# SECTION 4 Environmental, Inventory, and Analysis

## *Geology, Soils, Topography*

Norton is located within the Northeastern Coastal Zone *ecoregion* and the Narragansett/Bristol Lowland sub-ecoregion. The Narragansett/Bristol Lowlands are characterized by thick *glacial till* and *outwash* deposits. The topography is flat and gently rolling with very little elevations greater than 200 feet. Surface water is usually acidic. The vegetation is mostly central hardwoods. Underlying bedrock material of the Narragansett Basin formed during the Triassic-Jurassic period consists of sandstone, graywacke, shale and conglomerate; minor beds of meta-anthracite and fossil fuels. These descriptions were taken from Water Resources of the Taunton River Basin, Southeastern Massachusetts by J.R. Williams, D.F. Farrell and R.E. Willey, hydrologic Investigations Atlas HA-460, Published by the U.S. Geological Survey, 1973.

The vast majority of Norton consists of *stratified drift* (Geology of the Taunton Quadrangle, Bristol and Plymouth Counties Massachusetts, Joseph H. Hartshorn). These areas are described as stratified beds and lenses of well-sorted fine to coarse sands, including some beds and lenses of gravel, silt and clay. Norton contains several smaller isolated pockets of drift consisting mainly of well-sorted fine to coarse sandy gravel with numerous beds and lenses of sand, silt and clay. Larger regional pockets of glacial till are scattered throughout the town. The largest areas are concentrated in the western portion of the town extending from Mansfield and extending into Rehoboth. Bedrock outcrops are fairly evenly spread throughout town.

**Geology** *contributed by Frances Shirley in an interview with professor Daniel Murray, study of the U.S. Geological Survey maps, old Town maps and personal experience.*

Norton is in the Narragensett/Bristol Lowland Region of the Northeastern Coastal Zone. It is a relatively flat town, the highest point (176 feet) in the north near the Mansfield Town line, on Hole 13 of the Tournament Players Club Golf Course (TPC), and the lowest (about 70 feet) at the southern boundary on the Taunton line. There are a few relatively high spots in between, where a geologic feature creates a slight roll, but there are no real hills or valleys. Rivers are short, originating in a few towns to the north, and they flow gently, often spreading out over considerable wetlands rather than running in deep channels. The Wading River drops about 50 feet as it meanders three miles from the Norton/Mansfield town line to its junction with the Rumford, which has also dropped about 50 feet from the Mansfield line. The Canoe River, sixteen miles long, and the source of Norton's municipal water supply, drops only 20 feet as it makes its slow way from the Mansfield line to Lake Winnecunnet, which abuts the Taunton line.

Numerous small dams were built wherever there was an opportunity to create any head of water to run a mill, but there was no major industrial waterpower with the possible exception of the 500-acre Norton Reservoir. This was created in the mid 1800s in a low-lying farmland area with an esker at its downstream side to control the seasonal flow of the Rumford River for the woolen mills downriver. At its deepest point it is perhaps seven feet. A sizeable pond was also created north of Red Mill Road at the Easton Town line to run several mills on the Canoe River. The Wading River, whose name describes its shallowness, filled two large man-made ponds along its course: Barrowsville Pond and the Copperworks Pond, each with a mill at its downstream end. Nineteenth-century maps of the Town show a number of additional small millponds and mills along the Canoe River, the Wading River, the Rumford River and Mulberry Meadow Brook.

This relatively level terrain with its meandering streams and rivers is the result of the geologic history of Norton and its surrounding coastal plain area, and Norton's wetlands, water resources, and land use are closely tied to its gravel, rocks and soils.

## Geology-The Bedrock

The geologic underpinnings of Norton's green infrastructure fall into two parts: bedrock and the soft, generally uncollected surface material left after the glaciation of the last ice age over 10, 000 years ago. On top of these is a surface mantle composed of various soils, often acidic, that have built up in the past eight to ten thousand years and are subject to comparatively little erosion because of the lack of elevation.

The bedrock was formed in the Triassic and Jurassic eras of the Mesozoic period, and is comprised of the Rhode Island Formation, sedimentary rock probably about 300,000,000 years old. It is comprised of sandstone, shale and conglomerate, slightly deformed. The whole area was affected by the Alleghenian Orogony, which probably occurred in the early Triassic and created anticlines and synclines that strike E-NE. There are relatively few bedrock exposures in Norton---twenty or so--- although bedrock is often only a few feet down. One exposed area is at King Philip's Cave, off Plain Street, where very large glacial erratics are piled on elevated bedrock. Other easily accessible examples are at the corner of East Main and Pine Streets, on the Wheaton College campus; on East Main Street in the ledge area encountered at the Police Station; and at the intersection of Pine and Plain Streets. The overlay of glacial material hiding the bedrock varies from a few feet to about thirty.

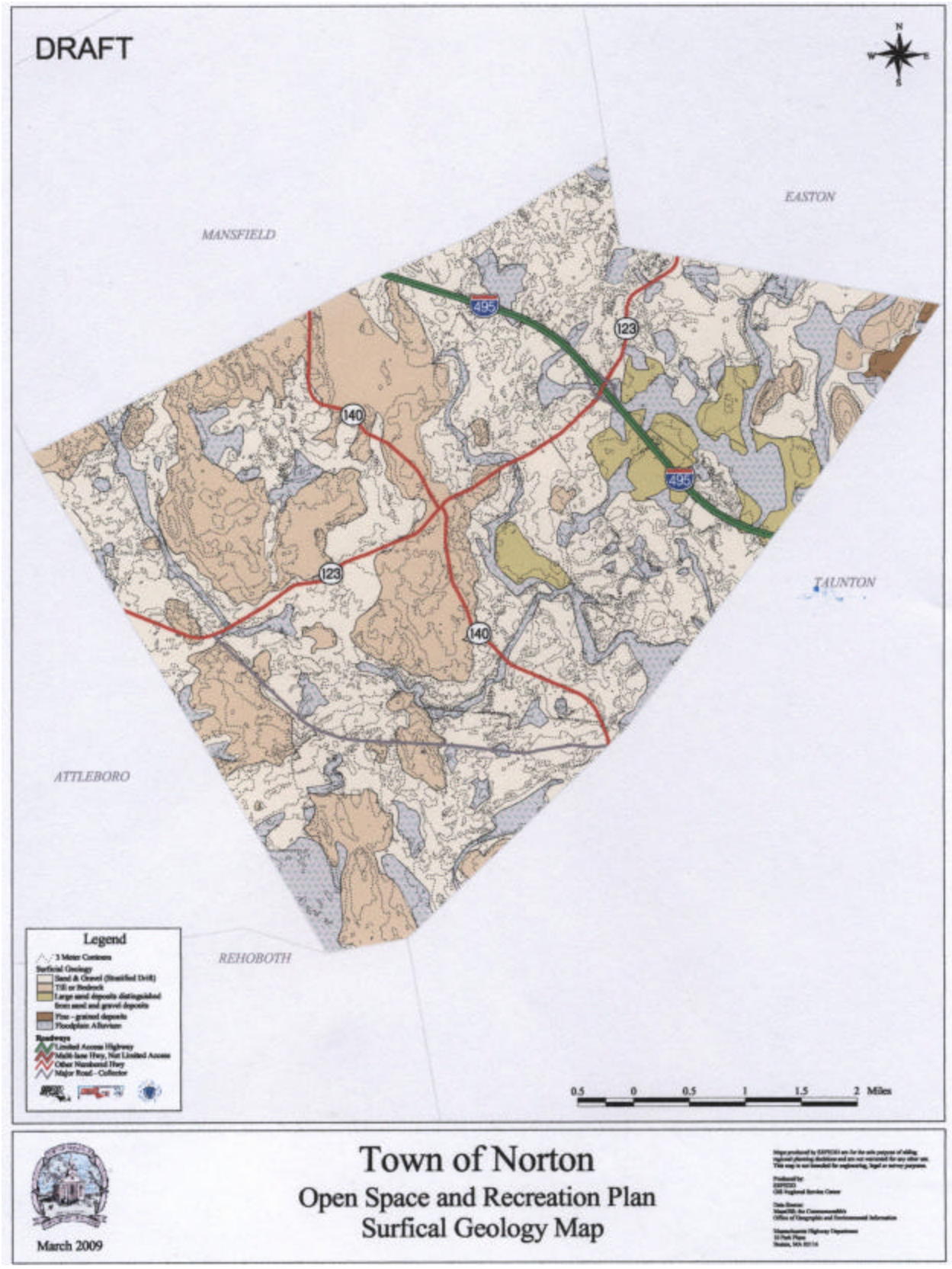
This bedrock is an important factor in planning for wells and septic systems. There are no predictable faults or layers, so well drillers must hope to find water in a fracture or network of fractures. But since these fractures are random, it also means that pollutants are likely to permeate in unpredictable fashion as well. Gasoline was found in one area as wells were drilled, though the leaking gas tanks were at a much shallower depth than the wells and were roughly a quarter mile away. Often there is a perched water table, as at the TPC Golf Course, on top of a clay and impermeable rock underlay, which made domestic well-digging relatively simple for early settlers. Today's wells are drilled deep into the bedrock.

*Photo of glacial erratic submitted by Christopher Cox*

## Surface Materials –The Results of Glaciation

The surface geology, through which streams flow and which provides the town's sole source, gravel-filtered aquifer along the Canoe River, is the result of glaciation that extended down to Block Island during the last Ice Age. As the ice sheet retreated, it left large quantities of drift, unsorted debris. Some, like the huge rocks at King Philip's Cave, were directly deposited from relatively nearby. Much of the drift is lodgement till, poorly sorted debris comprised of sand, clay and cobbles that was dropped at the edge of the glacier. Where water flow from meltwater

Surficial Geology



or streams running under the glacier is responsible for the deposits, there may be more sorting. There are several eskers in town, left by former stream channels under the glacier and composed of stratified drift. The best-known remnant of these is on land owned by the Norton Historical Society in the Great Woods near Great Woods Circle off Smith Street. There are other, smaller eskers at the outflow of the Norton Reservoir, beside Lake Winnecunnet, and along the Wading River. There are occasional drumlins, running generally north-south in the direction of the glacier flow, such as one on the TPC Golf Course. The islands in the main part of the Norton Reservoir look like the tops of drumlins. Kame terraces formed along the side of tongues of ice which later melted to form stream channels. One appears to be at Longwood Estates off Oak Street near Walker and another at the edge of the TPC Golf Course. There are also a couple of coastal plain or kettle ponds where a large chunk of ice compressed the underlying soil and created a pond when it gradually melted as the climate warmed. One of these is in the Lincolns Woods, near Lake Winnecunnet, and another is Winnecunnet itself, Norton's only natural lake.

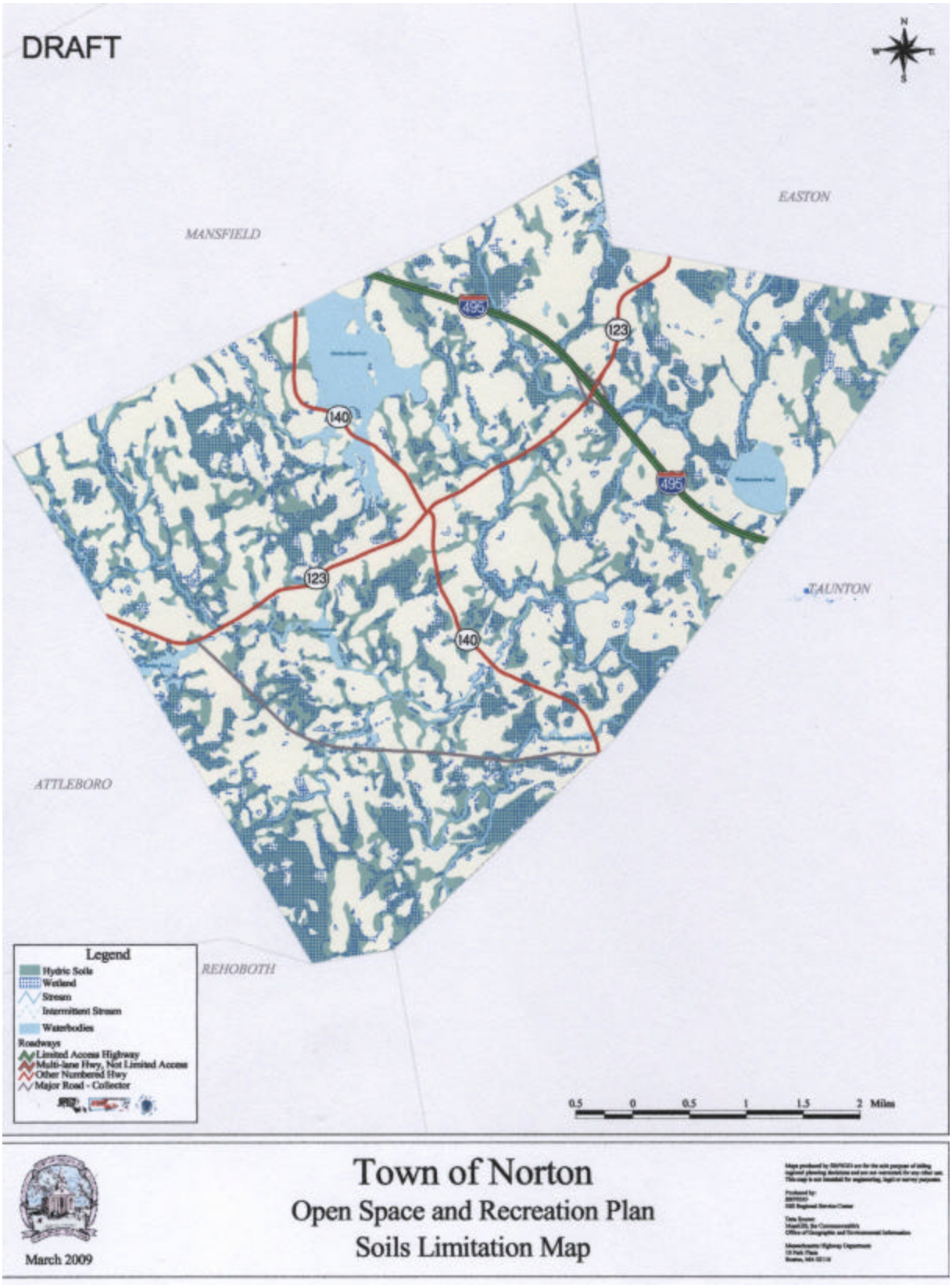
Because of this random depositing of glacial debris, with lenticular matter and a complex mix of materials brought down from the north, the drainage patterns in Norton have been described by Professor Daniel Murray as "deranged" and "messey". In other words, it is virtually impossible to predict precisely where water will flow or where such materials as road salt will end up, since there are the bedrock is irregular and there are not underground stream channels that can be predicted. Rivers and streams do move generally toward the southeast, generally as tributaries of the Taunton River. They follow the general slope of the land, but turn and meander. Often, like the Canoe River south of the Mansfield line, they create several channels through riverine meadows.

## Soils

The predominant general soil types in the Town are Hinckley-Medisaprists-Windsor, Paxton-Whitman-Ridgebury, and Paxton-Woodbridge-Ridgebury. Detailed information on parcels as small as three acres can be obtained from the Soil Survey of Bristol County, Massachusetts, United States Dept. of Agriculture, Natural Resource Conservation Services (formerly Soil Conservation Service) 1978, which is available for review in the Norton Conservation Commission office.

The general soil type *Hinckley-Medisaprists-Windsor* makes up approximately 55% of northern Bristol County. The low-lying Medisaprists have deposits of organic material that range from 16 inches to more than 10 ft. in thickness. The *water table* in this area is at or near the surface for more than nine months of the year, and water commonly ponds on the surface during the wettest part of the year. Wetness is the main limitation. The Hinckley and Windsor soils are rapidly to very rapidly permeable and retain a small amount of water for plant use. Droughtiness is the main limitation for farming in these soils. Coarse texture and the rapid permeability limit non-farm use.

The general soil type *Paxton-Whitman-Ridgebury* makes up 21% of northern Bristol County. The Paxton soils are well drained, the Ridgebury soils are poorly drained, and the Whitman soils are very poorly drained frequently with a perched water table very near the surface. Stoniness, restricted permeability and wetness are the main limitations for uses of these soils. The Soil Conservation Service recommends that proposals for intensive land use of sites containing these soils should be thoroughly reviewed.


DRAFT
N
MANSFIELD
EASTON
TAUNTON
ATTLEBORO
REHOBOTH
495
123
140
Legend
Hydric Soils
Wetland
Stream
Intermittent Stream
Waterbodies
Roadways
Limited Access Highway
Multi-lane Hwy, Not Limited Access
Other Numbered Hwy
Major Road - Collector
0.5 0 0.5 1 1.5 2 Miles
Town of Norton
Open Space and Recreation Plan
Soils Limitation Map
March 2009

The general soil type *Paxton-Woodbridge-Ridgebury* makes up 19% of northern Bristol County. These soils have a very firm substratum that restricts water movement. Stoniness, restricted water movement, and wetness are the main limitations to use. Again, proposals for intensive land use should be thoroughly investigated. The surface of any particular area may contain a diverse mixture of these soils at varying depths, as well as minor examples of other sorts. The attached map of the Great Woods area, including the TPC and surrounding conservation lands demonstrates this soil diversity.

## Topography

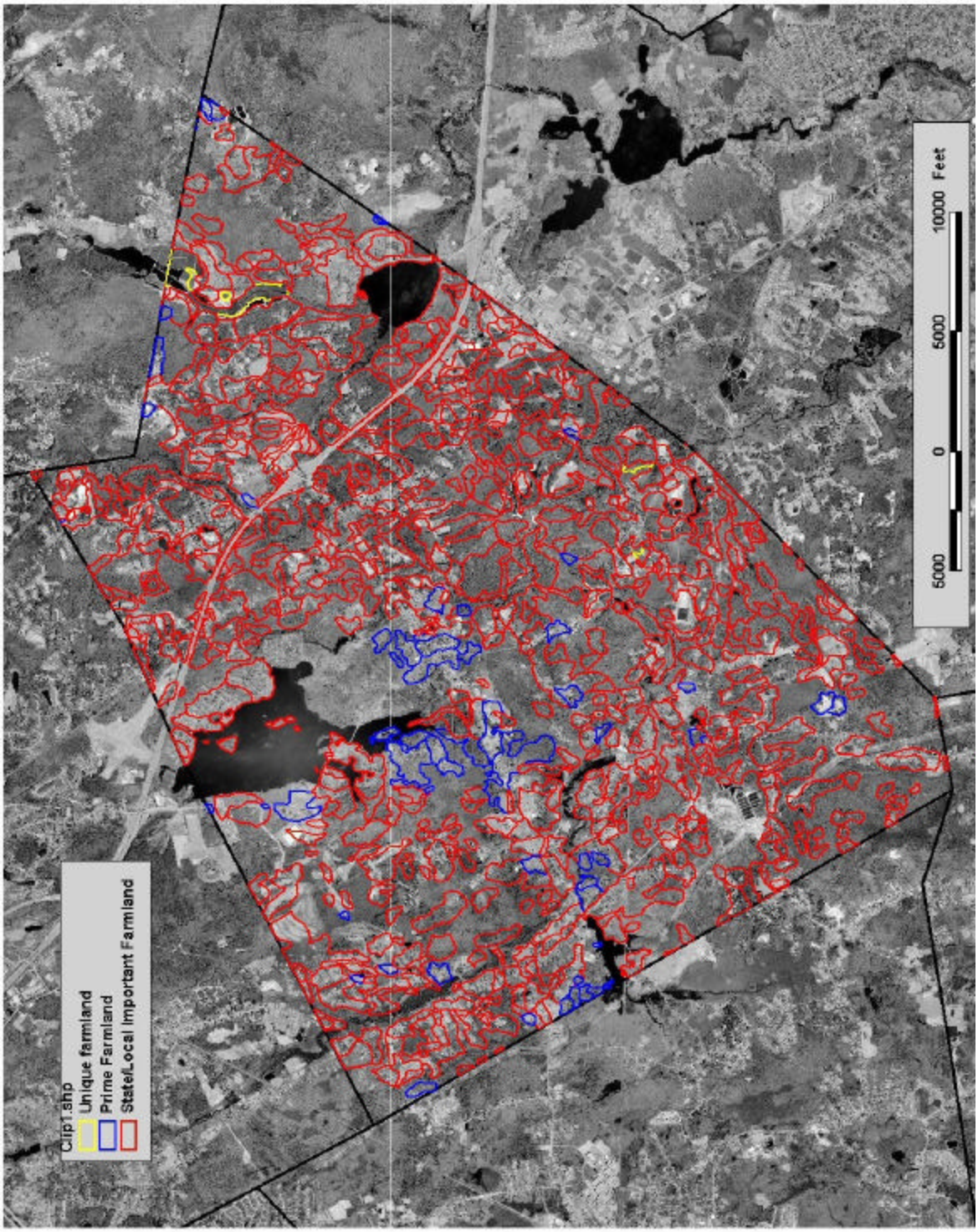
Topography within the town varies due to glacial action leaving glaciofluvial and glaciolacustrine deposits. *Glaciofluvial deposits* are the drift deposited by meltwater streams. *Glaciolacustrine deposits* are sorted drift left by meltwater within lakes associated with the margins of the glaciers. The topographic features range from *ground moraines, drumlins, eskers, kame terraces, kame fields*, *kettle holes* and Rhode Island formations, all created by glaciers over 10,000 years ago. *Oxbows* and *point bars* can be observed in our stream and river systems. Examples of these topographical features found in Norton have been described in "Surface Materials –The Results of Glaciation". This description was taken from the Geology of Selected Quadrangles in Massachusetts (Geological Survey Bulletin 1163-D, prepared in cooperation with the Commonwealth of Massachusetts Department of Public Works. GPO: 1967 and from review of the U.S.G.S. topographic map, Taunton Quadrangle, 7.5 x 15 minute. 1987.

## Prime and Significant (Statewide) Agricultural Soils

The US Dept. of Agriculture, Natural Resource Conservation Service notes that prime and important farmland exists primarily north and south of West Main St. There are some pockets of prime and significant farmland to the southwest of the southernmost point and along the western edge of the Norton Reservoir. Another large pocket of prime and significant farmland exists in the center of town along Route 123 and Route 140. Smaller pockets of important farmland exist along Barrows Street, parts of Taunton Avenue, south of Old Colony Road, near the intersection of West Main Street and South Worcester Street, and at the northeastern boundary with the Town of Easton. Unique farmland is shown to exist at the Fuller-Hammond cranberry bogs off Bay Rd and in two smaller pockets just off Taunton Avenue. The map on page 35 entitled, "Town of Norton Prime & Important Farmland" was provided by Charles (Chip) Worrilow III of the West Wareham Field Office, USDA.

*Resources on agricultural soils and farmland:*
Chip Worrilow. US Department of Agriculture, Natural Resource Conservation Service, 15 Cranberry Highway, West Wareham MA 02576. 508-295-5151 x 122.

# Town of Norton Prime & Important Farmland



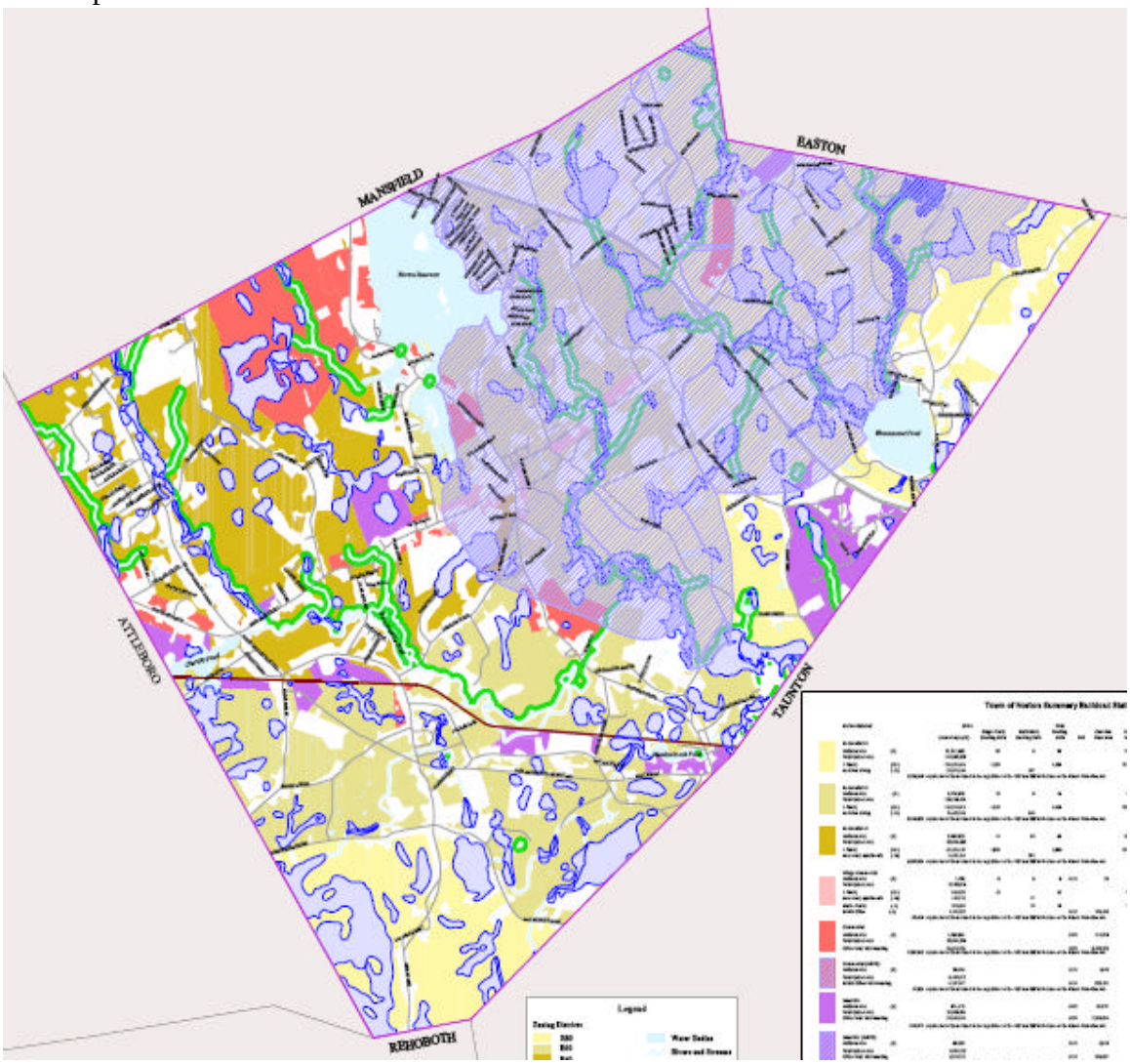
## Effects on Development *with contributions by Frances Shirley*

The topography and soil composition found within Norton has had an effect on the development of the community. The extensive wetland areas, large water bodies and rivers in addition to the finer soils are not suitable for on-site sewage disposal systems. The most significant impact on these water bodies has been shoreline development. Therefore, the recent development has been directed further from those areas. But as land becomes more scarce, the pattern of development is brought closer and closer to the lower-lying areas. Also, former cottage communities (now mostly year-round residences) exist along the northeast shore of Norton Reservoir and along the east, west and southern shores of Lake Winnecunnet. The effects of existing development on surface water quality are discussed later in this Section.

In the lower areas, this mix of soil types has often resulted in wetlands and Norton has been calculated to be over half swamps, areas that are essential for handling spring rains and snow melt. Some of these low-lying areas with Medisaprists have been developed as cranberry bogs. There are bogs near the Rumford River, remnants of one near Meadowbrook Pond, and the most extensive are the property of the Makepeace Corporation (Fuller-Hammond Bogs) between Bay Road and Mulberry Meadow Brook. There may be a natural bog in the Medieros Preserve near the juncture of Norton/Attleboro/Mansfield town lines. As a result of the high proportion of wetlands and the poor drainage, recent development has often been on marginal lands and if building is done during a dry year, there are later water problems in houses and yards. The roads and early development of town was along the higher ground between the low, wet areas but explosive population growth has led increased pressure to create building lots in fragile areas. The soil limitations for development are found on the Hydric Soil Map, found on the next page. The hydric soil map illustrates the extent of soil that is unsuitable for building construction or septic system placement. The Developable Land and Partial Constraints map (found on the next page) also illustrates limitations to development due to environmental factors. This map shows the riparian areas of perennial streams protected under the Wetland Protection Act as well as the Water Resource Protection District.

The glaciation also produced a local industry that has caused major changes to the topography. The layered gravels and sands have been mined and a great portion of the esker in the Great Woods was removed. Often quarrying was on a small local scale, but at the White Street pits and in the Great Woods, larger operations provided materials for parts of the Southeast Expressway, Logan Airport and most recently, Interstate 495. The quarries have taken the land down to bedrock in many areas and often resulted in new wetlands or wide swaths barren of most vegetation. At the former Pino operation in the Great Woods, the TPC has created numerous water features utilizing the old quarries. Other areas, such as the White Street pits have proved a problematic attraction for bikers. In some cases, the quarries have become garbage dumps, (the Riley quarries off Crane Street). Because of the nature of the gravels, the pollutants from such dumps can easily seep into wells. In the quarried areas, the overmantle has been lost and the vegetation has only gradually begun to return, whereas former woodlots and farmland have quickly returned to forest.

Developable Lands and Partial Constraints




**Legend**

Zoning Districts

- R80
- R60
- R40
- VC
- C
- I
- Water Resource Protection District
- Wetlands
- 100' - 200' Rivers Protection Act Buffer
- Water Bodies
- Rivers and Streams
- Roads
- Rail Lines

Map provided by MassGIS, EOEA and SRPEDD under the Build Out Analysis for the Town of Norton.

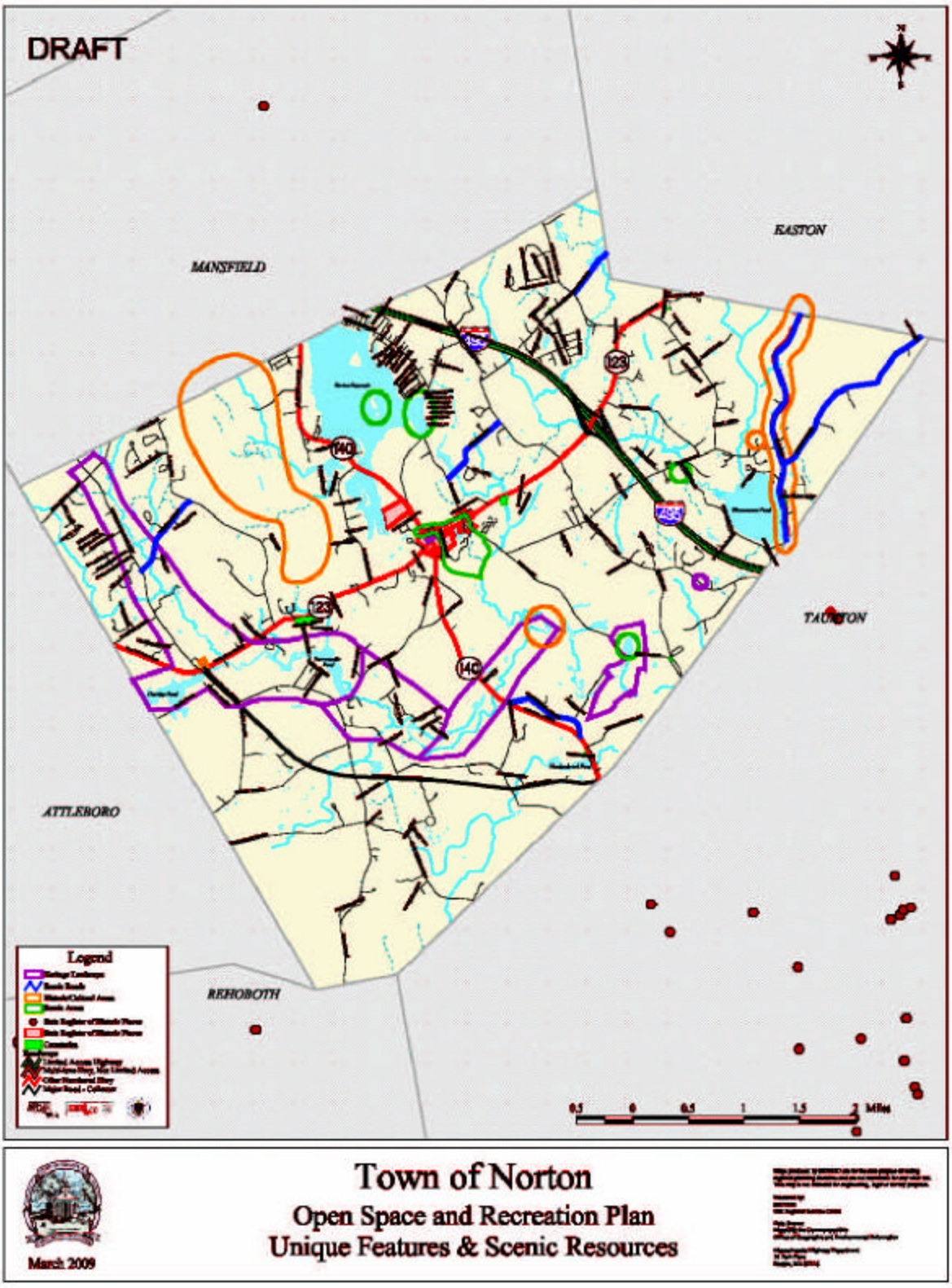
## *Landscape Character*

Norton has quickly changed from a rural to a suburban community in the last decade. Local farms have been disappearing at a quickening pace. Norton, once known for its scenic farmland, fields and forested land, is now an ever-growing residential community along Route 495. The Great Woods have long been an asset to the town. The amount and distribution of wetland and water bodies has also been a distinctive asset for Norton. Not only have historic records shown that the earliest human settlements lived near large water bodies such as Lake Winnecunnet, but recent housing records illustrate the same. The former summer cottages around the Norton Reservoir are now permanent year-round housing. Former mill villages are present around every major water body in town including Barrowsville Pond, and Chartley Pond. Similarly, Wheaton College has long dominated the town center with its historic buildings. Recent zoning changes have made it possible to keep the small town New England feel to the center of Norton. Mixed housing and commercial uses in the center keep the area populated after business hours. The Scenic Resources Map is found on page 36.

## Heritage Landscape Inventory

In 2001, the Conservation Commission applied for the Heritage Landscape Inventory Grant. This grant was offered through the Department of Environmental Management (DEM). A consultant was hired by DEM to help each community identify and document the landscapes that were unique to each community. Only 15 communities received the $10,000.00 grant. This pilot project identified *heritage landscapes*, special places that define the character of a community. Heritage landscapes are the result of human interaction with the geographic areas and contain natural and cultural resources. Examples of heritage landscapes include cemeteries, historic mill buildings, cranberry bogs, archaeological sites, river corridors, parks, shipyards, and farms. In July of 2001, Norton residents identified several sites they felt were important to Norton's history. A total of five sites were chosen for intensive study. Massachusetts Historical Commission forms were completed for each location and sent to the owners. Should any of the owners wish to pursue a Massachusetts Historic Register listing, these forms will be the basis of the nomination. Public Archaeological Laboratories Inc. of Pawtucket, RI conducted field research and further studied the Norton Center, Wading River corridor, Crane Farm, the former Copperworks area and an archaeological site on South Washington Street.

The following descriptions were taken from the Massachusetts Historical Commission's Forms A, D, and H completed by Public Archaeological Laboratories Inc. as part of the pilot project. Norton Center, or Town Common, dates to 19th-20th century. It is recorded as being in good condition with some alterations like the bandstand and Persian Gulf War, World War I, World War II, and Viet Nam War monuments as well as the Monument to the Site of the First Church (1710). Roads surround the center and historic buildings within the Norton Center Historic District listed in the National Register. The western portion contains a lawn enclosed in a 19th century iron post and rail fence. The triangular shape of the Town Common appears to still be in its historic configuration.


DRAFT
MANSFIELD
EASTON
TAUNTON
ATTLEBORO
REHOBOTH
Legend
Town of Norton
Open Space and Recreation Plan
Unique Features & Scenic Resources
March 2009

The Wading River corridor begins at the northwest corner of Norton as the Wading River flows from Shepard's Pond in Wrentham and Foxborough and through Mansfield. The river follows its path with several impoundments at Sweet's Pond (Mansfield), the crossing of Route 123 (West Main Street), joins Chartley Brook (a tributary from Chartley Pond), Barrowsville Pond and the Taunton Copperworks area near Taunton Avenue. The river then joins the Rumford River to form the Three-Mile River. There are three small historic industrial village concentrations along the river that coincide with the 18th and 19th century impoundments of the river in the areas of Chartley Pond, Barrowsville Pond and the Taunton Copperworks. The historic road sections are lined with the residential developments, mostly along the western side of the river by North Worcester Street and South Worcester Street. Massachusetts Historic Commission files document the presence of several campsites along both sides of the river by prehistoric Native Americans. Records show that Native Americans occupied areas near the river for at least 10,000 years. The Massachusetts Archaeological Society recorded two sites in 1939 while a private artifact collection was used to document the Sousa Farm. Unfortunately the Sousa Farm site was destroyed. Other sections of the river have a high potential for undocumented prehistoric records, particularly sites that have gently sloping terraces in close proximity to the river.

Crane Farm is located on both sides of Crane Street near the intersection with Pine Street. The Three-Mile River bisects much of the property and was once dammed for a livestock watering hole and ice-making pond. The property was a Dairy Farm and contains the various agricultural buildings for the dairy and blacksmith shop as well as the fields for hay production and pasture. Long-term ownership by the Crane family over two centuries has preserved one of the best examples of Norton's farming history.

There is an archaeological site on South Washington Street. This is a private residence and contains a fieldstone structure. The archaeological investigation is inconclusive about the purpose of the fieldstone structure. Speculation throughout town and amateur archaeological excavations have postulated Basque shepherding and Native American "sacrificial" altars. However, the PAL reports that quarry marks on the granite stones suggest a 19th century construction. The PAL report lists potential uses as a storage shed, garage or root cellar but it does acknowledge that evidence could have been removed, razed or stolen.

The Taunton Copperworks is located on Taunton Avenue along the Wading River. The Crocker Brothers constructed the 150- acre site to process copper. It includes a complex system of natural and man-made hydrological features, including a canal system extending upstream for almost one mile. Other stonework and foundations can be seen for the Rolling Mill Site, Manager's House, Refinery Site, Copper-works Bridge and the Power Canal. Portions of the site have been preserved by the Land Preservation Society of Norton and by the Conservation Commission through a conservation restriction at the Estates at Norton. The site is significant as an early supplier of ship hull sheathing and coin blanks to the U.S. Mint.

*Resources on heritage landscapes:*

- *Reading* the Land, Massachusetts Heritage Landscapes: A Guide to Identification and Protection. Public Archaeology Laboratories. Commonwealth of Massachusetts, Executive Office of Environmental Affairs, Department of Environmental Management, Boston. April 2003.
- Conserving our Common Wealth: A Vision for the Massachusetts Landscape. The Land Conservation Center of the Trustees of Reservations. The Cricket Press: Manchester by the Sea, MA. June 1999. www.thetrustees.org
- National Park Service-National Register of Historic Places. www.cr.nps.gov/nr/
- Trust for Public Land. www.tpl.org
- Massachusetts Historical Commission. www.state.ma.us/sec/mhc/mhcidx.htm
- Massachusetts Land Trust Coalition. www.massland.org
- PRESERVATION Mass. www.preservationmass.org