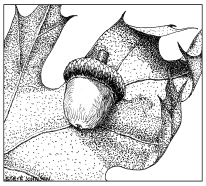
FOREST MANAGEMENT PLAN

Submitted to: Massachusetts Department of Conservation and Recreation
For enrollment in CH61/61A/61B and/or Forest Stewardship Program



CHECK-OFFS					*Administrative Box*			
CH61	CH61A	CH61B	STWSHP	C-S	Case No.		Orig. Case No.	
cert. ☐	cert. ☐	cert. ☐	new ☒	EEA ☐	Owner ID		Add. Case No.	
recert. ☐	recert. ☐	recert. ☐	renew ☐	Other ☐	Date Rec'd		Ecoregion	
amend ☐	amend ☐	amend ☐	Green Cert ☐		Plan Period		Topo Name	*Haverhill*
			Conservation Rest. ☐		Rare Spp. Hab.		River Basin	*Merrimack*
Plan Change: _____ to _____			CR Holder _____					

OWNER, PROPERTY, and PREPARER INFORMATION

Property Owner(s) ***City of Haverhill, Haverhill Conservation Dept., c/o Robert E. Moore***
Mailing Address *City Hall Room 310, 4 Summer Street, Haverhill, MA 01830* Phone *978-374-2334*

Property Location: Town(s) *Haverhill* Road(s) *Kenoza Street*

Plan Preparer ***Gary H. Gouldrup, New England Forestry Cons., Inc.*** Mass. Forester License # *81*
Mailing Address *72 Townsend Street, Pepperell, MA 01463* Phone *978-433-8780*

RECORDS

Assessor's Map No.	Lot/Parcel No.	Deed Book	Deed Page	Total Acres	Ch61/61A/61B *Excluded* Acres	Ch61/61A/61B **Certified** Acres	Stewardship *Excluded Acres*	Stewardship *Agricultural* Acres	Stewardship Acres
							Forest Legacy Only		
*	*	*	*	442.51	0.00	0.00	52.30	0.00	390.21
			TOTALS	**442.51**	**0.00**	**0.00**	**52.30**	0.00	**390.21**

Excluded Area Description(s) **(if additional space needed, continue on separate paper)**

There are 52.30 acres to be excluded from Forest Stewardship Classification. The exclusions include the Haverhill water treatment facility off of Kenoza Street, the Isaac Merrill memorial and parking lot, the open recreational areas of Winnekenni Park, Winnekenni Basin and the Winnekenni Castle site.

HISTORY

Year acquired *Since 1895* Year management began *2012*

Is subdivision plan on file with municipality? Yes ☐ No ☒
Are boundaries blazed/painted/flagged/signs posted? (circle all that apply) Yes ☐ No ☐ Partially ☒
Have forest products been cut within past 2 years? Yes ☐ No ☒

What treatments have been prescribed, but not carried out (last 10 years if plan is a recert.)?
stand no. *NA* treatment *NA* reason *NA*
(if additional space needed, continue on separate page)

Previous Management Practices (last 10 years)

Stand #	Cutting Plan #	Treatment	Yield	Value	Acres	Date
All	*NA*	*None*	*NA*	*NA*	*NA*	*NA*

Remarks: (if additional space needed, continue on separate page)

** Please see page #2 for Assessor's Map & Lot, Deed Book & Page, and Acreage listing.*

RECORDS (continued)

Assessor's Map No.	Lot/Parcel No.	Deed Book	Deed Page	Total Acres	Ch61/61A/61B *Excluded* Acres	Ch61/61A/61B **Certified** Acres	Stewardship *Excluded Acres*	Stewardship *Agricultural* Acres	Stewardship Acres
Haverhill									
465	*2-1	UK	UK	50.85	0.00	0.00	15.17	0.00	35.68
466	*185-13	UK	UK		0.00	0.00	0.00	0.00	
465	2-1A	UK	UK	1.83	0.00	0.00	1.83	0.00	0.00
466	185-14/15	UK	UK	8.70	0.00	0.00	0.00	0.00	8.70
459	2-13A	5556	95	4.00	0.00	0.00	0.00	0.00	4.00
466	*185-16	UK	UK	48.90	0.00	0.00	0.00	0.00	48.90
466	*185-17	UK	UK		0.00	0.00	0.00	0.00	
466	*185-51	UK	UK		0.00	0.00	0.00	0.00	
466	*185-49	UK	UK		0.00	0.00	0.00	0.00	
466	*185-46	UK	UK		0.00	0.00	0.00	0.00	
466	*185-47	UK	UK		0.00	0.00	0.00	0.00	
466	*185-45	UK	UK		0.00	0.00	0.00	0.00	
466	*185-48	UK	UK		0.00	0.00	0.00	0.00	
466	*185-44	UK	UK		0.00	0.00	0.00	0.00	
467	185-24	4563	57	5.50	0.00	0.00	0.00	0.00	5.50
467	*185-43A				0.00	0.00	0.00	0.00	
467	*185-43	UK	UK		0.00	0.00	0.00	0.00	
467	*185-30	UK	UK	56.80	0.00	0.00	0.00	0.00	56.80
467	*185-31A	UK	UK		0.00	0.00	0.00	0.00	
468	42-A	17947	70	32.04	0.00	0.00	0.00	0.00	32.04
409	*13-148	UK	UK		0.00	0.00	0.00	0.00	
409	*13-147	UK	UK	0.34	0.00	0.00	0.00	0.00	0.34
409	*13-146	UK	UK		0.00	0.00	0.00	0.00	
409	1A-1	4554	351	49.84	0.00	0.00	5.30	0.00	44.54
468	185-52	210	46414	54.59	0.00	0.00	0.00	0.00	54.59
468	185-54	6486	267	24.21	0.00	0.00	0.00	0.00	24.21
465	1-1	UK	UK	103.00	0.00	0.00	30.00	0.00	73.00
409	116-38	12879	599	0.23	0.00	0.00	0.00	0.00	0.23
409	114-19	12879	599	1.68	0.00	0.00	0.00	0.00	1.68
			TOTALS	**442.51**	**NA**	**NA**	**52.30**		**390.21**

** Lots highlighted by color are combined together when determining acreage.*

The total acreage of the property appears to be closer to 426-ares rather than the 442.51 as listed in the City's GIS system.

Owner(s) City of Haverhill – Winnekenni Park Town(s) Haverhill

Property Overview, Regional Significance, and Management Summary

The Winnekenni Park and Plug Pond Conservation Area is comprised of 390+/- acres of Forest Stewardship lands. The property is located in a central part of the city approximately 3000' east of City Hall. There are several points of access to the property. Public parking is available off of Kenoza Street at the Isaac Merrill House Memorial Park, the Winnekenni Park and the Winnekenni (Nichols) Castle site. The Plug Pond Conservation Area also provides access off of Belvidere Road at the southern end of the property. The forest is situated on the eastern side of a highly congested city area where residential, municipal and commercial building sites are the primary use of the land.

The property has been acquired periodically by the City of Haverhill since 1895. There are several historical sites and cultural resources located on the property. Winnekenni Castle, the Birchbrow Estate remains, the Isaac Merrill House Memorial, the Carleton Fountain, the Tyler Shelter Site and the Dudley Porter Memorial are all located on the property and help define the character of the Park. The following is a brief summary of the properties history that comes directly from the Haverhill Trails Guide:

"Dr. James R. Nichols, a local physician and inventor, built the Castle during 1873-1875 from 35,000 cubic feet of glacial boulders found on the property. Dr. Nichols inspiration of the castle's architecture came from the castles of England. The name "Winnekenni" comes from the Algonquian language and means "very beautiful". The Castle was sold to the city in 1895, at which time it became Haverhill's first public park. In 1967, after a devastating fire destroyed the aging building, a group of citizens formed the Winnekenni Foundation, which refurbished the interior of the building and made its surrounding grounds available to the public for the cultural and educational events".

Today, the Winnekenni Foundation continues the work of preserving the Castle and making it available to the community for concerts, plays, workshops, craft fairs, Halloween parties, fundraisers and so on. The Winnekenni Foundation will work with the Forest Stewardship Committee when working near or on the grounds of the Winnekenni Castle.

The Birchbrow Estate is another historical treasure. The foundations of this once famous mansion at the turn of the 19th century still remain on the hill overlooking Lake Saltonstall. Mr. Thomas Sanders built the mansion in 1880 from proceeds of investments that made it possible for Alexander Bell to develop the telephone. The estate was plagued with fires known to have occurred in 1886, 1892, 1895, and 1929. The mansion was eventually torn down in 1946 after being abandoned and vandalized.

The property lies in the Merrimack Watershed. The property is part of a "Potable Water Supply Watershed" and water quality protection and improvement is very important to the City of Haverhill. Water is pumped from Crystal Lake located northwest of the property and from the Millvale Reservoir located north of the property into Kenoza Lake. Water also drains from Lake Pentucket, located just west off the property, into Kenoza Lake. The cities water treatment facility is located on the northeast side of Kenoza Lake. Water is distributed to the citizens of Haverhill from the treatment facility.

The property is one of Haverhill's most highly used public recreational areas. Hiking, jogging and cross country skiing are activities that are popular on the woods roads and trails that wind throughout the forest. Tennis courts, playground and picnic areas are available near the entrance to Winnekenni Park off of Amesbury Road. Plug Pond Conservation Area provides swimming, boating, and fishing

opportunities for the public. The main trails have been identified with markers and a trails guide is available at the entrance to the castle parking lot. The forest stewardship land is dominated by mature and mostly overstocked woodlands (92%). An abandoned field occupies less than 1% of the forest structure while red maple swamps and open wetland resource areas cover the remaining 7% of the forest stewardship lands. Mixed oaks and mixed hardwoods are the primary forest types in areas west of Kenoza Lake in Compartment #3. Areas north and east of Kenoza Lake are dominated by coniferous forest types which include plantations of red pine, Scotch pine, Norway spruce, white pine and hemlock. Timber resource quality ranges from poor to high.

Declining forest health is a major concern on these woodlands at this time. Aging and overstocked forest types, forest fires in the past and mortality of trees due to insects are the primary concerns related to the decline of the forests overall health. Forest fires have had an impact on the woodlands west of Kenoza Lake over the years. Fire scars are evident in a significant portion of the large diameter hardwoods in stand #15 and sections of stand #14. Many of the large diameter hardwoods are showing external decay at the base of the fire scars. Internal decay is easily seen in the trees that have been slowly blowing down as a result of age and weakening stems. The most immediate concern to forest health is the presence of the hemlock woolly adelgid within the hemlock stands and plantations of Compartment #2. The hemlock wooly adelgid is a saprophytic leaf defoliator that has infested the trees on the property. Mortality within the hemlock stands has started as a result of the adelgids presence. A large percentage of the trees are severely chlorotic and nearing mortality. The hemlock stands are situated on moderate to steep slopes that are overlooking Kenoza Lake. Blowdowns are another concern in the hemlock stands as well as the large diameter hardwood forest types as the trees continue to age and decline in health.

Invasive and non-native vegetation on the property is prolific in the northern sections of the property of Compartment #1. Dense pockets of Japanese barberry, honeysuckle, buckthorn, fire bush, multiflora rose, and bittersweet are a threat to the biodiversity of natural communities on the property. Norway maple is also scattered throughout the forest canopy and is present in the understory as a source of forest regeneration.

Forest soils on the upland sections of the property consist primarily of well drained and moderately drained fine sandy loam (Paxton-Charlton-Woodbridge-Deerfield-Leicester). The very poorly drained wetland resource areas consist of deep organic muck (Freetown). Over 90% of the forest area is situated on upland forest soils.

Wildlife habitat is limited to mature woodland dwelling forms of wildlife. The mature woodlands offer habitat for raptors such as the owl and hawk. White-tailed deer, fox, and coyote may pass through the property from time to time, but the constant presence of domestic dogs and humans likely limits their time on the property. Timber harvesting will promote an unevenaged forest structure which will diversify the available habitats for local forms of wildlife.

Property Overview, Regional Significance, and Management Summary

The Mayor of Haverhill, through the Conservation Department, established the Haverhill Forest Management Committee in 2009. The Forest Management Committee has developed the following goals for the Winnekenni Park and Plug Pond Conservation Areas:

Management will focus on promoting a healthy forest environment for the safety and enjoyment of the residents of Haverhill and others who will visit the property. Watershed protection of Kenoza Lake is essential. The City would like to specifically accomplish the following on this property:

- Protect the water quality of the Kenoza Lake Watershed;
- Provide access and trails to the forest that are safe and enjoyable for the public;
- Enhance views to and from Winnekenni Castle;
- Develop an Urban Forest Management Plan;
- Remove trees with a high risk probability to public safety;
- Salvage trees infested with the hemlock woolly adelgid;
- Conduct a biomass operation to improve regeneration and aesthetics;
- Enhance wildlife habitat by diversifying tree age and species, creating and maintaining successional "pockets", and protecting legacy trees;
- Enhance both the quality and quantity of future timber products;
- Produce firewood that will be made available to the residents;
- Discourage unauthorized ATV access.

Developing an Urban Forest Management Plan will be done to identify high risk trees and to promote the health of shade trees in areas of high public use throughout the conservation area. Timber resource management will be aimed at enhancing the quality of timber resources into the future while protecting the Kenoza watershed, improving wildlife habitats and maintaining good aesthetics throughout the property. Commercial sales of timber will require whole-tree chipping of low quality trees and portions of trees that do not have firewood or sawtimber products primarily for aesthetic and fire protection purposes. Focusing on the removal of the hemlock wooly adelgid infested trees and trees with risk to public safety will be a priority. Removing low quality hardwoods for firewood will be done in order to generate a supply of firewood for the residents of Haverhill.

One of the primary management objectives of the Winnekenni Park and Plug Pond Conservation Areas will be to preserve, maintain and improve water quality as a public water resource supply for the residents of Haverhill. The Haverhill Forest Management Committee, with its consultant, has reviewed the Quabbin Reservoir Watershed System Land Management Plan, 2007-2017. The Quabbin Forest Management Objectives can be found on page 144 of the Plan. The Forest Management Committee would like to pursue management of the Kenoza Lake Watershed as stated in the first paragraph under the "Primary Objectives" (5.2.3.1). *"The primary objective of forest management of the Quabbin* (Kenoza Lake Watershed) *forest is to create and maintain a complex forest structure, which forms a protective forest cover and a biological filter on the watershed land. This watershed protection forest is designed to be vigorous, diverse in species and age, actively accumulating biomass, conserving ecological and economic values, actively regenerating, and most importantly maintaining a predictable flow of high quality water from the land"*. The Forest Management Committee will use the Quabbin Plan as a guide when managing the Kenoza Lake watershed lands.

Management on the Kenoza Lake Watershed will be approached by using the "*Subwatershed Administration of Forest Management*". The Quabbin Plan defines a subwatershed on page 145 (5.2.3.21). "*A subwatershed is defined in most cases as the land area that drains to a perennial tributary of the reservoir*." The Quabbin Plan defines this management theory on page 146 (5.2.3.2.2). "*The general theory behind the use of subwatershed-based planning is to control the proportion of a drainage area that is disturbed by management activities (e.g., logging or road work) during the management period in order to reduce the chances of water quality impacts. This approach is partly based on research on experimental watersheds throughout the eastern US that indicate that until approximately 25-30% of the watershed overstory stocking is harvested (assuming nearly 100% forest cover type), there is no detectable increase in water yield (Hornbeck and Kochenderfer, 2004: Hornbeck et al., 1993). As increases in transport of sediments and nutrients to tributaries and the reservoir are directly related to increases in water yield, it follows that the 25-30% threshold also applies to water quality changes (so long as Conservation Management Practices are in place, the greatest concern is with the movement of nutrients rather than sediments). The same research also demonstrated that water yield generally returns to pre-harvest conditions as the harvested area regenerates – usually within 3-10 years*."

Wildlife habitats will be enhanced through the timber harvesting practices. Creating multiple age classes within the forest will benefit a variety of wildlife species. Periodic clearing and reclamation of early successional forest habitat within the abandoned field (Stand 18) will be pursued as these areas grow into mature woodlands. Identifying large and healthy "Legacy Trees" will be done to promote "Old Growth" characteristics within the forest where these trees exist and where this practice is applicable. Vista cutting near Winnekenni Castle will also be pursued to enhance views to and from the castle. The vista harvesting project will be done at the discretion of the Winnekenni Foundation.

All forest management activities will be sensitive to protecting public safety, water quality, soils, cultural resources, wildlife habitats, rare and endangered species and their habitats, aesthetics and recreational values. When harvesting timber resources on the property a Chapter 132 Cutting Plan will be filed with the Department of Conservation and Recreation. The Division of Fisheries and Wildlife's Natural Heritage & Endangered Species Program (NHESP) will make recommendations to protect any special vegetation or wildlife and their habitats should they exist on the property.

Landowner Goals

Please **check** the column that best reflects the importance of the following goals:

Goal	Importance to Me			
	High	**Medium**	**Low**	**Don't Know**
Enhance the Quality/Quantity of Timber Products*****		X		
Generate Immediate Income			X	
Generate Long Term Income			X	
Produce Firewood			X	
Defer or Defray Taxes				
Promote Biological Diversity	X			
Enhance Habitat for Birds	X			
Enhance Habitat for Small Animals	X			
Enhance Habitat for Large Animals		X		
Improve Access for Walking/Skiing/Recreation	X			
Maintain or Enhance Privacy (For Abutters)	X			
Improve Hunting (Not Allowed)			X	
Improve Fishing (Not Allowed in Kenoza Lake)			X	
Preserve or Improve Scenic Beauty	X			
Protect Water Quality	X			
Protect Unique/Special/ Cultural Areas	X			
Other: Public Education & Outreach	X			

*** This goal must be checked "HIGH" if you are interested in classifying your land under Chapter 61/61A.**

1. In your own words please describe your goals for the property:

The City of Haverhill would like to improve and protect the forest resources on the Winnekenni Park & Plugs Pond Conservation Area for the benefit of the residents of Haverhill. Protecting the Kenoza Lake Watershed and maintaining public safety throughout the highly used recreational areas is a high priority. These goals will be accomplished by periodically harvesting timber resources, promoting biological diversity, enhancing wildlife habitat and educating the public on forest stewardship matters.

Stewardship Purpose

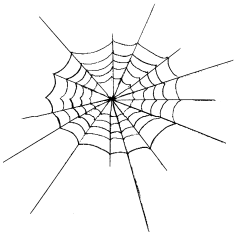
By enrolling in the Forest Stewardship Program and following a Stewardship Plan, I understand that I will be joining with many other landowners across the state in a program that promotes ecologically responsible resource management through the following actions and values:

1. Managing for long-term forest health, productivity, diversity, and quality.
2. Conserving or enhancing water quality, wetlands, soil productivity, biodiversity, cultural, historical and aesthetic resources.
3. Following a strategy guided by well-founded silvicultural principles to improve timber quality and quantity when wood products are a goal.
4. Setting high standards for foresters, loggers and other operators as practices are implemented; and minimizing negative impacts.
5. Learning how woodlands benefit and affect surrounding communities, and cooperation with neighboring owners to accomplish mutual goals when practical.

Signature(s): _____ Date: _____

Stewardship Issues

Massachusetts is a small state, but it contains a tremendous variety of ecosystems, plant and animal species, management challenges, and opportunities. This section of your plan will provide background information about the Massachusetts forest landscape as well as issues that might affect your land. **The Stand Descriptions and Management Practices sections of your plan will give more detailed property specific information** on these subjects tailored to your management goals.



Biodiversity: Biological diversity is, in part, a measure of the variety of plants and animals, the communities they form, and the ecological processes (such as water and nutrient cycling) that sustain them. With the recognition that each species has value, individually and as part of its natural community, maintaining biodiversity has become an important resource management goal.

While the biggest threat to biodiversity in Massachusetts is the loss of habitat to development, another threat is the introduction and spread of invasive non-native plants. Non-native invasives like European Buckthorn, Asiatic Bittersweet, and Japanese Honeysuckle spread quickly, crowding out or smothering native species and upsetting and dramatically altering ecosystem structure and function. Once established, invasives are difficult to control and even harder to eradicate. Therefore, vigilance and early intervention are paramount.

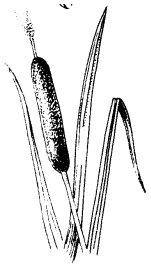
Another factor influencing biodiversity in Massachusetts concerns the amount and distribution of forest growth stages. Wildlife biologists have recommended that, for optimal wildlife habitat on a landscape scale, 5-15% of the forest should be in the seedling stage (less than 1" in diameter). Yet we currently have no more than 2-3% early successional stage seedling forest across the state. There is also a shortage of forest with large diameter trees (greater than 20"). See more about how you can manage your land with biodiversity in mind in the "Wildlife" section below. (Also refer to *Managing Forests to Enhance Wildlife Diversity in Massachusetts* and *A Guide to Invasive Plants in Massachusetts* in the binder pockets.)

Rare Species: Rare species include those that are **threatened** (abundant in parts of its range but declining in total numbers, those of **special concern** (any species that has suffered a decline that could threaten the species if left unchecked), and **endangered** (at immediate risk of extinction and probably cannot survive without direct human intervention). Some species are threatened or endangered globally, while others are common globally but rare in Massachusetts.

Of the 2,040 plant and animal species (not including insects) in Massachusetts, 424 are considered rare. About 100 of these rare species are known to occur in woodlands. Most of these are found in wooded wetlands, especially vernal pools. These temporary shallow pools dry up by late summer, but provide crucial breeding habitat for rare salamanders and a host of other unusual forest dwelling invertebrates. Although many species in Massachusetts are adapted to and thrive in recently disturbed forests, rare species are often very sensitive to any changes in their habitat

Indispensable to rare species protection is a set of maps maintained by the Division of Fisheries and Wildlife's Natural Heritage & Endangered Species Program (NHESP) that show current and historic locations of rare species and their habitats. The maps of your property will be compared to these rare species maps and the result indicated on the upper right corner of the front page of the plan. Prior to any

regulated timber harvest, if an occurrence does show on the map, the NHESP will recommend protective measures. Possible measures include restricting logging operations to frozen periods of the year, or keeping logging equipment out of sensitive areas. You might also use information from NHESP to consider implementing management activities to improve the habitat for these special species.



Riparian and Wetlands Areas: Riparian and wetland areas are transition areas between open water features (lakes, ponds, streams, and rivers) and the drier terrestrial ecosystems. More specifically, a **wetland** is an area that has hydric (wet) soils and a unique community of plants that are adapted to live in these wet soils. Wetlands may be adjacent to streams or ponds, or a wetland may be found isolated in an otherwise drier landscape. A **riparian area** is the transition zone between an open water feature and the uplands (see Figure 1). A riparian zone may contain wetlands, but also includes areas with somewhat better drained soils. It is easiest to think of riparian areas as the places where land and water meet.

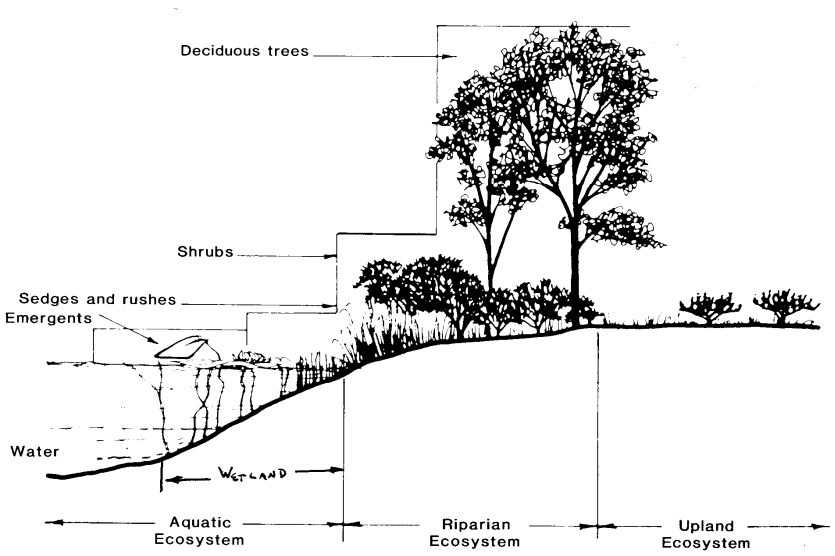


Figure 1: Example of a riparian zone.

The presence of water in riparian and wetland areas make these special places very important. Some of the functions and values that these areas provide are described below:

Filtration: Riparian zones capture and filter out sediment, chemicals and debris before they reach streams, rivers, lakes and drinking water supplies. This helps to keeps our drinking water cleaner, and saves communities money by making the need for costly filtration much less likely.

Flood control: By storing water after rainstorms, these areas reduce downstream flooding. Like a sponge, wetland and riparian areas absorb stormwater, then release it slowly over time instead of in one flush.

Critical wildlife habitat: Many birds and mammals need riparian and wetland areas for all or part of their life cycles. These areas provide food and water, cover, and travel corridors. They are often the most important habitat feature in Massachusetts' forests.

Recreational opportunities: Our lakes, rivers, streams, and ponds are often focal points for recreation. We enjoy them when we boat, fish, swim, or just sit and enjoy the view.

In order to protect wetlands and riparian areas and to prevent soil erosion during timber harvesting activities, Massachusetts promotes the use of "Best Management Practices" or BMPs. Maintaining or reestablishing the protective vegetative layer and protecting critical areas are the two rules that underlie these common sense measures. DEM's Massachusetts Forestry Best Practices Manual (included with this plan) details both the legally required and voluntary specifications for log landings, skid trails, water bars, buffer strips, filter strips, harvest timing, and much more.

The two Massachusetts laws that regulate timber harvesting in and around wetlands and riparian areas are the Massachusetts Wetlands Protection Act (CH 131), and the Forest Cutting Practices Act (CH132). Among other things, CH132 requires the filing of a cutting plan and on-site inspection of a harvest operation by a DEM Service Forester to ensure that required BMPs are being followed when a commercial harvest exceeds 25,000 board feet or 50 cords (or combination thereof).

Soil and Water Quality: Forests provide a very effective natural buffer that holds soil in place and protects the purity of our water. The trees, understory vegetation, and the organic material on the forest floor reduce the impact of falling rain, and help to insure that soil will not be carried into our streams and waterways.

To maintain a supply of clean water, forests must be kept as healthy as possible. Forests with a diverse mixture of vigorous trees of different ages and species can better cope with periodic and unpredictable stress such as insect attacks or windstorms.

Timber harvesting must be conducted with the utmost care to ensure that erosion is minimized and that sediment does not enter streams or wetlands. Sediment causes turbidity which degrades water quality and can harm fish and other aquatic life. As long as Best Management Practices (BMPs) are implemented correctly, it is possible to undertake active forest management without harming water quality.

Forest Health: Like individual organisms, forests vary in their overall health. The health of a forest is affected by many factors including weather, soil, insects, diseases, air quality, and human activity. Forest owners do not usually focus on the health of a single tree, but are concerned about catastrophic events such as insect or disease outbreaks that affect so many individual trees that the whole forest community is impacted.

Like our own health, it is easier to prevent forest health problems then to cure them. This preventative approach usually involves two steps. First, it is desirable to maintain or encourage a wide diversity of tree species and age classes within the forest. This diversity makes a forest less susceptible to a single devastating health threat. Second, by thinning out weaker and less desirable trees, well-spaced healthy individual trees are assured enough water and light to thrive. These two steps will result in a forest of vigorously growing trees that is more resistant to environmental stress.

Fire: Most forests in Massachusetts are relatively resistant to catastrophic fire. Historically, Native Americans commonly burned certain forests to improve hunting grounds. In modern times, fires most often result from careless human actions. The risk of an unintentional and damaging fire in your woods could increase as a result of logging activity if the slash (tree tops, branches, and debris) is not treated correctly. Adherence to the Massachusetts slash law minimizes this risk. Under the law, slash is to be removed from buffer areas near roads, boundaries, and critical areas and lopped close to the ground to speed decay. Well-maintained woods roads are always desirable to provide access should a fire occur.

Depending on the type of fire and the goals of the landowner, fire can also be considered as a management tool to favor certain species of plants and animals. Today the use of prescribed burning is largely restricted to the coast and islands, where it is used to maintain unique natural communities such as sandplain grasslands and pitch pine/scrub oak barrens. However, state land managers are also attempting to bring fire back to many of the fire-adapted communities found elsewhere around the state.

Wildlife Management: Enhancing the wildlife potential of a forested property is a common and important goal for many woodland owners. Sometimes actions can be taken to benefit a particular species of interest (e.g., put up Wood Duck nest boxes). In most cases, recommended management practices can benefit many species, and fall into one of three broad strategies. These are **managing for diversity, protecting existing habitat, and enhancing existing habitat**.

Managing for Diversity – Many species of wildlife need a variety of plant communities to meet their lifecycle requirements. In general, a property that contains a diversity of habitats will support a more varied wildlife population. A thick area of brush and young trees might provide food and cover for grouse and cedar waxwing; a mature stand of oaks provides acorns for foraging deer and turkey; while an open field provides the right food and cover for cottontail rabbits and red fox. It is often possible to create these different habitats on your property through active management. The appropriate mix of habitat types will primarily depend on the composition of the surrounding landscape and your objectives. It may be a good idea to create a brushy area where early successional habitats are rare, but the same practice may be inappropriate in the area's last block of mature forest.

Protecting Existing Habitat – This strategy is commonly associated with managing for rare species or those species that require unique habitat features. These habitat features include vernal pools, springs and seeps, forested wetlands, rock outcrops, snags, den trees, and large blocks of unbroken forest. Some of these features are rare, and they provide the right mix of food, water, and shelter for a particular species or specialized community of wildlife. It is important to recognize their value and protect their function. This usually means not altering the feature and buffering the resource area from potential impacts.

Enhancing Existing Habitat – This strategy falls somewhere between the previous two. One way the wildlife value of a forest can be enhanced is by modifying its structure (number of canopy layers, average tree size, density). Thinning out undesirable trees from around large crowned mast (nut and fruit) trees will allow these trees to grow faster and produce more food. The faster growth will also accelerate the development of a more mature forest structure, which is important for some species. Creating small gaps or forest openings generates groups of seedlings and saplings that provide an additional layer of cover, food, and perch sites.

Each of these three strategies can be applied on a single property. For example, a landowner might want to increase the habitat diversity by reclaiming an old abandoned field. Elsewhere on the property, a stand of young hardwoods might be thinned to reduce competition, while a "no cut" buffer is set up around a vernal pool or other habitat feature. The overview, stand description and management practice sections of this plan will help you understand your woodland within the context of the surrounding landscape and the potential to diversify, protect or enhance wildlife habitat.

Wood Products: If managed wisely, forests can produce a periodic flow of wood products on a sustained basis. Stewardship encompasses finding ways to meet your current needs while protecting the forest's ecological integrity. In this way, you can harvest timber and generate income without compromising the opportunities of future generations.

Massachusetts forests grow many highly valued species (white pine, red oak, sugar maple, white ash, and black cherry) whose lumber is sold throughout the world. Other lower valued species (hemlock, birch, beech, red maple) are marketed locally or regionally, and become products like pallets, pulpwood, firewood, and lumber. These products and their associated value-added industries contribute between 200 and 300 million dollars annually to the Massachusetts economy.

By growing and selling wood products in a responsible way you are helping to our society's demand for these goods. Harvesting from sustainably managed woodlands – rather than from unmanaged or poorly managed forest – benefits the public in a multitude of ways. The sale of timber, pulpwood, and firewood also provides periodic income that you can reinvest in the property, increasing its value and helping you meet your long-term goals. Producing wood products helps defray the costs of owning woodland, and helps private landowners keep their forestland undeveloped.

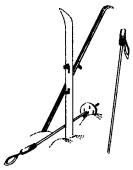
Cultural Resources: Cultural resources are the places containing evidence of people who once lived in the area. Whether a Native American village from 1,700 years ago, or the remains of a farmstead from the 1800's, these features all tell important and interesting stories about the landscape, and should be protected from damage or loss.

Massachusetts has a long and diverse history of human habitation and use. Native American tribes first took advantage of the natural bounty of this area over 10,000 years ago. Many of these villages were located along the coasts and rivers of the state. The interior woodlands were also used for hunting, traveling, and temporary camps. Signs of these activities are difficult to find in today's forests. They were obscured by the dramatic landscape impacts brought by European settlers as they swept over the area in the 17th and 18th centuries.

By the middle 1800's, more than 70% of the forests of Massachusetts had been cleared for crops and pastureland. Houses, barns, wells, fences, mills, and roads were all constructed as woodlands were converted for agricultural production. But when the Erie Canal connected the Midwest with the eastern cities, New England farms were abandoned for the more productive land in the Ohio River valley, and the landscape began to revert to forest. Many of the abandoned buildings were disassembled and moved, but the supporting stonework and other changes to the landscape can be easily seen today.

One particularly ubiquitous legacy of this period is stone walls. Most were constructed between 1810 and 1840 as stone fences (wooden fence rails had become scarce) to enclose sheep within pastures, or to

exclude them from croplands and hayfields. Clues to their purpose are found in their construction. Walls that surrounded pasture areas were comprised mostly of large stones, while walls abutting former cropland accumulated many small stones as farmers cleared rocks turned up by their plows. Other cultural features to look for include cellar holes, wells, old roads and even old trash dumps.



Recreation and Aesthetic Considerations: Recreational opportunities and aesthetic quality are the most important values for many forest landowners, and represent valid goals in and of themselves. Removing interfering vegetation can open a vista or highlight a beautiful tree, for example. When a landowner's goals include timber, thoughtful forest management can be used to accomplish silvicultural objectives while also reaching recreational and/or aesthetic objectives. For example, logging trails might be designed to provide a network of cross-country ski trails that lead through a variety of habitats and reveal points of interest.

If aesthetics is a concern and you are planning a timber harvest, obtain a copy of this excellent booklet: *A Guide to Logging Aesthetics: Practical Tips for Loggers, Foresters & Landowners,* by Geoffrey T. Jones, 1993. (Available from the Northeast Regional Agricultural Engineering Service, (607) 255-7654, for $7). Work closely with your consultant to make sure the aesthetic standards you want are included in the contract and that the logger selected to do the job executes it properly. The time you take to plan ahead of the job will reward you and your family many times over with a fuller enjoyment of your forest, now and well into the future.

This is your Stewardship Plan. It is based on the goals that you have identified. The final success of your Stewardship Plan will be determined first, by how well you are able to identify and define your goals, and second, by the support you find and the resources you commit to implement each step.

It can be helpful and enjoyable to visit other properties to sample the range of management activities and see the accomplishments of others. This may help you visualize the outcome of alternative management decisions and can either stimulate new ideas or confirm your own personal philosophies. Don't hesitate to express your thoughts, concerns, and ideas. Keep asking questions! Please be involved and enjoy the fact that you are the steward of a very special place.

STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	1	BL	2.75	13.7" DBH Pole-Small Sawtimber	90 sqft	27.2 Cds	60 (BL)

Black locust is the dominant overstory species in this adequately stocked pole and small sawtimber sized stand. The black locust stems are poorly formed and poor in timber quality. Scattered Norway maple, white ash, black cherry, American elm and mixed oak poles and sawtimber of poor to fair form and timber quality can also be found. Forest regeneration is limited due to the dense understory of invasive species which include honeysuckle, bittersweet, multiflora rose, buckthorn and barberry. The area is flat to gently sloped with moderately drained loamy sand soils (Deerfield) capable of producing high quality timber resources. Management will focus on promoting biological diversity by reducing or eliminating the presence of invasive species. The desired future condition is a stand that is growing high quality timber resources in several size and age classes while protecting the Kenoza Lake watershed.

STEW	2	WH	12.17	15.1" DBH Sawtimber	120 sqft	12,554 BF & 17.9 Cds	60 (WP)

White pine and mixed hardwoods dominate the overstory in this mostly overstocked sawtimber and pole sized stand. The white pine stems are poor to good in form and timber quality. Black knotted timber is common in the large white pine sawtimber component. Scattered black cherry, black oak, red maple, Norway maple, red pine and Norway spruce poles and sawtimber of poor to good form and timber quality can also be found. Forest regeneration is scattered and includes white pine and mixed hardwood saplings that are competing with invasive species such as honeysuckle, firebush, bittersweet, buckthorn, and bittersweet. Poison ivy is common as well. The area is flat to gently sloped with moderately well drained loamy sand soils (Deerfield) and well drained fine sandy loam soils (Paxton) capable of producing high quality timber resources. Management will focus on improvement thinning by selection harvest. The desired future condition is a stand that is growing high quality timber resources in several size and age classes while protecting the Kenoza Lake watershed.

STEW	3	RP	6.48	10.8" DBH Small Sawtimber	170 sqft	9,869 BF & 27.2 Cds	60 (WP)

Red pine is the dominant overstory species in this overstocked plantation in the small sawtimber class. Timber quality is poor to fair due to the overstocked conditions and slow growth. Scattered Norway maple, red maple, mixed oaks, black birch, white pine and black cherry poles and sawtimber of poor to good form and timber quality can also be found. Forest regeneration is scattered and includes mixed hardwood saplings competing with invasive species which include honeysuckle and bittersweet. Poison ivy is present as well. The area is flat to gently sloped with well drained fine sandy loam soils (Paxton) capable of producing high quality timber resources. Management will focus on group, patch and selection harvesting in order to encourage the development of native regeneration in the understory. The desired future condition is a stand that is growing high quality timber resources in several size and age classes while protecting the East Meadow Brook watershed.

STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	4	SCP	4.42	10.7" DBH Small Sawtimber	150 sqft	4,115 BF & 33.4 Cds	60 (WP)

Scotch pine is the dominant overstory species in this overstocked small sawtimber plantation. The stems are poorly formed and poor to fair in timber quality. Scattered black birch, mixed oaks, red maple, Norway maple, sassafras, black cherry and white pine poles and sawtimber of poor to good form and timber quality can also be found. Forest regeneration is scattered and includes mixed hardwood saplings. The understory is also growing invasive species which include firebush, bittersweet and honeysuckle. Ferns are growing here as well. The area is flat to gently sloped with moderately well drained loamy sand soils (Deerfield-Paxton). The forest soils are capable of producing high quality timber resources. Management will focus on patch cutting and group selection harvesting in order to encourage the development of native regeneration in the understory. The desired future condition is a stand that is growing high quality timber resources in several size and age classes while protecting the Kenoza Lake watershed.

STEW	5	OH	15.84	12.4" DBH Sawtimber-Pole	95 sqft	4,599 BF & 18.7 Cds.	60 (OM)

Mixed oaks and mixed hardwoods dominate the overstory in this well stocked sawtimber and pole sized stand. The mixed oak stems are generally well formed and fair to good in form and timber quality. The mixed hardwood component includes black cherry, red maple, white ash, elm and black locust poles and sawtimber of poor to good form and timber quality. Scattered white pine and sawtimber sized stems are present as well. Mixed hardwood and scattered white pine saplings are the primary source of regeneration. Arrowwood, honeysuckle and barberry are present in the understory. The area is flat to gently sloped with well to moderately well drained fine sandy loam soils (Paxton) capable of producing high quality timber resources. Management will focus on improvement thinning. The desired future condition is a stand that is growing high quality timber resources in several size and age classes while protecting the Kenoza Lake watershed.

STEW	6	MH	6.89	9.3" DBH Pole	70 sqft	2,315 BF & 12.2 Cds	60 (RO)

Mixed hardwoods dominate the overstory in this variably stocked pole and small sawtimber sized stand. The mixed hardwoods include red maple, mixed oaks, white ash, black cherry, black locust, sugar maple, basswood, and birch. Forest regeneration is scattered and includes mixed hardwood saplings competing with a dense understory of honeysuckle, bittersweet, multiflora rose, arrowwood, and barberry. The area is gently sloped with moderately well to somewhat poorly drained fine sandy loam soils (Woodbridge) capable of producing high quality timber resources. Management will focus on invasive species control and elimination. The desired future condition is a stand that is growing high quality timber resources in several size and age classes without the presence of invasive species while protecting the Kenoza Lake watershed.

STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	7	MH	3.27	6.7" DBH Sapling-Pole	30 sqft	5.4 Cds	60 (RO)

Mixed hardwoods dominate the overstory of this understocked abandoned field forest type. The area was once open with a road that was used by motor vehicles along the southern perimeter of the stand. Old cement posts with cables can still be found along the old road bed. Aspen, sugar maple, red maple, mixed oaks, black locust, elm, black birch, white birch, white ash, Norway maple, and white pine saplings and small poles can all be found growing in varying densities throughout the area. A dense understory of honeysuckle, multiflora rose, bittersweet, and staghorn sumac is present. The area is flat with well drained fine sandy loam soils (Paxton) capable of producing high quality timber resources. Management will focus on wildlife habitat improvement, biological diversity and water quality protection. The desired future condition is an area that provides habitat for wildlife and protects the Kenoza Lake watershed.

STEW	8	WH	7.52	11.6" DBH Sawtimber-Pole	170 sqft	10,825 BF & 32.4 Cds	63 (WP)

White pine and mixed hardwoods dominate the overstory in this mostly overstocked sawtimber and pole sized stand. The white pine stems are poor to good in form and timber quality. Black knotted timber is common in the large white pine sawtimber component. Scattered black birch, mixed oak, red maple, black locust, American elm, river birch, white ash and hickory poles and sawtimber of poor to good form and timber quality can also be found. Forest regeneration is scattered and includes mixed hardwood saplings that are competing witch hazel, honeysuckle, bittersweet, and barberry. The area is flat to gently sloped with well drained fine sandy loam soils (Paxton) capable of producing high quality timber resources. Water that is pumped from Millvale Reservoir to the north runs through this stand into Kenoza Lake. Management will focus on improvement thinning. The desired future condition is a stand that is growing high quality timber resources in several size and age classes while protecting the Kenoza Lake watershed.

STEW	9	HH	39.49	12.1" DBH Sawtimber-Pole	173 sqft	14,340 BF & 30.6 Cds	63 (WP)

Hemlock is the dominant overstory species in this overstocked sawtimber sized stand. Scattered white pine, black birch, red maple, white ash, mixed oaks, hickory, sugar maple, aspen, black cherry, Norway spruce and Norway maple poles and sawtimber of poor to good form and timber quality can also be found. Species composition, size class and density vary throughout the stand. Hemlock trees exceeding 25" in diameter (DBH) are common in areas along Dudley Porter Road. The hemlock component has been infested with the hemlock wooly adelgid. Mortality has begun within the stand and a significant portion of the trees are chlorotic and also closing in on mortality. Blowdowns are occurring in eastern and southern sections of the stand as well. Forest regeneration is scattered and consists of mostly shade tolerant hemlock saplings that are also infested with the adelgid. The area is gently to steeply sloped with well drained and moderately drained fine sandy loam soils (Paxton) capable of producing high quality timber resources. Management will focus on salvaging hemlock wooly adelgid infested trees via a two-three phase removal operation over the next ten years. The desired future condition is a stand that is growing high quality timber resources in several size and age classes without insect or disease issues that may affect forest health and water quality of the Kenoza Lake watershed.

STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	10	WH	20.66	11.9" DBH Sawtimber	147 sqft	10,447 BF & 26.0 Cds	60 (WP)

White pine is the dominant overstory species within this overstocked sawtimber sized stand. Most of this stand is a plantation. The white pine stems are poor to good in form and timber quality with areas of black knotted timber. Scattered Norway spruce, Scotch pine, red maple, Norway maple, black birch, hemlock, white ash, mixed oaks and other mixed hardwoods of poor to good form and timber quality can also be found. Forest regeneration is scattered and includes white pine, hemlock and mixed hardwood saplings competing with witch hazel, wild raisin, honeysuckle, bittersweet, poison ivy and ferns. The area is gently to steeply sloped with well to moderately well drained fine sandy loam soils (Paxton) capable of producing high quality timber resources. Management will focus on individual and group selection harvesting. The desired future condition is a stand that is growing high quality timber resources in several size and age classes while protecting the Kenoza Lake watershed.

STEW	11	NSP	6.08	13.0" DBH Small Sawtimber	150 sqft	18,110 BF & 17.0 Cds.	57 (SP)

Norway spruce is the dominant overstory species in this overstocked, small sawtimber plantation. The spruce component is generally well formed and fair to good in timber quality. Some areas in the north have experienced storm damage and wind-throw. Scattered hemlock, white pine and mixed hardwoods can also be found. Forest regeneration includes mixed hardwood and hemlock saplings. The area is gently to steeply sloped with well to moderately drained fine sandy loam soils (Paxton) capable of producing high quality timber resources. Management will focus on individual and group selection harvesting to encourage native regeneration in the understory. The desired future condition is a stand that is growing high quality timber resources in several size and age classes while protecting the Kenoza Lake watershed.

STEW	12	HH	5.17	9.4" DBH Pole-Sawtimber	90 sqft	1,606 BF & 23.1 Cds	60 (WP)

Hemlock, white pine, red maple, black birch, mixed oaks, white ash, sugar maple, elm, aspen, Norway maple, black cherry, and white birch poles and sawtimber can all be found in this pole and sawtimber sized stand. Species composition, stand density and size class varies throughout the area. The hemlock component is infested with the hemlock woolly adelgid. The overall timber quality is poor to fair. Forest regeneration is scattered and includes hemlock, and mixed hardwood saplings. Honeysuckle, barberry, firebush, bittersweet, and spicebush are present in the understory. The area is flat to gently sloped with moderately well drained fine sandy loam soils (Paxton) capable of producing high quality timber resources. Management will focus on salvaging the hemlock component and encouraging the well formed native tree species to develop. The desired future condition is a stand that is growing high quality timber resources in several size and age classes without insect or disease issues that may affect forest health and water quality of the Kenoza Lake watershed.

STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	13	MH	7.70	10.6" DBH Sawtimber-Pole	150 sqft	4,484 BF & 32.4 Cds	63 (RO)

Mixed hardwoods dominate the overstory in this well stocked sawtimber and pole sized stand. Sugar maple, mixed oaks, black locust, white ash, elm, white birch, red maple and hickory poles and sawtimber of poor to good form and timber quality can all be found. Forest regeneration consists of scattered sugar maple and mixed hardwood saplings. The area is gently sloped with well drained loamy sand soils (Hinckley) capable of producing high quality timber resources. Management will focus on improvement thinning. The desired future condition is a stand that is growing high quality timber resources in several size and age classes while protecting the Kenoza Lake watershed and maintaining high esthetics along Kenoza Lake.

STEW	14	OH	72.83	12.0" DBH Sawtimber	110 sqft	8,400 BF & 20.0 Cds	63 (RO)

Red oak and mixed hardwoods dominate the overstory in this well stocked sawtimber sized stand. The red oak stems are generally well formed and poor to good in form and timber quality. The mixed hardwood component includes American beech, hickory, red maple, black birch, white ash, yellow birch, black oak, white oak, and sugar maple poles and sawtimber of poor to good form and timber quality. Trees with a diameter of over 25" DBH are scattered throughout the area and several exceed 30" DBH. The stand has experienced storm damage and blowdown in recent years. Some fire scarred trees are present in areas along Stand #15. Mixed hardwood saplings are the primary source of regeneration. Witch hazel, spicebush, arrowwood and rhododendron are present in the understory. The area is gently to steeply sloped with well to moderately well drained fine sandy loam soils (Paxton-Woodbridge) capable of producing high quality timber resources. Management will focus on improvement thinning by selection harvesting. Trees that pose a threat to public safety will be targeted for removal as there are several trails and access roads that wind through the area. The desired future condition is a stand that is growing high quality timber resources in several size and age classes while protecting the Kenoza Lake watershed and preserving high aesthetics along the trails that overlook Kenoza Lake.

STEW	15	OH	106.60	12.6" DBH Sawtimber	100 sqft	4,597 BF & 20.9 Cds	63 (RO)

Mixed oaks and mixed hardwoods dominate the overstory of this well stocked sawtimber sized stand. The mixed oak component includes black oak, red oak and white oak of poor to good form and timber quality. Scattered hickory, red maple, black birch, American beech, sugar maple, ironwood, basswood, white ash and white pine poles and sawtimber of poor to good form and timber quality can also be found. Forest regeneration is scattered and includes mixed hardwood and white pine saplings. Witch hazel is common in the understory. Forest fires have affected the growth, development and quality of trees in this area over the years. The large sawtimber component in particular has fire scars and internal decay within a significant portion of these large diameter trees. The area is gently to steeply sloped with well and moderately well drained fine sandy loam soils (Paxton) capable of producing high quality timber resources. Management will focus on improvement thinning by selection harvesting. Trees that pose a threat to public safety will be targeted for removal. The Birchbrow Estate remains are partially located within this stand. The desired future condition is a stand that is growing high quality timber resources in several size and age classes while protecting the Kenoza Lake watershed and preserving high aesthetics along the trails that overlook Plugs Pond and Kenoza Lake. Preserving the remains of the Birchbrow Estate is also desired.

STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	16	OH	11.20	9.7" DBH Pole	70 sqft	626 BF & 16.2 Cds	60 (RO)

Mixed oaks and mixed hardwoods dominate the overstory in this variably stocked pole sized stand. This area was once open and part of the Birchbrow Estate pasture used for horses. The mixed oak stems are poor to good in form timber quality. The mixed hardwood component includes black walnut, black locust, black birch, hickory, elm, white birch, aspen, red maple and American beech poles and small sawtimber of poor to good form and timber quality. Several of the old foundations of the Birchbrow Estate are located along the trails that pass through this area. Mixed hardwood saplings are the primary source of regeneration. Bittersweet, honeysuckle, barberry and spicebush are present in the understory as well. The area is flat to gently sloped with well to moderately well drained fine sandy loam soils (Paxton) capable of producing high quality timber resources. The desired future condition is a stand that is growing high quality timber resources in several size and age classes while protecting the Kenoza Lake watershed and preserving high aesthetics along the trails that overlook Plugs Pond and Kenoza Lake. Preserving the remains of the Birchbrow Estate is also desired.

STEW	17	OH	4.30	7.3" DBH Pole	80 sqft	795 BF & 18.6 Cds	60 (RO)

Mixed oaks and mixed hardwoods dominate the overstory in this adequately stocked pole sized stand. The mixed oak stems are generally well formed and fair to good in form and timber quality. The mixed hardwood component includes black birch, sugar maple, Norway maple, red maple, aspen, white ash, gray birch, black cherry and hickory poles of poor to good form and timber quality. Red maple poles are located along the eastern sections of the stand in the low lying drainage areas. Mixed hardwood saplings are the primary source of regeneration. Honeysuckle, bittersweet, firebush, spicebush and staghorn sumac are present in the understory. The area is gently sloped with well to moderately well drained fine sandy loam soils (Paxton) and poorly drained fine sandy loam soils (Ninigret) capable of producing high quality timber resources. No management is recommended at this time. The desired future condition is a stand that is growing high quality timber resources in several size and age classes while protecting the Kenoza Lake watershed.

STEW	18	AF	3.00	Sapling Abandoned Field	NA	NA	63 (WP)

This area is an abandoned field that is growing white pine, mixed oak, black cherry, gray birch, red maple and aspen saplings. Apple trees are scattered throughout the area as well. Honeysuckle, bittersweet, buckthorn, silky dogwood, poison ivy, arrowwood, grasses and highbush blueberry are present as well. The area is gently sloped with well drained fine sandy loam soils (Paxton) capable of producing high quality timber resources. Management will focus on reclaiming this early successional habitat prior to the area developing into mature woodlands. The desired future condition is an area that continues to provide early successional habitat for wildlife.

STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	19	MS	21.30	Wetland Pond-Swamp	NA	NA	50 (RM)

This area is a vegetated wetland and a beaver pond with pockets of red maple woodlands in the southern sections. Highbush blueberry, spicebush, alder and other wetland shrubs and vegetation can be found growing along the edges of this area. Beaver are active in this site and currently most of the area is ponded. The area is flat, hummocky in spots and wet throughout the year with very poorly drained organic soils (Freetown Muck). The soils are not productive for growing timber resources. The area provides habitat for beaver, water foul and other forms of wetland wildlife. Management will focus on wildlife habitat enhancement by possibly installing a wood duck box. The desired future condition is a wetland resource area that continues to provide habitat for wildlife.

STEW	20	RM	4.00	8.6” DBH Pole	40 sqft	7 Cords	50 (RM)

Red maple is the dominant overstory species in this pole stand that is variably stocked. Highbush blueberry, alder, spicebush, winterberry and a variety of other wetland shrubs and plants are growing in the understory. This area was once used as a skating pond by the residents of Haverhill in the 1960’s. The area is flat and hummocky in spots with very poorly drained organic soils (Freetown Muck) only capable of producing fair quality timber resources due to the high water table. No management is recommended in this area at this time. The desired future condition is a wetland resource area that continues to provide habitat for wildlife.

STEW	21	MH	9.80	9.5” DBH Sawtimber-Pole	85	3,032 BF & 27.1 Cds	60 (SM)

Mixed hardwoods dominate the overstory of this well stocked pole and small sawtimber sized stand. The mixed hardwoods within the stand include sugar maple, aspen, black cherry, black locust, mixed oaks, Norway maple, white ash, and red maple of poor to good form and timber quality. Forest regeneration consists of mixed hardwood saplings. Forest fires have affected the development and quality of the stand. Fire scars and internal rot can be seen at the base of many of the larger diameter stems. The area is flat to steeply sloped with well drained fine sandy loam soils (Paxton) capable of producing high quality timber resources. Management will focus on improvement thinning practices. The desired future condition is a stand that is growing high quality timber resources in several size and age classes while protecting the Kenoza Lake watershed.

MANAGEMENT PRACTICES
to be done within next 10 years

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	

Timber Management

STEW	2	WH	Improvement Thin By Selection Harvest	10+/-	40 sqft	25 MBF & 250 Tons	2012-2021

Management will focus on improvement thinning by selection harvesting. The target is to harvest approximately 1/3 of the overstory volume. The emphasis will be to harvest mature white pine sawtimber (14" DBH+) in order to improve the growing conditions of the developing high quality white pine and mixed hardwood poles and small sawtimber sized stems. Poorly formed and low quality white pine and mixed hardwood stems of all sizes will also be harvested to improve the health and productivity of the stand. Advanced regeneration will be released and the site will be prepared for new production in the understory as a result of thinning. Scarifying the soil during the harvest will reduce the invasive species currently growing in the understory and increase the probability of establishing natural regeneration. High value sawtimber will be sold as sawlogs, while the low quality softwood trees and portions of trees will be chipped and utilized at wood burning facilities that generate electricity. The low quality hardwoods that are harvested will be cut, skidded and landed for the purpose of providing firewood to the citizens of Haverhill. Please see page 28 for details about the Haverhill Home Fuelwood Program. Whole-tree chipping the tops of trees will be important for protecting and improving aesthetics and reducing the threat of forest fires.

STEW	3	RP	Group Selection Patch Cut	14+/-	35 sqft	35 MBF & 420 Tons	2012-2021

Management will focus on improvement thinning by individual and group selection harvesting. A small patch cut may also be conducted in areas of very poor quality timber resources. The target is to harvest approximately 1/3-1/2 of the red pine overstory volume. Only the best formed stems that have healthy crowns and appear to be wind resistant will remain after the harvest. The primary function of the harvest will be to establish natural regeneration in the understory. Efforts will be made to release the developing white pine and mixed hardwoods of high quality. Advanced regeneration will be released and the site will be prepared for new production in the understory as a result of thinning. Scarifying the soil during the harvest will reduce the invasive species currently growing in the understory and increase the probability of establishing natural regeneration. High value sawtimber will be sold as sawlogs, while the low quality softwood trees and portions of trees will be chipped and utilized at wood burning facilities that generate electricity. The low quality hardwoods that are harvested will be cut, skidded and landed for the purpose of providing firewood to the citizens of Haverhill. Please see page 28 for details about the Haverhill Home Fuelwood Program. Whole-tree chipping the tops of trees will be important for protecting and improving aesthetics and reducing the threat of forest fires.

Continued …….

OBJECTIVE CODE: CH61 = Forest Products (for Ch. 61/61A) STEW= Stewardship Program practices
STD= stand Type= Forest type AC= acre MBF= thousand board feet BA= basal area VOL= volume

Owner(s) City of Haverhill – Winnekenni Park Town(s) Haverhill

MANAGEMENT PRACTICES
to be done within next 10 years

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	

Timber Management

STEW	4	SCP	Group Selection Patch Cut	4+/-	75 sqft	200 Tons	2012-2021

Management will focus on improvement thinning by individual and group selection harvesting. A small patch cut may also be conducted in areas of very poor quality timber resources. The target is to harvest approximately 1/2 of the Scotch Pine overstory volume. Only the best formed stems that have healthy crowns and appear to be wind resistant will remain after the harvest. The primary function of the harvest will be to establish natural regeneration in the understory. Efforts will be made to release the developing and mature white pine and mixed hardwoods of high quality. Advanced regeneration will be released and the site will be prepared for new production in the understory as a result of thinning. Scarifying the soil during the harvest will reduce the invasive species currently growing in the understory and increase the probability of establishing natural regeneration. Most of the timber harvested in this stand will be chipped and utilized at wood burning facilities that generate electricity unless a market for Scotch pine sawlogs can be found. The low quality hardwoods that are harvested will be cut, skidded and landed for the purpose of providing firewood to the citizens of Haverhill. Please see page 28 for details about the Haverhill Home Fuelwood Program. Whole-tree chipping the entire tree will be important for protecting and improving aesthetics and reducing the threat of forest fires.

STEW	5	OH	Selection Harvest Improvement Thin	15+/-	30 sqft	10 MBF & 375 Tons	2012-2021

Management will focus on improvement thinning by selection harvesting. The target is to harvest approximately 1/4 -1/3 of the overstory volume. The emphasis will be to harvest mature mixed oak sawtimber (18" DBH+) in order to improve the growing conditions of the developing high quality mixed oak poles and small sawtimber sized stems. Poorly formed and low quality mixed hardwood stems of all sizes will also be harvested to improve the health and productivity of the stand. Advanced regeneration will be released and the site will be prepared for new production in the understory as a result of thinning. Scarifying the soil during the harvest will reduce the invasive species currently growing in the understory and increase the probability of establishing natural regeneration. High value sawtimber will be sold as sawlogs, while the low quality softwood trees and portions of trees will be chipped and utilized at wood burning facilities that generate electricity. The low quality hardwoods that are harvested will be cut, skidded and landed for the purpose of providing firewood to the citizens of Haverhill. Please see page 28 for details about the Haverhill Home Fuelwood Program. Whole-tree chipping the tops of trees will be important for protecting and improving aesthetics and reducing the threat of forest fires.

Continued ……..

MANAGEMENT PRACTICES
to be done within next 10 years

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	

Timber Management

STEW	9	HH	Salvage Harvest Patch Cut-Group Selection	39+/-	96 sqft	425 MBF & 2000 Tons	2012-2021

A salvage harvest of hemlock wooly adelgid infested trees will be conducted in two or three phases over the next ten years of management in order to reduce the impacts that one harvest may have on the Kenoza Lake watershed. Steep slopes and potential erosion are the primary concern. Hemlock represents 56% of the stands total basal area (96 square feet per acre) on average. The emphasis will be to harvest the infested timber in patches and small groups. Efforts will be made in phase one to harvest infested trees of all sizes around the mature white pine, mixed oaks and mixed hardwood trees that will provide a seed source and help regenerate the areas where hemlock trees have been removed. Advanced mixed hardwood regeneration is scattered throughout the stand and will also aid in stabilizing the areas that have been salvaged. Erosion control measures will be implemented according to State standards when harvesting on steep slopes. A second and possibly third phase of salvage harvesting will be conducted after the first phase openings have been stabilized with natural regeneration. Quarantines on the adelgid infested trees will affect where and how the hemlock timber resources are sold. Whole-tree chipping and chipping the tops of trees that have sawlogs will be important for reducing the threat of forest fires and maintaining good aesthetics, insofar as practical, on such an aggressive harvesting project.

STEW	12	HH	Salvage Harvest Improvement Thin	5+/-	30 sqft	10 MBF & 125 Tons	2012-2021

Management will focus on a salvage harvest of hemlock wooly adelgid infested trees as well as improvement thinning. Approximately 1/3 of the overstory volume will be targeted for harvesting. All of the infested hemlock trees as well as poor quality white pine and mixed hardwood timber of all sizes will be cut in order to improve the growing conditions of the best formed white pine and mixed hardwood poles and developing small sawtimber. Advanced regeneration will be released and new production will be established as a result of the harvesting. Scarifying the soil during the harvest will reduce the invasive species currently growing in the understory and increase the probability of establishing natural regeneration. Quarantines on the adelgid infested trees will affect where and how the hemlock timber resources are sold. The low quality hardwoods that are harvested will be cut, skidded and landed for the purpose of providing firewood to the citizens of Haverhill. Please see page 28 for details about the Haverhill Home Fuelwood Program. Whole-tree chipping and chipping the tops of trees that have sawlogs will be important for reducing the threat of forest fires and maintaining good aesthetics.

Continued …….

MANAGEMENT PRACTICES
to be done within next 10 years

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	

Timber Management

STEW 10-11 WP-NS Selection Harvest 25+/- 40 sqft 70 MBF 2012-2021
Individual & Group & 925 Tons

Management will focus on improvement thinning by individual and group selection harvesting. The target is to harvest approximately 1/4 -1/3 of the overstory volume. The emphasis will be to harvest mature white pine and Norway spruce sawtimber (14" DBH+) in order to improve the growing conditions of the developing high quality poles and small sawtimber sized stems. Poorly formed and low quality white pine, Norway spruce and mixed hardwood stems of all sizes will also be harvested to improve the health and productivity of the stand. Advanced regeneration will be released and the site will be prepared for new production in the understory as a result of thinning. High value sawtimber will be sold as sawlogs, while the low quality softwood trees and portions of trees will be chipped and utilized at wood burning facilities that generate electricity. A portion of the low quality hardwoods that are harvested will be cut, skidded and landed for the purpose of providing firewood to the citizens of Haverhill. Please see page 28 for details about the Haverhill Home Fuelwood Program. Whole-tree chipping the tops of trees will be important for protecting and improving aesthetics and reducing the threat of forest fires.

STEW 14 OH Selection Harvest 50+/- 30 sqft 75 MBF 2012-2021
Improvement Thin & 1,250 Tons

Management will focus on improvement thinning by selection harvesting. The target is to harvest approximately 1/4 of the overstory volume. The emphasis will be to harvest trees that have been damaged in storms and trees that pose a potential threat to public safety along the access roads and trails that wind through this stand. Large diameter mixed oaks and mixed hardwood sawtimber (18" DBH+) will be harvested to improve the growing conditions of the developing high quality mixed oak and mixed hardwood poles and small sawtimber sized stems. Trees that have been burned in the past and are showing signs of internal decay are also a high priority for harvesting. Poorly formed and low quality mixed hardwood stems of all sizes will also be harvested to improve the health and productivity of the stand. A portion of the trees that are healthy and have reached a diameter of 25-30" DBH will be retained as "Legacy Trees". Advanced regeneration will be released and the site will be prepared for new production in the understory as a result of thinning. High value sawtimber will be sold as sawlogs, while the low quality softwood trees and portions of trees will be chipped and utilized at wood burning facilities that generate electricity. The low quality hardwoods that are harvested will be cut, skidded and landed for the purpose of providing firewood to the citizens of Haverhill. Please see page 28 for details about the Haverhill Home Fuelwood Program. Chipping the tops of trees will be important for protecting and improving aesthetics and reducing the threat of forest fires.

OBJECTIVE CODE: CH61 = Forest Products (for Ch. 61/61A) STEW= Stewardship Program practices
STD= stand Type= Forest type AC= acre MBF= thousand board feet BA= basal area VOL= volume

Owner(s) City of Haverhill – Winnekenni Park Town(s) Haverhill

MANAGEMENT PRACTICES
to be done within next 10 years

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	

Timber Management

STEW	15	OH	Selection Harvest Improvement Thin	50+/-	30 sqft	75 MBF & 1,250 Tons	2012-2021

Management will focus on improvement thinning by selection harvesting. The target is to harvest approximately 1/4 of the overstory volume. The emphasis will be to harvest trees that have been damaged in storms and trees that pose a potential threat to public safety along the access roads and trails that wind through this stand. Large diameter mixed oaks and mixed hardwood sawtimber (18" DBH+) will be harvested to improve the growing conditions of the developing high quality mixed oak and mixed hardwood poles and small sawtimber sized stems. Trees that have been burned in the past and are showing signs of internal decay are also a high priority for harvesting. Poorly formed and low quality mixed hardwood stems of all sizes will also be harvested to improve the health and productivity of the stand. A portion of the trees that are healthy and have reached a diameter of 25-30" DBH will be retained as "Legacy Trees". Advanced regeneration will be released and the site will be prepared for new production in the understory as a result of thinning. High value sawtimber will be sold as sawlogs, while the low quality softwood trees and portions of trees will be chipped and utilized at wood burning facilities that generate electricity. A portion of the low quality hardwoods that are harvested will be cut, skidded and landed for the purpose of providing firewood to the citizens of Haverhill. Please see page 28 for details about the Haverhill Home Fuelwood Program. Chipping the tops of trees will be important for protecting and improving aesthetics and reducing the threat of forest fires.

STEW	21	MH	Improvement Thin By Selection Harvest	8+/-	25 sqft	4 MBF & 280 Tons	2012-2021

Management will focus on improvement thinning by selection harvesting. The target is to harvest approximately 1/3 of the overstory volume. The emphasis will be to harvest all trees of poor form and poor quality of all sizes. Trees that have been burned in the past and are showing signs of internal decay are also a high priority for harvesting. Thinning around the best formed and high quality sugar maple, mixed oaks and black cherry poles and developing sawtimber will be a priority. Advanced regeneration will be released and the site will be prepared for new production in the understory as a result of thinning. Any high value sawtimber will be sold as sawlogs, while the low quality trees and portions of trees will be chipped and utilized at wood burning facilities that generate electricity. A portion of the low quality hardwoods that are harvested will be cut, skidded and landed for the purpose of providing firewood to the citizens of Haverhill. Please see page 28 for details about the Haverhill Home Fuelwood Program. Chipping the tops of trees will be important for protecting and improving aesthetics and reducing the threat of forest fires.

It should be noted that the above timber harvesting schedule will exceed the 30% Subwatershed Administration of Forest Management as defined in the Quabbin Forest Management Plan. The Forest Management Committee will choose where and when to harvest based on priority and will use the 30% harvesting of forest stocking as a guide.

OBJECTIVE CODE: CH61 = Forest Products (for Ch. 61/61A) STEW= Stewardship Program practices
STD= stand Type= Forest type AC= acre MBF= thousand board feet BA= basal area VOL= volume

Owner(s) City of Haverhill – Winnekenni Park Town(s) Haverhill

MANAGEMENT PRACTICES
to be done within next 10 years

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	

Biological Diversity

STEW 1-21 All Invasive Species Control 390+/- NA NA 2012-2021

The Forest Stewardship Committee is interested in promoting biological diversity on the property. Eliminating invasive and non-native trees, plants and shrubs will be done where these species exist and when economically feasible and practical. Buckthorn, firebush (winged euonymus), bittersweet, honeysuckle, Norway maple, and Japanese barberry are currently known to be growing on the property and are prolific in areas. Natural communities are being affected by their presence in several areas within the forest. The heaviest concentrations of invasive species growth can be found in Compartment #1 along Kenoza Street. Cutting the stems with saws, or with other mechanical means, will help reduce and control the spread of the invasive species. Controlling the invasive species through well timed timber management activities is another management tool. Encouraging vigorous growth of native tree species in the forest understory will be accomplished by scarifying the soil prior to seed dissemination. Another biodiversity issue is the distribution of forest growth stages. Trying to maintain multiple forest age and size classes on the property will also be pursued by the landowner on this property through periodic timber harvests and wildlife habitat management. Please see the Biological Diversity issues on page #8 for more details.

The Forest Stewardship Committee is currently seeking council from the UMass Amherst Extension Center for Agriculture and the United States Forest Service with regard to controlling invasive species as part of a forest stewardship program to ensure active management activities do not result in proliferation of these species in any of the City's forest lands.

Old Growth Timber Management

STEW 14 HH Old Growth Management 2+/- NA NA 2012-2021

Stand #14 contains a significant number of trees that are in the large sawtimber class that have old growth characteristics. The recommendation for this stand is to promote the health and vigor of these large diameter white pine stems. The University of Massachusetts Mass Woods Forest Conservation Program (masswoods.net) has published a brochure that can be used to assist landowners with the management of these old forest types. One requirement of restoring old growth characteristics involves having large trees with diameters of 25-30" in diameter (DBH). This stand has several trees that have reached that size with many more approaching this desired size. Thinning around these "Legacy Trees" would improve their growth and health into the future. Selecting the legacy trees would be done prior to removing the undesirable trees.

MANAGEMENT PRACTICES
to be done within next 10 years

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	

Wildlife Habitat Enhancement

STEW	18	AF	Early Successional Habitat Undesirable Vegetation Control	3+/-	NA	NA	2012-2021

Management in this area will focus on reclaiming and maintaining early successional forest habitat towards the end of this ten year management period as the area begins to develop into a forest. This site will be cleared by using whole-tree chipping equipment or by other mechanical vegetation control methods. The harvesting will probably be timed with commercial timber harvesting that occurs in Stands 14 or 15. Funding for this size and type of project may be available through the Federal Wildlife Habitat Incentive Program (WHIP).

Timber harvesting practices alone will enhance wildlife habitat. Creating an unevenaged forest structure while maintaining a variety of forest types and vegetation will greatly increase the diversity of wildlife species using this property for food, protection, mating and nesting. For more information on wildlife management please refer to *"Enhancing Wildlife Habitats; A Practical Guide For Forest Landowners"*. Please also see the Timber Management recommendations on pages 21-25.

In looking to implement the three-strategy approach of managing for diversity, protecting existing habitat, and enhancing existing habitat, the Forest Management Committee is currently contracted with Mass Audubon to review habitat characteristics and provide management recommendations prior to the Stewardship Plan's implementation.

Boundary Maintenance

STEW	All	All	Blaze & Paint	390+/-	NA	NA	2012-2021

The eastern boundary lines of the property were blazed and painted red approximately 10-15 years ago. Sections of the western and southern boundary lines have also been blazed and painted red. A new coat of paint and property identification signs would be appropriate in the near future. Abutting property surveys will be used to verify the property lines before conducting forest management activities on the property.

MANAGEMENT PRACTICES
to be done within next 10 years

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	

Cultural Resource Protection

STEW All All Protect Cultural Resources 390+/- NA NA 2012-2021

Protecting the cultural resources on the property is a high priority of the Forest Management Committee. The Birchbrow Estate remains, the Dudley Porter Memorial, the Carleton Fountain and the Winnekenni Castle are all historical resources that will be protected and preserved by the City of Haverhill. Efforts to protect the foundations of the Birch Brow Estate in particular will be pursued by the Committee. Removing trees that are growing into the foundations will be important for preserving them as the forest develops over time.

Urban Tree Management Plan

The Winnekenni Park and Plug Pond Conservation Areas attracts the residents of Haverhill and many people from surrounding communities on a daily basis. The City of Haverhill would like to provide a safe and enjoyable experience for all who visit and use the many trails that meander through the property. One of the Forest Management Committees concerns is the deteriorating health of trees within the conservation areas and along the trails within the forest. The Committee will consider the development of an Urban Tree Management Plan to address some of the concerns of aging trees and potentially high risk trees in areas that are highly used by the public.

Home Fuelwood Program

The Forest Management Committee has developed the *Haverhill Home Fuelwood Program* as a means of making firewood available to the residents of Haverhill. The low quality hardwood stems that are harvested in the recommended timber sales within the Kenoza Lake watershed will be one of the sources of wood for this program. Hardwood stems that are cut on the property will be skidded to landings on the property used for the commercial timber harvesting projects. The trees will be cut to a length of approximately 24 feet and then trucked to the Haverhill Highway Facility at 500 Primrose Street where the firewood will be stacked in one-cord piles. Haverhill residents will be allowed to bid on the one-cord piles at the completion of the commercial harvest. Successful bidders will be required to cut the trees into stove lengths and remove the firewood on their own. The successful bidders will be required to sign a liability waiver that does not hold the City of Haverhill liable for any accidents, injury or death as a result of cutting and removing the stacked firewood. The intent is to make the project revenue neutral and as safe as possible. There will be a cost of having the firewood trees cut, skidded, landed and trucked to the Haverhill highway facility at 500 Primrose Street of approximately $75-$80 per cord. Bids for the stacked firewood must at least cover this cost. The recommended harvests on Kenoza Lake watershed could generate as much as 400+/- cords of firewood for this program over a ten year period.

MANAGEMENT PRACTICES
to be done within next 10 years

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	

Recreation Management
Forest Stewardship Education

STEW	21	All	Trail Maintenance Forest Stewardship Education	390+/-	NA	NA	2012-2021

The existing trails at the Winnekenni Park and Plugs Pond Conservation Area will be periodically maintained for the safety, enjoyment and education of the residents of Haverhill. Trail maps, tags, interpretive signs, picnic tables, gates and a kiosk will all be variables associated with the management of the trails and the education of those who will be using the trails. Currently, the trails are marked with paint. Trail maps are available at the Castle. Interpretive signs along the trails will help educate the property users about Forest Stewardship matters within the forest interior.

Signature Page Please check each box that applies.

☐ **CH. 61/61A Management Plan** I attest that I am familiar with and will be bound by all applicable Federal, State, and Local environmental laws and /or rules and regulations of the Department of Conservation and Recreation. I further understand that in the event that I convey all or any portion of this land during the period of classification, I am under obligation to notify the grantee(s) of all obligations of this plan which become his/hers to perform and will notify the Department of Conservation and Recreation of said change of ownership.

☒ **Forest Stewardship Plan**. I pledge to abide by the management provisions of this Stewardship Management Plan for a period of at least ten years, following approval. I understand that in the event that I convey all or a portion of the land described in this plan during the period of the plan, I will notify the Department of Conservation and Recreation of this change in ownership.

Signed under the pains of perjury:

Owner(s) _____ Date _____

_____ Date _____

I attest that I have prepared this plan in good faith to reflect the landowner's interest.

Plan Preparer _____ Date _____

I attest that the plan satisfactorily meets the requirements of CH61/61A and/or the Forest Stewardship Program.

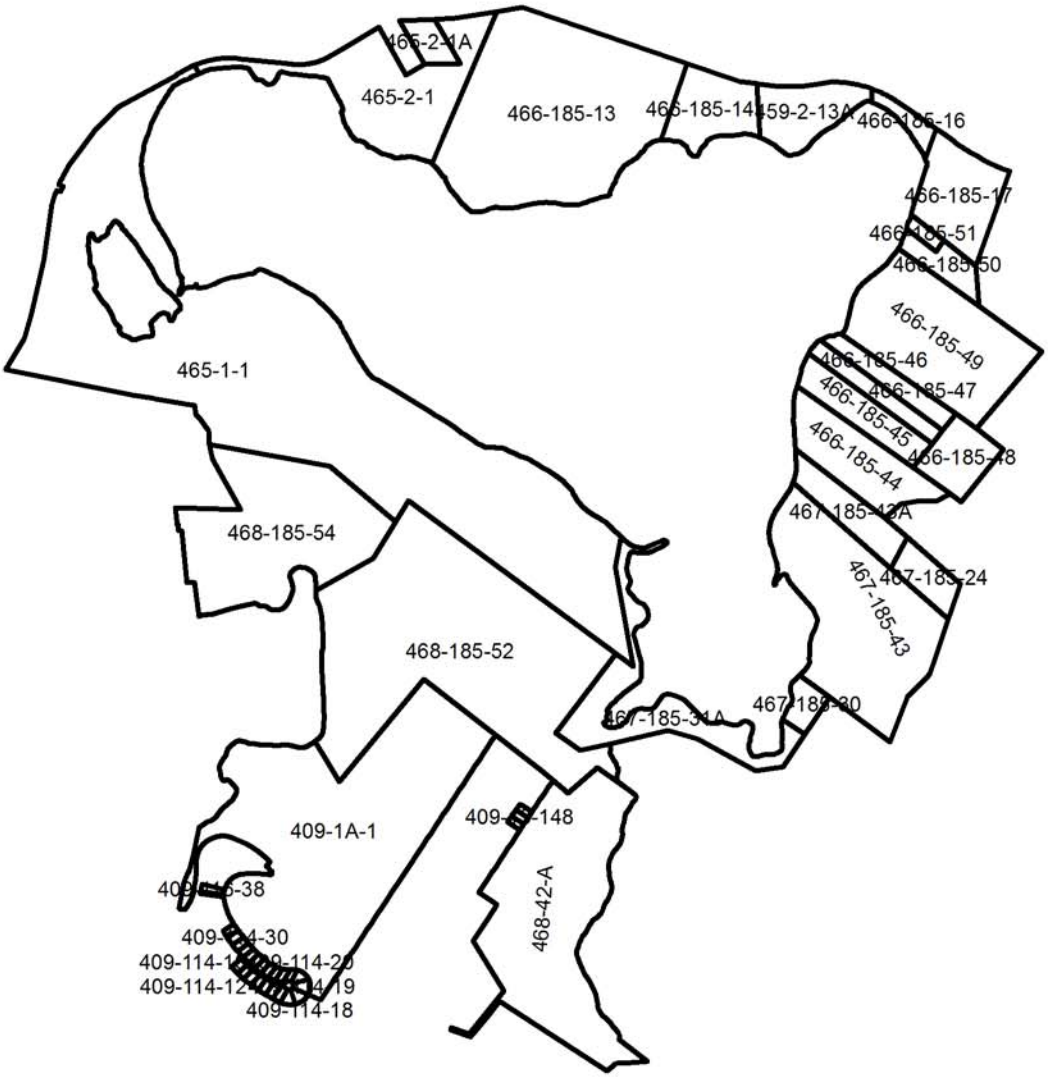
Approved, Service Forester _____ Date _____

Approved, Regional Supervisor _____ Date _____

In the event of a change of ownership of all or part of the property, the new owner must file an amended Ch. 61/61A plan within 90 days from the transfer of title to insure continuation of Ch. 61/61A classification.

Owner(s) City of Haverhill – Winnekenni Park Town(s) Haverhill

City of Haverhill
Winnekenni Park & Plug Pond Conservation Area
Haverhill, MA
Tax Map & Lot Numbers



1,320 660 0 1,320 2,640 Feet

N
W E
S

Prepared by:
New England Forestry Consultants, Inc
Sherman R. Small, Consulting Forester
Maine License # LF655
New Hampshire License # 409

March 19, 2012

Sketch map for management and planning purposes only, NOT A LEGAL SURVEY
Data obtained from MASS GIS, & New England Forestry Consultants, Inc.

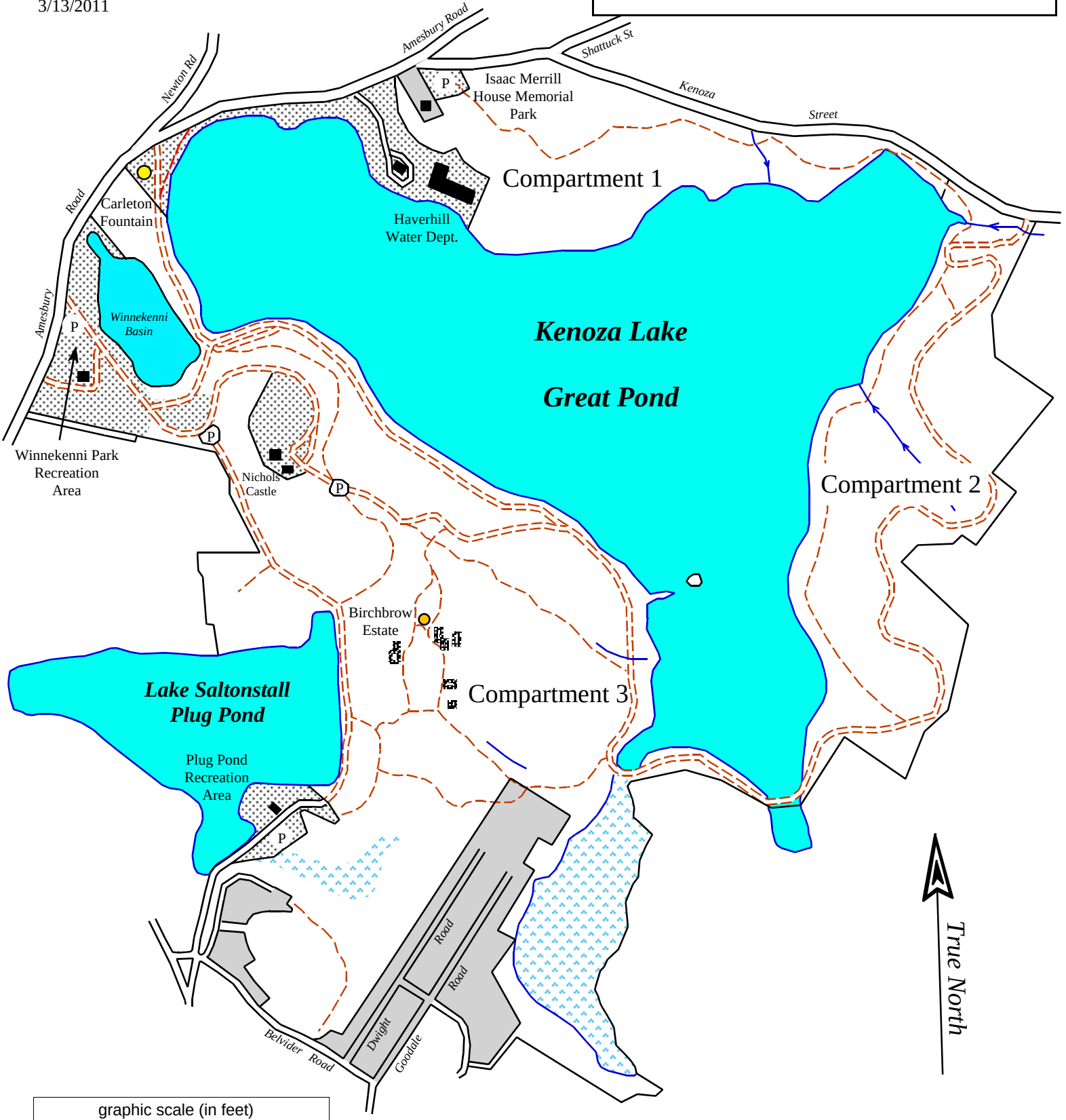
New England
Forestry Consultants, Inc.

Prepared By:
Gary H. Gouldrup
Consulting Forester
72 Townsend Street
Pepperell, MA 01463
978-433-8780
3/13/2011

COMPARTMENT MAP

Land in Haverhill, MA
Winnekenni Park & Plug Pond Conservation Area

Owned By:
City of Haverhill
Haverhill Conservation Department



BOUNDARY & STAND TYPE MAP

Land in Haverhill, MA
Winnekenni Park & Plug Pond Conservation Area

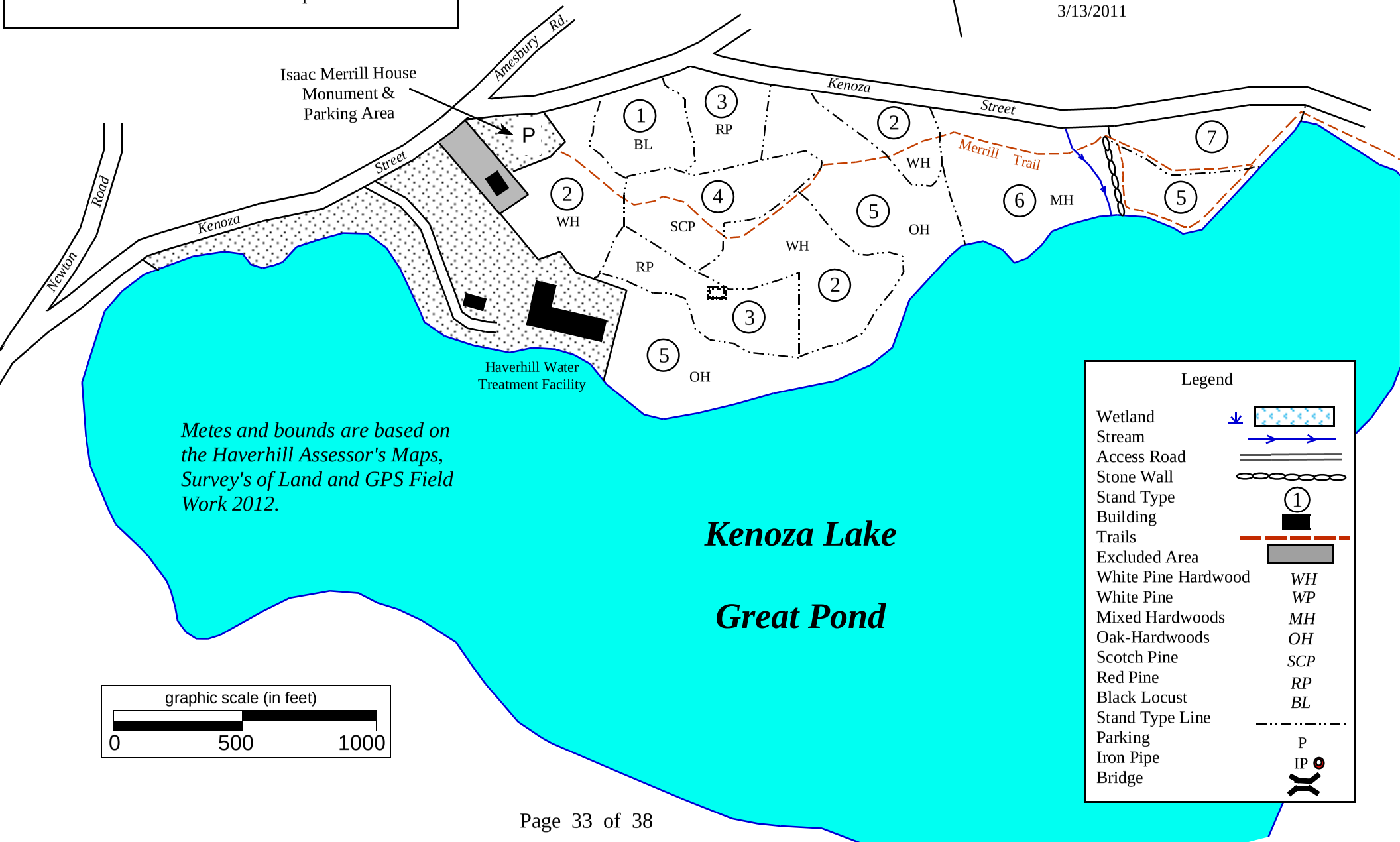
Owned By:
City of Haverhill
Haverhill Conservation Department

COMPARTMENT #1
65.38 Acres

True North

New England Forestry Consultants, Inc.

Prepared By:
Gary H. Gouldrup
Consulting Forester
72 Townsend Street
Pepperell, MA 01463
978-433-8780
3/13/2011



Metes and bounds are based on the Haverhill Assessor's Maps, Survey's of Land and GPS Field Work 2012.

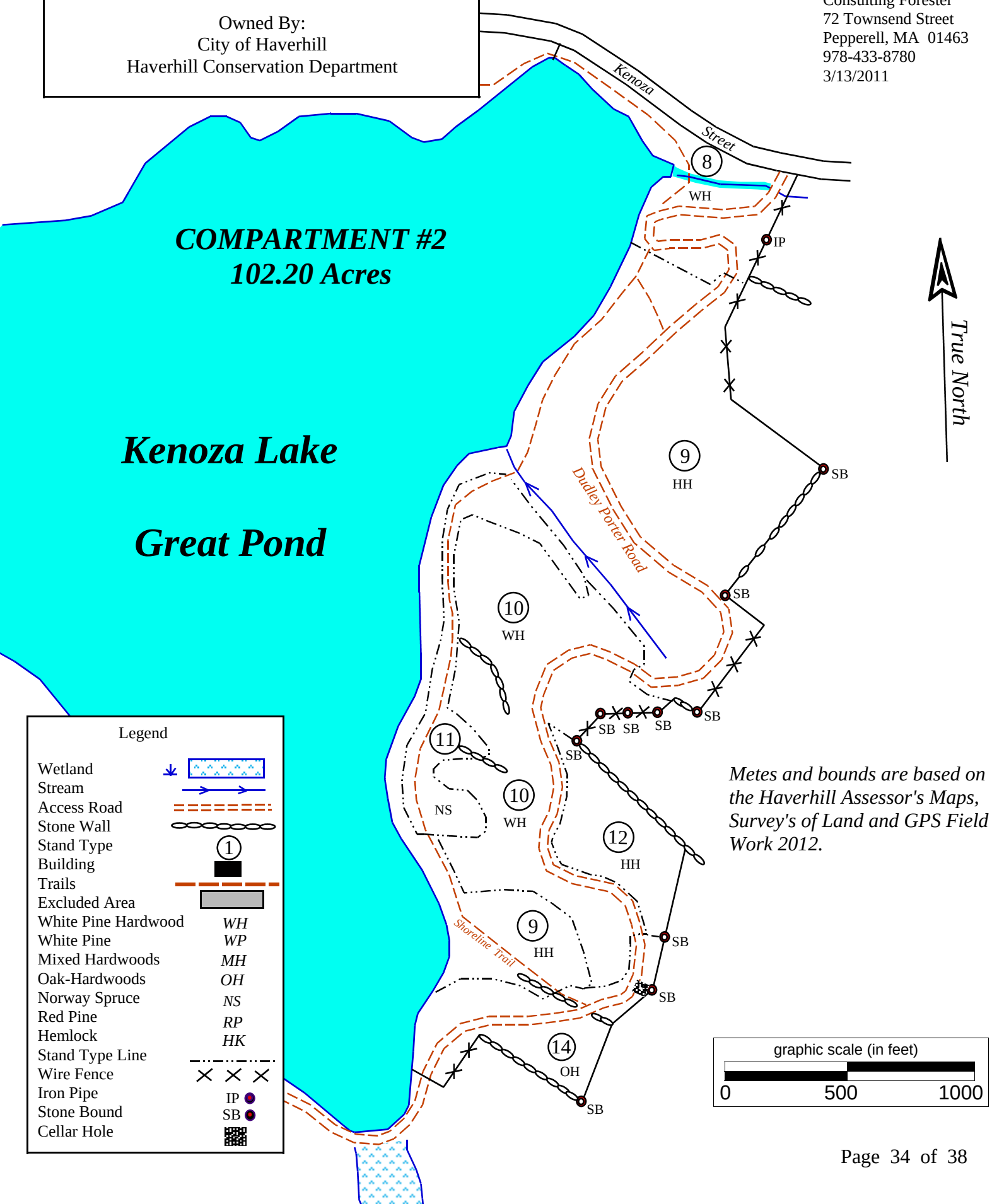
BOUNDARY & STAND TYPE MAP

Land in Haverhill, MA
Winnekenni Park & Plug Pond Conservation Area

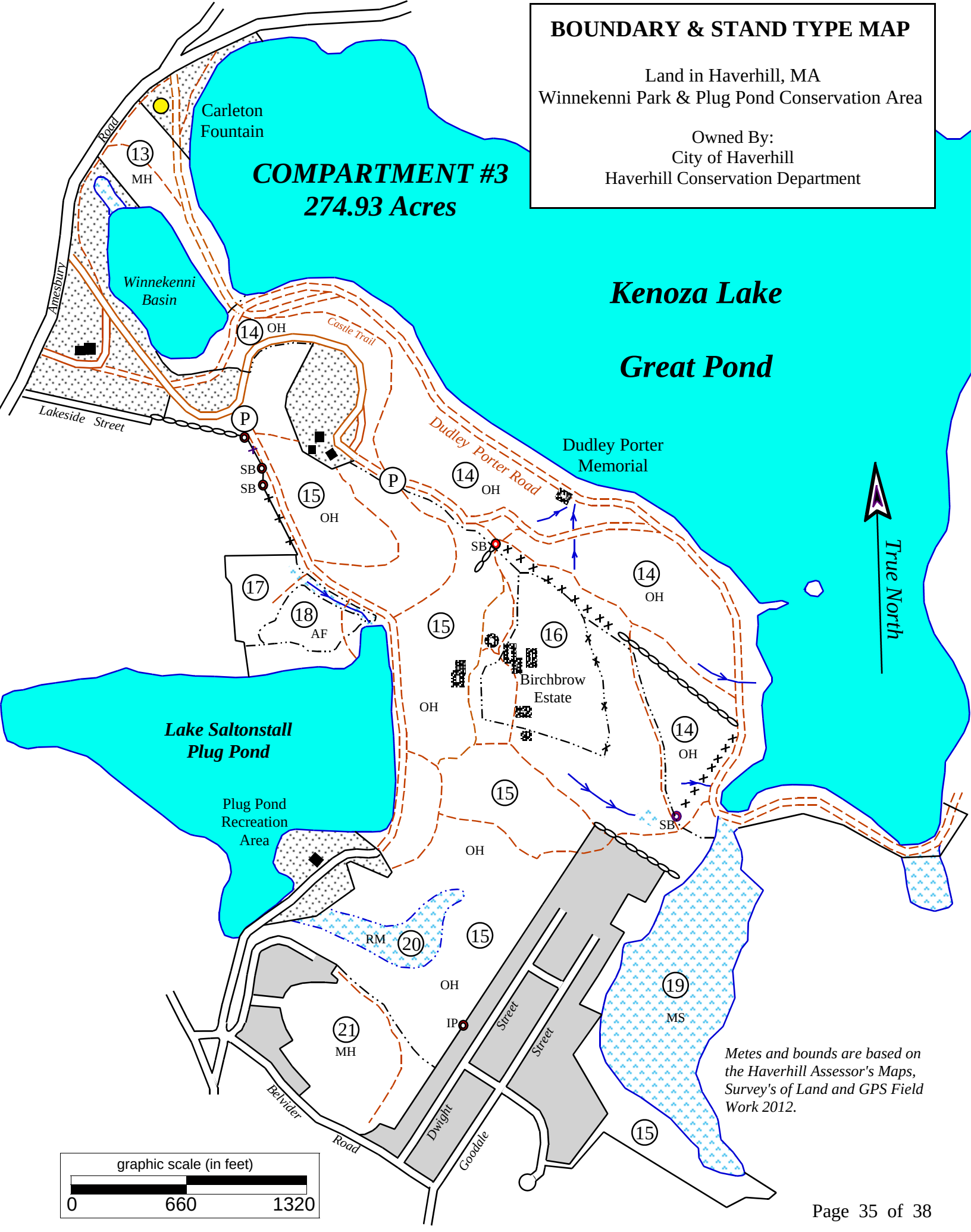
Owned By:
City of Haverhill
Haverhill Conservation Department

New England
Forestry Consultants, Inc.

Prepared By:
Gary H. Gouldrup
Consulting Forester
72 Townsend Street
Pepperell, MA 01463
978-433-8780
3/13/2011



Metes and bounds are based on the Haverhill Assessor's Maps, Survey's of Land and GPS Field Work 2012.


BOUNDARY & STAND TYPE MAP
Land in Haverhill, MA
Winnekenni Park & Plug Pond Conservation Area
Owned By:
City of Haverhill
Haverhill Conservation Department
COMPARTMENT #3
274.93 Acres
Kenoza Lake
Great Pond
Carleton Fountain
Winnekenni Basin
Amesbury Road
Lakeside Street
Castle Trail
Dudley Porter Road
Dudley Porter Memorial
Lake Saltonstall
Plug Pond
Plug Pond Recreation Area
Birchbrow Estate
Belvidere Road
Dwight Street
Goodale Street
True North
13 MH
14 OH
15 OH
16
17
18 AF
19 MS
20 RM
21 MH
P
SB
IP
graphic scale (in feet)
0
660
1320
Metes and bounds are based on the Haverhill Assessor's Maps, Survey's of Land and GPS Field Work 2012.

City of Haverhill
Winnekenni Park & Plug Pond Conservation Area
Haverhill, MA
2008 Aerial Photo

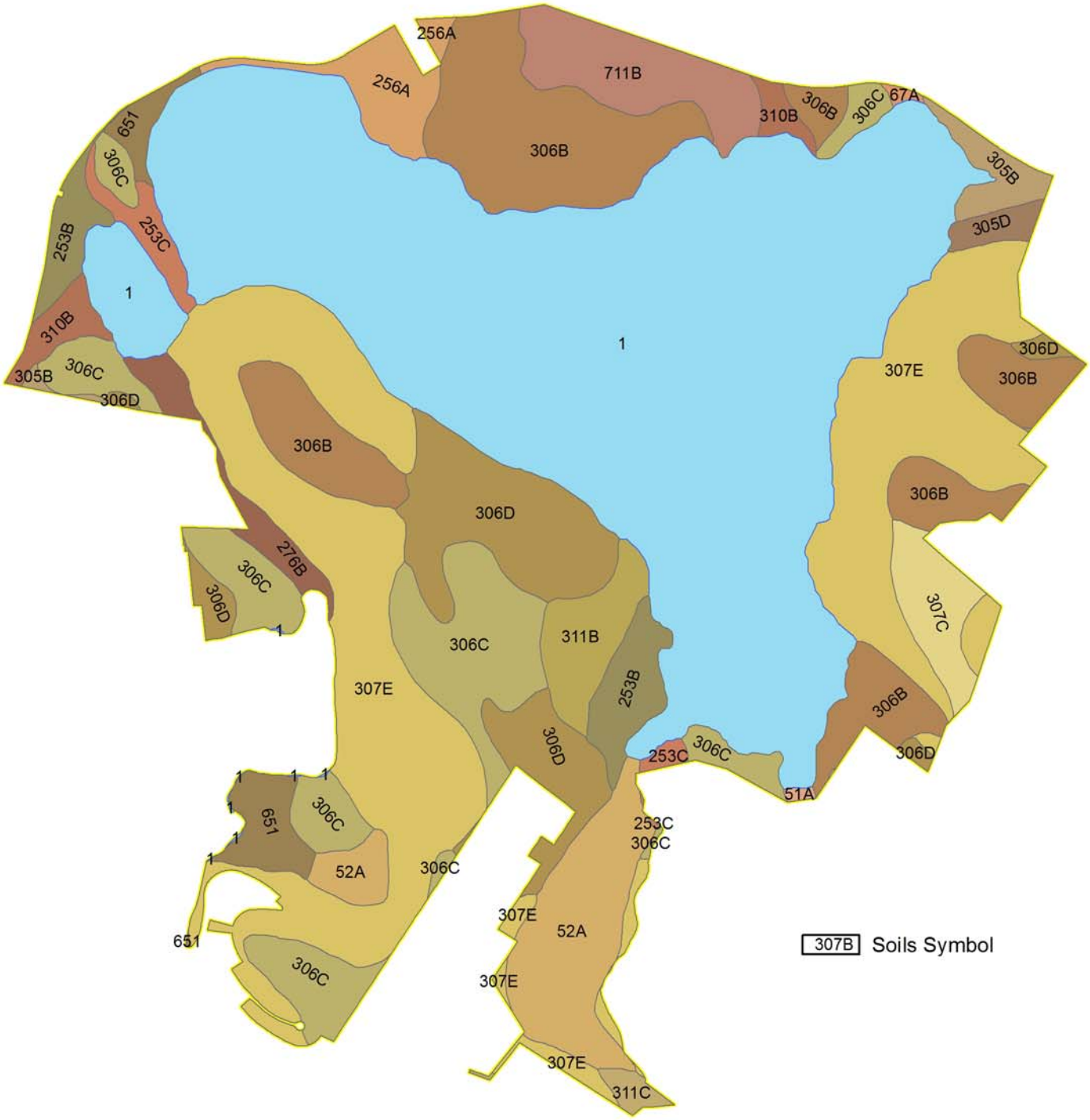
1,000 500 0 1,000 2,000 Feet

N
W E
S

Prepared by:
New England Forestry Consultants, Inc
Sherman R. Small, Consulting Forester
Maine License # LF655
New Hampshire License # 409
March 19, 2012

Sketch map for management and planning purposes only, NOT A LEGAL SURVEY
Data obtained from MASS GIS, & New England Forestry Consultants, Inc.

City of Haverhill
Winnekenni Park & Plug Pond Conservation Area
Haverhill, MA
Soils Map



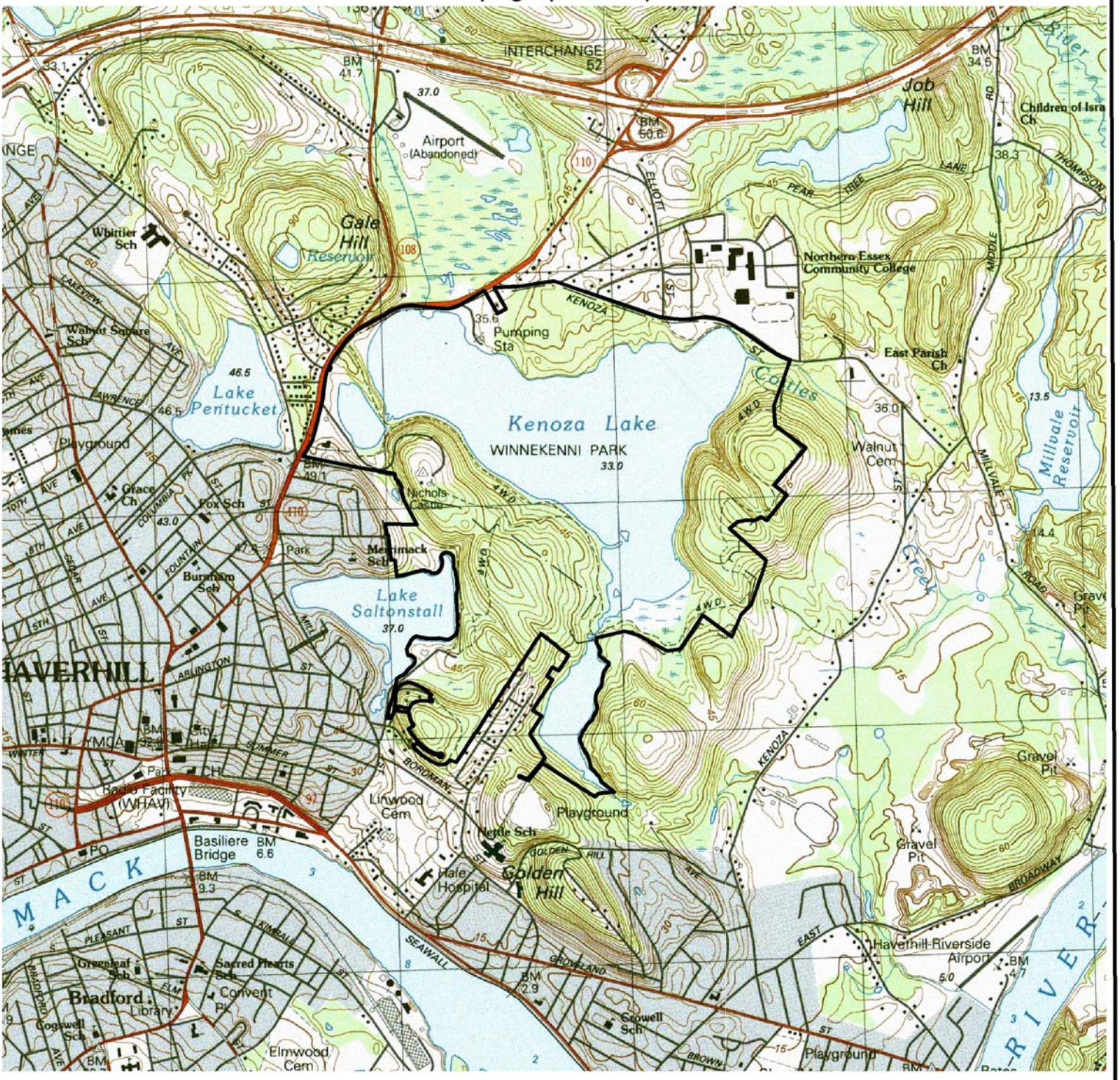
1,000 500 0 1,000 2,000 Feet

N W E S

Prepared by:
New England Forestry Consultants, Inc
Sherman R. Small, Consulting Forester
Maine License # LF655
New Hampshire License # 409
March 19, 2012

Sketch map for management and planning purposes only, NOT A LEGAL SURVEY
Data obtained from MASS GIS, & New England Forestry Consultants, Inc.

City of Haverhill
Winnekenni Park & Plug Pond Conservation Area
Haverhill, MA
Topographic Map



2,000 1,000 0 2,000 4,000 Feet

N
W E
S

Prepared by:
New England Forestry Consultants, Inc
Sherman R. Small, Consulting Forester
Maine License # LF655
New Hampshire License # 409

March 19, 2012

Sketch map for management and planning purposes only, NOT A LEGAL SURVEY
Data obtained from MASS GIS, & New England Forestry Consultants, Inc.