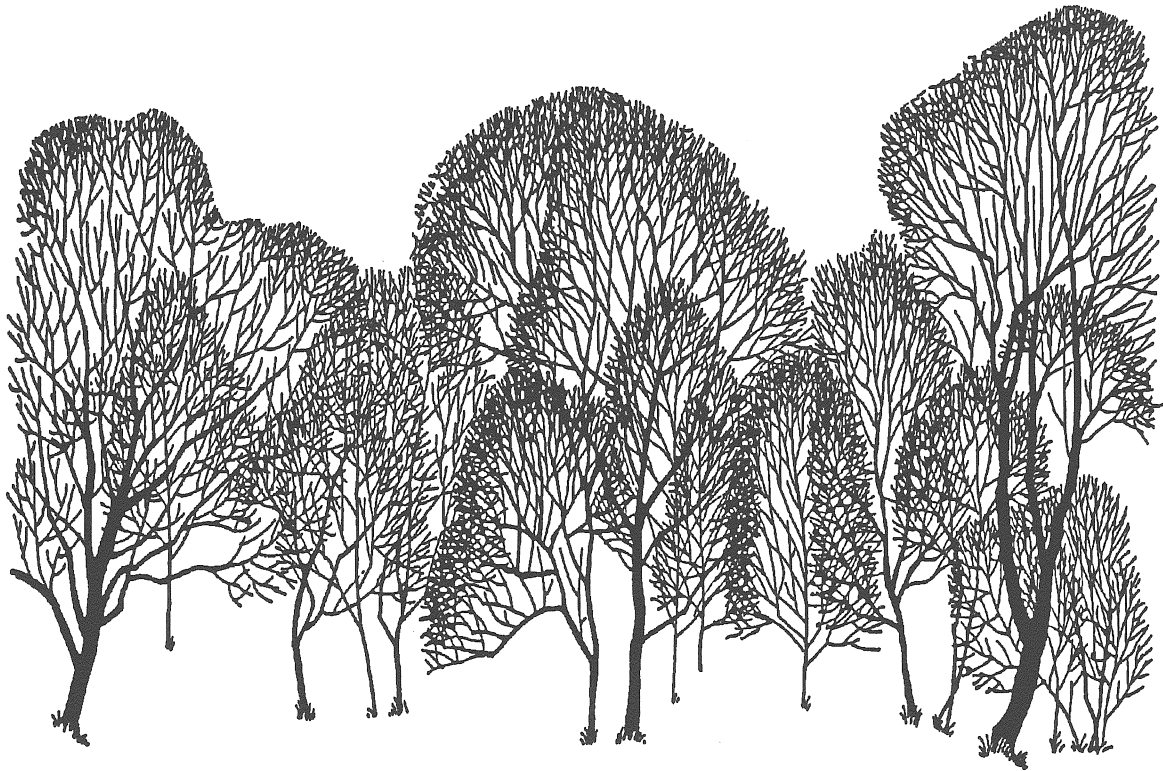


KING'S MARK ENVIRONMENTAL REVIEW TEAM



REPORT FOR

HAMMONASSET SCHOOL PROPERTY

MADISON,
CONNECTICUT

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

HAMMONASSET SCHOOL PROPERTY

MADISON, CONNECTICUT

Environmental Review Team Report

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

Wallingford, Connecticut

for the

Town of Madison

This report is not meant to compete with private consultants by supplying site designs or detailed solutions to development problems. This report identifies the existing resource base and evaluates its significance to the proposed development and also suggests considerations that should be of concern to the Town. The results of the Team action are oriented toward the development of a better environmental quality and long-term economics of the land use. The opinions contained herein are those of the individual Team members and do not necessarily represent the views of any regulatory agency with which they may be employed.

NOVEMBER 1991

ACKNOWLEDGMENTS

The King's Mark Environmental Review Team Coordinator, Suzanne Ferrarotti, would like to thank and gratefully acknowledge the following Team members whose professionalism and expertise were invaluable to the completion of this study:

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I would also like to thank Bob McDonald, Deborah Bunnell, Carolyn Stitt, and Gus Horvath of the Town of Madison for assisting in the completion of this report.

EXECUTIVE SUMMARY

Introduction

An environmental review was requested by the Town of Madison for the Hammonasset School Property, located in the southeastern corner of town. The 54 acre property was recently purchased by the Town for potential use as a recreation center and municipal offices. Currently, the property has approximately 24 acres of wetlands, 4 buildings and a few playing fields and tennis courts. The Town would also like to develop the river frontage where the property extends to the Hammonasset River for recreational use.

The purpose of this review is to inventory and assess existing natural resources, and discuss recreational opportunities, erosion and sedimentation (E&S) controls and the maintenance and regulatory activities necessary to maintain the Hammonasset School Property. This environmental information will be used to assist the Town in guiding conservation and development in this area.

The ERT Process

The review process consisted of 4 phases: (1) inventory of the site's natural resources; (2) assessment of these resources; (3) identification of resource problem areas; and (4) presentation of planning and land use guidelines. Based on the review process, specific resources, areas of concern, recreation limitations and development opportunities were identified.

Physical Characteristics

The Hammonasset School Property is located on the bank of the Hammonasset River. The elevation of the river at the site is less than 10 feet above mean sea level and the flow of the river is affected by the tides of Long Island Sound. Use of the property by the Town for recreation and town offices should not impact the river flow or water quality.

Topography

The topography is characterized by gently rolling hills with few steep slopes. The valley floor contains stratified sand and gravel deposits that may be as much as 50 to 100 feet thick. The topography of the sand and gravel train is hummocky with numerous kettles.

Geology and Resources

Two large kettle holes are found on the property. The holes eventually filled with organic matter and mud and are classified as wetland bogs. Bedrock does not outcrop on the property and the bedrock below the sand and gravel deposit should be a part of the Monson Gneiss, a hornblende-plagioclase-quartz gneiss. The sand and gravel forms an excellent aquifer with intergranular porosity and permeability capable of supplying 20 to 50 gallons of water per minute.

Soil Resources

The soils on the property are generally associated with glacial outwash plains and terraces. The soils consist of Hinckley, Manchester, Ninigret, Rumney, Carlisle and Udorthent soils. The proposed location of the nursing home should be reconsidered as it is very close to wetlands, the septic field location is in a highly permeable soil above an aquifer and the proposed buildings would be in an area with a high water table.

Forestry Considerations

The property can be divided into 4 distinct vegetation types, including, hardwood swamps and floodplain areas, mixed hardwoods, open grass and conifer plantations. Trees that present a hazard or risk should be removed and the healthy vigorous trees should be maintained. From a vegetative stand point, the property has excellent potential for development and use as a recreational center and municipal office complex.

Wetland Considerations

The 24 acres of wetlands found on the property are classified as Palustrine-Forested-Broad leaved deciduous-Temporarily saturated, Palustrine-Forested-Broad leaved deciduous/Scrub/Shrub-Seasonally saturated, Palustrine-Forested-Broad leaved deciduous/Emergent-Seasonally saturated, Palustrine-Open Water-Permanently saturated or Riverine-Tidal-Open Water-Permanent Tidal. This wetland system is a highly important ecological area that furnishes excellent habitat for a diverse array of wildlife.

It is recommended that the Town not allow the excavation of wetlands or allow the use of all-terrain vehicles. The wetlands are an excellent field study area for science classes if they are preserved in their natural state or with the introduction of a trail network.

Wildlife Considerations

Wildlife habitat on the property consists of mixed hardwoods, conifers, wetlands and open land. Wildlife frequenting the property include deer, fox, gray squirrel, woodpeckers, shrews, mice, moles, voles, black capped chickadees, ruby and golden crowned kinglets, morning doves, skunk, muskrat, mink, raccoon, hawks, owls, swallows, blackbirds, kingbirds, waxwings, newts, rabbits, robins, reptiles and amphibians.

The property provides a setting of diverse habitat types which easily could serve as an outdoor environmental education complex. Recommendations include leaving a buffer strip of 100 feet around all wetland sites, placing 2 woodduck boxes on the pond, maintaining habitats and wildlife requirements, developing a trail system and implementing backyard wildlife habitat management practices.

Fisheries Resources

The Hammonasset River is a valuable fisheries resource that is annually stocked with trout. Other typical species include bluegill, pumpkinseed, white suckers, chain pickerel, smallmouth bass, common shiners, fallfish, brown bullheads, blacknose dace, longnose dace and tessellated darters. The river also supports an important migratory fish community. Recommendations include establishing a nature/hiking trail (especially along the river), delineating all wetlands, maintaining a 100 foot buffer strip, carefully planning all future construction and managing the pond as a fishing and skating pond.

Parks and Recreation

The property seems well-sited to serve as a community center because of its location and the indoor and outdoor facilities present. Future development is not recommended or feasible because of the large acreage of wetlands and lack of remaining upland acreage. Suggestions include utilizing the ballfields on a multiple basis, providing sufficient parking, utilizing the trails as walking/nature and cross country ski trails, providing more access to the river and securing gates to discourage vandalism and unauthorized access.

Threatened and Endangered Plant and Animal Species

According to the Natural Diversity Data Base, there are no Threatened or Endangered Species or Connecticut "Species of Special Concern" on the property.

Planning Considerations

The property is located in the RU-2 zoning district which allows certain land uses only by special permit. The site provides a multitude of potential compatible uses. A nursing home is permitted via a floating zone application procedure. The Town should follow through on a 1988 Plan of Development recommendation to prepare an open space/recreation plan. An aquifer protection program should also be implemented and made part of the Plan of Development.

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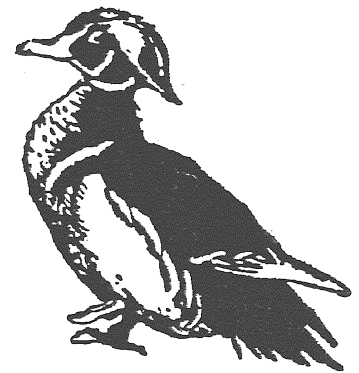
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INTRODUCTION



INTRODUCTION

An environmental review was requested by the Town of Madison for the Hammonasset School Property. The 54-acre property was recently purchased by the Town and is located in the southeastern corner of Town, adjacent to its boundary with Clinton. Access is provided by Duck Hole Road.

The Town is considering the property for potential use as a recreation center and municipal office complex. The construction of a 10-acre nursing home is also proposed on part of the property. Currently, the property has approximately 24 acres of wetlands, 4 buildings and a few playing fields and tennis courts. The Town would also like to develop the river frontage where the property extends to the Hammonasset River for recreation.

The purpose of this review is to inventory and assess existing natural resources and discuss recreational opportunities, erosion and sediment (E&S) controls and the maintenance and regulatory activities necessary to maintain the Hammonasset School Property. Specific objectives include:

- 1) Assessing the hydrological and geological characteristics of the site, including geological development limitations and opportunities;
- 2) Determining the suitability of existing soils to support planned development;
- 3) Discussing soil erosion and sedimentation concerns;
- 4) Assessing the impact of recreational development on the existing vegetation;
- 5) Assessing the impact of recreational development on the wetlands and watercourses;
- 6) Assessing the impact of recreational development on wildlife;
- 7) Assessing the impact on fisheries; and
- 8) Assessing planning and land use issues.

THE ENVIRONMENTAL REVIEW TEAM PROCESS

Through the efforts of the Town of Madison and the King's Mark ERT, this environmental review and report was prepared for the Town. This report primarily provides a description of on-site natural resources and presents planning and land use guidelines. The review process consisted of 4 phases:

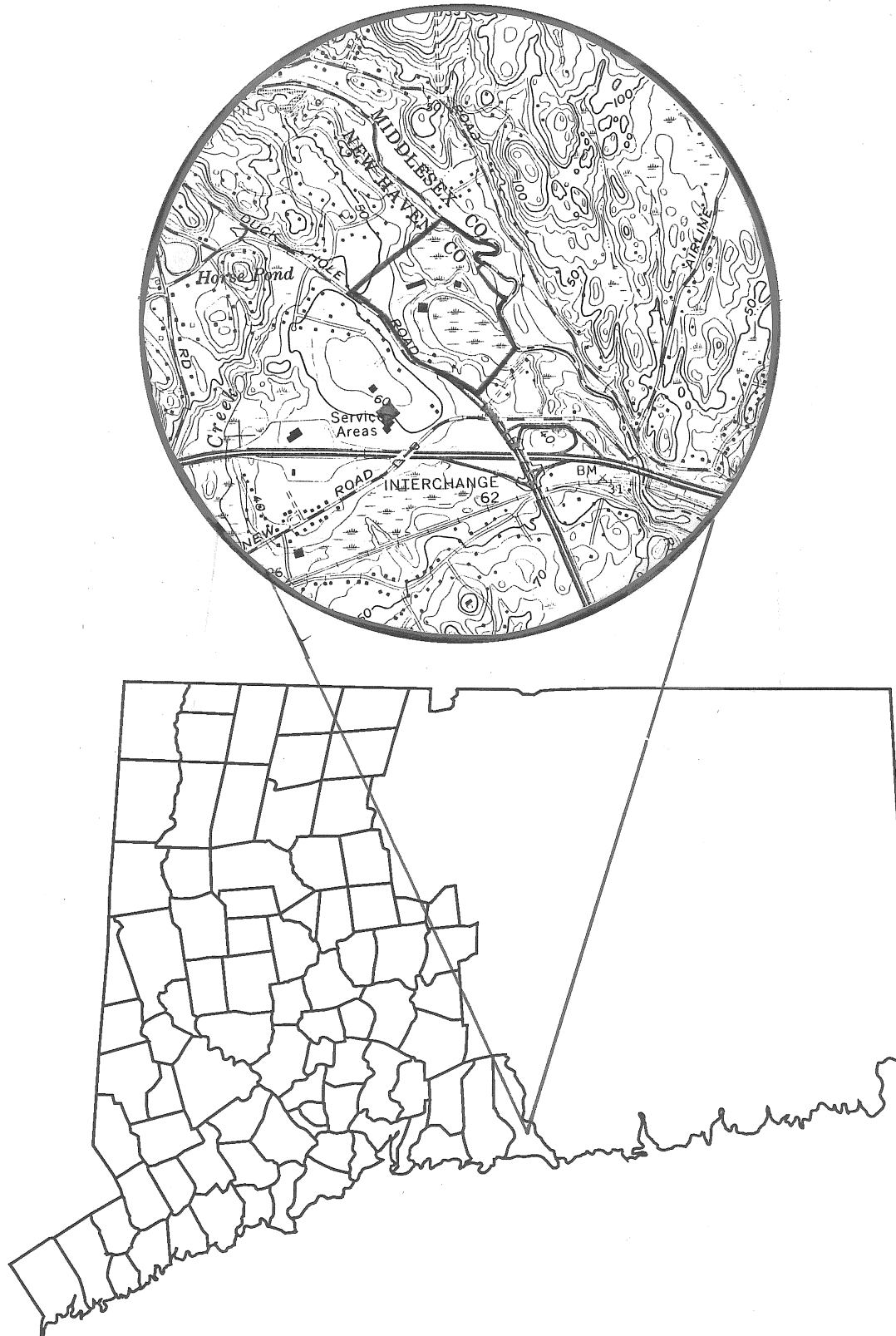
- 1) Inventory of the site's natural resources (collection of data);
- 2) Assessment of these resources (analysis of data);
- 3) Identification of resource problem areas; and
- 4) Presentation of planning and land use guidelines.

The data collection phase involved both literature and field research. The ERT field review took place on September 18, 1991. Field review and inspection of the property proved to be a most valuable component of this phase. The emphasis of the field review was on the exchange of ideas, concerns or alternatives. Mapped data or technical reports were also perused, and specific information concerning the property was collected. Being on-site allowed Team members to check and confirm mapped information and identify other resources.

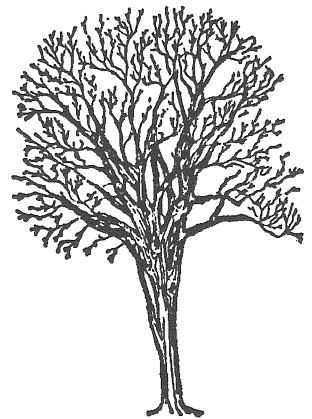
Once Team members had assimilated an adequate data base, they were able to analyze and interpret their findings. Results of this analysis enabled Team members to arrive at an informed assessment of the property's natural resource opportunities and limitations. Individual Team members then prepared and submitted their reports to the ERT Coordinator for compilation into the final ERT report.

Figure 1

LOCATION OF STUDY SITE



PHYSICAL CHARACTERISTICS



PHYSICAL CHARACTERISTICS

The Hammonasset School Property is located on the bank of the Hammonasset River, a large local river of Connecticut that heads approximately 16 miles to the north in the Town of Durham and empties into Long Island Sound, approximately 2 miles to the south. The elevation of the river at the site is less than 10 feet above mean sea level and the flow of the river is affected by tides in the Sound. The water appears to be clean and is stocked with fish twice a year. Little or no industrial development has occurred in the drainage basin and the river has a Class A designation. Use of the property by the Town for recreation and town offices should not impact the river flow or water quality.

TOPOGRAPHY

The Hammonasset School Property is located in the southern drainage basin of the Hammonasset River. The topography is characterized by gently rolling hills, most of which have a thin venier or glacial till (see Figure 3). Few steep slopes exposing bedrock exist. The valley floor contains stratified sand and gravel deposits that may be as much as 50 to 100 feet in thickness. Topography of the sand and gravel train is hummocky with numerous kettles. The sand and gravel was deposited by glacial melt-water streams on a broad braided flood-plain on top of, against and surrounding blocks of melting ice left over at the end of the last ice-age. The melting ice caused the irregular topography.

GEOLOGY AND RESOURCES

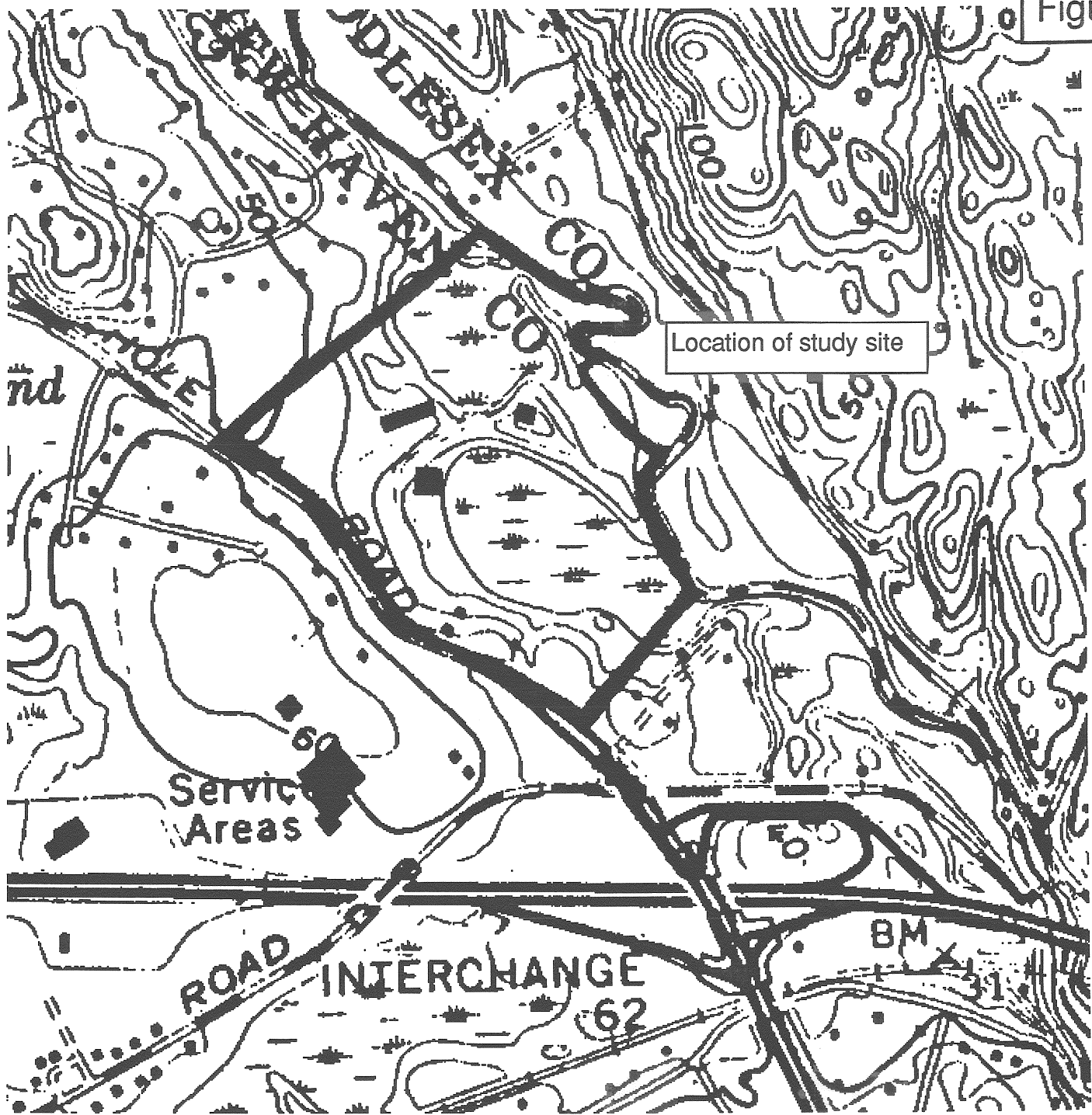
The 2 large kettle holes on the property bear testimony to the former presence of blocks of ice that projected above the flood plain. When the ice melted, steep sided banks of gravel were left surrounding depressions which may have been 10 or more feet deep. The holes eventually filled with organic matter and mud and are now classified as wetland bogs.

Bedrock does not crop out on the property. According to Lundgren and Thurrell (1973), bedrock below the sand and gravel deposit should be part of the Monson Gneiss, a hornblend-plagioclase-quartz gneiss (see Figure 4).

The sand and gravel is an important resource. It forms an excellent aquifer with intergranular porosity and permeability capable of supplying 20 to 50 or more gallons of water per minute if shallow wells are drilled. The water table is at the surface of the kettles, but is approximately 10 to 20 feet below the surface at the western corner of the property. Because the higher elevations of the property are well drained, it may be desirable if recreation fields are developed to have an on-site water supply for irrigation during summertime droughts.

The sand and gravel may also be mined for construction. Several gravel pits exist in a continuation of the deposit several miles north of the site. Gravel could be exploited during construction at locations where playing fields are to be developed. Resulting slopes at the edges of the fields could be useful for spectator seating. Depth to which the sand and gravel may be excavated will be limited by the depth of the water table, which should be determined ahead of time. Additionally, deposits of peat may exist in the kettles. However, this was not determined during the site visit.

Figure 3




**HAMMONASSET SCHOOL
PROPERTY**

MADISON, CONNECTICUT

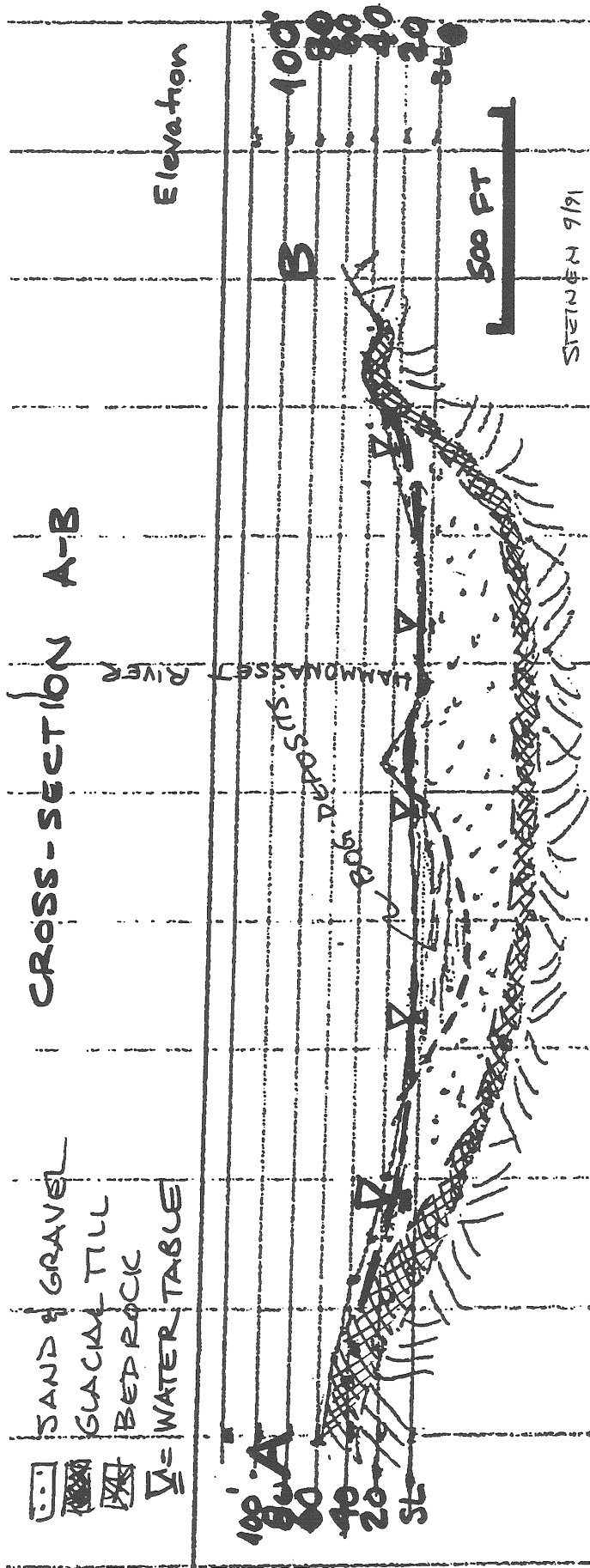
King's Mark Environmental Review Team


Scale: 1" = 375'



Topography

Figure 4



<p>HAMMONASSET SCHOOL PROPERTY</p> <p>MADISON, CONNECTICUT</p>	<p>King's Mark Environmental Review Team</p> 	<p>Geology</p>
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SOIL RESOURCES

In reviewing the Soil Survey of New Haven County, the soils on the Hammonasset School Property are generally associated with glacial outwash plains and terraces. These soils include the excessively drained Hinckley and Manchester soils (HkE, HME), the well drained Haven soil (HcB), the moderately well drained Ninigret soil (Nn), the poorly drained Rumney soils (Ru, Rv) and the very poorly drained Carlisle muck (Ce) (see Figure 5).

The Haven and Ninigret soils are considered prime farmland soils with the soil quality, growing season and moisture supply needed to economically produce sustained high yields of crops when managed properly. The Rumney and Carlisle soils are hydric soils that are regulated as wetlands by the State of Connecticut through municipal commissions under the Inland Wetlands and Watercourses Act.

The soil found in the 3 open areas adjacent to Duck Hole Road is called Udorthent. Udorthents are well drained to excessively drained soil. It is generally composed of cut or borrow areas and/or filled areas. Because the characteristics of the soil are so variable, on-site investigation and evaluation is needed for specific properties. The proposed location for the nursing home facility is on these Udorthents as well as on the Ninigret adjacent to the extensive Carlisle muck wetland system.

EROSION AND SEDIMENT CONTROL

With the construction of the proposed nursing home facility, the potential exists for erosion and sedimentation to reach the Carlisle muck wetland system. However, due to the relatively gentle topography, prevention of erosion and

sedimentation could be readily accomplished by following the standards as outlined in the "Connecticut Guidelines for Soil Erosion and Sediment Control".

The following erosion control practices should be considered when designing controls for the project. These practices are listed along with their specific location in the Guidelines. They are:

1. Temporary Vegetative Cover (Chapter 6.A).
2. Permanent Vegetative Cover (Chapter 6.B).
3. Temporary Mulching (Chapter 7.B).
4. Sediment Barrier (Chapter 7.F).
5. Construction Entrance (Chapter 8.F).
6. Diversion (Chapter 8.B).

When properly applied, these practices should be sufficient to protect the surrounding resources from erosion and sedimentation. Site conditions can change rapidly, however, and further controls may become necessary to deter potential erosion and sedimentation. Therefore, the site should be monitored frequently, both weekly and after a storm event.

Soil Suitability and Planned Land Use

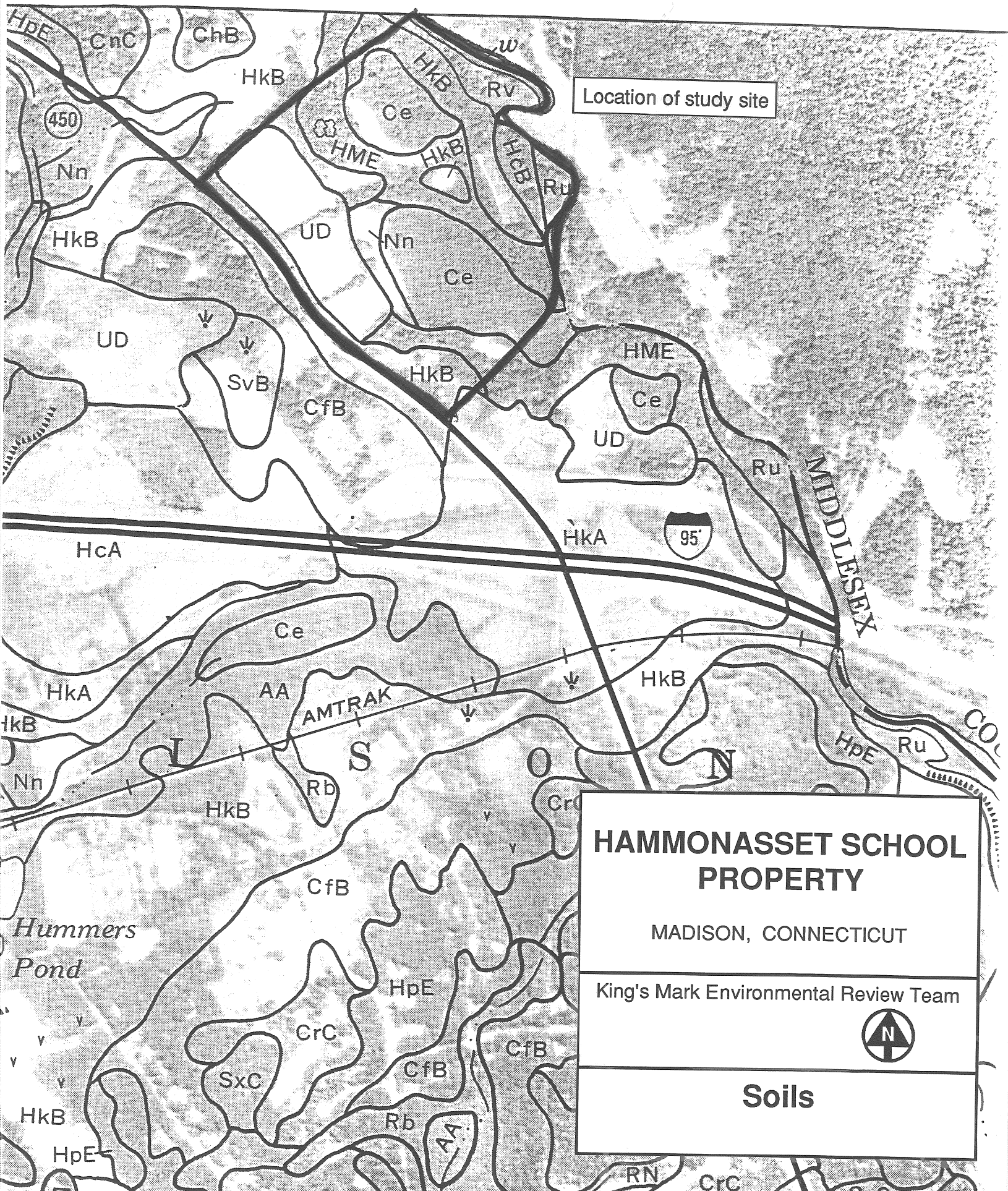
The proposal to locate a nursing home on the property as well as the need to install a septic system to handle the quoted estimate of 11,000 gallons a day needs careful attention. The envelope for the nursing home, as drawn on the site plans, is located on the edge of the wetland. This would place a portion of the facility in the Ninigret soils. This soil has poor potential for community development. It is easy to excavate, however, the steep slopes of excavations are unstable. A seasonally high water table is located at a depth of approximately 20 inches from late fall to mid-spring. Foundations and basements need to be properly designed and constructed to insure a stable foundation and to prevent wet basements.

Because of the above limitations, as well as the high potential for erosion and sedimentation control failure so close to the Carlisle wetland system, further planning efforts should be considered that would reposition the nursing home facility further away from the wetland system and out of the Ninigret soil if possible. The location of the facility in the Udorthent soil, and the proposal to locate the septic facility beneath the soccer fields which are also Udorthent soils, also needs careful attention. As noted before, this soil requires on-site investigation and evaluation for most uses because the characteristics of the soil are so variable.

Concerns also exist because of the potential for rapid permeability in this soil. Because the drainage class is well drained to excessively drained, the potential for the on-site septic system to pollute groundwater is high. The permeability of the soil needs to be evaluated and consideration given to the fact that an aquifer exists below the site. This aquifer is within a stratified drift area and is noted on the State of Connecticut's map entitled "Connecticut Natural Resource Atlas Series: Ground Water Yields". The protection of the aquifer should be given high priority in any evaluation of septic system evaluation.

Appendix A provides information regarding soil limitations for sanitary facilities and building site development as well as for recreational development.

Figure 5



Location of study site

**HAMMONASSET SCHOOL
PROPERTY**

MADISON, CONNECTICUT

King's Mark Environmental Review Team



Soils

BIOLOGICAL RESOURCES



FORESTRY CONSIDERATIONS

Vegetation

The 54-acre Hammonasset School Property can be divided into 4 distinct vegetation types, including 3 hardwood swamp/flood plain areas, several mixed hardwood stands, 3 open grass fields and several conifer plantations (see Figure 6). The acreages of these areas were obtained from aerial photographs and should only be used as estimates.

Vegetation Type Descriptions

1) **Hardwood Swamps and Flood Plain Areas:** There are approximately 24 acres of this vegetation type. These wetland areas are somewhat variable with all size classes of trees represented. Red maple is the dominant tree species with black gum, white ash and yellow birch making up a minor component. Understory vegetation includes sweet pepperbush, highbush blueberry, spicebush, arrowwood, maple leaf viburnum, swamp azela, swamp rose, witch hazel, deciduous holly, red stemmed dogwood, speckled alder, gray birch and hardwood tree seedlings. Herbaceous vegetation present are tussock sedge, sphagnum moss, skunk cabbage, spirea, wild sasparilla, marsh marigold, wild geranium, solomons seal, trilium, violets, Jack-in-the pulpit, poison ivy, green briar, sensitive fern, royal fern, hay scented fern, cinnamon fern and club moss.

2) **Mixed Hardwoods:** Approximately 13 acres of mixed hardwoods are found on the property. These areas are fully stocked with reasonably healthy poles (i.e., trees 6.1" to 11" in dbh) and sawtimber (i.e., trees 11.1" and greater in dbh). White oak, scarlet oak and black oak are dominant in the overstory with scattered red oak, black birch, red maple, sugar maple, hickory and American beech. Occasional yellow birch, white ash and tulip tree are found in close proximity to the wetlands.

Understory vegetation is comprised of hardwood tree seedlings, including, black cherry, choke cherry, flowering dogwood, sassafras and American chestnut. Shrubs present are maple leaf viburnum, sweet pepperbush, arrowwood, highbush blueberry, witch hazel and hazelnut. Seedling size (i.e., trees less than 1" in dbh) and sapling size (i.e., trees 1.1" to 6" in dbh) white pine are found throughout the understory of this vegetation type. Ground cover includes huckleberry, lowbush blueberry, club moss, Canada mayflower, poison ivy, wild sasparilla, bracken fern and hay scented fern.

3) **Open Grass Fields:** Open grass fields are used primarily for sport activities and also on a limited basis for parking. There are approximately 11 acres on the property. These fields must be mowed on a regular basis to prevent weed species and hardwood tree seedlings from becoming established.

4) **Conifers:** Approximately 6 acres of conifers, including, white pine, Norway spruce, white spruce and larch were planted among the hardwoods years ago and are now pole to sawtimber size. These trees are located around the edges of the playing fields, along the eastern boundary trail, around the buildings and near the parking lots. These trees add considerably to the aesthetics of the site and should be protected from future development.

Limiting Conditions and Potential Hazards

Currently there are 2 main conditions limiting the health and vigor of existing trees on the property. One condition is the saturated soils that created the hardwood swamp and flood plain areas. The high water tables in these areas restrict the depth of root development, limiting the stability and size the trees can attain. Trees in these areas are very susceptible to windthrow. Construction that creates openings adjacent to these wetlands will increase the susceptibility of these trees to windthrow resulting from accelerated wind speeds. The second condition is soil compaction and root exposure along the trails. Trees are very sensitive to the condition of the soil

within the entire area of the root systems. Soil compaction may adversely affect the delicate soil moisture and aeration balance, leading to a general decline in tree health and vigor. Exposure and physical damage to tree root systems may have the same affect. These stresses make trees more susceptible to secondary insect and disease organisms which may cause mortality.

Many of the trees in close proximity to existing buildings and parking lots are used to support electrical wires and lighting fixtures. The wires, fixtures and hardware used to attach the wires and fixtures should be completely removed from these trees to reduce potential hazards. Poles for lighting fixtures utilizing underground wiring would be a much safer alternative.

Additional potential hazards include trees with their roots exposed, dead trees, dead tree parts and those trees which have a high probability of falling due to excessive decay or lean. These trees become hazard trees if there is a high risk of injuring people or damaging property. All trees with the above mentioned characteristics would be hazards if located within striking distance of a building or along areas of high use such as hiking trails, roads, parking lots or playing fields. Many of the conifers have dead or damaged limbs that should be properly pruned to reduce the risk.

Construction activities that occur too close to trees that are to be retained will adversely effect the health of the trees and may create future hazards. Care should be taken not to disturb the soil within 20 to 50 feet (depending on tree diameter as the larger the tree, the further away disturbance should occur) of single trees or groups of trees to be retained.

Aesthetic Considerations

The aesthetics of a forest depends upon numerous characteristics of the individual trees, the forest as a whole and the landscape. Some of these characteristics include: size and distribution of the trees, density of the forest, variety

of forest scenes, unique or interesting features, amount of dead and down material, depth of view into the forest and the visual attractiveness of the bark texture and leaf and flower color. Generally, forests with large trees and a deep unobstructed view into the woods are most desirable.

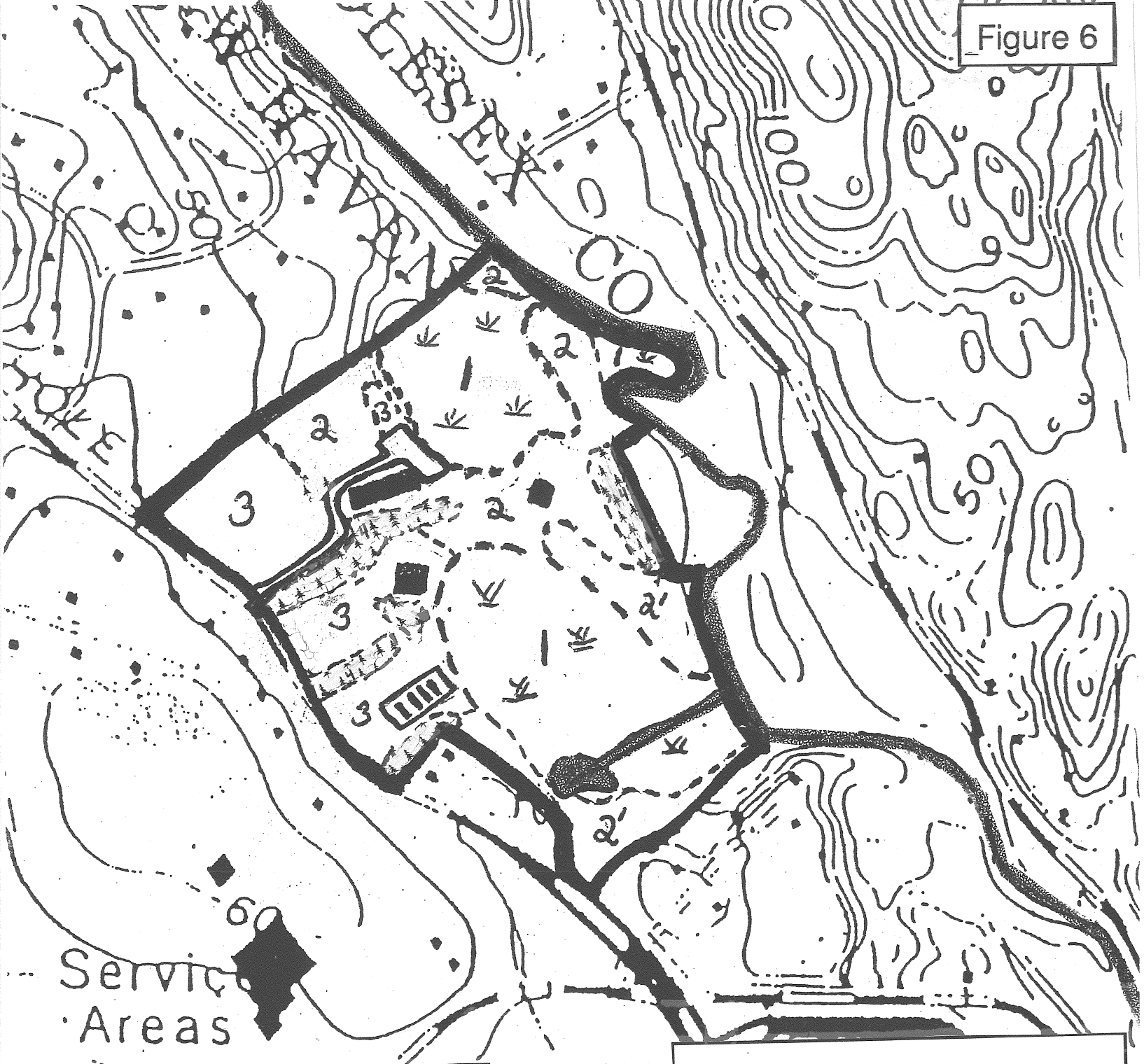
There are a variety of large oaks which are located along the trails within the mixed hardwood stands that appear healthy and are growing vigorously. These trees could be designated as standards to be retained for their aesthetic appeal as long as they remain healthy. All of the healthy conifers should also be designated as standards. These trees add significantly to the aesthetics of the property especially when they are located within or close to high use areas. The windthrow trees which are scattered throughout the property detract from the aesthetics of the property and should be removed or at least cut so they fall closer to the ground.

Management Considerations

The removal of risk and hazard trees and the maintenance of healthy vigorous trees should be of major concern in the development and management of this property. The health and vigor of the hardwood and conifer standards could be improved and sustained by removing the poorer quality trees which are directly competing for space, sunlight, water and nutrients. The hardwoods that are removed could be utilized as fuelwood and removed at no cost to the town. At the same time, trees which were blown over by recent winds storms could be removed and utilized.

An experienced professional forester should be retained to determine which trees are hazardous to life and property, which trees are to be retained as standards, which trees should be removed to maintain those standards and which trees need to have branches pruned. From a vegetative stand point, this property has excellent potential for development and use as a recreational center and municipal office complex.

Figure 6



Service Area



conifers



Hammonasset River & pond



buildings



tennis courts

Type 1 - hardwood swamp/floodplain

Type 2 - mixed hardwoods

Type 3 - open grass fields

Type 4 - conifers

HAMMONASSET SCHOOL PROPERTY

MADISON, CONNECTICUT

King's Mark Environmental Review Team

Scale: 1" = 100'



Vegetation Map

WETLAND CONSIDERATIONS

The 24 acres of wetlands located on the Hammonasset School Property are concentrated in 2 locations, one large area to the north of the school buildings and another large area to the south of the school buildings. The wetlands located north of the buildings can best be described as a forested hardwood swamp characterized by a mature red maple canopy and containing vegetation typically associated with swampy areas, i.e., spicebush, various fern species, skunk cabbage and sphagnum moss.

The wetlands located on the southern half of the property are vegetatively more diverse than the wetlands to the north. This wetland contains extensive mats of sphagnum moss, which is more typically associated with bogs. The accumulated peat deposits underlying the ground surface were very hummocky and displayed many different wetland plants, including, arrow arum, buttonbush, highbush blueberry, silky dogwood, winterberry and different aster species. Many larch trees were observed growing in this area as well.

A small ponded area is located on the south side of the bog-like wetland system. This open water area contains emergent vegetation on the fringes and floating lilies on the water surface. Some pockets of small shrubs are also growing on the fringes.

The wetland areas described above should not be thought of as separate entities. They are, in fact, one wetland complex that has been bisected by the school development. This wetland complex functions in conjunction with the Hammonasset River, providing migratory wildlife with excellent quality habitat.

The National Wetlands Inventory recognizes the following types of wetlands to be present on this property:

- 1) Palustrine-Forested-Broad leaved deciduous-Temporarily saturated.
- 2) Palustrine-Forested-Broad leaved deciduous/Scrub/Shrub-Seasonally saturated.
- 3) Palustrine-Forested-Broad leaved deciduous/Emergent-Seasonally saturated.
- 4) Palustrine-Open Water-Permanently saturated.
- 5) Riverine-Tidal-Open Water-Permanent Tidal.

Wetland and Watercourse Functions

Wetlands and watercourses have a valuable influence on the quantity and quality of surface water which supplies large portions of the population with clean water for recreation and domestic use. One of the most valuable functions of wetlands for surface water is protection of and increase in water quality. Wetlands prevent pollutants from reaching watercourses by acting as a vegetative buffer and retaining and absorbing pollutants.

By the nature of the soils, vegetation and topography in wetlands, they have the potential to store large volumes of water by permitting floodwaters to spread out. The gradual release of water over time reduces peak flow rates. Vegetation and meandering streams physically slow the passage of flood waters.

Freshwater wetlands constitute the principle habitat for waterfowl such as ducks, geese and swans, and for fur bear animals such as mink, muskrat, otter and beaver. Other species, including, deer, grouse, quail, pheasant, turkeys, marsh birds and songbirds also use wetlands. The basic needs of water, food and cover are supplied to the wildlife.

Generally speaking, wildlife diversity can be directly related to vegetative diversity. Wetland habitat quality is influenced by numerous factors including:

- 1) The number of wetland classes. The greater the number of wetland classes present in a wetland, the greater the diversity of wildlife habitat types.

- 2) The degree of vegetative life form interspersion. Interspersion is a term used to describe the degree of mixing of vegetative types or of vegetation and water within a given area. The more irregular the distribution of plant types, the better the interspersion. The greater the length of edge between 2 vegetative types, the greater the abundance of wildlife.
- 3) The percentage cover. The relative proportions of cover and water are important for wildlife productivity. For example, wetlands with equal proportions of cover and open water areas are more valuable than wetlands with unequal proportions.
- 4) The size. In general, the larger the wetland, the greater the vegetative and wildlife productivity and diversity.
- 5) The surrounding habitat type. Many wildlife species use surrounding uplands as well as wetlands for habitat. Therefore, the kind of vegetation and land use adjacent to wetlands affects its wildlife value.
- 6) The juxtaposition. A wetland located near other wetlands or connected to other wetlands by a stream is more valuable for wildlife habitat than an isolated wetland because the wildlife can use more than one wetland to satisfy their needs and use the stream corridor for travel.

Given the following factors present in this wetland/watercourse system:

- 1) The diversity of habitat types (i.e., ponded water, forested swamp, shallow marsh, boggy forested wetland and the river) as well as the vegetative diversity contained in each;
- 2) The high degree of vegetative interspersion and the large edge area between the various types of wetlands;
- 3) The presence of stream corridors and riverine systems that connect this wetland system to neighboring wetlands;
- 4) The relative equal proportion of open water to forested areas;
- 5) The uncommonness of the boggy wetland to the area;
- 6) The isolation from intense developments; and
- 7) The large area that the wetlands occupy,

this wetland system is a highly important ecological area that furnishes excellent habitat for a diverse array of animals. Additionally, the potential for the existence of rare and/or uncommon plant species in the wetlands is very good, especially due to its boggy nature in some areas.

Potential Uses of the Property

In order to protect the valuable natural resources on the property, potential development should be limited to recreational and educational options. It is suggested that the Town not allow the excavation of the wetlands for peat, gravel or any other materials. The wetlands are an excellent field study area for science classes if they are preserved in their natural state or with the introduction of perhaps a gravel, wood chip or boardwalk trail network. The use of all terrain vehicles on trails should be discouraged because of the disturbances they cause. It is preferable to leave the existing pond in its present condition since it is currently providing breeding habitat for amphibians. However, it could be enlarged to provide additional open water as long as it is constructed in a fashion which would incorporate an emergent shelf to promote the growth of emergent vegetation. The development of upland portions of the property for additional playing fields, courts or skating rinks is acceptable, however a buffer area of at least 100 feet around wetland boundaries is recommended.

WILDLIFE CONSIDERATIONS

The wildlife habitat types found on the 54-acre property include mixed hardwoods, conifers, wetlands and open land.

The mixed hardwoods habitat consists of a variety of hardwood species, including, red maple, red oak, cherry, ash, hickory, black birch and scattered white pine. Understory vegetation includes dogwood, witchhazel, viburnum, arrowwood, smilax, blueberry, multiflower rose, sweet pepperbush, nettle, bedstraw, poison ivy, grape and hardwood regeneration. Wildlife frequenting such sites include deer, fox, raccoon, gray squirrel, woodpeckers (hairy and downy) and non-game species such as shrews, moles, mice, voles and snakes.

The conifer habitat consists of strips and scattered white pine. White pine provides habitat diversity and is utilized by seed eating birds such as black capped chickadees and ruby and golden crowned kinglets. This habitat also serves as roosting and nesting cover for owls, hawks and mourning doves.

The wetland habitat consists of Hammonasset River Riparian Zone, a small pond and 2 red maple swamp sites. Vegetation within these areas consists of red maple, alder, dogwood, tussock sedge, sweet pepperbush, pickerelweed, skunk cabbage, false hellebore and duckwood. Wildlife using such sites include deer, raccoon, skunk, muskrat, mink, fox, swallows, red-winged blackbirds, kingbirds, cedar waxwings, woodpeckers, woodducks, water and garter snakes, salamanders, newts and painted turtles.

The open land habitat consists primarily of developed grass athletic fields. There is one small undeveloped grass field and several open grassy walkways. Although these sites are intensively used, they do serve as feeding sites for species such as robins, cedar waxwings, kingbirds, flycatchers, cottontail rabbits and bats.

Discussion/Recommendations

The property already has facilities which could serve as a town recreation center/municipal complex. It also provides a setting of diverse habitat types which easily could serve as an outdoor environmental education complex. Long range planning should consider the need for outdoor education and that available sites for such activities are dwindling. Recommendations include:

- 1) Leave buffer strips (100 feet) of natural vegetation along all wetland sites to help filter and trap silt and sediments.
- 2) Place 2 woodduck boxes on pond site.
- 3) Maintain mixed hardwood site (east of most northern athletic field) in as undeveloped a state as possible for wildlife and educational purposes.

- 4) Develop an environmental education trail system which highlights wildlife openings, plantings, bluebird boxes, woodduck boxes, forest management and the ecology of the site.
- 5) During land clearing care should be taken to maintain certain forestland wildlife requirements:
 - a. Encourage mast producing trees (oak, hickory, beech).
 - b. Leave 3-5 snag/den trees per acre as they are used by many birds and mammals for nesting, roosting and feeding.
 - c. Trees with vines (fruit producers) should be encouraged.
 - d. Brush debris could be windrowed to provide cover for small mammals, birds, amphibians and reptiles.
 - e. Removal of dead and down woody material should be discouraged where possible. The existence of many wildlife species (salamanders, snakes, mice, shrews and insects) depends on the presence of dead trees (Hassinger 1986).
- 6) Implementation of backyard wildlife habitat management practices should be encouraged. Such activities involve providing food, water, cover and nesting areas.

On a property of small acreage with many buildings, landscaping can do a great deal to provide habitat and make an area attractive to wildlife. First, leave as many trees as possible around the buildings. This will not only benefit wildlife by providing food, cover and nesting sites (i.e., especially for songbirds), but will also be more aesthetically pleasing. Plant trees and shrubs which are useful to wildlife and landscaping. Large expanses of lawn with no trees or shrubs present should be discouraged.

Planting shrubs that are less palatable to deer may lessen problems with nuisance deer. Shrubs less palatable to deer include evergreen hybrid rhododendrons, American holly, scotch mountain laurel, common lilac and white pine. Taxus spp. (yews) experience a greater degree of damage as they are preferred winter foods of deer (Conover, 1988).

FISHERIES RESOURCES

The 54-acre Hammonasset School Property is being considered by the Town of Madison for potential use as a recreation center along with housing various municipal offices. Approximately 2,700 linear feet of the property abuts the Hammonasset River, a valuable fisheries resource.

Fish Populations

The Hammonasset River supports an important fishery for hatchery trout as it is annually stocked with more than 8,000 adult (9-12") brown, rainbow and brook trout. Most of the Hammonasset River stream corridor has not been encroached upon by development, thus it supports a viable population of resident stream fishes. The stream adjacent to the Hammonasset School Property is of relatively low gradient. Species typical of this habitat include bluegill and pumpkinseed sunfish, white suckers, chain pickerel, smallmouth bass, common shiners, fallfish and brown bullheads. The stream gradient generally increases upstream of the property location and becomes more favorable to species preferring swifter stream velocities such as blacknose dace, longnose dace and tessellated darters. White suckers and fallfish should occupy microhabitat areas within upstream areas as well.

The Hammonasset River also supports an important anadromous or migratory fish community. The river is known to host runs of river herring, white perch and sea-run brown trout. The first known barrier to anadromous fish migrations occurs at Lake Hammonasset, several miles upstream. Spawning runs of river herring are expected between the months of March and June. Sea-run brown trout may immigrate in early spring or in the fall with the onset of the spawning season. The fish assemblage of the small pond on the property is unknown, however, habitat appears to be most suitable for the survival of warmwater fish populations such as

bluegills, pumpkinseeds, chain pickerel and brown bullheads.

Recommendations

The following recommendations are provided to assist with on-site planning:

- 1) The Hammonasset River and its associated wetlands could serve as a valuable ecological study area for town residents. A nature/hiking trail system could be developed on the property which follows along the river and through wetlands. The established trail system should follow a closed-loop; that is, it should begin and end at the same point and be well marked. The construction of a raised boardwalk is suggested in wetlands to limit disturbance and possible erosion and sedimentation. Permits will be required from the Madison Inland Wetland Agency for any work in wetlands. Care should also be exercised along the river to minimize erosion and sedimentation. Trail development along the river will also serve to increase access for local fishermen. Any riverside trails could be maintained by the town or the Madison Land Trust.
- 2) During the review meeting it was mentioned that alternative land uses for the parcel include sand/gravel excavation and the construction of a nursing home. No plans were available delineating specific development locations, although it was mentioned that sand/gravel deposits were underlying wetlands. Any development of this sort should focus upon minimizing disturbance to on-site wetland and riverine habitat; hence, an initial step would be to hire a certified soil scientist to delineate all on-site freshwater inland wetlands. Once wetlands are flagged, the town should target only non-wetland areas for future development and consider the impacts to the overall reduction of open space. It is highly recommended that at the minimum, a 100 foot open space buffer zone be maintained along all wetlands and from the edge of the wetland boundary of the Hammonasset River. No construction nor alteration of existing habitat should be allowed in this zone.
- 3) Any future construction of ballfields should be carefully planned to control soil erosion during initial phases of construction. Stormwater runoff should not be concentrated, but be allowed to disperse via sheetflow. Additionally, liming and fertilization practices should be carefully controlled to eliminate nutrient loading to the river.
- 4) The small pond on the property could serve a dual purpose as a fishing pond as well as a skating pond. This pond would be useful to introduce children to basic fishing techniques. In addition to the existing warmwater fish community, small numbers, i.e., 100-200 adult trout could be stocked in the early spring to create a temporary put-and-take fishery. Fish could be harvested during organized fishing derbies. The only limiting environmental parameter for creating a temporary spring trout fishery is the pH content. The pH level of the pond should be 6.0 or greater to support trout.

THREATENED AND ENDANGERED PLANT AND ANIMAL SPECIES

According to Natural Diversity Data Base maps and files, there are no known extant populations of Federally Endangered and Threatened species or species **proposed** for State Endangered, Threatened or Special Concern status (General Statutes Section 26-303 - Section 26-315) within the Hammonasset School Property boundaries.

Natural Diversity Data Base information includes all information regarding critical biologic resources available at the time of the request. This information is a compilation of data collected over the years by the Natural Resources Center's Geologic and Natural History Survey and cooperating units of DEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultation with the Data Base should not be substituted for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as enhance existing data. New information is incorporated into the Data Base as it becomes available.

LAND USE AND PLANNING CONSIDERATIONS



PARKS AND RECREATION

Description of Site

This property consists of a well-drained section underlain with glaciofluvial deposits and of a poorly drained section underlain mainly with muck and in part with floodplain soils along the Hammonasset River. As expected, development has occurred on the well-drained upland while the wetlands have remained in a natural condition.

Major structures on the property include the main school building, an arts building, a gym and a maintenance building. There are also 4 soccer fields and a tennis complex with 4 courts. Several trails and old roads also exist on upland portions of the property.

Recommendations

Although not located in a geographically general location within the Town of Madison, the property's location on a State road near a major interchange on I-95 makes it quite central in terms of ease of access from centers of population in the town. Therefore, it seems well-sited to serve as a community center. Meeting rooms, art shows, senior center and indoor sport facilities for night and winter use are examples of uses or activities which the existing buildings should be able to house.

The existing ballfields are in active use and are in great demand. Similarly, the tennis courts show evidence of use. Further development on the property is not recommended or feasible because of the large acreage of wetlands and the lack of remaining upland acreage. Thus both the wetland areas and the limited areas of undeveloped upland are recommended to remain in their present wooded condition.

Minor suggestions to consider include:

- 1) Utilize the ballfields on a multiple use basis if necessary or appropriate, as soccer fields in fall and spring and softball fields in the summer.

- 2) Ensure that sufficient parking is available to serve the gym and tennis courts.
- 3) Utilize the various short trails and wooded roads as walking/nature and cross country ski trails.
- 4) Provide more access to the Hammonasset River to offer fishing opportunities.
- 5) Place gates at several vehicular accessways at the east end of the property to improve management control and discourage unauthorized access and possible vandalism.
- 6) Similarly, secure a gate nightly at the Duckhole Road entrance.

PLANNING CONSIDERATIONS

Site Location

The Hammonasset School property encompasses approximately 54 acres abutting the west side of the lower reach of the Hammonasset River. The property is located in the RU-2 zoning district of town, with direct access onto Duck Hole Road in Madison. The property provides easy, convenient access to all locations within the community, via Duck Hole Rd, Rte. 79, I95, the Hammonasset Connector and Rte 1. The following approximate distances from the property were calculated:

- 5.8 miles to the North Madison Circle
- 3.2 miles to the High School
- 3.1 miles to the Municipal buildings @ Meetinghouse Lane
- 4.0 miles to the Surf Club
- 3.1 miles to the Town Center
- 4.8 miles to the Brown Intermediate School

Municipal Land Use Regulations

Currently, in the RU-2 District of the community, the following uses are allowed by Special Permit:

* Philanthropic, educational, recreational or religious use by a duly incorporated, non-profit body, governmental unit or community association, excluding correctional institutions and institutions for the insane. (note: these uses are subject to a maximum building coverage of 15%)

* Clubs

* Parks and playgrounds operated by a governmental unit, non-profit corporation or community association.

* Day care center or nursery school.

* A private hospital, sanitarium or clinic providing that the lot area shall be not less than 5,000 square feet (s.f.) for each patient accommodation but excluding hospitals for the insane or drug addicts; provided further that all buildings so used shall be not less than 100 feet from any property or street line.

* Health Care Facilities District (HCFD), based on specific standards and zone change process.

Building regulations affecting the property within the RU-2 District:

Minimum lot area = 60,000 s.f. (40,000 s.f. of "buildable land")

Minimum lot width = 175 ft.

Maximum building coverage, all buildings = 10%

Maximum building height = 30 feet

Minimum yards = Front: 40 feet

Rear: 30 feet

Side: 30 feet each side

(note: "Buildable land" shall mean all land that is not inland or tidal wetlands or watercourses as defined in Sections 22a-29 and 22a-38 C.G.S., within the 100-year flood plain, or slopes with an incline of 25% or greater.)

Flood Plain District

The Flood Plain District is a class of district in addition to and overlapping one or more of the other zoning districts of the community. The following requirements are applicable in the Flood Plain District:

"Within the Flood Plain District, no building or other structure shall be constructed, moved or substantially improved unless a Flood Hazard Area Permit therefore is obtained from the Town Engineer in

accordance with a certain ordinance entitled "Flood Plain Management Ordinance, Town of Madison, Connecticut". "

"Within the Flood Plain District, there shall be no paving, other than normal maintenance and repair of roads and driveways, and no excavation, removal, grading or depositing of earth materials, other than bona fide landscaping operations on a lot, unless such Flood Hazard Area Permit therefore is obtained from the town Engineer."

Aquifer Protection Area

"In accordance with PA 89-305, each municipality with an aquifer protection area, by ordinance, must authorize an existing board or commission to adopt regulations establishing aquifer protection areas and to regulate activities in those areas. The aquifer protection areas are those delineated on maps prepared by water utilities or DEP and approved by the DEP. They are areas that contribute water to existing well fields or potential well fields in geologic areas with high water yields known as stratified drift deposits."

Site Plan Considerations

The environmental constraints placed on the property are considerable and reflected in the regulations highlighted in the previous paragraphs.

The property contains a large amount of inland wetland soils which lie in a special flood hazard area (100 year flood zone). The current buildings and playing fields lie outside the wetland areas.

In the 1988 Municipal Plan of Development, a "greenbelt" had been delineated along the Hammonasset River to be designated as the Hammonasset Watershed District. Within this bounded area, the growth plan sought to encourage public and Land Trust purchases and to work with neighboring communities concerning groundwater protection. The town's zoning policy reflects the general goals of the state's conservation and development plan which designates the land for conservation purposes. The town will be setting up new regulations to establish and adhere to the aquifer protection legislation. The Hammonasset River is a critical resource for the region and the Connecticut Water Company. Along the river in Madison, there are 7 existing wells which tap into the stratified drift aquifers. Two of

the wells lie in the vicinity of the Hammonasset School property. In the 1987 water supply master plan prepared by the Connecticut Water Company, the report recommended that an aquifer protection program be implemented and made part of the plan of development for the Town of Madison.

The present building coverage, excluding parking areas, roads and tennis courts, appears to be approximately .05% of the buildable portion of the property. This would allow additional building construction on the 3 acre upland area north of the Academic Building. The current residential land use adjacent to the property can be categorized as middle density residential.

Use and/or expansion of the Academic Building to house municipal departments, i.e., engineering, planning and zoning, recreation, inland wetlands and other associated departments should be seriously considered. A few key factors in determining the feasibility and efficiency of locating certain municipal departments on the property include the following considerations:

- * cost of heating and cooling (electric),
- * need for proximity to other municipal departments, (tax assessors, town clerk)
- * Future electronic communication capability (GIS, computer networks).

Although a new energy management system was installed during the 1989-90 school year, an energy audit may be beneficial in assessing cost and recommending alternatives of increased operation of the buildings on a 12 month schedule.

Health Care Facilities District (HCFD)

Health care facilities are permitted via a "floating zone" application procedure. Under this procedure, a zone change request is submitted along with a HCFD Development Plan with specific standards. Using the "floating zone" process, a Health Care Facility District could be sited in the rural residential, residential or

light industrial zones of the community. Floating zones are designed to establish special use districts and appropriate standards before an exact location is determined.

The key HCFD development plan requirement for the property is the detailed soil report. A detailed analysis and necessary approvals and safeguards for an on-site sewage system are critical due to the close proximity of Connecticut Water Co. drinking water supply wells.

Potential Uses

The Town of Madison is very fortunate to have been able to acquire such a unique parcel of land. The athletic fields, tennis courts, gymnasium and classrooms are needed for recreation department programs and municipal office space. The property provides a multitude of potential compatible uses. The town could improve and expand their current excellent townwide recreational programs while protecting the aquifer zone along the river. The wetlands adjacent to the river provide an excellent buffer and habitat for wildlife.

The property also provides an opportunity to create some unique new programs, such as adult and child day care and a recreational center for teens. Although active recreation programs and opportunities are needed in the community, passive uses of the property would be beneficial and compatible. The existing paths south of the tennis courts and Arts Barn should be left as natural as possible, while maintaining accessibility and stabilization. The entire property is laid out in a campus design, making it ideal for community activities. The pathways, buildings and active playing fields all interconnect with each other and the natural surroundings.

With the purchase of this property, the town should follow through on a 1988 Plan of Development recommendation to establish a representative committee and prepare a comprehensive Townwide open space/recreational plan. The community

should take stock of assets, needs, uses and costs involved with maintaining existing open space and recreational programs. As less funding and programs becomes available from federal and state sources, it becomes the responsibility of municipality to provide the level of recreational opportunities and municipal services demanded by the public.

APPENDICIES



Appendix A: Soil Limitations Chart

MAJOR LIMITATIONS TO THE
DEVELOPMENT OF:

MAP UNIT NAME	SEPTIC TANK ABSORPTION FIELD	DWELLINGS WITH BASEMENTS	DWELLINGS WITHOUT BASEMENTS	PATHS AND TRAILS
Carlisle: Ce	severe: floods, wetness	severe: wetness, low strength, excess humus, frost action	severe: wetness, low strength, excess humus, frost action	severe: wetness, excess humus
Haven: HcB	slight	slight	slight	slight
Hinkley: HkB	slight	slight	slight	moderate, small stones
HME: Hinckley Part	severe: slope	severe: slope	severe: slope	severe: slope
Manchester Part	severe: slope	severe: slope	severe: slope	severe: slope
Ninigret: Nn	severe: wetness	moderate: wetness	severe: wetness	slight
Rumney: Ru	severe: floods, wetness	severe: floods, wetness	severe: floods, wetness	severe: floods, wetness
Rumney variant: Rv	severe: floods, wetness	severe: floods, wetness, frost action	severe: floods, wetness	severe: floods, wetness

Appendix B: Hammonasset School Property Statistics

HAMMONASSET SCHOOL PROPERTY STATISTICS

Building Dimensions:

Academic Building (Total Dimension).....	241' X 93'
Gym (Total Dimension).....	147' X 104'
Playing Floor.....	100' X 80'
Art Barn (Total Dimension).....	100' X 80'
Main Floor.....	60' X 60'
Maintenance Building (Total Dimension).....	40' X 72'
Greenhouse (Total Dimension).....	12' X 16'

The Art Barn and Academic Building both have heat and air conditioning. The gym has heat only. The Maintenance Building uses a wood stove for heat when necessary. The Greenhouse also has heat. We are 100% electric. We have budgeted \$40,000 for electricity for the 1990-91 school season.

A new energy management program was completed in the winter of 1989-90 school year. The savings figures will not be know until the end of this year.

The Academic Building and gym have new roofs as of 1985. They are still under warranty.

The electric service to each building is 277/480 volts down to 120/208 volts.

400 Amp service to the Gym
200 Amp service to the Art Barn
400 Amp service to the Academic Building

The original architect was Robinson Green Beretta of Providence, Rhode Island.

The school property consists of 54.69 acres. The break down of the property is as follows:

14 acres - large swampy area to the south
6.8 acres - small swampy area to the north
3.7 acres of wet area along the river
24 acres of wet area in total

Approximately 3 acres of wooded area on the north side of the Academic Building are suitable for building.

The upper field is approximately 5 acres.
The lower field is approximately 2 acres.
There are four tennis courts.
There is parking for approximately 175 cars.

The Connecticut Water Company has an easement of approximately 30 feet. This easement runs the entire width of the Hammonasset property from east to west. This easement is for access to their property and for a water line which runs from Clinton under the Hammonasset River, across our property to Duck Hole Road (town map #1898).

NOTES