preparation date	The date that the plan was presented to the landowner for acceptance (to be placed on the title page of the plan).
Location description, or directions to site	A description of how to find the site; i.e., survey information, tax map information, or specific written directions to the site (to be placed on the title page of the plan).
Stewardship acres	The number of acres covered by the plan.
Landowner goals for the property	A list of the landowner's goals for owning and managing forest land.
Regional context information	Location of the property in relation to the national ecoregional map developed by Robert G. Bailey, USDA Forest Service (1994), OR, a simple statement about the forest location in relation to surrounding land uses, OR the "watershed address".
General property description	A property overview giving general location, major forest types, general landforms, relevant descriptions of the landscape, etc. (usually one paragraph).
Interaction with surrounding properties	Describe stewardship activities within the context of the neighborhood and how interdependency may affect management.
Maps of the property (GIS-based map sets can be provided at no cost)	An aerial photo, drawing, or map that contains stand delineations, roads, boundaries, water, etc., clearly and adequately labeled. Include legend, north arrow, and scale bar.
Known threatened and endangered species	Review statewide database for possible presence of threatened and endangered (T&E) species (state and Federal listings). If T&E species are present, suggestions should be made for their protection and habitat enhancement. If no T&E species are found, note this in the general description or stand description.

Cultural heritage databases checked (if available) or field observations noted	Check with CT cultural databases that list archeological or other cultural sites of importance that should be noted in the plan. If nothing is found just note it. Your forester can do these database checks.
Soils information	Describe how soils may affect the attainment of landowner goals. (Can be generalized over the entire property when soils are uniform.)

Description

Plan Component

Stands by cover type and area (acres)	A description of forest stands in terms of cover type and acreage.
Description of dominant vegetation	List trees by species and size class within the stand.

Description (CONTINUED)

Plan Component

Stand characteristics, based on a reliable field inventory. ***(These items are included when management for timber products is a landowner goal.)**	A reliable field inventory is any sampling technique that will provide similar results when replicated in the same place. This item is not scored separately but is apparent from the following 6 items.
Stand age	The general age of a stand, as determined by measurement or growth models.
Stand health	A statement describing the health and condition of the forest, including noted problems such as insects, diseases, site hazards, or stocking.
Site quality	A statement describing the site capability for supporting forest growth and associated flora and fauna.
Stocking	A description of the relative population of trees within a stand on a per acre basis. This can be expressed in trees per acre or basal area, along with terms such as “overcrowded” or “under utilized” as long as these terms are clear to the forest owner.
***Stand volume**	An expression of the amount of usable wood that is contained in the standing trees, expressed as board feet per acre, cords per acre, cubic feet per acre, or tons per acre.

***Timber quality**	A statement indicating the quality of the timber (acceptable, undesirable, or cull).
***Growth rate**	The growth produced by the forest on a /acre/year basis, measured by increment borings, growth models, or permanent CFI plots. Expressed as a unit growth/acre/year or as a percent of the residual stand.
Stand history	A statement regarding the past use of the stand. Sources of information include the landowner, observation, old photos and neighbors.
Integrated items	For a landowner interested in enhancing his/her land in a particular use, this will be a fundamental, well-developed part of the stewardship plan. In cases where the landowner's interests do not include enhancing the property's other potential uses, the plan should still offer the landowner a brief description of "what might be" if all options were pursued. **No matter what the landowner's goals are, the following 5 potential use items should be discussed.**
Habitat and wildlife use	**The potential use of the stand by wildlife, as well as ways to minimize any negative impacts on wildlife of management activities.**
Water quality issues	**A statement addressing any water quality issues that might be occurring in the forest and suggestions for optimizing impacts of management activities on water quality. May include references to BMPs or AMPs.**
Timber production potential	**This requirement can be met by including a non-technical description of the site's relative potential; for example: "The combination of climate, soils, drainage, and topography present here result in a site well suited to tree growth and timber production." Although timber production may not be the owner's first priority, this will communicate available options to the landowner.**
Recreational opportunities	Recreational use is one of the primary goals of forest owners in the Area. Development of trails, vistas, feeding stations, hunting areas, and fishing piers are some of the practices that have been recommended in plans. In some areas, sites will have little to no recreation potential, in which case an acknowledgement of that would be appropriate and sufficient. This element is one that helps ensure that plans address multiple benefits.

Description (CONTINUED)

Plan Component

Important natural features	The amount of description needed to satisfy this requirement will depend on the particularities of each site. Dramatic viewscapes, rock formations, waterfalls, scenic meadows, rivers, streams, etc., if present, should be described and taken into account in plan formulation. A site that has no particular features that distinguish it from other sites can be described in the following manner: "Beyond the description provided above, this property or ownership does not have any particular natural features requiring additional mention."

Recommendations

Plan Component

Long-range silvicultural objectives for each forested cover type or stand	Describe clearly and succinctly the silvicultural objectives of each stand as they relate to the landowner's goals.
Schedule for completion of prescribed activities	A schedule for and descriptions of prescriptions and activities that will take place over the next 5 years or 10 years to achieve long-range objectives. See Activity Schedule example below, which illustrates the form to use for either 5 or 10 years of activity. Under the minimum standards, only 5 years of activity is required.

ACTIVITY SCHEDULE

Landowner: *Mr. Example* **Planning Horizon:** *10 years* **Date:** *August 12,2001*

ACTIVITY LOCATION Unit Numbers	**PRIORITY**	**TIME PERIOD**	**ACTIVITY**
9	1	Fall 2002	Maintain fence to protect seedlings until white pines are over 5 feet tall.
9, 10, 6, 5, and 4	1	Fall 2003	Develop trail access.
1 and 8	2	Spring 2003	Prepare site, plant white pine and red oak seedlings, and fence to protect from deer.
4 and 5	1	Winter 2003	Treat grapevines, and do crown-touching release of timber crop.

Communication

Plan Component

Management Unit Analysis Table	Summarizes stands (management units) by area, site class, cover type, description, management objectives, and recommended management activities; see following example. A table should still be prepared even if only one management unit is identified.

Communication (CONTINUED)

Management Unit Analysis Table

Mgmt Unit	Acres	**Site Quality**	*Cover Type*	**Description**	**Management Objective**	**Management Activity**
1	8.0	Dry to moderately moist	Mixed hardwoods	Reverting old field, white oak, sassafras, black cherry, and black walnut	Convert low-value hardwood unit to white pine and red oak	Prepare site; plant white pine and red oak; fence to protect seedlings from deer.
2	4.4	Dry to moderately moist	Oak-hickory	White oak, black oak, chestnut oak, hickory, and small sawtimber	Regenerate to higher value hardwoods	Treat grapevines; treat culls; establish desirable regeneration; harvest timber.
3	16.0	Dry to moderately moist	Mixed hardwoods	Reverting old field, red maple and yellow poplar	Convert low value hardwood unit to white oak and red oak	Prepare site; plant white oak and red oak; fence to protect seedlings from deer.

Plan Component	
OPTIONAL **Summary paragraph from landowner profile that evaluates landowner's available Time, Interest, Money, and Energy (TIME)**	The TIME element is a useful tool for both the plan preparer and the landowner. Including it in the stewardship plan gives the landowner a clear understanding of the assumptions made by the plan's author in its preparation – assumptions that, if incorrect, could impact on plan implementation. "Landowner prefers to do the work himself over a long period of time" or "Cost share programs are of strong interest to the landowner and will be vital in the completion of these practices" are examples of appropriate statements. Plan preparers may devise their own system for assessing landowner's capabilities.
Easy-to-follow logical format	The plan is formatted in such a way that the reader can logically follow the flow of ideas, and will understand what should be completed and why.
The writing style is easy to read and understand.	Readability is subjective, but most people can agree on a well-written plan.
The writer avoids wordiness, jargon, and mistakes in grammar and spelling.	A missing comma, mis-capitalized word, absent parentheses, some use of jargon, a misspelled word, or incorrect grammar should not result in a "Not Acceptable" rating. If the plan on the whole contains few errors of this nature, it should be rated as successfully meeting this element.
The plan meets the landowner's needs and provides useful advice in a skillful way.	While this is probably the most subjective of the elements, the peer review/consensus process should be able to resolve any conflicts of opinion.
The plan is likely to inspire the landowner to action.	Does the plan meet or exceed the landowner's expectations? Does it help the landowner better appreciate the potential of the property and inspire action to fulfill that potential? Reviewers should consider their ratings for the previous three elements in rating this standard.

Wildlife Resources

Background

The Aquarion Water Company Properties consist of two parcels in southeastern Woodbury. The town requested ERT assistance in providing information for developing a management plan for these excess water company properties. One parcel is 181 acres and located on Old Sherman Hill Road, Scuppo Road and the Southbury Town Line. The other parcel is 62 acres on Route 64, close to the Middlebury town line however, this parcel was not visited during the site walk and is not included in this report.

The 181-acre parcel includes the rail bed for the Woodbury trolley line and connects to existing open space. The site is mostly forested uplands, with several watercourses and a 10-acre pond located near the center of the parcel. The property will remain open for passive recreation, including hiking, fishing and bicycling, and the town envisions a greenway walking trail, possibly connecting the Middlebury Trolley Line with Woodbury's Main Street sidewalk system and a connection to the Whittemore Sanctuary Trails.

Existing Wildlife Habitat

Forested Uplands

The property consists mainly of forested uplands around the central wetland. Slopes are fairly steep, with ledges and outcrops present. The overstory contains birch and hemlock, while the understory is sparse. The shrub layer is sparse, as is the predominantly fern herbaceous layer. Scattered barberry is present, but there is no major infestation, and no herbiciding control is to be implemented. There is a significant pine stand.

Forested areas such as these are valuable to wildlife, providing cover, food, nesting and roosting places and denning sites. Mast or acorns produced by oaks provides excellent forage for a wide variety of mammals and birds including white-tailed deer, gray squirrel, southern flying squirrel, eastern chipmunk, white-footed mouse, eastern wild turkey and blue jay. Trees, both living and dead, also serve as a home for a variety of insects, which, in turn, are eaten by many species of

birds, including woodpeckers, warblers and nuthatches. Other wildlife species found in this habitat type include white-breasted nuthatch, American redstart, barred owl, broad-winged hawk, redback salamander and northern ringneck snake.

There is limited opportunity to manage the forested habitat to benefit wildlife. Forestry management techniques could be considered for the more level, lower elevation portions of this site. Creating a variety of age-classes within a forested area is often beneficial to a wide variety of wildlife species. The location of any wetlands should be carefully considered when planning any cutting. Forestry management should only be undertaken under the advisement of a certified professional forester.

While no invasive species control is currently planned, the spread of Japanese barberry and other invasives should be monitored. Invasive species such as Japanese barberry can become the dominant vegetation in the understory, significantly reducing plant diversity. They displace native vegetation that provides high-quality forage, thereby diminishing the value of an area to wildlife. Although very time-intensive and laborious, hand pulling as a management technique can be considered as an alternative to herbicide use. The amount of labor involved can be reduced if control techniques are implemented before the invasive species become widespread.

Wetlands

There are several watercourses on the property, as well as a centrally located 10-acre pond with a dam in the southwest corner. There is evidence of beaver activity in and around the pond. At this time, there are no plans to control the beaver activity through trapping. Additionally, the site walk evidenced a significant amount of garbage around the pond, indicating a fair amount of human activity. The vegetation around the reservoir includes multiflora rose, common reed, goldenrods and highbush blueberry.

Many species of reptiles and amphibians, such as the gray tree frog and the spotted salamander, use wetlands for breeding and spend the balance of their time in the adjacent forested uplands. Many bird species use forested wetlands at varying times of the year for breeding, feeding and shelter. Examples include Louisiana waterthrush, wood thrush, northern water thrush, and eastern phoebe. Other wildlife likely utilizing this habitat for food and cover are raccoons, star-nosed moles, wood frogs, pickerel frogs, spring peepers and northern water snakes.

The riparian habitat, or riparian zone, is the area of trees, shrubs and herbaceous plants that follow the edge of streams, rivers, lakes and ponds. It can provide habitat for many aquatic-based species including frogs, salamanders, beaver, ducks, beaver, muskrats, and mink. Generally, the greater the vegetative diversity along the edges of watercourses, the greater the value for wildlife. The vegetation found in this habitat is tolerant to periodic flooding and its presence causes floodwater to slow down and allows the soil to absorb the excess water. The zone of vegetation along a stream or river is often the only remaining contiguous vegetation within a developed area, especially in a densely populated state like Connecticut. It may continue for miles, providing an important travel corridor for wildlife and connecting one habitat to another.

As in the upland, invasive species, including the multiflora rose found around the reservoir and streams should be monitored. Invasive vegetation does, however, provide important cover and structure therefore, if large infestations are treated and removed, it is recommended that native shrubs be planted, rather than leaving the area devoid of vegetation for a length of time. If management includes replacing invasive species with natives, shrubs that could be planted include silky and red-stemmed dogwood, highbush blueberry, cranberry and spicebush.

Education and Trails

The town may wish to include an educational component to their management of the property including placement of interpretive signs can be placed at appropriate locations.

If additional recreational trails are to be made part of the property, care must be taken in order to prevent disturbance to wildlife. Please see Attachment A regarding recommended guidelines for trail establishment. Trails should not bisect fields, as this would provide predators with additional easy access to more portions of the field. Because small mammals and ground nesting birds are easily disturbed and sometimes killed by domestic dogs, it is advisable to continue

existing enforcement of leash requirements. If possible, enforcement should be added to areas that currently only request compliance at least during the entire nesting season.

Summary

Large, unfragmented parcels of mature forest containing multiple habitat types, including wetlands are increasingly rare in Connecticut, as development creates small, isolated patches of habitat in the landscape. For wildlife, large blocks of habitat are always better, as they can provide a greater variety of food (different types of acorns, catkins, a variety of berries), more nesting and roosting sites, and areas for cover. Continued stewardship of this area will conserve the inherent wildlife values.

Attachment A

General Guidelines for Protecting Wildlife Resources When Developing Trails

Some properties may lend themselves to providing a variety of recreational opportunities (e.g., hiking, hunting, fishing, nature study and photography, horseback riding, mountain biking.) Properly designed trails can provide excellent opportunities to increase public appreciation for wildlife and the ecological values of various habitats. Trails should be designed to enhance the learning and aesthetic aspects of outdoor recreation while minimizing damage to the landscape. They should be laid out to pass by or through the various cover types and other special features represented on the property while avoiding those areas prone to erosion or that contain plants or animals that may be impacted by human disturbance. Uses that are generally considered "compatible" could impact sensitive resources depending on the location, timing and frequency of their occurrence. For example, while regulated fishing is considered an accepted form of outdoor recreation, there could be impacts associated with it, such as streambank erosion at heavily used sites. The overall level of disturbance to vegetation/habitat and wildlife can be significantly reduced by establishing one or two (will depend on property size and degree of importance to natural resources) multiple-use trails rather than several single/exclusive-use trails.

Some guidelines to follow when developing a trail system include:

- Narrow, passive-use recreation trails with natural substrate that would require minimal vegetation removal, maintain forest canopy closure, prohibit the use of motorized vehicles, and require dog owners to keep their dogs under control, are preferred to reduce environmental impacts and disturbance to wildlife. Abandoned roadways (e.g., farm/logging roads) should be incorporated into the trail system whenever possible and appropriate to minimize cutting activity/vegetation removal;
- If a paved, multi-purpose trail is established, avoid the use of curbing. If it is necessary, Cape Cod style curbing (curbing at 45 degree angle) is recommended;
- Know the characteristics of the property and plan the layout so that the trail passes by or through a variety of habitat types;
- Make the trail as exciting and safe as possible and follow a closed loop design. Avoid long straight stretches of >100'; trails with curves and bends add an element of surprise and anticipation and appear more "natural";
- Traversing wetlands and steep slopes should be avoided whenever possible to minimize erosion and sedimentation problems; where wetlands must be crossed, a boardwalk system should be used;
- The property boundaries and trail should be well marked. It is best to provide a map/informational leaflet describing the wildlife values associated with the property (e.g., value of wetlands, various habitat types/stages of succession, habitat management practices) and guidelines for responsible trail use;
- Potential impacts of trails on private property owners should be identified. Where trails bisect private property, the access should be of adequate width and the trail well-marked to help avoid potential conflicts (e.g., trespass by trail users);

- For more specific guidance on trail design and construction contact the Connecticut Forest & Park Association (860-346-2372 or www.ctwoodlands.org) or Appalachian Mountain Club (www.outdoors.org);
- For an extensive literature review about the effects of different types of recreation activities on wildlife, visit web site www.Montanatws.org – 307 page document published in 1999 entitled, "Effects of recreation on Rocky Mountain wildlife: A review for Montana."

Prepared by the CT DEP Wildlife Division for the Partners In Stewardship Program (June 2002)
Questions? Contact CT DEP Wildlife Division at 860-295-9523 (Eastern CT) or 860-675-8130 (Western CT)

The Natural Diversity Data Base Review

The Natural Diversity Data Base maps and files have been reviewed for the project area. According to their records, multiple State-listed species (RCSA Sec. 26-306) have been documented within or near the identified parcels.

State-Listed Plant Species

The following State-listed plant species have been documented in the vicinity of the identified parcels and may also occur on the properties if suitable habitat exists:

- Bladderwort *(Utricularia resupinata)*
    - Protection Status: State Endangered
    - Habitat: In the waters of pond-, lake-, and river-shores. Blooms Jul-Sep.
- Beaked rush *(Rhynchospora macrostachya)*
    - Protection Status: State Threatened
    - Habitat: Wet sands and peaty ponds with a fluctuating water table. Blooms late Jul-Oct.
- Small's yellow-eyed *(Xyris smalliana)*
    - Protection Status: State Endangered
    - Habitat: Sandy bogs, wet sandy depressions, and shores of ponds. Blooms Jul-Oct.
- Hooker's orchid *(Platanthera hookeri)*
    - Protection Status: State Special Concern, Historic
    - Habitat: Dry or moist rich woods. Blooms mid-May to mid-July.
- American ginseng *(Panax quinquefolius)*
    - Protection Status: State Special Concern
    - Habitat: Found in rich, rocky woods. Blooms Jun.
- Sand bramble *(Rubus cuneifolius)*
    - Protection Status: State Special Concern
    - Habitat: Openings in woods, roadsides, Flowers May to mid-Jul. Fruits Jul-Sep.

- Torrey bulrush *(Schoenoplectus torreyi)*
    - Protection Status: State Threatened
    - Habitat: Sandy pond shores and freshwater tidal shores. Blooms Aug-Oct.
- Pod grass *(Scheuchzeria palustris ssp. americana)*
    - Protection Status: State Endangered
    - Habitat: Wet bogs, quagmires, and peaty shores. Blooms May-Jul.
- Arethusa *(Arethusa bulbosa)*
    - Protection Status: State Special Concern, Historic
    - Habitat: Sphagnum bogs and peaty wetlands. Blooms late May-Jun.
- Clasping-leaved water-horehound *(Lycopus amplectens)*
    - Protection Status: State Special Concern
    - Habitat: Swamps and ponshores in sandy or peaty soils. Blooms Aug, Sep.

If botanical surveys of the parcels are conducted, please consider submitting data and/or reports to the Connecticut Natural Diversity Data Base; 79 Elm Street, 6th Floor; Hartford, CT 06106.

For more information regarding State-listed plant species, please contact Nelson DeBarros (nelson.debarros@ct.gov).

State-Listed Wildlife Species

A Natural Diversity Data Base (NDDB) Review of State Listed Species for Aquarion Water Company Surplus Property Acquisition in Woodbury indicates the following extant populations of species on or within the vicinity of the site:

Bobolink *(Dolichonyx oryzivorus)*
Protection Status: Species of Special Concern

Bobolinks require open grassy areas to forage, breed and nest. Unlike other grassland birds that require large tracts of grassland habitat, the bobolink can successfully breed in grasslands as small as five acres. Its breeding season is approximately May through August and it is during this period that this species is most susceptible to disturbances in its habitat. Minimizing impacts to open fields, meadows and other grassy areas during this time period will likewise minimize impacts to this species.

Jefferson salamander "complex" *(Ambystoma jeffersonianum)*
Protection Status: Species of Special Concern

Jefferson salamander “complex” results in the hybridization of the Jefferson salamander with the blue-spotted salamander. The hybrids can only be reliably distinguished by

karyological and biochemical analyses. Jefferson salamanders prefer steep, rocky areas, in or near undisturbed second growth deciduous forests and their breeding pools may be in hemlock groves or grassy pasture ponds. They actively breed from February – April. Best management practices around the breeding pools should be used and any canopy cover around the pools should try to be saved if possible to keep the area forested, which is what they require.

For more information regarding State-listed wildlife species, please contact Elaine Hinsch (elaine.hinsch@ct.gov).

Natural Diversity Data Base information includes all information regarding critical biologic resources available to us at the time of the request. This information is a compilation of data collected over the years by the CT Department of Energy & Environmental Protection, Bureau of Natural Resources 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 substituted 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. If the proposed work has not been initiated within 12 months of this review, contact the NDDB for an updated review.

Greenways and Trails Review

Site Visit and Observations

The ERT Team entered the Sherman Hill parcel via Old Sherman Hill Road near the intersection with Trolley Bed Road and walked south westerly ending at Scuppo Road. The ERT Team walked most of the way along the Old Trolley Bed (TB) trail. The TB trail is currently being used and has great potential for improvements and linkages both on the subject property and beyond.

A question that came to mind is that of any restrictions that may be placed on the parcel if it remains classified as a potential drinking water supply reservoir. Per the Department of Public Health's Drinking Water Division (DWD), if the property is Class III, it does not require a recreational activities permit. This reviewer is not sure what the status of the properties is with respect to DWD Class so here is the link for the three different classifications. http://www.ct.gov/dph/lib/dph/agency_regulations/sections/pdfs/title_25._water_resources/25-7._establishment_of_criteria.pdf

The Recreational Trails & Greenways Program would encourage the Town of Woodbury to:

- Improve the existing TB trail which might include:
    - Improvements to trail surface and drainage;
    - Addition of amenities such as signage (might include allowed uses, safety, directional, interpretive) benches, rest areas, etc.
    - Website information that would include parking availability and allowed uses such as hiking, equestrian, and mountain bikes, etc.
    - Establishment of a trail maintenance program that could include volunteers from all user groups and neighbors.
- Add trail linkages within the parcel;
- Add trail linkages to adjacent parcels;

- Extend the CT Greenway Designation for the Middlebury Greenway where appropriate. See http://www.ct.gov/dep/lib/dep/greenways/greenwaysmap2012.pdf

The DEEP Recreational Trails & Greenways Program is available upon request to assist the Town. The Recreational Trails Program grant round closed March 29, 2013 and they anticipate a summer 2013 announcement of approved proposals. Details can be found at: www.ct.gov/deep/rectrails.

Archaeological and Cultural Resources

The Office of State Archaeology (OSA) had the opportunity to conduct a field review of the two parcels for their archaeological and historic sensitivity. A review of the Office of State Archaeology's Site Files and Maps shows no known archaeological sites, however, field review has documented at least three historic ruins that will be soon listed in the state site file records.

The north Route 64 parcel which includes 62 acres close to the Middlebury town line contains the following cultural resources of historic significance: 1) Old road bed which appears to have been the main road connecting Middlebury/Woodbury prior to the modern Route 64 corridor. If so, it is possible that General Rochambeau's French Army may have traveled along this road during their 1781 trek to join Washington in Yorktown. More historic research will be required to determine this event. 2) Along with a series of impressive stonewalls and mounds, this parcel also has two historic house foundation ruins, including remnants of the cellar, chimneystack, and water wells in place. Based on the configuration of the stone ruins, both houses appear to date either the late-18th or early-19th centuries. Both houses have the potential to yield important information about Woodbury's past through archaeological excavations. These sites would make excellent research studies.

The larger parcel to the south has the visible trail system of the Middlebury Trolley Line, which connected Middlebury/Waterbury with Woodbury's Main Street (Route 6). The trolley line has a great deal of historic integrity. Although the metal rails were removed during the scrap iron drives of both the First and Second World Wars, the trolley bed and the stone arches passing over water systems are still intact. The engineering features of the trolley line, including the stone crossings, roadbed and dams, are visible and impressive. The OSA suggests that the Middlebury Trolley Line roadbed, with its engineering features intact, is eligible for the State and National Registers of Historic Places.

The Office of State Archaeology strongly recommends the preservation of the historic resources in both parcels. Use of the property for passive recreation, including hiking trails, fishing and non-motorized bicycles would be proper. In addition, these historic resources would provide a tremendous educational opportunity as outdoor laboratories to teach school students and the general public the town's history, and to promote the preservation of cultural resources.

In this regard, the OSA would be pleased to work with the Town of Woodbury to promote an educational awareness of their cultural resources. They would be pleased to offer field tours for the town's citizens to promote these parcels and encourage the community to understand how special these lands are, and why they need to be preserved.

Planning Review

Background

The town of Woodbury is looking to purchase two surplus properties from the Aquarion Water Company to add to the town's existing open space. The first property (017-040) is 181 acres and is located between Old Sherman Hill Road and the Southbury town line. This property contains the Woodbury Reservoir and the bed of an old trolley line. The trolley bed extends from Old Sherman Hill Road to Middle Quarter Road, less than a quarter mile from Route 6 (Main Street). The trolley bed is graded, free of vegetation, and contains intact stream crossings. The Woodbury Reservoir has been disconnected from the public water supply since 1977.The second property (019-089) is 62 acres and is adjacent to the Whittemore Sanctuary off of Route 64. This property contains a mix of forest and wetlands. Both properties are used by town residents for passive recreation such as hiking and fishing. South Brook flows through the properties before entering the Pomperaug River just west of Route 6. The acquisition of these properties would allow the town to connect multiple open space properties together, and could serve as an important non-motorized transportation and recreation corridor in the region. If not acquired as open space, the properties could be developed.

Land Use and Zoning

The Woodbury Reservoir property (017-040) is zoned OS-80 — an open space district with a minimum lot size of 80,000 square feet (1.83 acres). The second property (019-089) is zoned OS100 — an open space district with a minimum lot size of 100,000 square feet (2.30 acres). Both properties are classified as Class I or II water supply land, although Aquarion Water Company is seeking an abandonment permit from the state. Once the property is declassified as water supply land, it is in danger of being developed. Using Community VIZ software, COGCNV staff conducted a build-out analysis for the two properties. A build-out is a projection of the maximum development potential of an area under current zoning regulations. Natural constraints and assumptions of the efficiency of land development were taken into account in the build-out. Under current zoning regulations, the two properties are capable of supporting 60 new housing units. New development would increase stormwater flow, cause adverse effects on nearby aquifers and wetlands, and destroy wildlife habitat. Results of the build-out analysis can be seen in Figure 1.

The *State Plan of Conservation and Development (POCD): 2005-2010* guide map (Figure 2) identifies the land in both properties as either "Conservation Areas" (57%), "Preservation Areas" (37%), or "Open Space" (6%). Conservation of natural resources and limited development are recommended in these areas. However, in the draft *State Plan of Conservation and Development: 2013-2018* guide map (Figure 3) only 46% of the land is considered "Priority Conservation Areas." The remaining 54% is classified as "Balanced Growth Areas," land that meets the criteria of both development and conservation areas. One of the drawbacks of the draft plan is that it uses census blocks to calculate "Priority Development Areas." Census blocks are larger in rural areas which over-generalize development factors that may or may not be relevant. Because of this, the draft state plan classifies much of the Woodbury Reservoir property with neighboring residential developments, resulting in a "Balanced Growth" designation. COGCNV's *Regional Plan: 2008* and Woodbury's *POCD: 2009* classify the properties as existing open space. The discrepancies between these plans can be explained by their handling of

Class I and Class II water supply lands, which are classified as open space in the regional and local plans, but not in the state plans (Figure 4). COGCNV finds the acquisition of these properties to be in compliance with its *Regional Plan.*

According to the Center for Land Use Education and Research (CLEAR) 2006 land cover dataset, land cover at the two Aquarion properties was 69% deciduous forest, 13% coniferous forest, 11% wetlands, 5% water, and 2% developed (Figure 5). 40% of the property adjacent to the Whittemore Sanctuary was comprised of forested wetlands. Land cover for the two properties has remained unchanged since 1985.

Transportation

The conversion of the Woodbury Trolley Line into a multi-use greenway was proposed in COGCNV documents in the early 1990s. Greenway planning in the 1990s sought to build a continuous multiuse trail along the old trolley bed from Route 63 in Middlebury to Route 6 in Woodbury. The Middlebury portion of the trail has been completed and terminates at Lake Quassapaug about a quarter mile from the Woodbury town line. The end of the trolley bed on Old Sherman Hill Road is 1.82 miles from the Middlebury town line, while the Middlebury Greenway ends 0.36 miles before the Woodbury town line. The total distance would be 2.18 miles to connect the trail to Middlebury's trolley line. In 1994, the Woodbury Trolley Line multi-use trail was selected as one of the region's two Transportation Enhancement projects and was approved for federal Transportation Enhancement funding. This project was to connect with the Middlebury Trolley Line greenway at Old Sherman Hill Road and continue to Route 6. However, the sale of the former Woodbury Water Company property prevented the project from moving forward.

Primary access to the Woodbury Reservoir property can be found at Old Sherman Hill Road and Middle Quarter road, where there are unmarked pull-off areas for vehicles. An additional access point can be found on Scuppo Road, where a formerly gated water company road provides direct vehicular access to the reservoir. If the town purchases the property, they may wish to re-gate this entrance to prevent the property from being used by motorized vehicles. The towns owns a property (086-001C) on Scuppo Road that has part of the trolley bed ROW. Another parcel owned by the Water Company (086-001) separates this property from the Woodbury Reservoir property. The Views housing development (102-048) off of Middle Quarter Road owns the final 2000 feet of ROW. This property has a conservation restriction by the town. Signs identifying designated parking areas as well as permitted and restricted recreational uses should be included at the Old Sherman Hill Road and Middle Quarter Road parking areas. The second property can only be accessed through the Whittemore Sanctuary trail system. There is no vehicle access.

The two properties are separated by Route 64 and Old Sherman Hill Road. According to CT DOT's 2011 traffic log data, Route 64 between Middle Quarter Road and the Middlebury town line had an average daily traffic (ADT) of 6,800 vehicles per day and a posted speed limit of 45 mph. Staff traffic counts on Old Sherman Hill Road in 2009 showed an ADT of 520 vehicles per day and an average speed of 35 mph (10 mph above the posted speed limit). Bicycle and pedestrian connections between the two properties would occur along Trolley Bed Road and would require crossings at Old Sherman Hill Road, Route 64, and Tuttle Road. All of these roads lack crosswalks and there are no signs to warn vehicles of crossing pedestrians or bicyclists.

Sightlines on Route 64 at the intersection of Trolley Bed Road and Tuttle Road are approximately 650 feet to the west and 2000 feet to the east[1]. These sightlines would provide an ample vehicle stopping distance for pedestrians and bicyclists crossing Route 64.

Connections between the Woodbury Reservoir property and the Main Street sidewalks would be via the old trolley bed, which continues through three nearby parcels before ending at Middle Quarter Road. Two of these parcels are town owned (086-001 and 086-001C), while the third is privately owned (102-048). The two town parcels are part of the town's existing open space and the privately owned parcel (Southbrook development) has conservation restrictions. Route 6 between Middle Quarter Road and Route 64, near the end of the trolley bed, was listed as a high hazard location for pedestrians in COGCNV's 2009 *Pedestrian and Bicycle Safety in the CNVR* report. Pedestrians and bicyclists are likely to use this stretch of roadway to access the trolley bed trail. The location saw an ADT of 13,100 vehicles per day in 2011. Sidewalks only exist on the east side of Route 6 and numerous commercial driveways — none of which have crosswalks — interrupt the sidewalk system. A map showing the trail, sidewalk, and greenway system in the study area can be seen in Figure 6.

Funding

Open space acquisition funds can be obtained through the Recreational and Natural Heritage Trust Program and the Open Space and Watershed Land Acquisition Grant Program, both administered by DEEP.

The Recreational and Natural Heritage Trust Program is used to acquire property that expands the state's system of parks, forests, wildlife, and other natural open spaces. This program is only used for land that is directly purchased and maintained by DEEP.

The Open Space and Watershed Land Acquisition Grant Program is a land acquisition program for municipalities and non-profit conservation organizations. The program reimburses municipalities or non-profit conservation organizations up to 65% of fair market value for open space acquisition. Funding for this program has been limited in recent years due to state budget cuts. Additional information on this program can be found here: http://www.ct.gov/dep/cwp/view.asp?a=2706&q=323834&depNav_GID=1641

Funding for a multi-use greenway on the old trolley bed will be limited in upcoming years by financial constraints and competition from other high-priority regional greenway projects. MAP-21, the latest federal transportation bill, consolidated all non-motorized funding into one category called "Transportation Alternatives", removed line-item funding for the Recreational Trails Program (now under the consolidated Transportation Alternatives program), and reduced non-motorized funding by one-third. DEEP will continue funding the Recreational Trails Program through 2014 when MAP-21 expires. Funding for the Recreational Trails Program is uncertain after 2014.

COGCNV's allotment of federal Transportation Enhancement funds (which are now part of the Transportation Alternatives program) is fully committed through the year 2014. The next round

[1] Sightlines refer to the maximum unobstructed line-of-sight between a vehicle and a pedestrian or bicyclist crossing the street.

of solicitations will not likely occur for many years. The COGCNV encourages the town to submit this project during the next round of Transportation Enhancement solicitations for future consideration. It should be noted that two high-priority regional greenway projects – the Naugatuck River Greenway and the Farmington Canal Trail – will be among the regional projects competing for a limited pool of non-motorized transportation funds in upcoming years. An alternative source of funding is the Recreational Trails Program, administered by DEEP. There are several things that should be done in order to strengthen the application of this project. The first is to contact the Connecticut Greenways Council about becoming a designated state greenway. This could be done either as a new standalone greenway, or as an extension of the Middlebury Greenway. Under the Recreational Trails Program, greenway designation is one of the criteria used to select funded projects. A complete list of criteria for the designation of greenways in Connecticut can be found here:
http://www.ct.gov/dep/cwp/view.asp?a=2707&q=323850&depNav_GID=1704

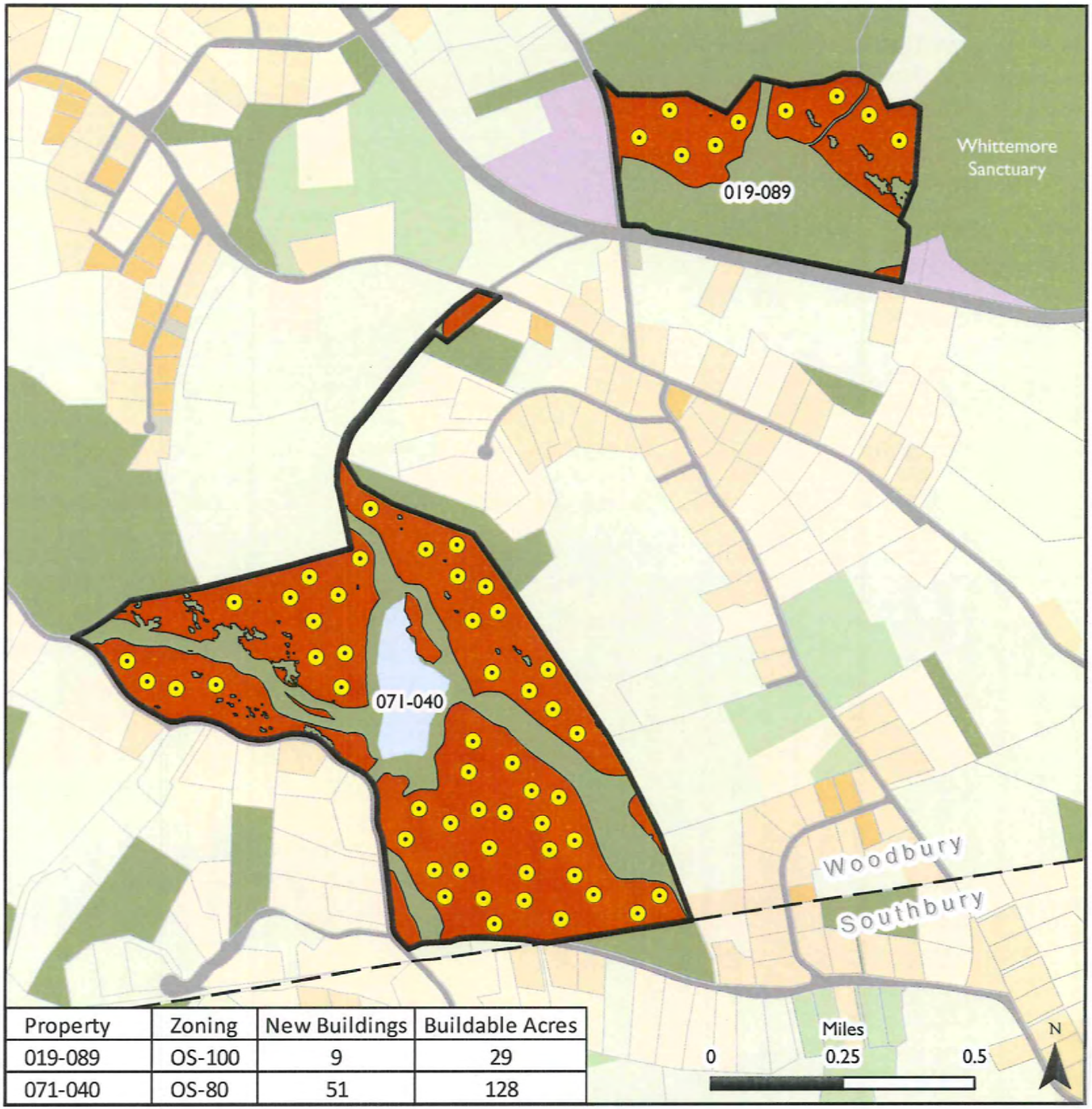
The town should include this project in its future Plan of Conservation and Development and should work with officials to include this project in upcoming regional and state plans. Future applications should highlight the regional significance of this project since it would help tie together open space and multi-use trails in Woodbury, Southbury, and Middlebury. All of these criteria would strengthen an application under the Recreational Trails Program guidelines. The complete grant selection criteria for the Recreational Trails Program can be found here:
http://www.ct.gov/dep/cwp/view.asp?a=2707&q=416740&depNav_GID=1642

Figure 1. Build-Out Analysis

New Buildings
Developable Land

Existing Land Use
Agriculture
Commercial
Urban Medium
Residential 3 (1 to 2 Dwelling Units per Acre)
Residential 4 (0.5 to 1 Dwelling Units per Acre)
Residential 5 (Less than 0.5 Dwelling Units per Acre)
Recreational or Open Space
Right Of Way
Undeveloped Land
Water

Aquarion Properties
Town Boundary
Parcels



Property	Zoning	New Buildings	Buildable Acres
019-089	OS-100	9	29
071-040	OS-80	51	128

Source: Existing Land Use, Developable Land - COGCNV; Build-out Buildings from Community VIZ analysis

Council of Governments
Central Naugatuck Valley

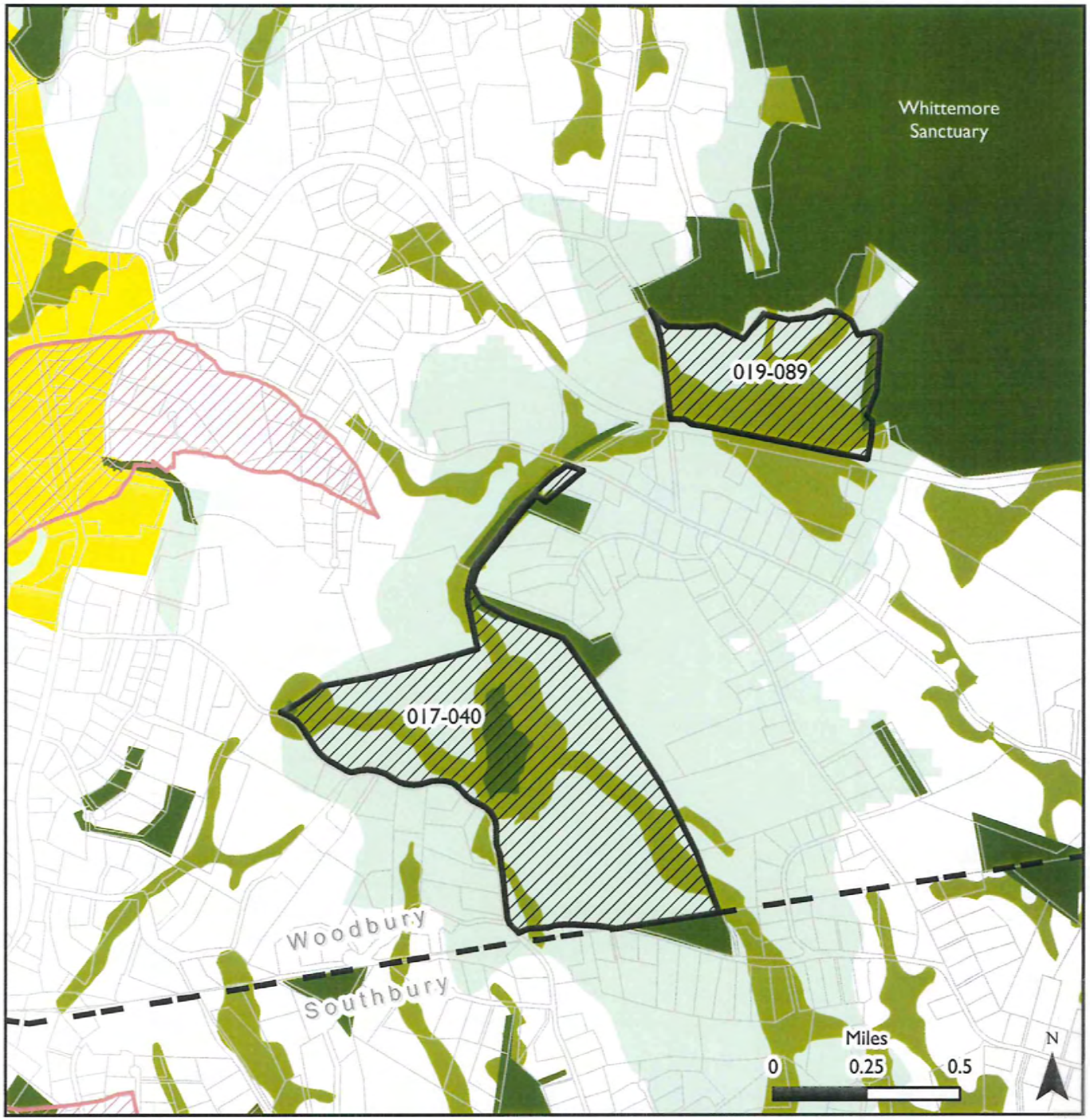
Figure 2. 2008 State POCD Guide Map

Classifications (2008)

- Regional Center
- Neighborhood Conservation
- Growth Area
- Rural Community Center
- Existing Preserved Open Space
- Preservation Area
- Conservation Area
- Rural Lands

- Aquifer Protection Area
- Aquarion Properties
- Town Boundary
- Parcels

Council of Governments
Central Naugatuck Valley



Souce: Classifications - Office of Policy and Management; Parcels - COGCNV; Aquifer Protection Area - CT DEEP

Figure 3. 2013 Draft POCD Guide Map

Draft Classifications (2013)

- Marsh
- Water
- Village Development Areas
- Protected Open Space and Farmland
- Balanced Growth Areas

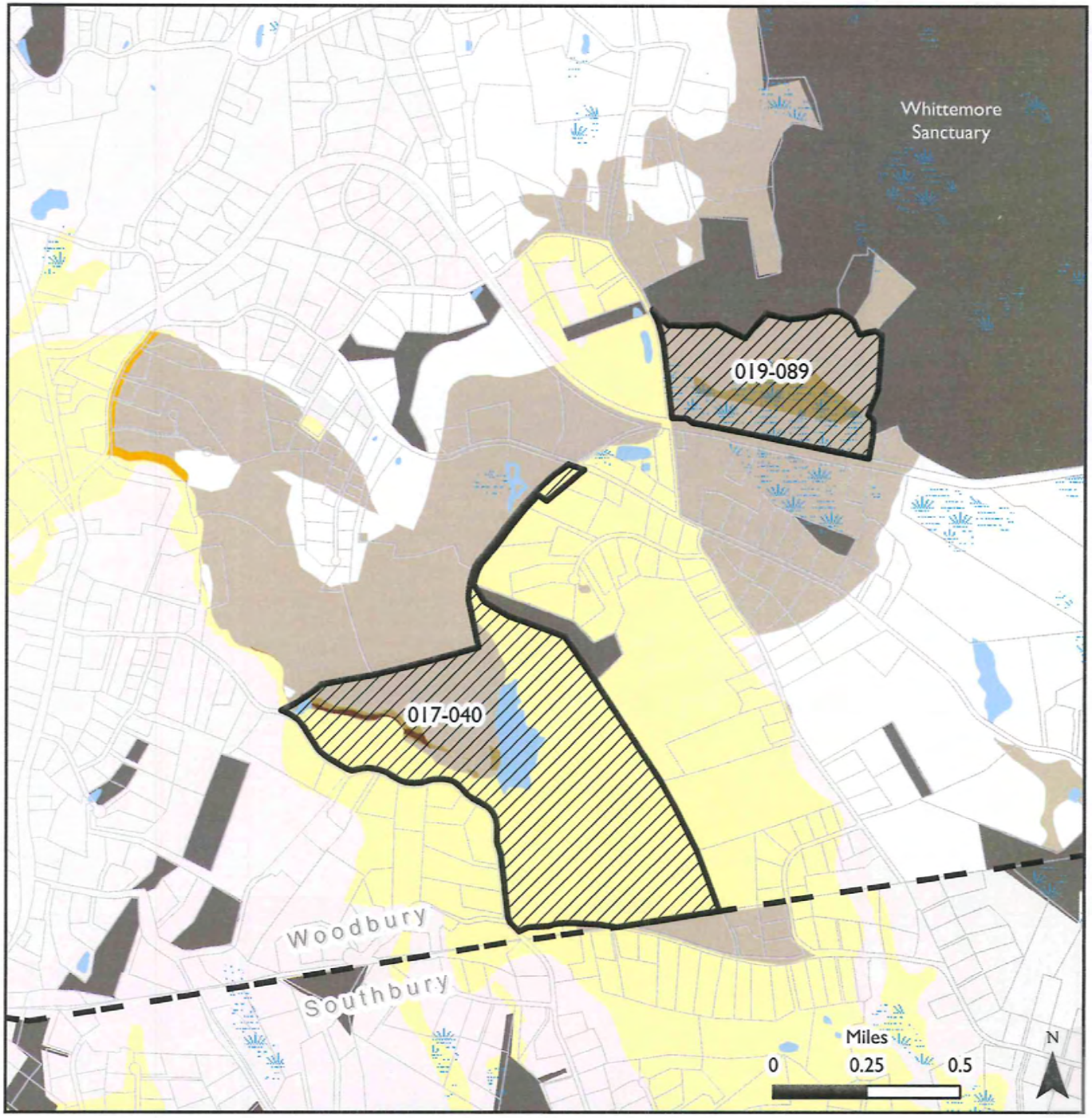
Priority Dev. Areas

- 1 - 2
- 3
- 4 - 6

Priority Cons. Areas

- 1 - 2
- 3
- 4 - 6

- Aquarion Properties
- Town Boundary
- Parcels

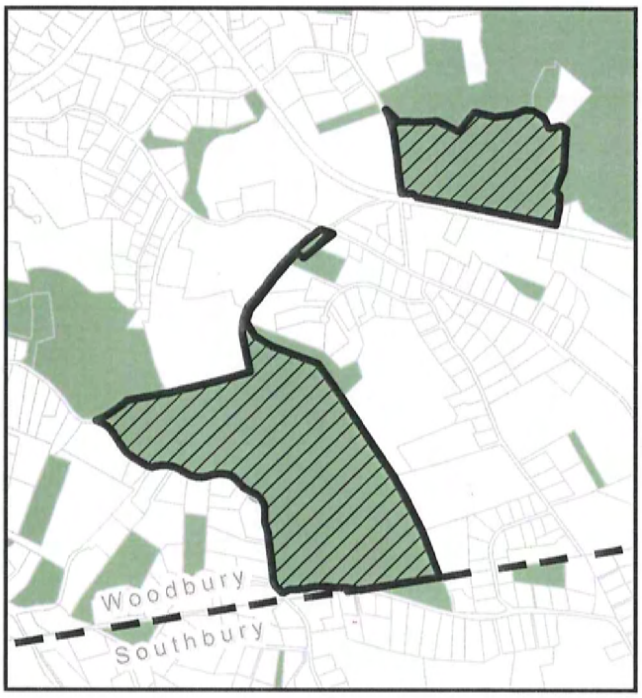


Council of Governments Central Naugatuck Valley

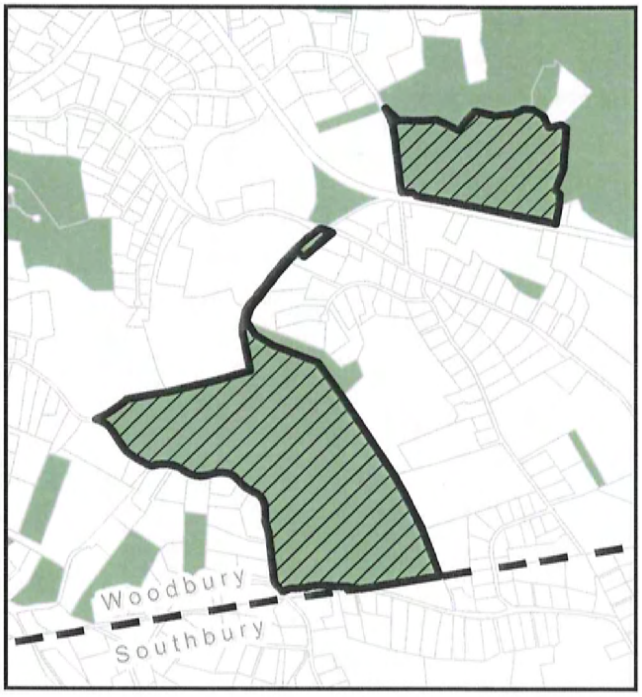
Souce: Classifications - Office of Policy and Management; Parcels - COGCNV; Aquifer Protection Area - CT DEEP

Figure 4. Local, State, and Regional Plans of Conservation and Development: Protected Open Space *

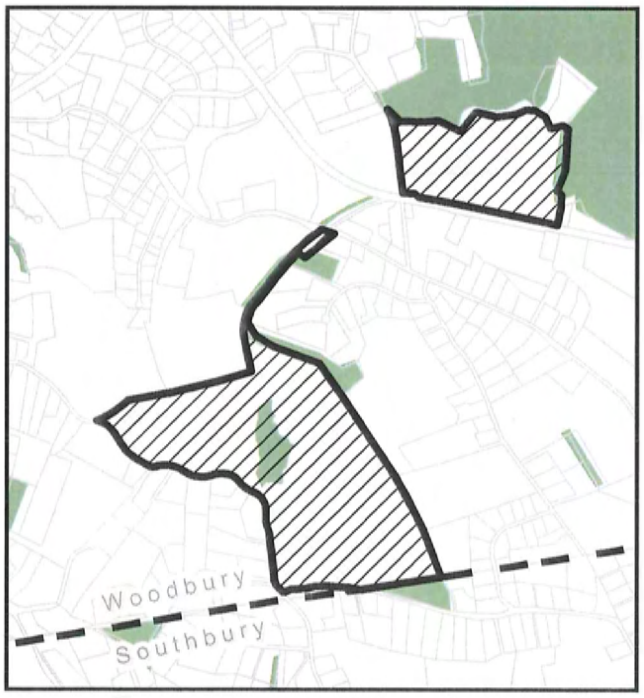
COGCNV Regional Plan: 2008



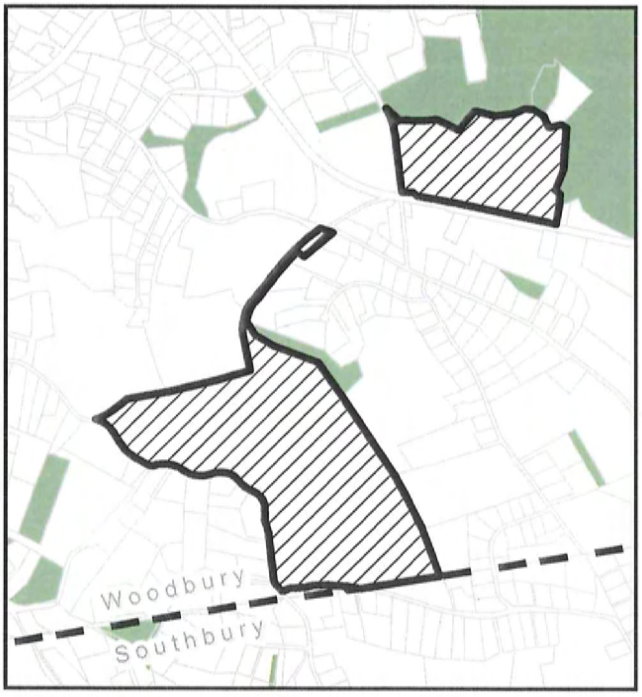
Town of Woodbury POCD: 2009



State POCD: 2005-2010



Draft State POCD: 2013



Preserved Open Space*

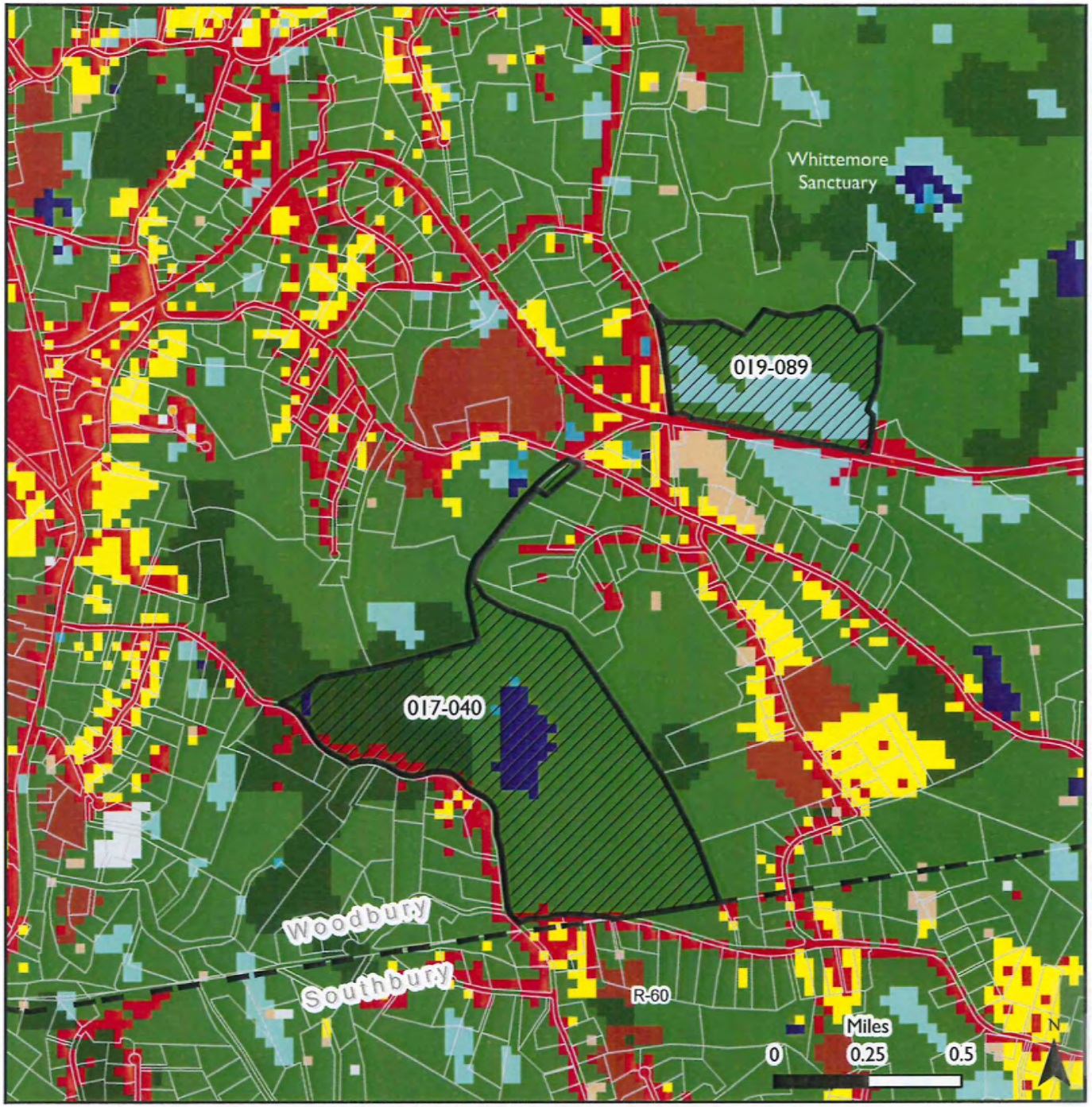
Council of Governments
Central Naugatuck Valley

* Includes conservation restrictions and easments

Figure 5. Land Cover: 2006

Land Use Category
- Agriculture
- Barren Land
- Coniferous Forest
- Deciduous Forest
- Developed
- Forested Wetland
- Non-forested Wetland
- Other Grasses
- Tidal Wetland
- Turf & Grass
- Utility ROWs
- Water

- Aquarion Properties
- Town Boundary
- Parcels



Council of Governments Central Naugatuck Valley

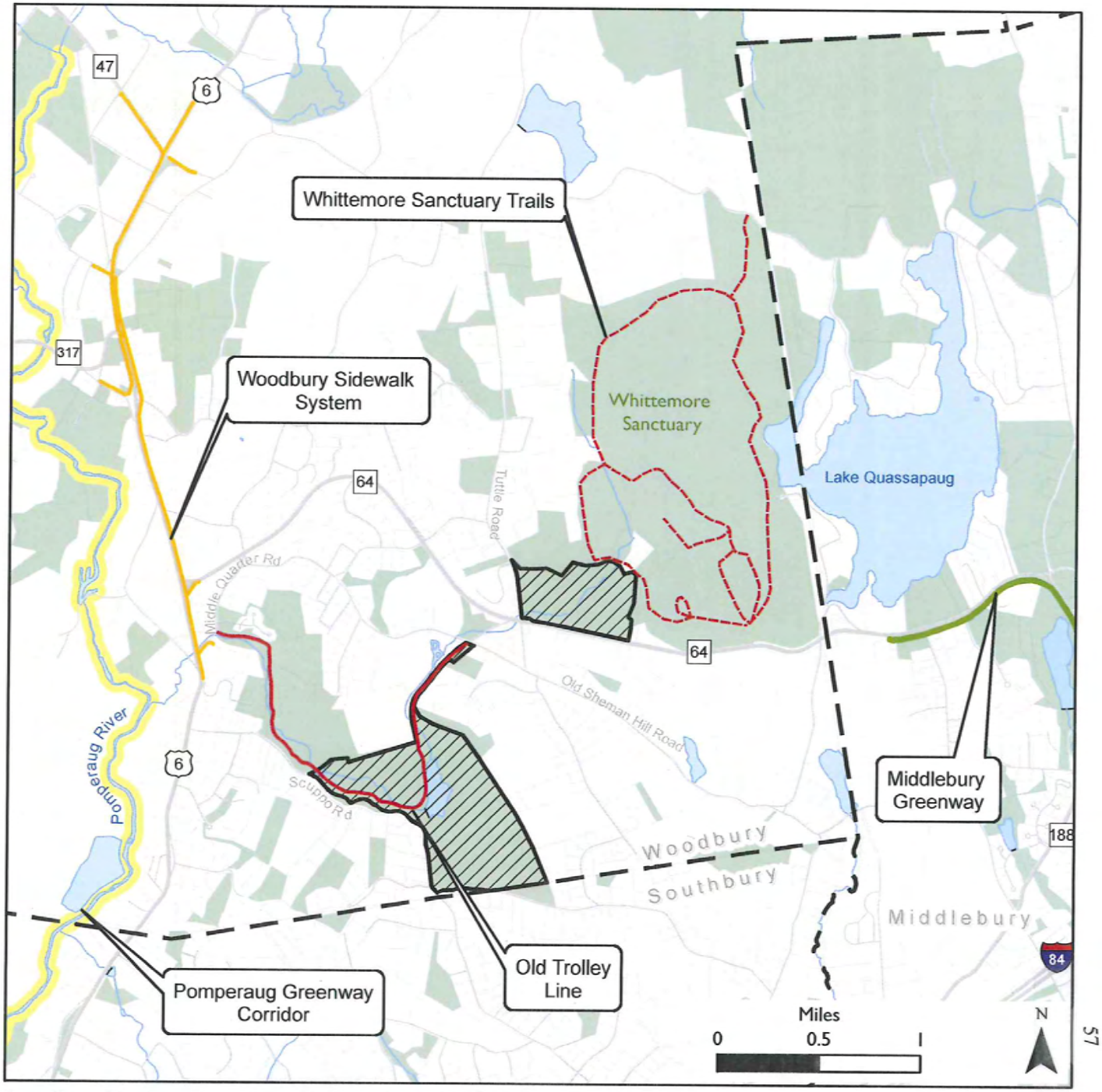
Source: Land Use Category Data - UConn Center for Land Use Education and Research (CLEAR), 2006 Land Cover dataset

Figure 6. Area Trails, Greenways, and Sidewalks

Transportation
- Greenways
- Sidewalks
- Old Trolley Line
- Whittemore Trail System
- Pomperaug Greenway Corridor

Roads
- Local
- Interstate
- State Hwy
- U.S. Hwy

Land Use
- Towns
- Water Company Properties
- Water
- Open Space
- Parcels



Source: Town of Woodbury - Parcels; Town of Southbury - Parcels; COGCNV - Open Space, Transportation; CT DEEP - Roads, Water

Council of Governments Central Naugatuck Valley

Dam Review

Woodbury Reservoir Dam #16803

The dam breached during a storm in 1999 and the water company was given a permit to stabilize the breach in 2001. This work was completed in 2002. The water company also performed minor repairs to the formalized breach in 2012 to stabilize the riprap slope protection. The spillway was lowered in 1999 by 5’ leaving a pond of about 5’ deep. If the remainder of the dam were removed during the 2001 breach formalization process, the pond would drop another 5’. It was felt that there was very little benefit as far as stability and liability when weighed against the environmental harm that would occur by the removal of the open water body. The dam currently has a hazard classification as “Breached”, however, this isn’t quite accurate as a small dam still exists. It is generally thought by DEEP staff that the dam has a minimal downstream hazard at this time. But, this reviewer would not be able to say that the remainder of this dam could be classified as a “negligible” hazard dam without more documentation. There is a small amount of deferred maintenance that could be performed on the dam. Although not mandatory at this stage, if the maintenance work gets done sooner rather than later, it would make it easier to maintain the dam site.

Lower Reservoir Dam #16836

DEEP has very little information about this dam on file. There is no photo, but they know that the dam is 10’ tall and 160’ long. It has a 16’ spillway and a .5 square mile drainage area. There is no hazard classification noted in their files.

Documents associated with the dam repair/maintenance may be found in the Appendix.

Appendix

Soil Series Descriptions

AGAWAM SERIES

The Agawam series consists of very deep, well drained soils formed in sandy, water deposited materials. They are level to steep soils on outwash plains and high stream terraces. Slope ranges from 0 to 15 percent. Saturated hydraulic conductivity is moderately high or high in the upper solum and high or very high in the lower solum and substratum. Mean annual temperature is about 48 degrees F. and mean annual precipitation is about 47 inches.

TYPICAL PEDON: Agawam fine sandy loam in a nearly level cultivated field at an elevation of about 124 feet. (Colors are for moist soil unless otherwise stated.)

RANGE IN CHARACTERISTICS: Solum thickness ranges from 15 to 35 inches. Coarse fragments range from 0 to 10 percent by volume in the surface, 0 to 30 percent in the B and C horizons above a depth of 40 inches and 0 to 60 percent below. The soil ranges from very strongly acid to slightly acid, unless limed.

GEOGRAPHIC SETTING: Agawam soils are level to steep soils on outwash plains and high stream terraces. Most areas are on slopes that are less than 15 percent. Steeper slopes are on terrace escarpments and steep sides of gullies in dissected outwash plains. The soils formed in sandy water deposited material derived principally from schist, granite, gneiss, and phyllite. Mean annual precipitation ranges from 28 to 55 inches and mean annual air temperature from 45 degrees to 50 degrees F. The mean growing season ranges from 120 to 200 days.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Well drained. Runoff and internal drainage are negligible to low. Saturated hydraulic conductivity is moderately high or high in the upper solum and high or very high in the lower solum and substratum.

USE AND VEGETATION: Most areas are used for growing cultivated hay, silage corn, tobacco, potatoes, and truck crops. Some areas are used for growing pasture. Native vegetation is forest composed mainly of white pine, gray birch, red maple, red, white, black, and scarlet oaks.

BRANFORD SERIES

The Branford series consists of very deep, well drained soils formed in loamy over sandy and gravelly outwash. They are nearly level to strongly sloping soils on outwash plains and terraces. Slope ranges from 0 to 15 percent. Saturated hydraulic conductivity is moderately high or high in the solum and high or very high in the substratum. Mean annual temperature is about 50 degrees F., and mean annual precipitation is about 47 inches.

TYPICAL PEDON: Branford silt loam - cultivated field on a 2 percent slope at an elevation of about 80 feet. (Colors are for moist soils unless otherwise noted.)

RANGE IN CHARACTERISTICS: Thickness of the solum ranges from 20 to 40 inches and typically corresponds to the depth of contrasting sand or sand and gravel. Rock fragments, mainly rounded pebbles, range from 0 to 30 percent in the solum and from 10 to 65 percent in

individual layers of the substratum. Unless limed, the soil is very strongly acid to moderately acid throughout.
GEOGRAPHIC SETTING: Branford soils are nearly level to strongly sloping soils on terraces and outwash plains. Slope commonly ranges from 0 to 8 percent but the range includes 0 to 15 percent. The soils formed in loamy over stratified sandy and gravelly glaciofluvial materials derived mainly from red sedimentary rocks and basalt. Mean annual temperature is 45 to 52 degrees F., mean annual precipitation is 38 to 50 inches and the growing season is 140 to 185 days.
DRAINAGE AND PERMEABILITY: Well drained. Surface runoff is negligible to medium. Saturated hydraulic conductivity is moderately high or high in the solum and high or very high in the substratum.
USE AND VEGETATION: Much of the acreage is used for cultivated crops, hay and pasture. Common crops are silage corn, vegetables, tobacco and nursery stock. Some areas are wooded or used for community development. Common trees are white, black and red oak, hickory, gray birch, white pine, hemlock and white ash.

CANTON SERIES

The Canton series consists of very deep, well drained soils formed in a loamy mantle underlain by sandy till derived from parent materials that are very low in iron sulfides. They are on nearly level through very steep glaciated plains, hills, and ridges. Slope ranges from 0 through 35 percent. Saturated hydraulic conductivity is high in the solum and high or very high in the substratum. The mean annual temperature is about 46 degrees F. (10 degrees C.) and the annual precipitation is about 44 inches (1194 millimeters).
TYPICAL PEDON: Canton fine sandy loam, 3 to 8 percent slopes, extremely bouldery in a forested area at an elevation of about 87 meters. (Colors are for moist soil.)
RANGE IN CHARACTERISTICS: Solum thickness commonly ranges from 18 through 36 inches (46 to 91 centimeters), but the range includes through 14 inches (36 centimeters). It corresponds closely to the depth to the sandy till. Rock fragment content consists of 0 through 20 percent gravel and 0 through 5 percent cobbles in the solum. Gravel content is 10 through 30 percent, cobbles 5 through 10 percent, and stones 0 through 10 percent in the substratum. Stones and boulders are 0 through 15 percent of the surface and subsoil. Rock fragments are dominantly granite, gneiss, and quartzite. The soil ranges from extremely acid through moderately acid.
GEOGRAPHIC SETTING: Canton soils are on glaciated upland plains, hills, and ridges. Slope ranges from 0 through 35 percent. The soils developed in a fine sandy loam mantle over acid sandy till of Wisconsin age derived from parent materials that are very low in sulfur, mainly from granite and gneiss and some fine-grained sandstone. The climate is humid temperate. The mean annual air temperature is 45 to 51 degrees F. (7 through 11 degrees C.), and the mean annual precipitation ranges from 42 through 26 inches (1016 through 1295 millimeters).
DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Well drained. Runoff is negligible to medium. Internal drainage is medium. Saturated hydraulic conductivity is high in the solum and high or very high in the substratum.
USE AND VEGETATION: Mostly forested. Some areas have been cleared of surface stones and are used for crops and pasture. Native vegetation is forest composed of eastern white pine, northern red, white, and black oaks, hickory, red maple, sugar maple, gray birch, yellow birch, beech, eastern hemlock, and white ash.

CHARLTON SERIES

The Charlton series consists of very deep, well drained loamy soils formed in till derived from parent materials that are very low in iron sulfides. They are nearly level to very steep soils on till plains and hills. Slope ranges from 0 to 50 percent. Saturated hydraulic conductivity is moderately high or high. Mean annual temperature is about 10 degrees C and mean annual precipitation is about 1194 mm.

TYPICAL PEDON: Charlton fine sandy loam - forested, very stony, at an elevation of about 170 meters. (Colors are for moist soil.)

RANGE IN CHARACTERISTICS: Thickness of the solum ranges from 50 to 97 centimeters. Depth to bedrock is commonly more than 180 centimeters. Rock fragments range from 5 to 35 percent by volume to a depth of 100 centimeters and up to 50 percent below 100 centimeters. Except where the surface layer is stony, the fragments are mostly subrounded gravel and typically make up 60 percent or more of the total rock fragments. Unless limed, reaction ranges from very strongly acid to moderately acid. The ratio of ammonium oxalate extractable iron to dithionite-citrate extractable iron is high, greater than 0.15.

GEOGRAPHIC SETTING: Charlton soils are nearly level to very steep soils on till plains and hills. Slope ranges from 0 to 50 percent. The soils formed in acid till derived from parent materials that are very low in sulfur, mainly from schist, gneiss, or granite. Mean annual temperature ranges from 7 to 11 degrees C and mean annual precipitation commonly ranges from 940 to 1245 centimeters, but the range includes as low as 660 centimeters in some places east of Adirondack Mountains in the Champlain Valley of New York. The growing season ranges from 115 to 185 days.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Well drained. Runoff is negligible to medium. Saturated hydraulic conductivity is moderately high or high in the mineral soil.

USE AND VEGETATION: Areas cleared of stones are used for cultivated crops, specialty crops, hay, and pasture. Many scattered areas are used for community development. Stony areas are mostly wooded. Common trees are northern red, white, and black oak, hickory, sugar maple, red maple, black and gray birch, white ash, beech, white pine, and hemlock.

CATDEN SERIES

The Catden series consists of very deep, very poorly drained soils formed in woody and herbaceous organic materials in depressions on lake plains, outwash plains, moraines, and flood plains. Saturated hydraulic conductivity ranges from moderately low to high. Slope ranges from 0 to 2 percent. The mean annual temperature is about 13 degrees C and the mean annual precipitation is about 1258 mm.

RANGE IN CHARACTERISTICS: The organic material extends to a depth of 51 inches or more. The reaction throughout the pedon ranges from very strongly acid to neutral in 0.01M calcium chloride. The pH value is 4.5 or more (in 0.01M calcium chloride) in one or more layers of organic soil materials within the control section. Woody fragments occur throughout the

profile in most pedons consisting of twigs, branches, logs or stumps, and range from 0 to 30 percent by volume in the control section. Fragments range in size from 2 cm to more than a 30 cm diameter.

GEOGRAPHIC SETTING: Catden soils are in depressions on lake plains, outwash plains, moraines, and flood plains. These soils formed in woody and herbaceous organic materials. Slope ranges from 0 to 2 percent. Mean annual temperature is 7 to 10 degrees C. The mean annual precipitation commonly is 1190 to 1270 mm but the range includes as low as 660 mm in some places east of Adirondack Mountains in the Champlain Valley of New York. The frost-free period is 120 to 180 days.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Very poorly drained. Depth to the seasonal high water table ranges from 30 cm above the surface to 30 cm below the surface from September to June. Surface runoff is very low or negligible. Saturated hydraulic conductivity ranges from moderately low to high. Some areas are subject to rare, very brief flooding during March and April.

USE AND VEGETATION: Most areas are used for wildlife, or are in woodland or cutover woodland. Some of these soils are used for pasture. Common vegetation is red maple, skunk cabbage, marsh fern, and sphagnum moss.

FREETOWN SERIES

The Freetown series consists of very deep, very poorly drained organic soils formed in more than 130 centimeters of highly decomposed organic material. They are in depressions or on level areas on uplands and outwash plains. Slope ranges from 0 to 2 percent. Saturated hydraulic conductivity is moderately high or high. The mean annual temperature is about 9 degrees Celsius and mean annual precipitation is about 1143 millimeters.

RANGE IN CHARACTERISTICS: The organic material extends to a depth of 130 centimeters or deeper. Cumulative layer of hemic materials comprise less than 25 centimeters and fibric materials less than 12 centimeters of the subsurface and bottom tiers. Woody fragments are in some part of the profile or throughout the profile in most pedons and comprise up to 25 percent of some horizons. Fragments consist of twigs, branches, logs, or stumps and are 1 centimeter to more than a 30 centimeters in diameter. Wood fragments are firm but break abruptly under pressure. Reaction is less than 4.5 in 0.01 molar calcium chloride throughout the control section.

GEOGRAPHIC SETTING: Freetown soils are in bogs that range from small enclosed depressions to bogs of several hundred acres in size. These bogs are on lake plains, outwash plains, till plains and moraines. Slope ranges from 0 to 2 percent. Mean annual temperature is 7 to 10 degrees Celsius. Mean annual precipitation is 1016 to 1270 millimeters. The frost-free period is 120 to 180 days.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Very poorly drained. Saturated hydraulic conductivity is moderately high or high.

USE AND VEGETATION: Mostly forested. Native vegetation includes red maple, American elm, green ash, eastern hemlock, Atlantic white cedar, buttonbush, winterberry, swamp azaleas, and leatherleaf. Some acreage has been cleared and is used for truck crops. The main crop is cranberries.

HINCKLEY SERIES

The Hinckley series consists of very deep, excessively drained soils formed in glaciofluvial materials. They are nearly level through very steep soils on terraces, outwash plains, deltas, kames, and eskers. Saturated hydraulic conductivity is high or very high. Slope ranges from 0 through 60 percent. Mean annual temperature is about 45 degrees F. (7 degrees C.) and mean annual precipitation is about 45 inches (1143 millimeters).

TYPICAL PEDON: Hinckley loamy sand in woodland at an elevation of about 785 feet. (All colors are for moist soil.)

RANGE IN CHARACTERISTICS: Solum thickness ranges from 12 through 34 inches (30 through 87 centimeters). Rock fragment content of the solum ranges from 5 through 50 percent gravel, 0 through 30 percent cobbles, and 0 through 3 percent stones. Rock fragment content of individual horizons of the substratum ranges from 10 through 55 percent gravel, 5 through 25 percent cobbles, and 0 through 5 percent stones. In some places gravel content throughout the soil ranges up through 75 percent. The soil ranges from extremely acid through moderately acid, except where limed.

GEOGRAPHIC SETTING: Hinckley soils are nearly level through very steep soils on terraces, outwash plains, deltas, kames, and eskers. Slope is generally 0 through 8 percent on tops of the terraces, outwash plains and deltas. Slope of 8 through 60 percent or more are on the kames, eskers and margins of the outwash plains, deltas, and terraces. The soils formed in glaciofluvial sand and gravel derived principally from granite, gneiss, and schist. Mean annual temperature ranges from 45 through 55 degrees F. (7 through 13 degrees C.) and mean annual rainfall ranges from 40 through 50 inches (1016 through 1270 millimeters). Length of the growing season ranges from 140 through 240 days.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Excessively drained. Surface runoff is negligible through low. Saturated hydraulic conductivity is high or very high.

USE AND VEGETATION: Cleared areas are used for hay, pasture, and silage corn. In the southern Connecticut River Valley, Hinckley soils are used for growing tobacco and truck crops and in eastern Massachusetts, truck crops. Most areas are forested, brush land or used as urban land. Northern red, black, white, scarlet and scrub oak, eastern white and pitch pine, eastern hemlock, and gray birch are the common trees. Unimproved pasture and idle land support hardhack, little bluestem, bracken fern, sweet fern, and low bush blueberry.

HOLLIS SERIES

The Hollis series consists of well drained and somewhat excessively drained soils formed in a thin mantle of till derived mainly from parent materials that are very low in iron sulfides such as gneiss, schist, and granite. They are shallow to bedrock. They are nearly level through very steep upland soils on bedrock-controlled hills and ridges. Slope ranges from 0 through 60 percent. Saturated hydraulic conductivity is moderately high or high. Depth to hard bedrock ranges from 25 to 50 cm. Mean annual temperature is about 9 degrees C, and mean annual precipitation is about 1270 mm.

TYPICAL PEDON: Hollis gravelly fine sandy loam, 3 to 15 percent slopes, forested.
RANGE IN CHARACTERISTICS: Thickness of the solum and depth to bedrock range from 25 to 50 cm. Rock fragments commonly range from 5 through 35 percent by volume, but some pedons have less than 5 percent rock fragments. The fragments are mostly subrounded gravel, except where the surface is stony. The soil has 20 percent or more silt in the particle-size control section. Unless limed, reaction ranges from extremely acid through moderately acid in the organic horizons and very strongly acid through moderately acid in the mineral horizons.

GEOGRAPHIC SETTING: Hollis soils are nearly level through very steep soils on bedrock controlled hills, modified by glacial processes. Slope ranges from 0 to 60 percent. The soils formed in a thin mantle of till derived from local bedrock of schist, granite, and gneiss that is very low in sulfur. Mean annual temperature ranges from 7 to 12 degrees C and mean annual precipitation ranges from 940 to 1295 mm, but the range includes as low as 660 mm in some places east of Adirondack Mountains in the Champlain Valley of New York. The growing season ranges from 115 through 185 days.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Well drained and somewhat excessively drained. Surface runoff is negligible to very high. Saturated hydraulic conductivity is moderately high or high.

USE AND VEGETATION: Mostly forested. Small areas with few rock outcrops are cleared of stones and used for cultivated crops, but most cleared areas are in hay or pasture. Scattered areas are used for community development. Common trees are northern red, white, black, and chestnut oak, hickory, eastern white pine, eastern hemlock, and gray and black birch.

MERRIMAC SERIES

The Merrimac series consists of very deep, somewhat excessively drained soils formed in outwash. They are nearly level through very steep soils on outwash terraces and plains and other glaciofluvial landforms. Slope ranges from 0 through 35 percent. Saturated hydraulic conductivity is high or very high. Mean annual temperature is about 48 degrees F. (9 degrees C.) and mean annual precipitation is about 42 inches (1067 millimeters).

TYPICAL PEDON: Merrimac fine sandy loam cultivated, at an elevation of about 122 meters. (Colors are for moist soil.)

RANGE IN CHARACTERISTICS: Solum thickness ranges from 18 through 36 inches (46 through 91 centimeters). Rock fragments are commonly granite or gneiss or schist but up to 25 percent are flat, fine-grained slate, shale, or phyllite fragments. The upper part of the solum commonly has 2 through 20 percent gravel, but includes cobbles in some pedons, and the lower part 5 through 30 percent. The substratum contains 2 through 55 percent gravel and 5 through 15 percent cobbles. Total volume of rock fragments in the particle-size control section is less than 35 percent. Clay content is less than 18 percent. Reaction ranges from extremely acid through moderately acid, unless limed.

GEOGRAPHIC SETTING: Merrimac soils are level to very steep soils on outwash plains and valley trains, and associated kames, eskers, stream terraces and water deposited parts of moraines. The steeper slopes are on the margin escarpments of terraces and plains, and on eskers and kames. Slope ranges from 0 through 35 percent. The soils formed in water sorted gravelly and sandy material derived mainly from granitic, gneissic, and some schistose rocks. Mean annual precipitation ranges from 28 through 55 inches (711 through 1397 millimeters); mean annual air temperature ranges from 45 through 50 degrees F. (7 through 10 degrees C.), mean growing season ranges from 120 through 200 days.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Somewhat excessively drained. Runoff is negligible through medium. Saturated hydraulic conductivity is high or very high.

USE AND VEGETATION: Most areas are cultivated and used for growing hay, pasture, silage, corn, or truck crops. Some areas are used to grow tobacco in the Connecticut River Valley in Massachusetts and Connecticut. Some areas are forested with mostly white pine, gray birch, hemlock, red maple, and red, black, white, and scarlet oaks.

NINIGRET SERIES

The Ninigret series consists of very deep, moderately well drained soils formed in loamy over sandy and gravelly glacial outwash. They are nearly level to strongly sloping soils on glaciofluvial landforms, typically in slight depressions and broad drainage ways. Slope ranges from 0 through 15 percent. Saturated hydraulic conductivity is moderately high or high in the solum and high or very high in the substratum. Mean annual temperature is about 49 degrees F. and mean annual precipitation is about 48 inches.

TAXONOMIC CLASS: Coarse-loamy over sandy or sandy-skeletal, mixed, active, mesic Aquic Dystrudepts

TYPICAL PEDON: Ninigret fine sandy loam - idle field, 2 percent slope. (Colors are for moist soil unless otherwise noted.)

RANGE IN CHARACTERISTICS: Thickness of the solum ranges from 18 through 38 inches and typically corresponds to the depth of sand or sand and gravel. Rock fragments, mainly rounded pebbles, range from 0 to 15 percent by volume in the solum, from 0 to 30 percent in the substratum above a depth of 40 inches, and from 0 to 60 percent below. Unless limed, the soil is very strongly acid through moderately acid to a depth of 30 inches and very strongly acid through slightly acid below 30 inches.

GEOGRAPHIC SETTING: Ninigret soils are nearly level to strongly sloping soils on glaciofluvial landforms. Slopes range from 0 through 15 percent, but commonly are 0 through 8 percent. The soils formed in loamy over stratified sandy and gravelly glacial outwash derived from a variety of acid rocks. Mean annual temperature ranges from 45 through 52 degrees F., mean annual precipitation ranges from 35 through 50 inches, and the growing season ranges from 120 through 195 days.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Moderately will drained. Surface runoff is negligible to medium. Saturated hydraulic conductivity is moderately high or high in the solum and high or very high in the substratum. The soil has a seasonal high water table.

USE AND VEGETATION: Much of the acreage is used for cultivated crops, hay, or pasture. Common crops are silage corn, vegetables, tobacco, and nursery stock. Some areas are idle, wooded, or used for community development. Common trees are red, white and black oak, red maple, sugar maple, white pine, gray birch, white ash, and hemlock.

PAXTON SERIES

The Paxton series consists of well drained loamy soils formed in lodgement till. The soils are very deep to bedrock and moderately deep to a densic contact. They are nearly level to steep soils on till plains, hills, and drumlins. Slope ranges from 0 to 45 percent. Saturated hydraulic conductivity is moderately high or high in the surface layer and subsoil and low to moderately high in the substratum. Mean annual temperature is about 10 degrees C., and mean annual precipitation is about 1194 millimeters.

TAXONOMIC CLASS: Coarse-loamy, mixed, active, mesic Oxyaquic Dystrudepts

TYPICAL PEDON: Paxton fine sandy loam - in a brushy field at an elevation of about 850 feet. (Colors are for moist soil unless otherwise noted.)

RANGE IN CHARACTERISTICS: Thickness of the mineral solum commonly ranges from 50 to 100 centimeters. The depth to the densic contact and material is commonly 50 to 100 centimeters, but the range includes 46 to 100 centimeters. Depth to bedrock is commonly more than 1.5 meters. Rock fragments range from 5 through 35 percent by volume in the mineral soil. Except where the surface is stony, the fragments are mostly subrounded gravel and typically make up 60 percent or more of the total rock fragments. Unless limed, reaction ranges from very strongly acid through moderately acid in the mineral soil.

GEOGRAPHIC SETTING: Paxton soils are nearly level to steep and are on till plains, hills, and drumlins. Slope commonly is 0 through 35 percent, but range from 0 through 45 percent in some pedons. The soils formed in acid lodgement till derived mostly from schist, gneiss, and granite. Mean annual temperature ranges from 7 to 11 degrees C., mean annual precipitation ranges from 940 to 1245 millimeters, and the growing season ranges from 115 through 180 days.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Well drained. Surface runoff is negligible to high. Saturated hydraulic conductivity is moderately high or high in the mineral solum and low through moderately high in the substratum.

USE AND VEGETATION: Many areas are cleared and used for cultivated crops, hay, or pasture. Scattered areas are used for community development. Some areas are wooded. Common trees are red, white, and black oak, hickory, sugar maple, red maple, gray and black birch, eastern white pine, and eastern hemlock.

MONTAUK SERIES

The Montauk series consists of well drained soils formed in lodgement or flow till derived primarily from granitic materials. The soils are very deep to bedrock and moderately deep to a densic contact. These soils are on upland till plains and moraines. Slope ranges from 0 through 35 percent. Saturated hydraulic conductivity is moderately high or high in the mineral solum and low through moderately high in the substratum. Mean annual temperature is about 9 degrees C, and mean annual precipitation is about 1143 mm.

TAXONOMIC CLASS: Coarse-loamy, mixed, subactive, mesic Oxyaquic Dystrudepts

TYPICAL PEDON: Montauk sandy loam on a 5 percent slope in a forested area. (Colors are for moist soil unless otherwise noted.)

RANGE IN CHARACTERISTICS: Thickness of the solum and depth to the dense substratum typically ranges from 50 to 97 cm, but the range currently includes 45 to 97 cm. Rock fragments range from 3 to 35 percent in the solum and 5 to 50 percent in the C horizon. The soil ranges from extremely acid to moderately acid.

GEOGRAPHIC SETTING: Montauk soils are on glaciated uplands and moraines. Slopes range from 0 to 35 percent. The landscape in some areas has many closed depressions, some of which are filled by perennial ponds or wet spots. The soils formed in thick moderately coarse or medium textured till mantles underlain by firm sandy till. Some areas have very stony or extremely stony surfaces. The climate is humid and cool temperate. Mean annual precipitation ranges from 889 to 1422 mm, mean annual temperature ranges from 8 to 11 degrees C, and the mean annual frost-free period ranges from 120 to 200 days. Elevation ranges from 3 to 122 meters above sea level.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Well drained. Runoff is low to high. Saturated hydraulic conductivity is moderately high or high in the solum and low through moderately high in the substratum.

USE AND VEGETATION: Many of the nearly level and gently sloping areas are cleared and used for production of potatoes and vegetable crops, hay, silage corn and pasture. Steeper and uneven areas are largely forested. Woodland contains northern red oak, white oak, and occasionally yellow poplar, eastern white pine, red pine, sugar maple, beech, and birch.

SUTTON SERIES

The Sutton series consists of very deep, moderately well drained loamy soils formed in till. They are nearly level to strongly sloping soils on plains, low ridges, and hills, typically on lower slopes and in slight depressions. Slope ranges from 0 to 15 percent. Saturated hydraulic conductivity is moderately high or high throughout. Mean annual temperature is about 10 degrees Celsius and mean annual precipitation is about 1194 millimeters.

TAXONOMIC CLASS: Coarse-loamy, mixed, active, mesic Aquic Dystrudepts

TYPICAL PEDON: Sutton fine sandy loam, extremely stony - forested, with a one inch layer of undecomposed litter on surface at an elevation of about 250 meters. (Colors are for moist soil.)

RANGE IN CHARACTERISTICS: Thickness of the solum ranges from 50 to 100 centimeters. Depth to bedrock is commonly more than 2 meters. Rock fragments range from 5 to 35 percent by volume to a depth of 100 centimeters and up to 50 percent below 100 centimeters. Except where the surface is stony, the fragments are mostly subrounded gravel and typically make up 60 percent or more of the total rock fragments. Unless limed, reaction ranges from very strongly acid to moderately acid.

GEOGRAPHIC SETTING: Sutton soils are nearly level to strongly sloping soils typically on lower slopes or in slightly depressed areas on glaciated hills. Slope ranges from 0 to 15 percent. The soils formed in acid till derived mainly from schist, gneiss, and granite. Mean annual temperature ranges from7 to 11 degrees Celsius mean annual precipitation ranges from 940 to 1250 millimeters. The growing season ranges from 115 to 185 days.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Moderately well drained. Surface runoff is slow to medium. Saturated hydraulic conductivity ranges from moderately high or high throughout.

USE AND VEGETATION: Cleared areas are used for cultivated crops, hay, or pasture. Scattered areas are used for community development. Some areas are wooded. Common trees are red oak, white oak, black oak, hickory, ash, red maple, gray birch, hemlock, and white pine.

SCARBORO SERIES

The Scarboro series consists of very deep, very poorly drained soils in sandy glaciofluvial deposits on outwash plains, deltas, and terraces. They are nearly level soils in depressions. Slope ranges from 0 through 3 percent. Saturated hydraulic conductivity is high or very high. Mean annual temperature is about 49 degrees F. (9 degrees C.) and the mean annual precipitation is about 44 inches (1118 millimeters).

TYPICAL PEDON: Scarboro mucky fine sandy loam woodland; in an area of Scarboro mucky fine sandy loam at an elevation of about 212 meters. (Colors are for moist soil.)

RANGE IN CHARACTERISTICS: Stones range from 0 through 5 percent by volume in the A horizon and upper part of the C horizon and are absent in the lower part of the C horizon. Cobbles range from 0 through 10 percent in the A horizon, 0 through 5 percent in the upper part of the C horizon, and are absent in the lower part of the C horizon. Gravel ranges from 0 through

10 percent by volume in the A horizon, 0 through 20 percent in the upper part of the C horizon to a depth of 30 inches (76 centimeters), and 0 through 50 percent in the C horizon below a depth of 30 inches (76 centimeters). Reaction ranges from very strongly acid through moderately acid in the A horizon and upper part of the C horizon, and from very strongly acid through neutral in the lower part of the C horizon.
GEOGRAPHIC SETTING: Scarboro soils are in level or nearly level depressions on outwash plains, deltas, and terraces. Slope is less than 3 percent. The soils formed in sandy glaciofluvial deposits. Mean annual temperature ranges from 46 through 57 degrees F. (8 through 14 degrees C.) and mean annual precipitation ranges from 38 through 55 inches (965 through 1397 millimeters).
DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Very poorly drained. Saturated hydraulic conductivity is high or very high. Surface runoff is high or very high. The water table is at or near the surface for 6 to 12 months of the year, and many areas are ponded for short periods.
USE AND VEGETATION: Shrub and brush land or woodland. Common shrubs are speckled alder, smooth alder, rhoda azalea, steeplebush spirea, leatherleaf, labrador-tea, winterberry, highbush blueberry, large cranberry, black huckleberry, poison sumac, and sheep laurel. Common trees are red maple, slippery elm, Atlantic white cedar, tamarack, eastern white pine, willow, and gray birch.

RIDGEBURY SERIES

The Ridgebury series consists of very deep, somewhat poorly and poorly drained soils formed in till derived mainly from granite, gneiss and schist. They are commonly shallow to a densic contact. They are nearly level to gently sloping soils in low areas in uplands. Slope ranges from 0 to 15 percent. Saturated hydraulic conductivity ranges from moderately low to high in the solum and very low to moderately low in the substratum. Mean annual temperature is about 49 degrees F. and the mean annual precipitation is about 45 inches.
TAXONOMIC CLASS: Loamy, mixed, active, acid, mesic, shallow Aeric Endoaquepts
TYPICAL PEDON: Ridgebury sandy loam - on a 3 to 8 percent slope in an extremely stony wooded area at an elevation of about 1095 feet. (Colors are for moist soil.)
RANGE IN CHARACTERISTICS: Depth to the dense till commonly is 14 to 19 inches. The A horizon has 5 to 25 percent gravel, 0 to 10 percent cobbles, and 0 to 25 percent stones by volume. The B and C horizons have 5 to 25 percent gravel, 0 to 5 percent cobbles and 0 to 5 percent stones. Rock fragments within the soil range from 5 to 35 percent by volume and are subangular fragments. The unlimed soil ranges from very strongly acid through moderately acid but some horizon within a depth of 40 inches is moderately acid.
GEOGRAPHIC SETTING: The nearly level to gently sloping Ridgebury soils are in slightly concave areas and shallow drainageways of till uplands. Slope ranges from 0 to 15 percent. The soils formed in loamy till derived mainly from granite, gneiss and schist. Mean annual air temperature ranges from 45 to 52 degrees F. and mean annual precipitation ranges from 40 to 50 inches. Mean growing season ranges from l00 to l95 days.
DRAINAGE AND PERMEABILITY: Commonly poorly drained but the range includes the wetter part of somewhat poorly drained. Runoff is negligible to medium. Saturated hydraulic conductivity ranges from moderately low to high in the solum and very low to moderately low in the substratum. A perched, fluctuating water table above the dense till saturates the solum to or near the surface for 7 to 9 months of the year.

USE AND VEGETATION: Largely forested to gray birch, yellow birch, red maple, hemlock, elm, spruce and balsam fir. Cleared areas are used mainly for hay and pasture.

ROALD HAESTAD, INC.
Consulting Engineers

37 Brookside Road, Waterbury, Connecticut 06708
Telephone: (203) 753-9800 FAX: (203) 575-9249
Website: www.rhiengineering.com

ROALD HAESTAD, P.E., F-ASCE, DEE
RONALD G. LITKE, P.E., M-ASCE
DONALD L. SMITH, P.E., F-ASCE
SALVATORE LONGO, P.E., M-ASCE
WILLIAM S. ANDRES, P.E.-L.S., M-ASCE, CALS
DAVID J. LOMBARDO, P.E., M-ASCE
MICHAEL K. WILSON, P.E.

February 13, 2012

DEEP/Bureau of Water Management
Inland Water Resources Division
79 Elm Street
Hartford, CT 06106

Attention: Arthur P. Christian II
Supervising Civil Engineer
Dam Safety Section

Re: Woodbury Reservoir Dam

Gentlemen:

This letter is a follow-up to the January 25, 2012 letter from Paula L. McEvoy of United Water. Woodbury Reservoir Dam was partially breached in 1999 and the breach was stabilized with riprap in 2002 under Dam Construction Permit No. DS-00-04. The dam was inspected on January 27, 2012 by Steven Houst and Neal DeDominicis of United Water and William Andres of Roald Haestad, Inc. Some of the riprap from the side slopes of the breach channel has been removed and placed at the upstream entrance to the breach channel. Some erosion has occurred on the side slopes and on the downstream embankment, see the attached photos. The enclosed plans show the proposed work to restore and restabilize the breach channel by removing riprap placed in the entrance to the breach channel, re-grading the side slopes, and replacing the riprap on the side slopes. A large tree that has fallen across the channel downstream of the dam will be removed. United Water would like to perform this work as soon as possible.

It is our understanding the proposed work is maintenance and a dam construction permit is not required. Please confirm that a permit is not required for the proposed work.

Very truly yours,

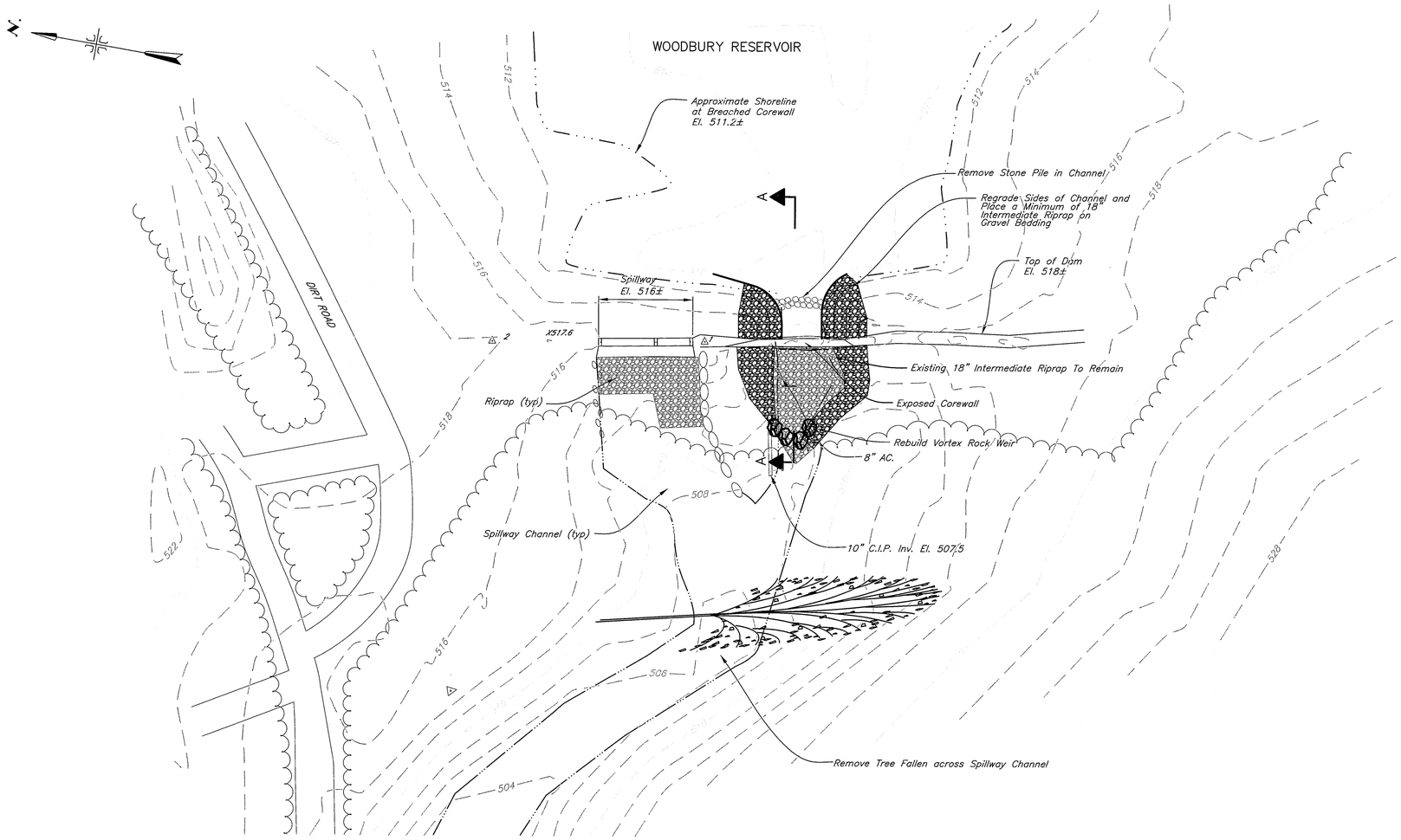
ROALD HAESTAD, INC.

By _____
William S. Andres, P.E./L.S.
Senior Project Engineer

WSA/jnc
encl.
cc: P. McEvoy, UW (w/encl.)
N. DeDominicis, UWC (w/encl.)
S. Houst, UWC (w/encl.)
G. Remsen, UWNY (w/encl.)
File 262-004 (w/encl.)

An Equal Opportunity Employer

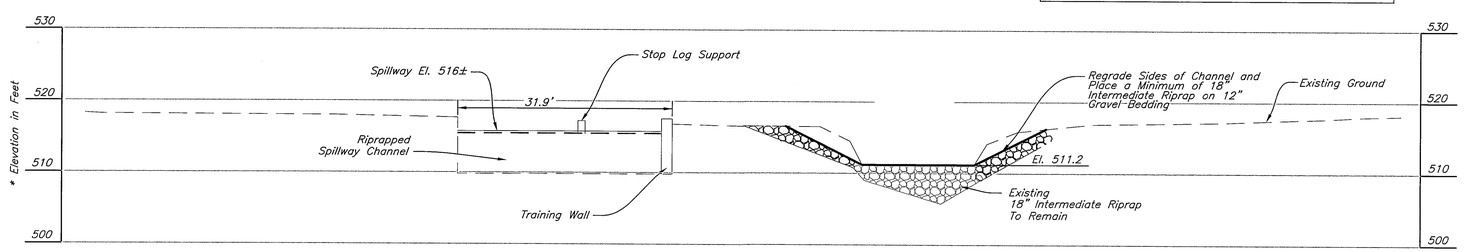
UNITED WATER CONNECTICUT
WOODBURY RESERVOIR DAM
WOODBURY, CT



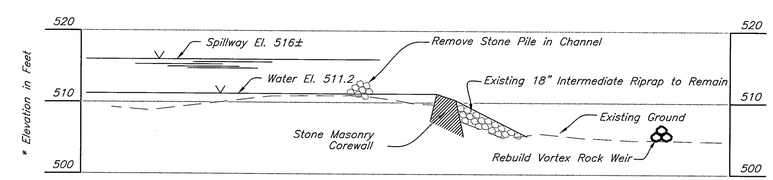
PLAN
SCALE: 1" = 20'

NOTES:

1. Riprap Placed in Streambed to be Compacted and Filled with Gravel Bedding.
2. Riprap Placed on Slopes Shall be Covered with 6" Topsoil and Seeded to Within 2 Feet of Water Level.



ELEVATION
SCALE: 1" = 10'



SECTION A–A
SCALE: 1" = 10' HORIZ. AND VERT.

Sediment and Erosion Controls

The Contractor shall furnish, install, maintain and remove sediment and erosion controls as shown, and any additional controls ordered by the Owner or the Engineer, that may be required to meet field conditions. Sediment and erosion controls shall be in accordance with the Publication entitled "2002 Connecticut Guidelines for Soil Erosion and Sediment Control" by the Connecticut Council on Soil and Water Conservation. Provisions shall be made so that water which flows from disturbed areas does not contain sediments. Provisions shall include, but not be limited to, silt fences around stockpiled material, and sediment barriers downstream of all areas under construction. All sedimentation and erosion controls shall be maintained until permanent vegetation or erosion controls are established, at which time they shall be removed by approved methods.

Gravel Bedding

Gravel bedding shall consist of clean gravel conforming to Sections M.02.03 and M.02.06 of the State Standard Specification Form 816, Grading "B" or clean crushed stone from 1/2" to 2-1/2" suitable to form a solid base without excess of voids.

Intermediate Riprap

Materials for riprap shall be dark gray, hard, durable stone of proper size to form a compact, solid blanket to protect the slope and prevent erosion. The rock shall be obtained from an approved source and shall be angular, dense, and sound rock, resistant to abrasion and able to resist long exposure to weathering.

Riprap shall meet the following gradation:

Stone Size	Percentage of the Mass
18" or over	0
10" - 18"	30 - 50
6" - 10"	30 - 50
4" - 6"	20 - 30
2" - 4"	10 - 20
Less than 2"	0 - 10

The gravel bedding on which riprap is to be placed shall be brought to subgrade and thoroughly compacted prior to placing riprap.

Care shall be taken in placing riprap to obtain a good gradation of materials so that the riprap will be firm and solid. Surfaces shall be leveled to the required alignment and slope by hand placing so as to fill large voids and to make the surfaces even. Riprap shall be placed to a thickness of 18".

Topsoiling

The Contractor shall use topsoil from stripping operations and additional topsoil from outside sources. On all areas disturbed by construction, the Contractor shall grow an approved stand of grass. The Contractor shall be responsible for the satisfactory growth of grass.

Topsoil shall be free of rocks, roots, clumps of sod and other debris, but does not have to be screened.

Surfaces which are to be topsoiled shall be properly graded and prepared prior to placement of the topsoil. Topsoil shall be placed to a minimum compacted thickness of 6" unless otherwise shown. The topsoil shall be lightly compacted by roller, and shall be raked to provide an even, smooth surface at the required slopes and grades immediately before seeding.

Seeding

Grass seed shall be of the previous year's crop. It shall meet current standards of the Association of Official Seed Analysts. The seed mix shall contain the following:

Kind of Seed	Percent by Weight
Chewings Fescue	35
Hard Fescue	30
Colonial Bentgrass	5
Birdsfoot Trefoil	10
Perennial Ryegrass	20

Seed shall be delivered to the site in unopened containers with manufacturer's label attached.

The work shall include the preparation of the topsoil, application of seed, lime, mulching, watering, and all other operations necessary to provide a satisfactory growth of grass.

Maintenance of grassed areas shall begin immediately following seeding. Seeded areas shall be protected by watering, and replanting, as necessary to obtain an acceptable sod, composed of the grasses specified. The Contractor may use water from the reservoir for watering the grass.

* Elevations Shown refer to NGVD of 1929

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ROALD HAESTAD, INC.
CONSULTING ENGINEERS
WATERBURY, CONNECTICUT

DESIGNED DRAWN CHECKED
REVISED

UNITED WATER
WOODBURY RESERVOIR DAM
WOODBURY, CONNECTICUT

CHANNEL MAINTENANCE
PLAN, SECTION AND ELEVATION
SCALES AS NOTED

DATE: FEBRUARY 2012
SHEET NO. 1 OF 1
DWG. NO. 262–004–01.0

CAD FILE ID "20PLATE"

CT DEEP DAM SAFETY REPORT TO FILE

Issued By: Peter Spangenberg

Issue Date: 2-27-2012

Memo to File of **2/27/2012**

CT Dam#: **16803** WOODBURY RESERVOIR DAM

Hazard Class: **BRE** WOODBURY

Staff : Peter Spangenberg Other Party: File

Notes Instructions:

I have reviewed the plans submitted by Haestad regarding the maintenance work at Woodbury Reservoir. From conversations with Bill Andres at Haestad he reports that the sides of the breach channel were eroded when some riprap was removed from the channel and placed to form a weir across the entrance to the channel causing an elevated pond level. The erosion occurred during the tropical storms of last August and September. The proposed construction is described by plans prepared by Haestad, entitled "United Water Company, Woodbury Reservoir Dam, Woodbury, Connecticut, Channel Maintenance, Plan, Section, and Elevation" and is dated February 2012.

I recommend that a DEEP dam repair permit should not be required as the proposed work is considered maintenance. This dam was breached under permit in 2002 and this happened because the breach channel was tampered with by trespassers. It is recommended that a schedule for regular inspections be implemented to ensure that they can discover any modifications to the channel by vandals and be able to correct the condition before it causes more damage.

Connecticut Department of

ENERGY &
ENVIRONMENTAL
PROTECTION

March 5, 2012

William S. Andres
Roald Haestad, Inc.
Waterbury, CT 06708

Re: Woodbury Reservoir Dam, Woodbury
Owner: United Water Connecticut
Dam ID#: 16803 Hazard Class: Breached
Permit Need Determination 2012-01

Dear Mr. Andres:

The Department of Energy and Environmental Protection (DEEP) Dam Safety Program has reviewed the February 13, 2012 letter proposal and plan sheet for the maintenance of the riprap within the breach channel and downstream slope of the dam at Woodbury Reservoir. It us our understanding that sides of the breach channel were eroded when trespassers removed some riprap from the channel and placed it to form a weir across the entrance to the channel causing an elevated pond level. The erosive flows occurred during the tropical storms of last August and September. The proposed construction is described on the plan prepared by Roald Haestad, Inc. entitled "United Water Company, Woodbury Reservoir Dam, Woodbury, Connecticut, Channel Maintenance, Plan, Section, and Elevation" and is dated February 2012.

Based on the information provided, it has been determined a DEEP dam repair permit pursuant to Connecticut General Statutes (CGS) Sections 22a-403 is not required as the proposed work is considered maintenance. It is recommended that a schedule for regular inspections be implemented to ensure that the breach channel remains intact and the dam remains breached. This would allow you to detect vandalism at the dam and correct the condition before it causes more damage. Once the work has been completed, please submit a letter report describing the maintenance work performed.

Please be advised a municipal inland wetlands permit may be required for this work and the local agency should be contacted for such a determination. In addition, U.S. Army Corps of Engineers permit(s) may be required for the activities proposed and you should contact them (if you have not already done so), regarding their jurisdiction at 978-318-8879 or write to them at the New England District Regulatory Branch, 696 Virginia Road, Concord, MA 01742-2751.

Roald Haestad, Inc.
Woodbury Reservoir Dam #16303
February 27, 2012

Should you have any questions regarding this matter please direct them to Arthur Christian of the IWRD's Dam Safety Section at 860-424-3880.

Sincerely,

Denise Ruzicka, Director
Inland Water Resources Division.

DR:PLS:apc

cc: Paula McEvoy, United Water Connecticut, 110 Kent Road, New Milford, CT 06776
Woodbury Inland Wetlands Commission
US ACOE Regulatory

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, soil scientists, foresters, climatologists and landscape architects, recreational 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 - an 83 town area serving western Connecticut. (www.kingsmark.org)

As a public service activity, the Team is available to serve towns within the King's Mark RC&D Area - *free of charge.*

Purpose of the Environmental Review Team

The Environmental Review Team is available to assist towns in the review of sites proposed for major land use activities or natural resource inventories for critical areas. For example, the ERT has been involved in the review of a wide range of significant land use 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 site and highlighting opportunities and limitations for the proposed land use.

Requesting an Environmental Review

Environmental reviews may be requested by the chief elected official of a municipality or the chairman of an administrative agency such as planning and zoning, conservation or inland wetlands. Environmental Review Request Forms are available at your local Conservation District and through the King's Mark ERT Coordinator. This request form 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 the purposes of a review and a statement identifying the specific areas of concern the Team members should investigate. When this request is reviewed by the local Conservation District and approved by the King's Mark RC&D Executive Council, the Team will undertake the review. At present, the ERT can undertake approximately two reviews per month depending on scheduling and Team member availability.

For additional information regarding the Environmental Review Team, please contact the King's Mark ERT Coordinator, Connecticut Environmental Review Team, P.O. Box 70, Haddam, CT 06438. The telephone number is 860-345-3977, connecticutert@aol.com, www.cterg.org.