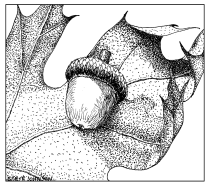
FOREST MANAGEMENT PLAN

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 & Merrimac* Road(s) *Brandy Brow Road*

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

Forest Legacy Only

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
*	*	*	*	457.10	3.24	0.00	3.24	0.00	453.86
			TOTALS	**457.10**	**3.24**	**0.00**	**3.24**	0.00	**453.86**

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

There are 3.24 acres to be excluded from Forest Stewardship Classification. The area is a leaf mulching site managed by the City of Haverhill. Please see the Boundary & Stand Type Map on page 33 for exclusion details.

HISTORY

Year acquired *Since 1915* Year management began *2011*

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.*

This is the first Forest Stewardship Plan prepared for the property.

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									
462	203-23(3)	UK	UK	15.03	0.00	0.00	3.24	0.00	11.79
462	203-10	UK	UK	17.47	0.00	0.00	0.00	0.00	17.47
462	203-25(3)	UK	UK	36.81	0.00	0.00	0.00	0.00	38.61
462	203-29(2)	116155	PR	6.90	0.00	0.00	0.00	0.00	6.90
462	203-25A	116155	PR	6.90	0.00	0.00	0.00	0.00	6.90
462	203-9(3)	116241	PR	12.95	0.00	0.00	0.00	0.00	12.95
462	203-17(2)	UK	UK	9.80	0.00	0.00	0.00	0.00	9.80
462	203-13	UK	UK	1.70	0.00	0.00	0.00	0.00	1.70
462	203-22	116228	PR	17.20	0.00	0.00	0.00	0.00	17.20
462	203-19(2)	116228	PR	7.80	0.00	0.00	0.00	0.00	7.80
462	203-7	116152	PR	3.00	0.00	0.00	0.00	0.00	3.00
462	203-4	116151	PR	2.25	0.00	0.00	0.00	0.00	2.25
462	203-27	UK	UK	6.00	0.00	0.00	0.00	0.00	6.00
462	203-2	116153	PR	4.10	0.00	0.00	0.00	0.00	4.10
462	203-26	UK	UK	2.39	0.00	0.00	0.00	0.00	2.39
462	204-70	UK	UK	5.19	0.00	0.00	0.00	0.00	5.19
462	204-69	UK	UK	3.50	0.00	0.00	0.00	0.00	3.50
462	204-66	UK	UK	6.60	0.00	0.00	0.00	0.00	6.60
462	204-67	UK	UK	6.60	0.00	0.00	0.00	0.00	6.60
462	204-66	UK	UK	6.60	0.00	0.00	0.00	0.00	6.60
462	204-3	UK	UK	4.32	0.00	0.00	0.00	0.00	4.32
462	204-4	UK	UK	4.69	0.00	0.00	0.00	0.00	4.69
462	204-6	UK	UK	11.89	0.00	0.00	0.00	0.00	11.89
462	204-12(4)	UK	UK	24.19	0.00	0.00	0.00	0.00	24.19
462	204-16	16114	384	2.40	0.00	0.00	0.00	0.00	2.40
462	204-28	UK	UK	6.30	0.00	0.00	0.00	0.00	6.30
462	204-7	16114	384	13.60	0.00	0.00	0.00	0.00	13.60
462	204-20	UK	UK	4.10	0.00	0.00	0.00	0.00	4.10
462	204-62(3)	UK	UK	42.30	0.00	0.00	0.00	0.00	42.30
462	204-59	UK	UK	13.50	0.00	0.00	0.00	0.00	13.50
462	204-30	116227	PR	10.00	0.00	0.00	0.00	0.00	10.00
462	204-31	UK	UK	7.40	0.00	0.00	0.00	0.00	7.40
464	2-4(3)	116229	PR	20.43	0.00	0.00	0.00	0.00	20.43
464	2-3	116154	PR	5.99	0.00	0.00	0.00	0.00	5.99
433	1-55	116226	PR	2.58	0.00	0.00	0.00	0.00	2.58
433	1-60	9464	132	0.51	0.00	0.00	0.00	0.00	0.51
433	1-61	9464	132	0.51	0.00	0.00	0.00	0.00	0.51
Merrimac									
79	1-2	2315	447	101.80	0.00	0.00	0.00	0.00	101.80
			TOTALS	**457.10**	**NA**	**NA**	**3.24**	0.00	**453.86**

******* *Parenthesis indicate the number of lots combined within the lot referenced.*

Owner(s) City of Haverhill – East Meadow Brook Town(s) Haverhill

Property Overview, Regional Significance, and Management Summary

The 457+/-acre East Meadow Brook forest is located in the northern corner of Haverhill (356-acres) and a southwestern corner of Merrimac (101-acres). The property boarders the Plaistow and Newton, NH state boundary line. Route 495 is only 1,635' southeast of the southern extent of the property. The best access to the property is off of Brandy Brow Road in Merrimac. The forest is situated in a semi-rural area where housing developments have become the primary land use around the property over the last 30+ years.

The property has been acquired periodically over time since 1915. Many of the previous landowners sold sand and gravel off the land. Old gravel pits that were abandoned are in various stages of succession. Several of the pits were recently abandoned, while others have been abandoned for over 30 years. Many of these pits provided sand and gravel for the construction of Route 495.

The property lies in the Merrimack Watershed. Water that passes through the property flows south into East Meadow Brook. East Meadow Brook dissects the property from north to south. Water that leaves the property continues to flow south into the Millvale Reservoir and eventually into the Merrimack River which is approximately 2.8 miles south of the property. 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 Millvale Reservoir to Kenoza Lake where a water treatment facility is located for the distribution of water to the citizens of Haverhill.

The forest stewardship land is diverse and consists of mature woodlands (65%), abandoned gravel pits (16%) and open wetland resource areas (19%). White pine and mixed oaks are the dominant tree species in the uplands and represent approximately 76% of the forest stocking. Timber resource quality ranges from poor to high. The abandoned sand and gravel pits provide young forest and early successional habitat. Most of the trees growing in these abandoned pits are in the sapling class (0-4" DBH), although some of the pits that were abandoned over 25 years ago are moving into the pole class (5" DBH+). The undisturbed areas within the forest are growing stands of timber that are overstocked and in the large sawtimber class. Most of these mature stands of timber have not been managed in the past. It is common to find trees that exceed 25" in diameter (DBH) throughout these mature woodland areas. A unique stand of sugar maple can be found in the northwest corner of Stand #24 within Compartment #3. Invasive and non-native vegetation on the property include barberry, buckthorn, autumn olive, multiflora rose, bittersweet, and honeysuckle. Most of the invasive species can be found growing in the abandoned pits.

Forest soils on the upland sections of the property include well drained loamy sand (Hinckley), well drained fine sandy loam (Paxton), loamy course sand (Carver), loamy fine sand (Hinckley-Windsor) and moderately drained fine sandy loam (Deerfield). The poorly drained sites include fine sandy loam (Scarboro-Ridgebury) and very poorly drained muck (Freetown). The abandoned pits are listed as a soil type of their own. The pit soils are disturbed and consist of primarily sand and gravel.

Wildlife habitat is diverse throughout the property. Active beaver flows, vernal pools, ponds, early successional forests, mature woodlands, and open wetlands provide habitat for numerous forms of native wildlife. The Blanding's turtle is known to exist within areas north of Brandy Brow Road. Owls, deer, turkey, fox, roughed grouse, woodcock, pileated woodpecker, beaver and snowshoe hare

were all observed during the forest inventory.

The Haverhill City Mayor, through the Conservation Department, established the Haverhill Forest Stewardship Committee in 2009. The Forest Stewardship Committee has developed the following goals for the East Meadow Brook property:

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 East Meadow Brook is essential. The City would like to specifically accomplish the following on this property:

- Enhance both the quality and quantity of future timber products;
- Conduct a biomass operation to improve regeneration and aesthetics;
- Produce firewood that will be made available to residents;
- Enhance wildlife habitat by diversifying tree age and species, creating and maintaining successional "pockets", and protecting heritage trees.
- Protect and enhance the habitat for the Blanding's Turtle.
- Discourage unauthorized ATV access;
- Protect the water quality of the East Meadow Brook Watershed.

Timber resource management will be aimed at enhancing the quality of timber resources into the future while improving wildlife habitats and 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. Removing low quality hardwoods for firewood will be done in order to generate a supply of firewood for the residents of Haverhill.

The primary management objective of the East Meadow Brook property will be to preserve, maintain and improve water quality as a public water resource supply for the residents of Haverhill. The Haverhill Forest Stewardship Committee 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 Stewardship Committee would like to pursue management of the East Meadow Brook property as stated in the first paragraph under the "Primary Objectives" (5.2.3.1). *"The primary objective of forest management of the Quabbin* (East Meadow Brook) *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

Stewardship Committee will use the Quabbin Plan as a guide when managing the East Meadow Brook watershed lands.

Continued on page 5 ……

Management on the East Meadow Brook 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. Artificial nest boxes for wood ducks will be installed in the open water resource areas with emergent vegetation. Periodic clearing and reclamation of early successional forest habitat within the abandoned sand and gravel pits will be pursued as these areas grow into mature woodlands. The Blanding's Turtle will benefit from openings created within these sandy gravel pits. Identifying large "Legacy Trees" will be done to promote "Old Growth" characteristics within the forest where these trees exist and where this practice is applicable.

All forest management activities will be sensitive to protecting 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			X	
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			X	
Improve Hunting			X	
Improve Fishing		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 East Meadow Brook property for the benefit of the residents of Haverhill. Protecting the East Meadow Brook Watershed is a high priority. These goals will be accomplished by periodically harvesting timber resources, discouraging the use of unauthorized motor vehicle use (ATV's), enhancing wildlife habitat and educating the public on forest stewardship matters.

Stewardship Purpose

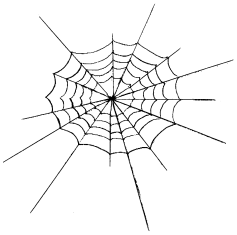
By enrolling in the Forest Stewardship Program and following a Stewardship Plan, I understand that I will be joining with many other landowners across the state in a program that promotes ecologically responsible resource management through the following actions and values:

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.

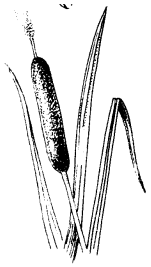
Another factor influencing biodiversity in Massachusetts concerns the amount and distribution of forest growth stages. Wildlife biologists have recommended that, for optimal wildlife habitat on a landscape scale, 5-15% of the forest should be in the seedling stage (less than 1" in diameter). Yet we currently 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.

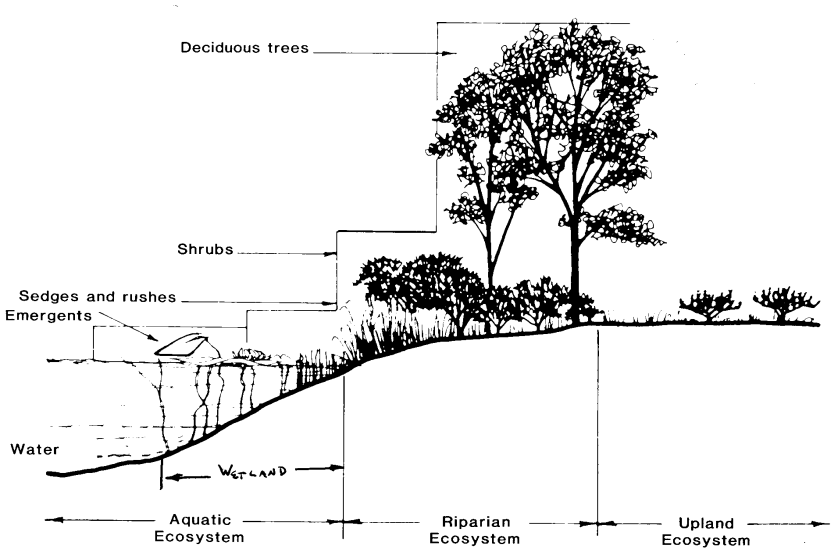


Figure 1: Example of a riparian zone.

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.

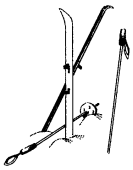
Cultural Resources: Cultural resources are the places containing evidence of people who once lived in the area. Whether a Native American village from 1,700 years ago, or the remains of a farmstead from the 1800's, these features all tell important and interesting stories about the landscape, and should 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	WP	34.28	14.0" DBH Sawtimber	160 sqft	17,810 BF & 22.1 Cds	65 (WP)

White pine is the dominant overstory species in this overstocked sawtimber sized stand. The white pine stems are generally well formed and fair to good in form and timber quality. Scattered mixed oaks, red pine and red maple poles and sawtimber of poor to good form and timber quality can also be found. There are several trees that exceed 25 inches in diameter (DBH). Forest regeneration is scattered and includes white pine saplings that are being suppressed by the dense overstory canopy. The area is gently to moderately sloped with well drained loamy sand soils (Hinckley). The forest soils are capable of producing high quality timber resources. Management will focus on harvesting a portion of the overstory timber through the shelterwood system. 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.

STEW	2	MS	6.55	Pond-Marsh	NA	NA	NA

This wetland resource area is currently a beaver pond and marsh. Dead trees (snags) are scattered throughout the area with cattails, fragmites and wetland plants and shrubs. The level of water within this area fluctuates with the intensity of beaver activities. The area is flat with very poorly drained organic soils (Freetown Muck). Management will focus on wildlife habitat improvement by installing an artificial nesting box for wood ducks. The desired future condition is a wetland resource area that continues to provide habitat for wetland wildlife.

STEW	3	GP	9.02	Gravel Pit (Sapling)	NA	NA	60 (WP)

This area is an abandoned sand and gravel pit. White pine and mixed hardwood saplings are growing in pockets within the pit. Alder, honeysuckle, autumn olive, lowbush blueberry, huckleberry and other early successional vegetation can also be found. Illegal use of motorized vehicles (ATV's) is excessive. The sandy soils are exposed as a result of the ATV use within this area. The area is flat to steeply sloped with excessively drained sandy soils (Pit) capable of producing high quality white pine timber resources. Management will focus on discouraging the use of ATV vehicles. The desired future condition is an area that provides early successional forest habitat for wildlife and protects the East Meadow Brook watershed.

STEW	4	WO	14.53	12.2" DBH Pole-Sawtimber	120 sqft	10,310 BF & 16.9 Cds	63 (WP)

White pine and mixed oaks dominate the overstory in this well stocked pole and sawtimber sized stand. The white pine and mixed oak stems are generally well formed and poor to good in timber quality. Scattered aspen, red maple, birch and other mixed hardwood 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. Witch hazel, hazelnut, lowbush blueberry and huckleberry are present in the understory. The area is gently to moderately sloped with well drained loamy sand soils (Hinckley). The forest soils are 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 East Meadow Brook watershed.

STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	5	WO	10.35	10.9" DBH Sawtimber-Pole	160 sqft	10,030 BF & 28.7 Cds	65 (WP)

White pine and mixed oaks dominate the overstory in this overstocked sawtimber and pole sized stand. The white pine and mixed oak stems are generally well formed and poor to good in timber quality. Scattered red maple and other mixed hardwood poles and sawtimber of poor to good form and timber quality can also be found. Forest regeneration is scattered and includes white pine saplings that are being suppressed by the dense overstory canopy. The area is gently sloped with well drained loamy sand soils (Hinckley). The forest soils are capable of producing high quality timber resources. Management will focus on improvement thinning by 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 East Meadow Brook watershed.

STEW	6	MS	17.23	Wetland Pond-Marsh-Wooded	NA	NA	50 (RM)

This wetland resource area includes Neal Pond, open marshes and pockets red maple woodlands. Alder, silky dogwood, gray dogwood, highbush blueberry, cattails, ferns, barberry, spicebush, honeysuckle and other wetland plants and shrubs can be found growing in this area. A stand of red maple pole sized stems is located in the eastern sections of this area. The beaver are active within this site. The area is flat, hummocky in spots, and wet throughout most of the year. The soils on the west side are organic and very poorly drained (Freetown Muck), while eastern sections are poorly drained fine sandy loam (Scarboro). The soils are not productive due the high water table. Management will focus on wildlife habitat improvement and water quality protection. The desired future condition is a wetland resource area that provides habitat for wetland wildlife and protects the East Meadow Brook watershed.

STEW	7	WH	9.56	13.5" DBH Sawtimber-Pole	200 sqft	18,365 BF & 35.4 Cds	65 (WP)

White pine and mixed hardwoods dominate the overstory in this 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. The mixed hardwoods include red maple, mixed oaks, white ash, elm, hop hornbeam, aspen, black cherry and white birch. Forest regeneration is scattered and includes white pine saplings that are being suppressed by the dense overstory canopy. Alder, honeysuckle, barberry, highbush blueberry, witch hazel and ferns are all growing in the understory. The area is flat to gently sloped with moderately well drained loamy sand soils (Deerfield), and poorly drained soils in the drainage ways (Scarboro). The forest soils are capable of producing high quality timber resources. Management will focus on improvement thinning, although no harvesting is recommended during this ten year management period. 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	8	MS	15.25	Wetland Beaver Pond	NA	NA	50 (RM)

This wetland resource area is a beaver pond and open marsh. Beaver activity is high at this time. Alder, silky dogwood, gray dogwood, highbush blueberry, cattails and other wetland plants and shrubs can be found growing in and along the edges of this area. East Meadow Brook flows through this area. Dead snags are also present. The area is flat, hummocky in spots, and wet throughout most of the year. The soils are organic and very poorly drained (Freetown Muck). The soils are not productive due the high water table. Management will focus on wildlife habitat improvement and water quality protection. The desired future condition is a wetland resource area that provides habitat for wetland wildlife and protects the East Meadow Brook watershed.

STEW	9	OH	11.84	8.8" DBH Small Sawtimber-Pole	100 sqft	4,495 BF & 15.8 Cds	63 (RO)

Mixed oaks and mixed hardwoods dominate the overstory in this well stocked small sawtimber and pole sized stand. The mixed oak stems are generally well formed and fair to good in timber quality. The mixed hardwood component includes hickory, white birch, and red maple poles and sawtimber of poor to fair from and timber quality. Scattered white pine sawtimber sized stems are present as well. Mixed hardwood saplings are the primary source of regeneration. Witch hazel and wild raisin are present in the understory as well. 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 improvement thinning, although no timber management is recommended during this ten year. 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.

STEW	10	GP	27.83	Sapling-Pole Gravel Pit	25 sqft	1.5 Cds	63 (WP)

This area is an abandoned sand and gravel pit. White pine and mixed hardwood saplings and small poles are growing in pockets within the pit. The mixed hardwoods include aspen, mixed oaks, red maple, birch and black locust. Alder, honeysuckle, autumn olive, highbush blueberry, and other early successional vegetation can also be found. ATV's use the trails within this area frequently. The area is flat to steeply sloped with excessively drained sandy soils in the higher elevations (Pit). The lower lying areas tend to be seasonally wet with poorly drained soils. Blanding's turtles are known to live in this area. An area along the Plaistow, NH boundary line was recently encroached upon by an abutting landowner. The encroachment area has been cleared of debris, re-graded and topsoil has been spread to cap the site. Management will focus on maintaining early successional habitat for wildlife. Protecting and enhancing the habitat of the Blanding's turtle is a priority for this stand as well. Discouraging the use of ATV vehicles will also be pursued. The desired future condition is an area that provides early successional forest habitat for wildlife and the Blanding's turtle 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	11	WH	24.22	8.3" DBH Pole-Sawtimber	85 sqft	1,105 BF & 17.4 Cds	57 (WP)

White pine and mixed hardwoods dominate the overstory within this unevenaged stand. Species composition, stand density and size class vary greatly throughout this area. The mixed hardwoods include red maple, mixed oaks, aspen, birch, ironwood, elm, and white ash poles and sawtimber sized stems of poor to good form and timber quality. The understory vegetation includes silky dogwood, alders, winterberry, spicebush, witch hazel, barberry, honeysuckle, skunk cabbage and ferns. Forest regeneration is scattered and includes white pine and mixed hardwood saplings. East Meadow Brook runs through this stand from north to south. The area is a flat and wet with poorly drained soils along East Meadow Brook (Freetown-Scarboro). The higher elevations are moderately well to well drained (Hinckley-Pits). Portions of this stand include areas that were disturbed during gravel extraction. No management is recommended in this area at this time. The desired future condition is an area that provides habitat for wildlife while serving as a watershed protection zone for East Meadow Brook.

STEW	12	GP	13.59	Sapling Gravel Pit	5 sqft	0.5 Cds	57 (WP)

Mixed hardwoods are the primary tree species within this abandoned sand and gravel pit. Black locust, aspen, white birch, mixed oak, black cherry, red maple, elm, white pine, Norway maple and tulip poplar saplings and infrequent poles and sawtimber sized stems can all be found. The area is understocked with trees. The understory vegetation is extremely dense and includes honeysuckle, bittersweet, multiflora rose, autumn olive, wild raspberry, alder and knotweed. The area is gently sloped with well and poorly drained soils that were disturbed during gravel extraction (Pits). No management is recommended in this area at this time. The desired future condition is an area that provides habitat for wildlife while protecting the East Meadow Brook watershed.

STEW	13	WK	3.42	11.9" DBH Sawtimber	210 sqft	13,335 BF & 37 Cds	57 (WP)

Hemlock, white pine and red maple are the dominant overstory species in this overstocked sawtimber sized stand. The overall timber quality is poor to fair. Forest regeneration is limited due to the dense overstory canopy. Hemlock saplings are scattered throughout the stand. Numerous wind blown trees covered with moss can be found lying on the forest floor. The area is flat, hummocky in spots, and very poorly drained with fine sandy loam soils (Scarboro) capable of producing fair quality timber resources. No management is recommended in this wetland resource area at this time. The desired future condition is an area that provides habitat for wildlife 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	14	WO	52.99	11.7" DBH Sawtimber	146 sqft	13,765 BF & 21.5 Cds	63 (WP)

White pine is the dominant overstory species within this overstocked sawtimber sized stand. The white pine stems range from poor to good in form and timber quality. Black knotted timber is common in the largest white pine trees. A strong component of mixed oak poles and sawtimber of poor to good form and timber quality can also be found. Scattered red maple, aspen, and hemlock are present as well. Forest regeneration is scattered and includes white pine, hemlock and mixed hardwood saplings. Witch hazel and highbush blueberry are present in the understory. The area is gently to steeply sloped with mostly well drained loamy sand soils (Hinckley) capable of producing high quality timber resources. There are several low lying wetland resource areas that are poorly drained (Scarboro). Vernal pools are scattered throughout the stand as well. Management will focus on selection harvesting a portion of the mature overstory. This stand has areas of large sawtimber sized stems that exceed 25" in diameter (DBH). Many of these trees will be chosen as "Legacy Trees" and protected for maintaining old growth characteristics within the stand. 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.

STEW	15	WO	14.00	12.5" DBH Sawtimber	120 sqft	9,130 BF & 18.7 Cds	63 (WP)

White pine and mixed oaks dominate the overstory in this overstocked sawtimber sized stand. The white pine and mixed oak stems are generally well formed and fair to good in timber quality. Scattered red maple and other mixed hardwood poles and sawtimber of poor to good form and timber quality can also be found. Forest regeneration is scattered and includes white pine saplings. Witch hazel, highbush blueberry, lowbush blueberry and huckleberry are present in the understory. The area is gently to steeply sloped with well drained loamy sand soils (Hinckley). Areas along the wetlands to the south are poorly drained. The forest soils are capable of producing high quality timber resources. Management will focus on improvement thinning by 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 East Meadow Brook watershed.

STEW	16	OH	18.86	9.2" DBH Sawtimber	130 sqft	4,930 BF & 24.5 Cds	60 (RO)

Mixed oaks are the dominant overstory species in this well stocked sawtimber sized stand. The oak component is fair to good in form and timber quality. Scattered hickory, red maple, black birch, white birch, 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. It appears that forest fires have scarred a portion of the large sawtimber sized trees within the stand. The area is gently to steeply sloped with well and moderately well drained loamy sand soils (Hinckley-Windsor) capable of producing high quality timber resources. Management will focus on improvement thinning by 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 East Meadow Brook watershed.

STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	17	MS	41.39	Wetland Pond-Marsh-Wooded	NA	NA	50 (RM)

This wetland resource area surrounds East Meadow Brook. Open beaver ponds, marshes and wooded swamps are all part of this site. Vegetation includes alder, silky dogwood, gray dogwood, highbush blueberry, cattails, ferns, barberry, spicebush, skunk cabbage and other wetland plants and shrubs. Pockets of red maple pole sized stems are scattered throughout this area as well. The beaver are active within this site and have created ponds and dead snags. The area is flat, hummocky in spots, and wet throughout most of the year. The soils are organic and very poorly drained (Freetown Muck). The soils are not productive due the high water table. Management will focus on wildlife habitat improvement and water quality protection. The desired future condition is a wetland resource area that provides habitat for wetland wildlife and protects the East Meadow Brook watershed.

STEW	18	GP	7.84	Sapling-Pole Gravel Pit	10 sqft	0.7 Cds	63 (WP)

This area is an abandoned sand and gravel pit. White pine, mixed oaks, black cherry, black locust, birch and aspen saplings and poles are growing in pockets within the pit. Honeysuckle, autumn olive, lowbush blueberry, huckleberry and other early successional vegetation can also be found. ATV's use the trails within this area often. The sandy soils are exposed as a result of the ATV use within this area. The sand pit is flat to steeply sloped with excessively drained sandy soils (Pit) capable of producing high quality white pine timber resources. Management will focus on discouraging the use of ATV vehicles. The desired future condition is an area that provides early successional forest habitat for wildlife and protects the East Meadow Brook watershed.

STEW	19	WO	25.01	8.9" DBH Pole-Sawtimber	113 sqft	2,362 BF & 22.0 Cds	63 (WP)

White pine and mixed oaks are dominate the overstory in this well stocked pole and sawtimber sized stand. The white pine and mixed oak stems are poor to good in form and timber quality. Scattered red maple and aspen poles and sawtimber can also be found. Forest regeneration is scattered and includes white pine saplings. Witch hazel, highbush blueberry, lowbush blueberry and huckleberry are present in the understory. The area is gently to moderately sloped with well drained loamy sand soils (Hinckley). A seasonally wet area centrally located in the stand is seasonally wet and poorly drained (Scarboro). The forest soils are capable of producing high quality timber resources. Management will focus on improvement thinning by selection harvesting although no harvesting is recommended in the next ten years. 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	20	OM	25.51	9.5" DBH Pole-Sawtimber	105 sqft	3,000 BF & 21.0 Cds	60 (RO)

Mixed oaks dominate the overstory of this well stocked pole and sawtimber sized stand. Black oak is the primary species. The timber quality of the oak is poor to good. Scattered white pine and red maple poles and sawtimber can also be found. Forest regeneration is scattered and includes white pine and mixed hardwood saplings. Witch hazel and huckleberry is common in the understory. Several vernal pools can be found. The area is gently to moderately sloped with mostly well drained loamy fine sand (Windsor). Management will focus on improvement thinning, although no timber harvesting is recommended for the next ten years of management. 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.

STEW	21	MS	7.15	Wetland Pond-Swamp	10 sqft	1 Cord	50 (RM)

This area is a vegetated wetland and a beaver pond with pockets of red maple woodlands. Highbush blueberry, spicebush, alder and other wetland shrubs and vegetation can be found growing within these areas. 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 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 while protecting the East Meadow Brook watershed.

STEW	22	GP	14.99	Sapling Gravel Pit	NA	NA	63 (WP)

This area is an abandoned sand and gravel pit. White pine, mixed oaks, black cherry, black locust, birch and aspen saplings and small poles are growing in pockets within the pit. Honeysuckle, autumn olive, lowbush blueberry, huckleberry and other early successional vegetation can also be found. ATV's use the trails within this area often. The sandy soils are exposed as a result of the ATV use within this area. The sand pit is flat to steeply sloped with excessively drained sandy soils (Pit) capable of producing high quality white pine timber resources. Some of the lower areas of the pit are somewhat poorly drained and seasonally wet. Management will focus on discouraging the use of ATV vehicles. The desired future condition is an area that provides early successional forest habitat for wildlife and protects the East Meadow Brook watershed.

Continued on page 20 ……

STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	23	MH	22.83	9.4" DBH Sapling-Pole-Sawtimber	85 sqft	1,200 BF & 17.3 Cds	60 (RO)

Mixed hardwoods are the dominant overstory species within this unevenaged stand. Species composition, stand density and size class vary greatly throughout this area. The mixed hardwoods include red maple, mixed oaks, aspen, birch, ironwood, elm, and white ash poles and sawtimber sized stems of poor to good form and timber quality. Pockets of white pine sawtimber and hemlock poles and small sawtimber sized stems are present as well. The understory vegetation includes alders, winterberry, spicebush, highbush blueberry, witch hazel, barberry, honeysuckle, skunk cabbage and ferns. Forest regeneration is scattered and includes white pine and mixed hardwood saplings. The area is a flat to steeply sloped along the edges of the old pits. Portions of this stand include areas that were disturbed during gravel extraction. The soils range from well drained to very poorly drained (Hinckley-Windsor-Scarboro-Pits). The soils are capable of growing fair to high quality timber resources. No management is recommended in this area 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 East Meadow Brook watershed.

STEW	24	OH	25.62	9.6" DBH Sawtimber-Pole	133 sqft	4,035 BF & 27.8 Cds	63 (RO)

Mixed oaks and mixed hardwoods dominate the overstory in this well stocked sawtimber and pole sized stand. The oak component is fair to good in form and timber quality. The mixed hardwood component includes sugar maple, basswood, hickory, red maple, birch and aspen poles and sawtimber of poor to good form and timber quality. Infrequent white pine and hemlock stems are present as well. The sugar maple component is unique for this forest and is primarily located in the northwest section of the stand. Forest regeneration is scattered and includes mixed hardwood and white pine saplings. Witch hazel is common in the understory. The area is gently to steeply sloped with well and moderately well drained loamy sand soils (Hinckley-Windsor-Carver) capable of producing high quality timber resources. Management will focus on improvement thinning by 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 East Meadow Brook 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	1	WP	Shelterwood	9+/-	45 sqft	130 MBF & 800 Tons	2011-2015

Management will focus on harvesting through the shelterwood system. The target is to harvest approximately 1/4 to 1/3 of the overstory volume. The emphasis will be to harvest mature white pine sawtimber (18" DBH+) in order to improve the growing conditions of the developing high quality white pine 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 increase the health and productivity of the stand. 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 24 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. Some of the largest trees within the stand (25" DBH+) will be selected as "Legacy Trees" and retained for biological diversity. This shelterwood harvest will prepare the understory for establishing new regeneration while releasing advanced regeneration.

STEW	4	WO	Selection Harvest Improvement Thin	14+/-	35 sqft	35 MBF & 420 Tons	2011-2015

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 white pine and mixed oak sawtimber (18" DBH+) in order to improve the growing conditions of the developing high quality white pine and mixed oak 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. 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 24 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 – East Meadow Brook 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	5	WO	Selection Harvest Improvement Thin	10+/-	40 sqft	25 MBF & 300 Tons	2011-2015

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 white pine and mixed oak sawtimber (18" DBH+) in order to improve the growing conditions of the developing high quality white pine and mixed oak 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. 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 24 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	WO	Selection Harvest Improvement Thin	40+/-	40 sqft	160 MBF & 1,200 Tons	2011-2015

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 white pine and mixed oak sawtimber (18" DBH+) in order to improve the growing conditions of the developing high quality white pine and mixed oak 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. 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 24 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. Some of the largest trees within the stand (25" DBH+) will be selected as "Legacy Trees" and retained for biological diversity.

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	15	WO	Selection Harvest Improvement Thin	12+/-	40 sqft	30 MBF & 360 Tons	2011-2015

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 white pine and mixed oak sawtimber (18" DBH+) in order to improve the growing conditions of the developing high quality white pine and mixed oak 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. 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 24 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	16	OM	Selection Harvest Improvement Thin	15+/-	35 sqft	30 MBF & 450 Tons	2011-2015

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. 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 24 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	24	OM	Selection Harvest Improvement Thin	22+/-	30 sqft	33 MBF & 660 Tons	2011-2015

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 and mixed hardwood 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. 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 below 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.

Home Fuelwood Program

The Forest Stewardship Committee has developed the *Haverhill Home Fuelwood Program* as a means of making available firewood to the residents of Haverhill. The low quality hardwood stems that are harvested in the recommended timber sales within the East Meadow Brook watershed will be the source 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 stacked in one-cord piles within the landings. 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 and landed of approximately $40 per cord. Bids for the stacked firewood must at least cover this cost. The recommended harvests on East Meadow Brook watershed should generate approximately 200+/- 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	

Biological Diversity

STEW	1-24	All	Invasive Species Control	453+/-	NA	NA	2011-2020

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, Autumn olive, firebush (winged euonymus), bittersweet, honeysuckle, Norway maple, Japanese barberry and knotweed are currently known to be growing on the property. 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 the abandoned gravel pits. Cutting the stems with saws 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 #6 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	2011-2015

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	2,6,8,17, 21		Artificial Nest Boxes Wood Duck	87+/-	NA	NA	2011-2020

These wetland resource areas provide habitat for ***wood ducks***. The open water and emergent vegetation within these areas are important for the development of young wood ducks. The boxes should be set up approximately four feet above open water on cedar, or metal poles to protect the young and eggs from predators. The boxes should also be set up over water that is 1-4 feet deep. The boxes should be cleaned every year and new bedding placed on the bottom of the box. The Division of Fisheries and Wildlife can provide further information about the box dimensions, installation, and maintenance. The recommendation is to install no more than one (1) box in each area on an experimental basis.

STEW	10	GP	Early Successional Habitat Undesirable Vegetation Control Blanding's Turtle Habitat Enhancement	10+/-	NA	NA	2011-2020

Management in this area will focus on reclaiming and maintaining early successional forest habitat. Approximately 10+/- acres within this abandoned gravel pit are maturing into the small pole sized class (4-7" DBH). These areas will be cleared of all trees by using whole-tree chipping equipment. The harvesting will probably be timed with commercial timber harvesting in Stand #14. The Blanding's turtle will benefit greatly from this practice. The turtle prefers open sandy soils for nesting in early June. Thickets that will result from the clearing will provide a shrub layer of protection for the turtle. The mechanical cutting and removal of invasive species will be pursed at the same time. Wetland areas will be avoided with appropriate buffers being observed around any vernal pools. 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 21-24.

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 seeking council from such regulatory and advocacy agencies as the Massachusetts Division of Fisheries & Wildlife and Mass Audubon. The Committee is also reviewing services that might be provided by a wildlife habitat consultant to assist in ensuring the long-term protection of the City's wildlife.

MANAGEMENT PRACTICES
to be done within next 10 years

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

Boundary Maintenance

STEW	All	All	Blaze & Paint	453+/-	NA	NA	2011-2020

No boundary blazing or painting has been done on the property. Abutting property surveys will be used to identify the property lines. Blazing and painting the property lines should be done prior to any timber harvesting activities. Most of the property corners were identified during the field inventory. Iron pipes, stone bounds and wire fences that were found have been indicated on the Boundary Map on pages 32-24.

Illegal Motorized Vehicle Control

STEW	All	All	Discourage ATV Use	453+/-	NA	NA	2011-2020

ATV and illegal motorized vehicle use is a concern at the East Meadow Brook Watershed. These vehicles can often be found within the abandoned gravel pits and along the trails and woods roads throughout the property. Soil disturbance, erosion and wetland crossings will have an impact on water quality within the watershed. Signs will be posted indicating the allowed and prohibited uses of the property.

Forest Stewardship Education

STEW	All	All	Forest Stewardship Education	453+/-	NA	NA	2011-2020

The Forest Stewardship Committee will educate the public about the forest management practices addressed in this Plan prior to implementation. This will involve public meetings at City hall, local media correspondence and field trips to the East Meadow Brook watershed area.

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.

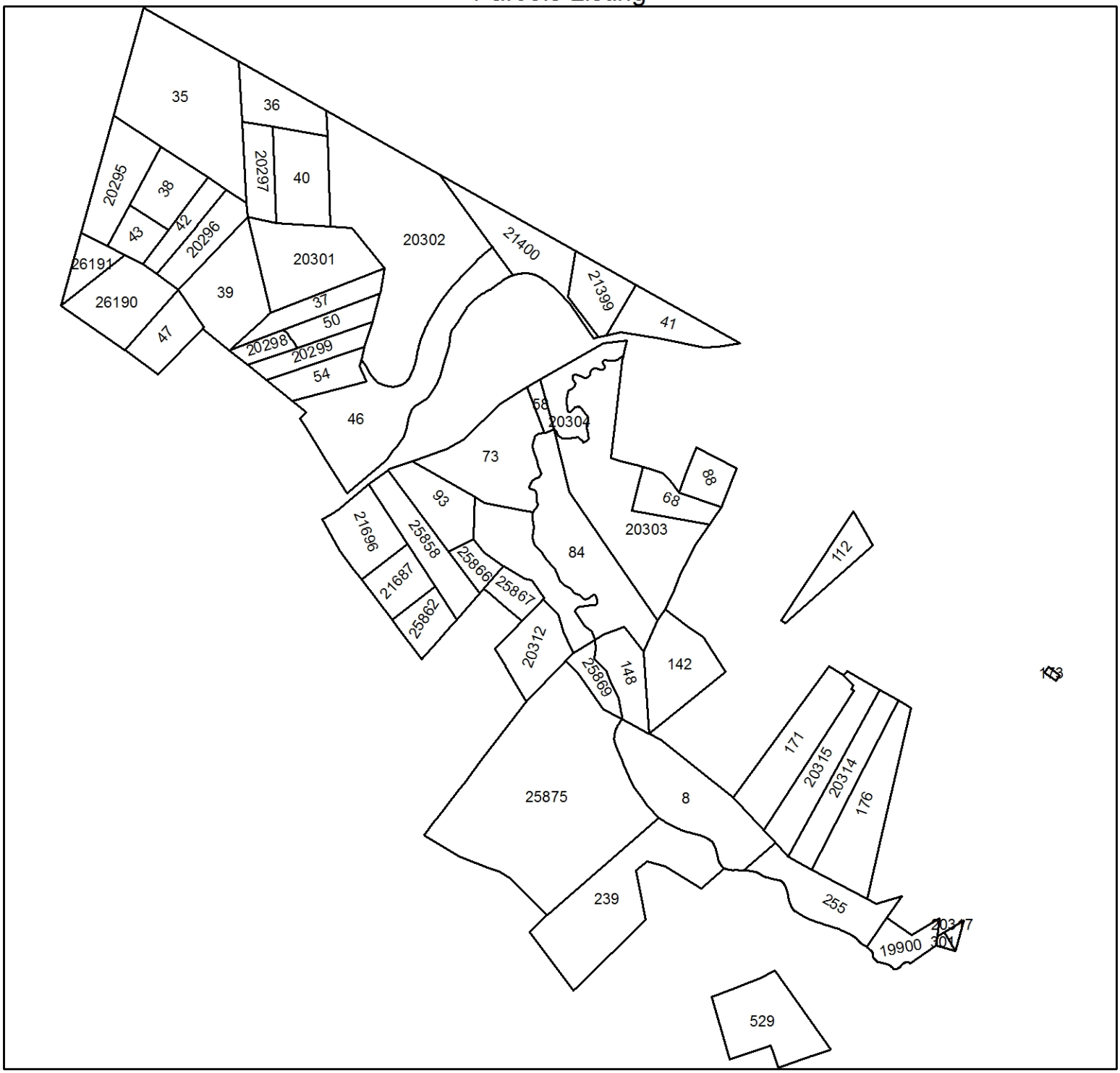
Approved, Service Forester _____ Date _____

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 – East Meadow Brook Town(s) Haverhill

City of Haverhill
East Meadow Brook Lot
Haverhill & Merrimac, MA
Parcels Listing



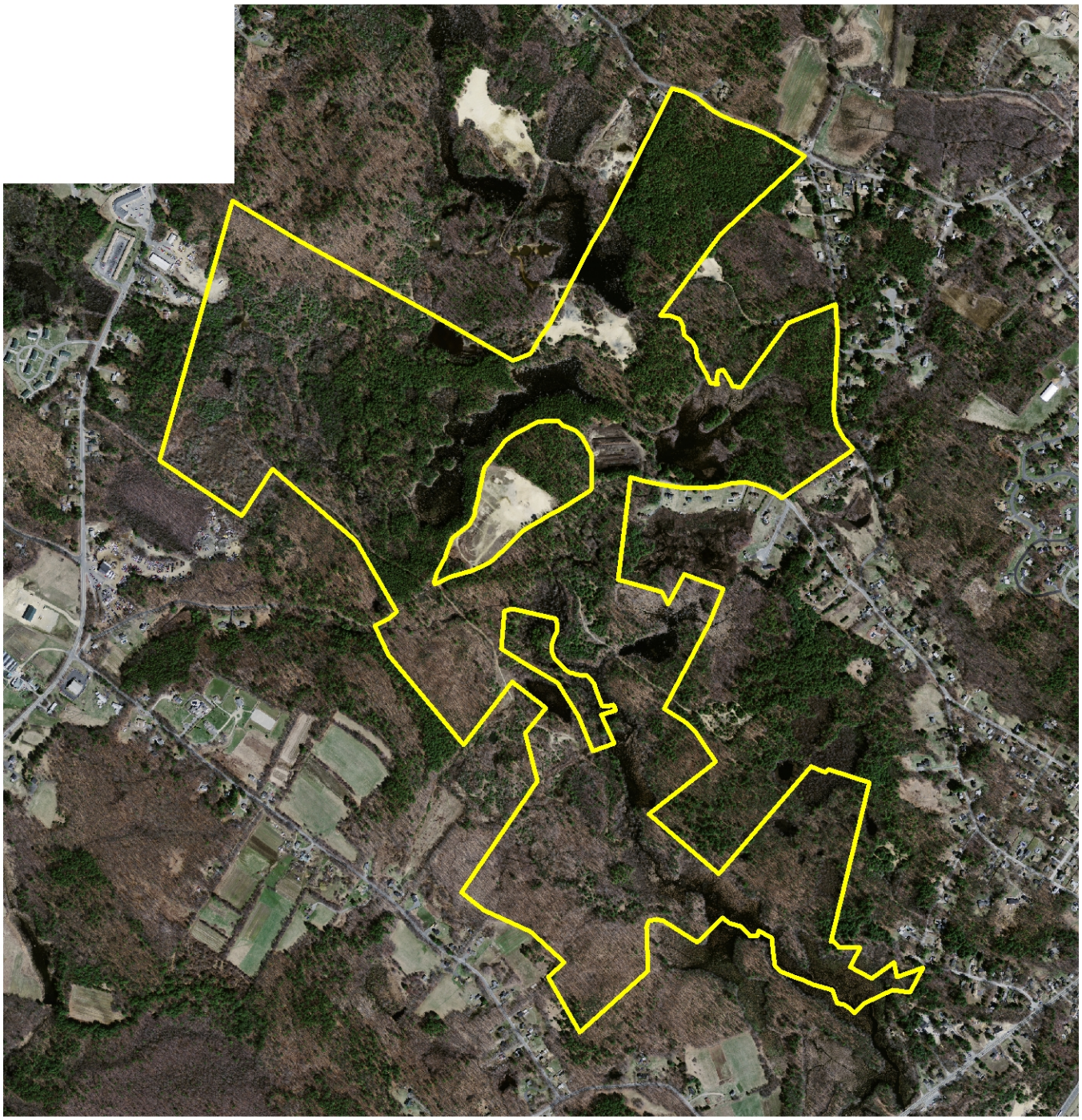
1,000 500 0 1,000 2,000 Feet

N
W E
S

Prepared by:
New England Forestry Consultants, Inc
Sherman R. Small, Consulting Forester
Maine License # LF655
New Hampshire License # 409
April 8, 2011

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

City of Haverhill
East Meadow Brook Lot
Haverhill & Merrimac, MA
2008 Aerial Photo



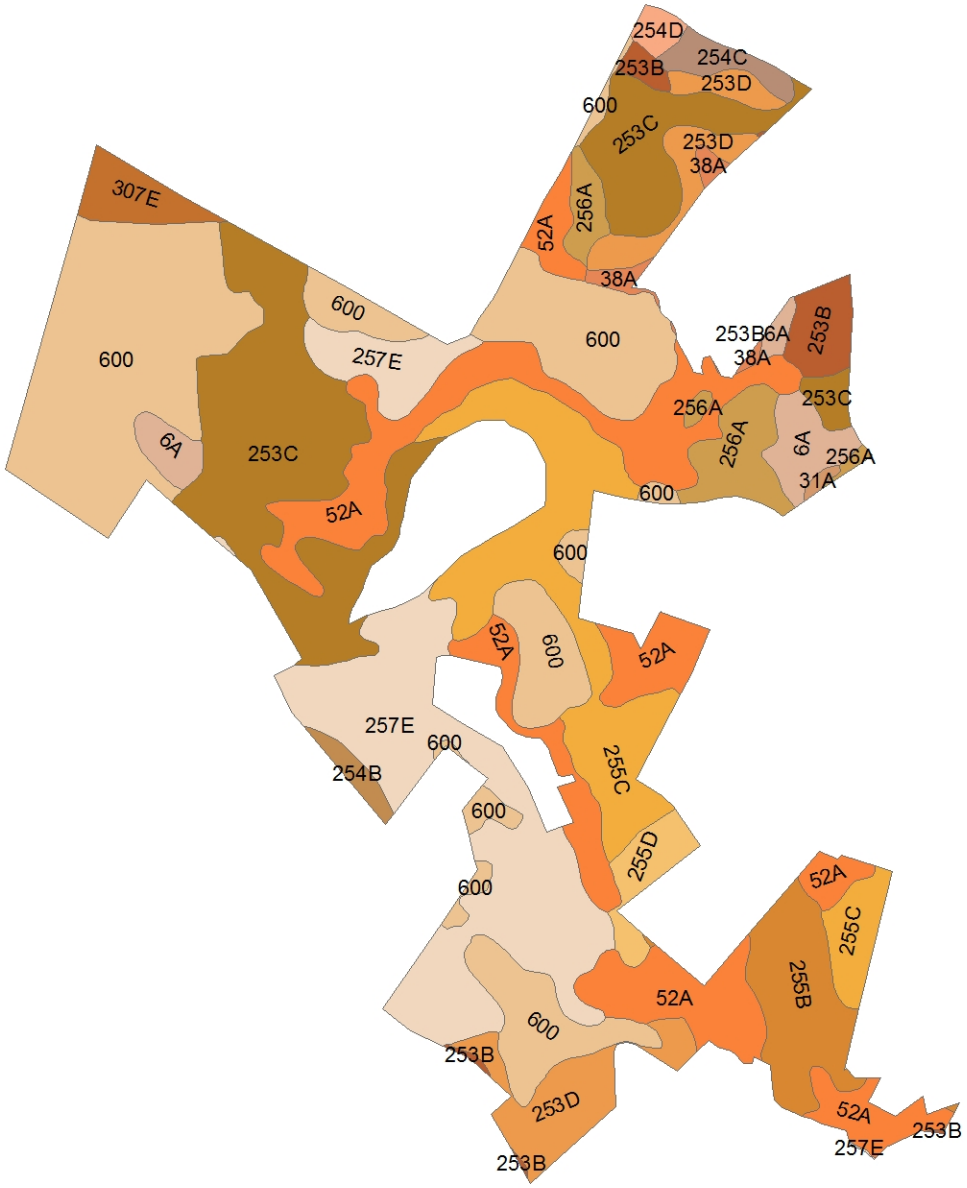
1,320 660 0 1,320 2,640 Feet

N
W E
S

Prepared by:
New England Forestry Consultants, Inc
Sherman R. Small, Consulting Forester
Maine License # LF655
New Hampshire License # 409
March 30, 2011

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
East Meadow Brook Lot
Haverhill & Merrimac, MA
Soils Map



307B Soils Symbol

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 30, 2011

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

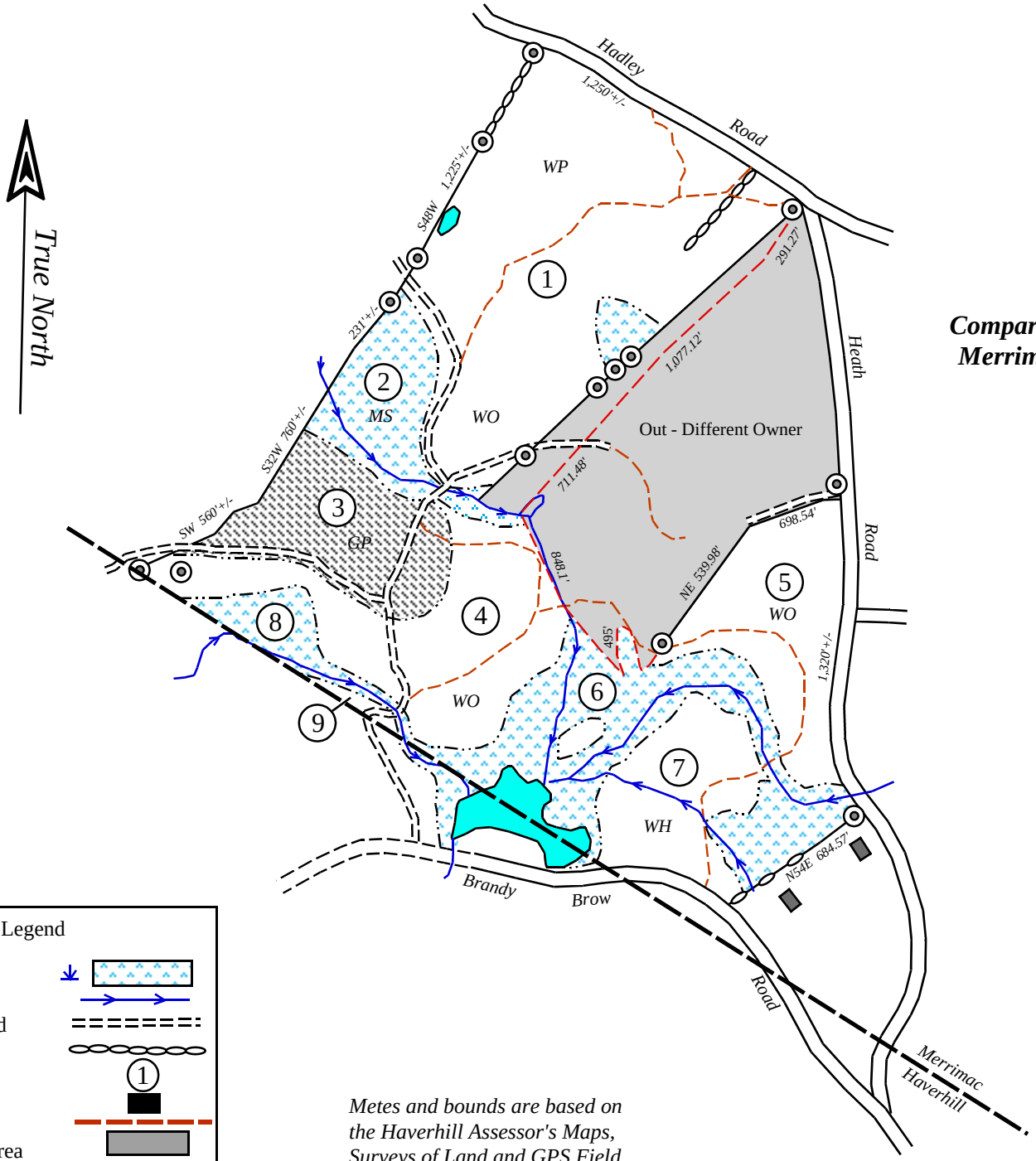
New England
Forestry Consultants, Inc.

Prepared By:
Gary H. Gouldrup
Consulting Forester
72 Townsend Street
Pepperell, MA 01463
978-433-8780
3/28/2011

BOUNDARY & STAND TYPE MAP

Land in Haverhill, MA
East Meadow Brook Lot

Owned By:
City of Haverhill
Haverhill Conservation Department



Compartment 1
Merrimac Lot

Metes and bounds are based on the Haverhill Assessor's Maps, Surveys of Land and GPS Field Work 2011.

Legend

Wetland	
Stream	
Access Road	
Stone Wall	
Stand Type	1
Building	
Trails	
Excluded Area	
White Pine Hardwood	*WH*
White Pine	*WP*
Mixed Hardwoods	*MH*
Oak-Hardwoods	*OH*
River Flood Plain	*MS*
Stand Type Line	
Iron Pipe	IP
Stone Bound	SB
Assessor's Lot Line	

graphic scale (in feet)
0 660 1320

New England
Forestry Consultants, Inc.

Prepared By:
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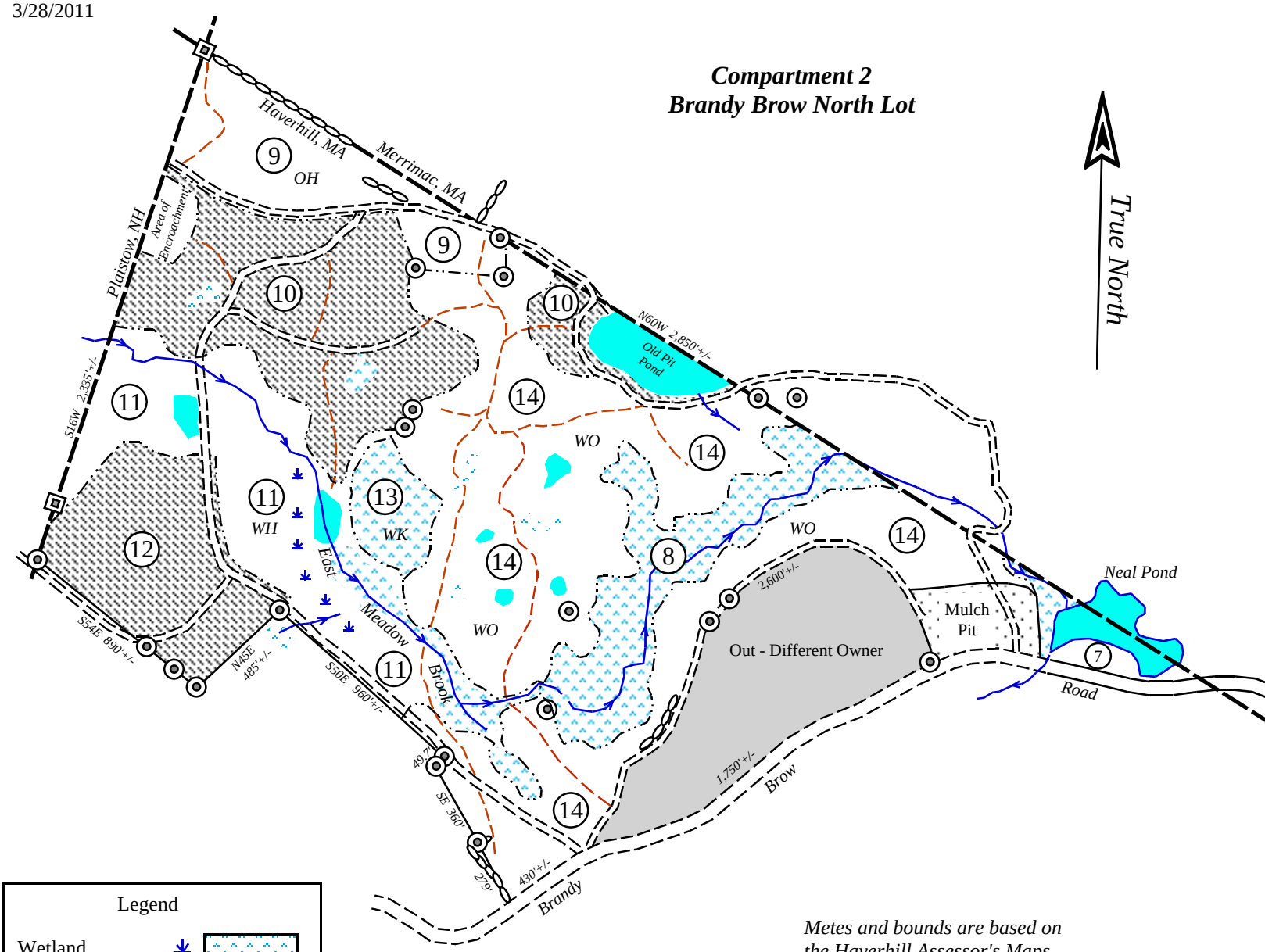
Consulting Forester
72 Townsend Street
Pepperell, MA 01463
978-433-8780
3/28/2011

BOUNDARY & STAND TYPE MAP

Land in Haverhill, MA
East Meadow Brook Lot

Owned By:
City of Haverhill
Haverhill Conservation Department



Metes and bounds are based on the Haverhill Assessor's Maps, Surveys of Land and GPS Field Work 2011.

Legend

Wetland	
Stream	
Access Road	
Stone Wall	
Stand Type	1
Building	
Trails	
Excluded Area	
White Pine Hardwood	WH
White Pine	WP
Mixed Hardwoods	MH
Oak-Hardwoods	OH
River Flood Plain	MS
Stand Type Line	
Iron Pipe	IP
Stone Bound	SB
Assessor's Lot Line	

graphic scale (in feet)
0 660 1320

New England Forestry Consultants, Inc.

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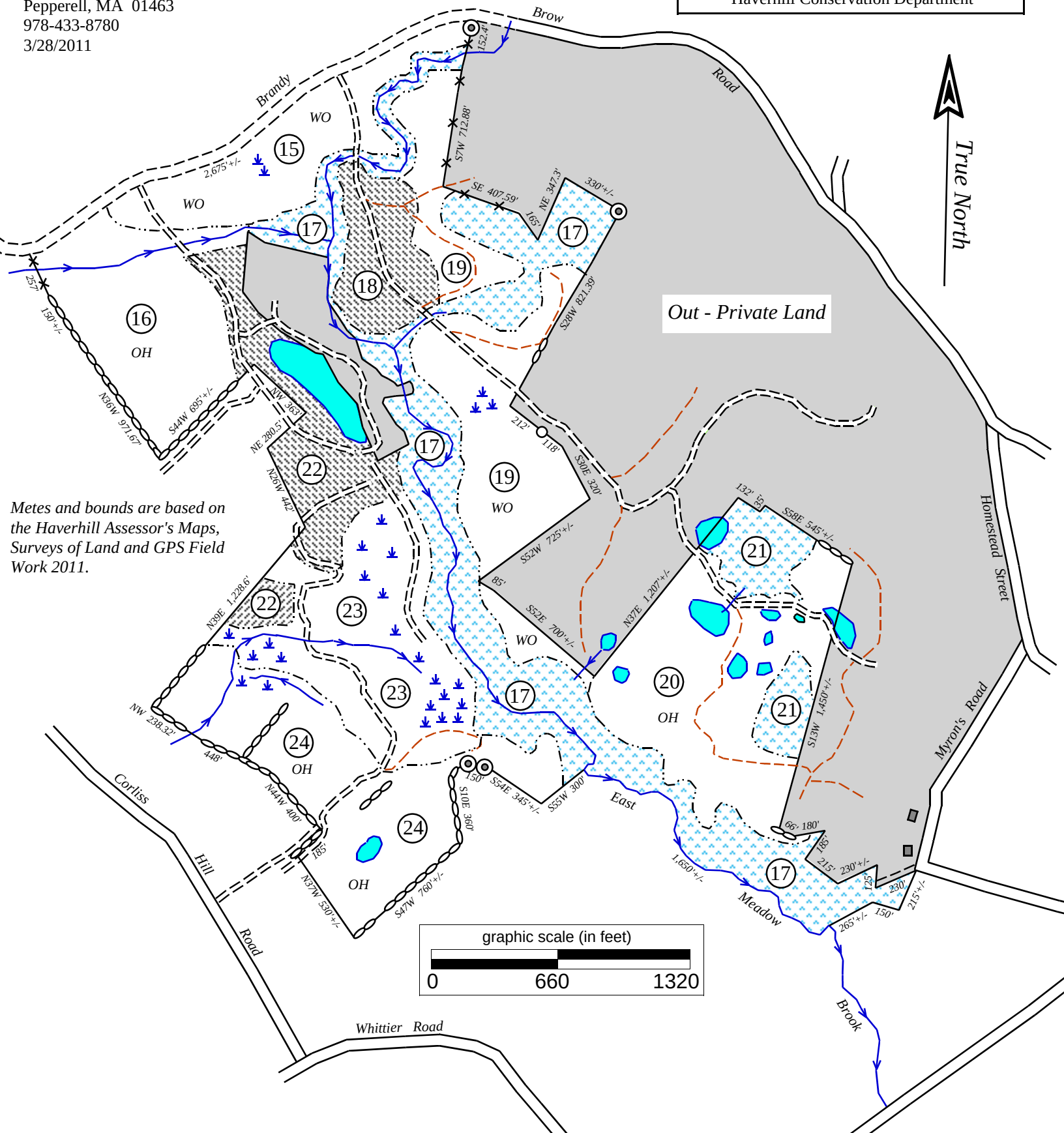
Consulting Forester
72 Townsend Street
Pepperell, MA 01463
978-433-8780
3/28/2011

Compartment 3
Brandy Brow South Lot

BOUNDARY & STAND TYPE MAP

Land in Haverhill, MA
East Meadow Brook Lot

Owned By:
City of Haverhill
Haverhill Conservation Department

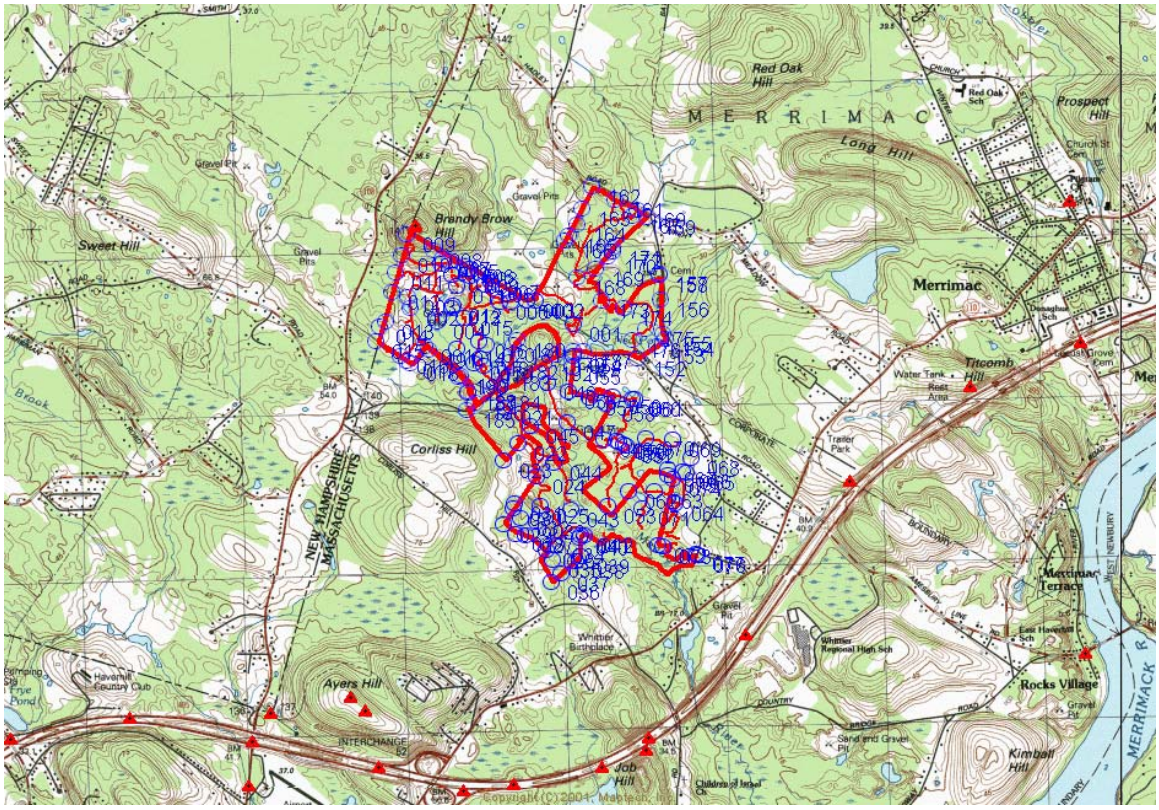


Metes and bounds are based on the Haverhill Assessor's Maps, Surveys of Land and GPS Field Work 2011.

TOPOGRAPHICAL MAP

Land In:
Haverhill, MA
East Meadow Brook Lot

Owned By:
City of Haverhill
City Hall Room 310, 4 Summer Street
Haverhill, MA 01830



Topographical Map – Haverhill Quadrangle

Scale 1 inch = 4000 feet

April 18, 2011

Prepared By: Gary H. Gouldrup, New England Forestry Consultants, Inc.