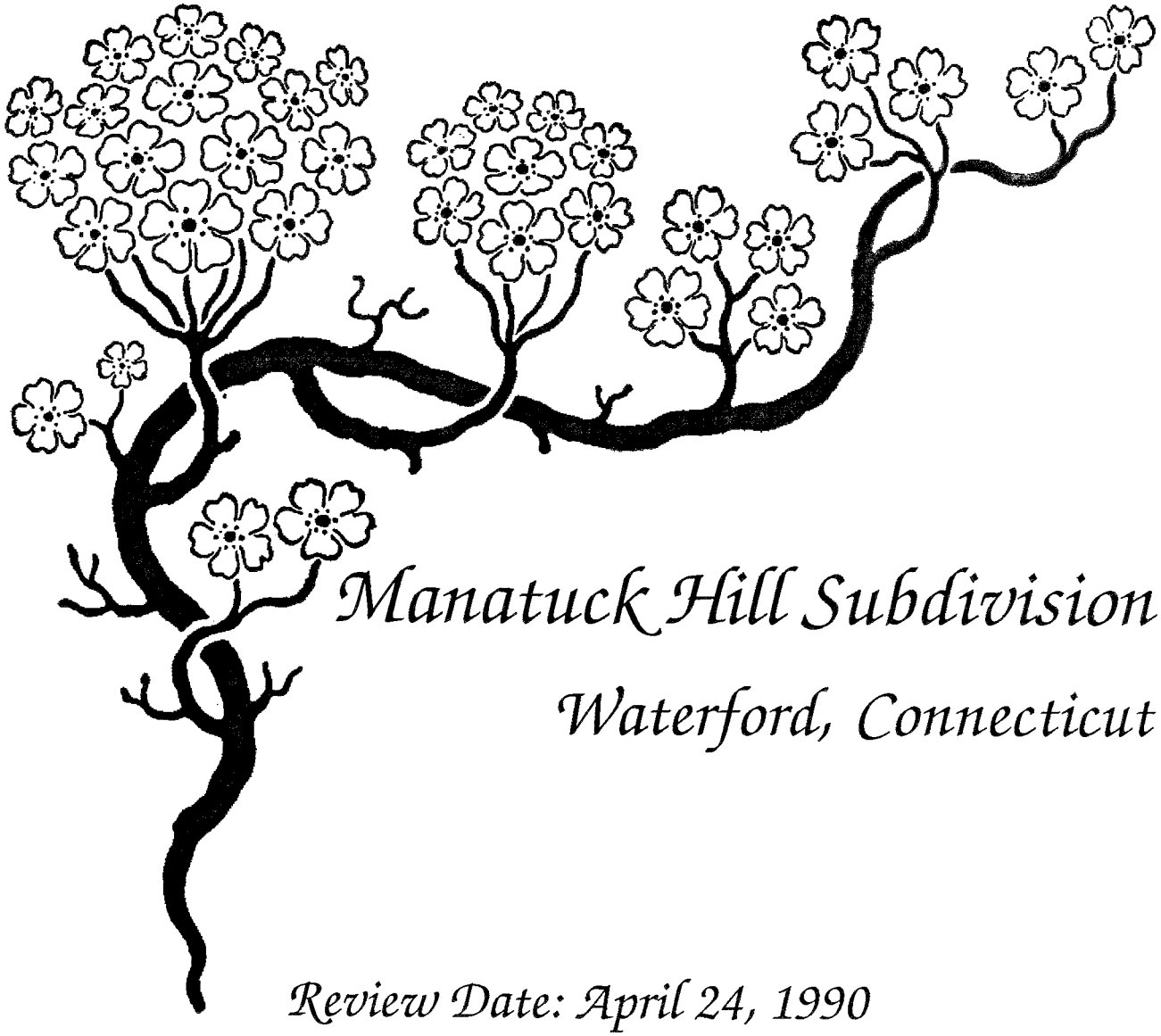
Manatuck Hill Subdivision

Waterford, Connecticut

July 1990

EASTERN CONNECTICUT ENVIRONMENTAL REVIEW TEAM REPORT

Eastern Connecticut Resource Conservation and Development Area, Inc.



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Review Date: April 24, 1990

Report Date: July 1990

Eastern Connecticut Resource Conservation and Development Area, Inc.

EASTERN CONNECTICUT ENVIRONMENTAL REVIEW TEAM

P.O. Box 70, Route 154

Haddam, Connecticut 06438

(203) 345-3977

ENVIRONMENTAL REVIEW TEAM REPORT
ON

Manatuck Hill Subdivision
Waterford, Connecticut

This report is an outgrowth of a request from Waterford Planning and Zoning Commission to the New London County Soil and Water Conservation District (SWCD). The S&WCD referred this request to the Eastern Connecticut Resource Conservation and Development (RC&D) Area Executive Council for their consideration and approval. The request was approved and the measure reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The ERT met and field checked the site on Tuesday, April 24, 1990. Team members participating on this review included:

Dawn McKay	*Zoologist* *DEP - NRC - Natural Diversity Data Base*
Brian Murphy	*Fisheries Biologist* *DEP - Eastern District*
Liz Rogers	*District Conservationist* *USDA - Soil Conservation Service*
Paul Rothbart	*Wildlife Biologist* *DEP - Eastern District*
Richard Serra	*Regional Planner* *Southeastern CT Regional Planning Agency*
Elaine Sych	*ERT Coordinator* *Eastern Connecticut RC&D Area, Inc.*

Bill Warzecha *Geologist/Sanitarian*
DEP - Natural Resources Center

Prior to the review day, each Team member received a summary of the proposed project, a list of the town's concerns, a location map, and a soils map. During the field review the Team members were given a topographic map, a full set of plans, correspondence from RTM Associates, City of New London, Waterford Water Pollution Control Authority and Enviro-Tech Consultants. The Team met with, and were accompanied by the Waterford Environmental Planner, a member of the Conservation Commission, an adjacent property owner, the developers and their engineer and soil/environmental consultants. Following the review, reports from each Team member were submitted to the ERT Coordinator for compilation and editing into this final report.

This report represents the Team's findings. It is not meant to compete with private consultants by providing site designs or detailed solutions to development problems. The Team does not recommend what final action should be taken on a proposed project -- all final decisions rest with the Town and landowner. 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 developer and the Town. The results of this Team action are oriented toward the development of better environmental quality and the long-term economics of land use.

The Eastern Connecticut RC&D Executive Council hopes you will find this report of value and assistance in making your decisions on this proposed subdivision.

If you require additional information, please contact:

Elaine A. Sych
ERT Coordinator
Eastern Connecticut RC&D Area
P.O. Box 70
Haddam, Connecticut 06438
(203)345-3977

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1. Location, Zoning and Land-Use

The approximately 130 acre site is located in southcentral Waterford. It is bounded on the east by Jordan Brook and its accompanying floodplains, Fog Plain Road and residential properties on the south, wooded, undeveloped land and a Connecticut Light and Power Company high tension wire right-of-way on the west and wooded, undeveloped land on the north. A private driveway that serves a few homes and that extends from Rockridge Road on the west abuts an interior part of the site. Also a segment of Tyke Lane, a cul-de-sac off Parkway South, abuts a northern section of the site.

The site is currently zoned R-40 which allows single-family homes on lots of 40,000 square feet or larger. A cluster design concept has been proposed by the applicant for the site. The purpose of this zone would be to allow flexibility in site design and encourage preservation of sensitive and natural areas. It is understood that the town is working on cluster regulations but they are not approved to date.

A review of information supplied to Team members indicates that all lots, except #61 which is 20,800 square feet, are 40,000 square feet (about 1 acre) or more in size. Each lot would be served by public water from the New London Water Department and tied into the Waterford municipal sewer system. As such, the principal hydrogeologic impacts commonly associated with residential development are allayed and only those effects resulting from construction and the proposed residential use of the land are at question.

It is understood that all lots below 180 feet above mean sea level on the site can be supplied with sufficient water pressure. Lots above elevation 180 would either need to be served by a central pressure boosting pump station or individual on-site wells that tap the underlying bedrock. About 50% of the proposed lots would be located above elevation 180.

Comparing a 1934 air photo to a 1986 air photo of the site and vicinity indicates that little has changed on the property. The major difference between the two photos is the presence of pastureland that is shown on the 1934 air photo. The pastureland was located mainly on the crest of Manatuck Hill near the existing water tank. Transition from 1934 to present for the site and vicinity has resulted in an increase in wooded land, a decrease in farmland and an increase in residential land.

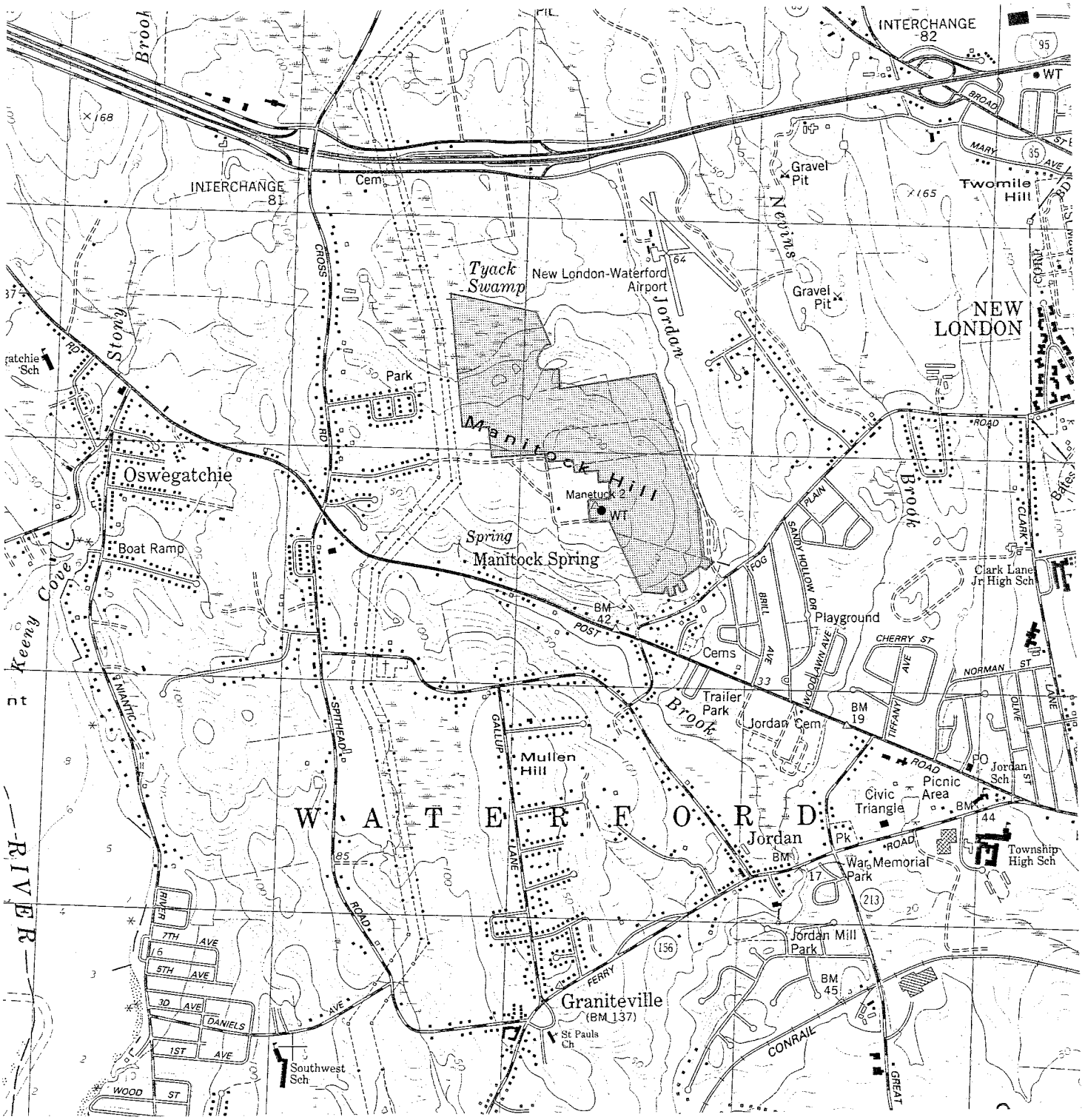
Bedrock underlying the central and southern parts of the site has a granitic texture. In the past this rock had economic value mainly as building stone and rip-rap. As such, the rock was quarried at many locations in Waterford. It appears that the rock may have been quarried on a small scale in places on the site as evidenced by the presence of cut stone with drill hole piles near small depressional features.

The site is presently undeveloped and generally unused. The "woods" road and trails that transect the site appear to be used by off road vehicles such as trailbikes and all terrain vehicles (ATV's).

LOCATION MAP

Scale 1" = 2000'

Approximate Site Location



2. Topography

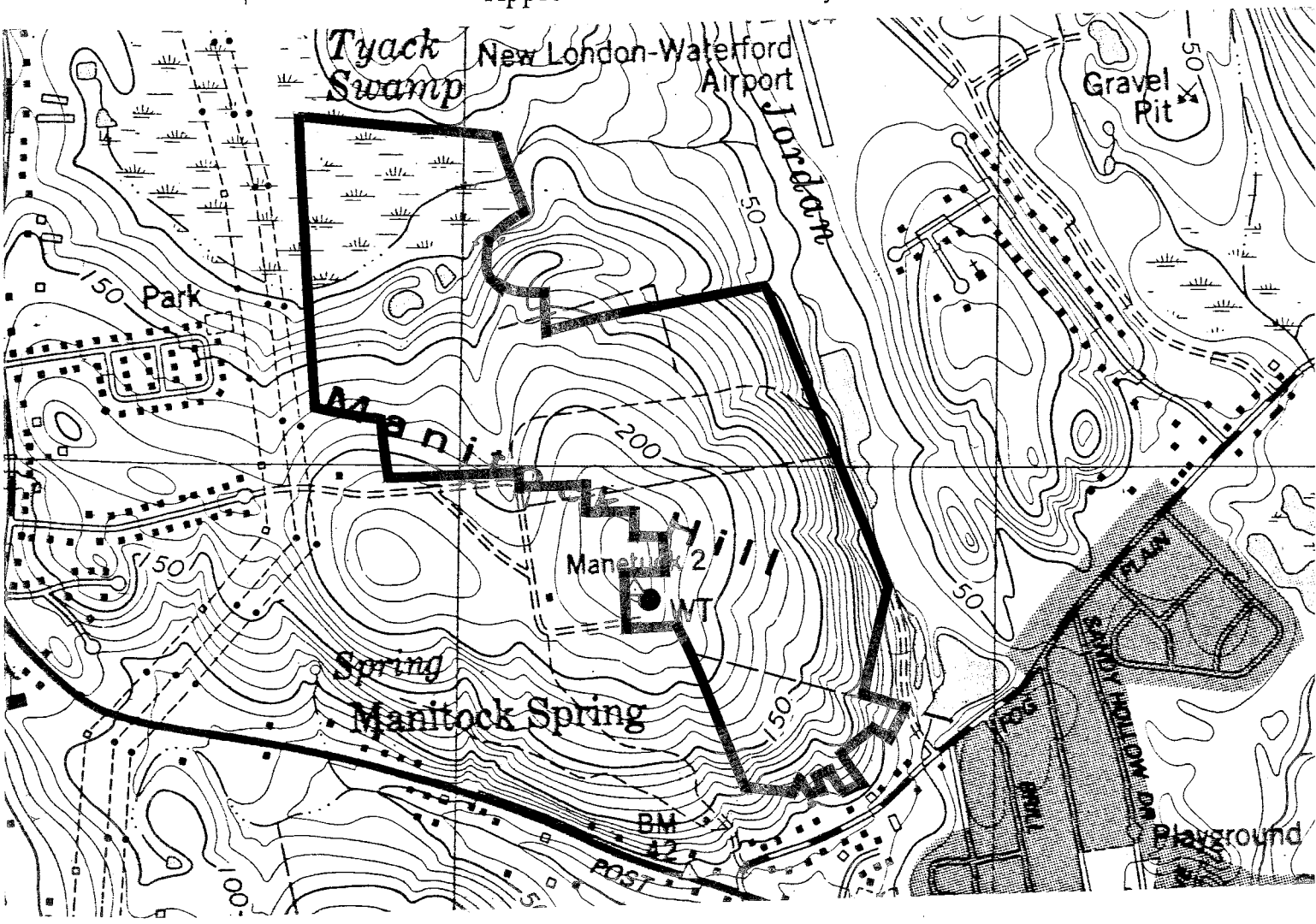
The site encompasses the north and east side of Manatuck Hill, a rock cored hill which is one of the highest peaks in southern Waterford. Approximately 20 acres of Tyack Swamp, which drains to Jordan Brook encompasses the northern limits of the property.

Site topography ranges from flat to very steep. The steepest slopes, which are controlled by the underlying bedrock, occur on the east flank and southern parts of Manatuck Hill. A small area of moderately steep slopes also occurs in the northcentral parts near Tyack Swamp. Flat slopes occur throughout Tyack Swamp and on the crest of Manatuck Hill. The remainder of the site contains slopes that range from gentle to moderate.

Maximum and minimum elevations on the site are ±240 feet above mean sea level (crest of Manatuck Hill) and 50 feet above mean sea level (along the Jordan Brook floodplain in the eastern limits), respectively.

TOPOGRAPHIC MAP
Scale 1" = 1000'

Approximate Site Boundary



3. Geology

The site is encompassed entirely by the Waterford topographic quadrangle. A bedrock geologic map (GQ-575, by R. Goldsmith, 1967) and a surficial geologic map (GQ-329, by R. Goldsmith, 1964) for the quadrangle have been published by the Connecticut Geological and Natural History Survey.

Goldsmith (map GQ-575) indicates that the rock core of the site is comprised of three rock types; two subunits of New London Gneiss and a Mamacoke Formation subunit.

As can be seen by the accompanying bedrock geologic map, the majority of the site (southeast parts) is underlain by a New London Gneiss subunit known as the Joshua Rock Gneiss Member. It is described as a medium gray, medium grained equigranular (the mineral in the rock are similar in size) granitic gneiss which weathers with small cherry red-spots. Sparse outcrops of the rock unit occur on the east flank of Manatuck Hill. The central portion of the site is underlain by a New London Gneiss subunit described as massive, gray granitic gneiss which is peppered with brilliant black biotite and scattered prominent magnetite. Major minerals include quartz and oligoclase. The final rock type, found in the northern parts of the site is a Mamacoke Formation subunit. In general, it consists of interlayered light to dark gray, medium grained gneiss.

Gneisses are crystalline rocks that have undergone metamorphism (geologically altered by great heat and pressure in the earth's crust). The term gneiss refers to the textural and structural aspects of the rock. Gneisses tend to be banded rocks characterized by alternating layers of granular (light-colored) minerals and platy or flaky (dark-colored) minerals. The term granitic, used in the preceding paragraph generally applies to rocks that are light-colored coarse grained rocks. They typically contain quartz as the essential mineral along with feldspar and dark-colored minerals.

The exact depth to bedrock is unknown but probably does not exceed 10 feet in most places. Bedrock outcrops on the site are few but there is a concentration of medium to large sized surface boulders in the southern parts and east flank of Manatuck Hill.

For those areas of Waterford not accessible to municipal water mains, the underlying bedrock serves as the major aquifer for domestic water supplies. There is a possibility that the proposed homes, which are above elevation 180, may need to rely on the underlying bedrock as a water supply source unless a pressure boosting pump station is located on the site. The installation of the pump station would reduce the risk of groundwater contamination to on-site wells drilled on the site and should be strongly considered.

Overlying bedrock across the site is a relatively thin blanket (generally 10 feet or less) of unconsolidated sediments of glacial origin called till. Till consists of sediments that range in size from clay to large boulders, but is predominantly sand, silt and gravel. Based on soil mapping data, the texture of most till on the site is sandy and loose. The till sediments were deposited by glacial ice as it moved across the bedrock surface from north to south/southeast.

The composition of the till in the southern parts of the site is slightly different than the till on the remainder of the site. It is characterized by the presence of many large subrounded boulders that are concentrated at the surface. Additionally, poorly to well sorted stratified sand and gravels are found in the deposit. Map GQ-329 identified these sediments as end moraine deposits. They formed at the front margin of a glacier. The material in the end moraine is deposited by dumping of rock debris from the ice margin. Along the eastern property line, glacial stream deposits consisting of interbedded pebble gravel, sand, with minor layers of cobble gravel were deposited by streams flowing from wasting masses of glacier ice in the Jordan Brook Valley. These deposits, in places along the eastern property boundary, have been mined, probably for construction material.

Tyack Swamp, in the northern parts consists of post-glacial sediments called swamp deposits. These deposits consist of partly decomposed organic material mixed or interbedded with silt and sand.

According to the site plans distributed to Team members the boundaries for regulated wetland soils that include the portion of Tyack Swamp on the site were flagged in the field by a certified soil scientist and their boundaries superimposed onto the plan.

The principal wetland soils occur in and are associated with Tyack Swamp. According to the site plan, Tyack Swamp consists mainly of Adrian and Palms Muck (Aa).

These nearly level, <u>very poorly drained</u> soils are commonly found in depressions and along streams of outwash plains and glaciated uplands. Typically, the Adrain soils have a surface layer of black and very dark grey muck 12 inches thick. The subsurface layer is black muck 21 inches thick. The substratum is gray, gravelly sand to a depth of 60 inches or more. The Palms soils typically have a layer of black muck 9 inches thick. The subsurface layer is very dark brown and black muck 21 inches thick. The substratum is gray and grayish brown silt loam and fine sandy loam to a depth of 60 inches or more.

The major concerns with the Aa soils include low strength due to the presence of organic materials and a high water table that is at or near the ground surface most of the year. As such, these soils are poorly suited for any type of development.

Except along the eastern property lines the remainder of the wetland soils are identified as Ridgebury, Leicester and Whitman extremely stony fine sandy loams. This undifferentiated group contains soils that range from poorly drained (Ridgebury and Leicester) to very poorly drained (Whitman). They occur in drainageways and depressions on the till covered site in areas that are generally flat. The soil texture and presence of soil mottling indicates a seasonally high groundwater table condition. In general, the seasonally high water table is about 6 inches below ground surface in the Ridgebury and Leicester soils and at or near ground surface in the Whitman soils. The primary engineering concerns with these wetland soils are the seasonally high water table and a slowly permeable substratum approximately 1.5 feet below ground surface in the Ridgebury and Whitman soils. Most of these wetland areas provide good habitat for wetland plants and wildlife and perform important hydrologic functions.

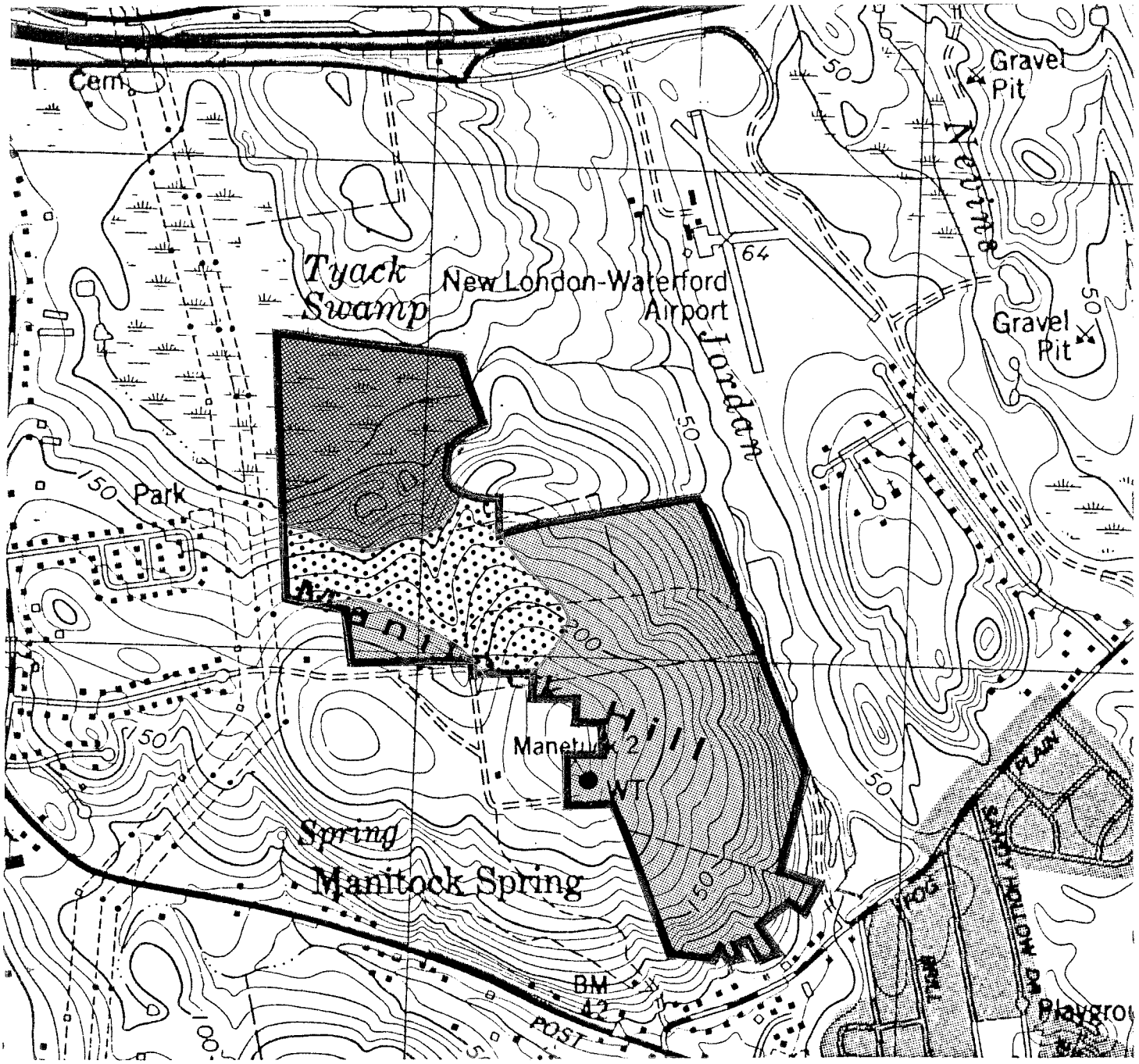
It should be noted that other wetland soils (Aquents-Aq) have been mapped along the site's eastern property line. These soils have been disturbed by man as a result of excavation. As a result, the original soil materials have been excavated to the ground water table. Typically, these soils have a seasonal high water table within 20 inches of the soil surface, have an aquic moisture regime, and can be expected to support hydrophytic vegetation.

Based on present plans, the applicant has made a conscientious effort to minimize impacts to regulated wetland soils on the site. One road crossing of wetlands located between stations 40+00 and 42+00 is proposed for the proposed subdivision. Additionally, there is potential to utilize the small ponds and the accompanying wetlands in the northern parts for the purpose of storm water management. (Also see *Geologic Development Concerns* and *Hydrology* sections of report.)

BEDROCK GEOLOGIC MAP

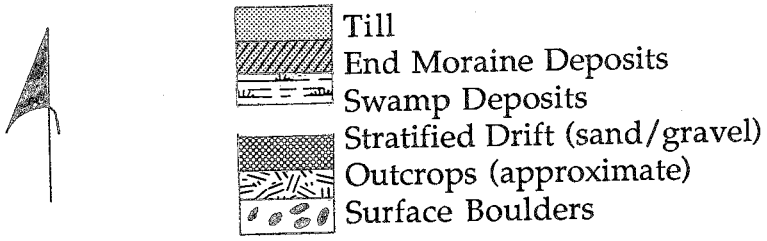
Scale 1" = 1000'

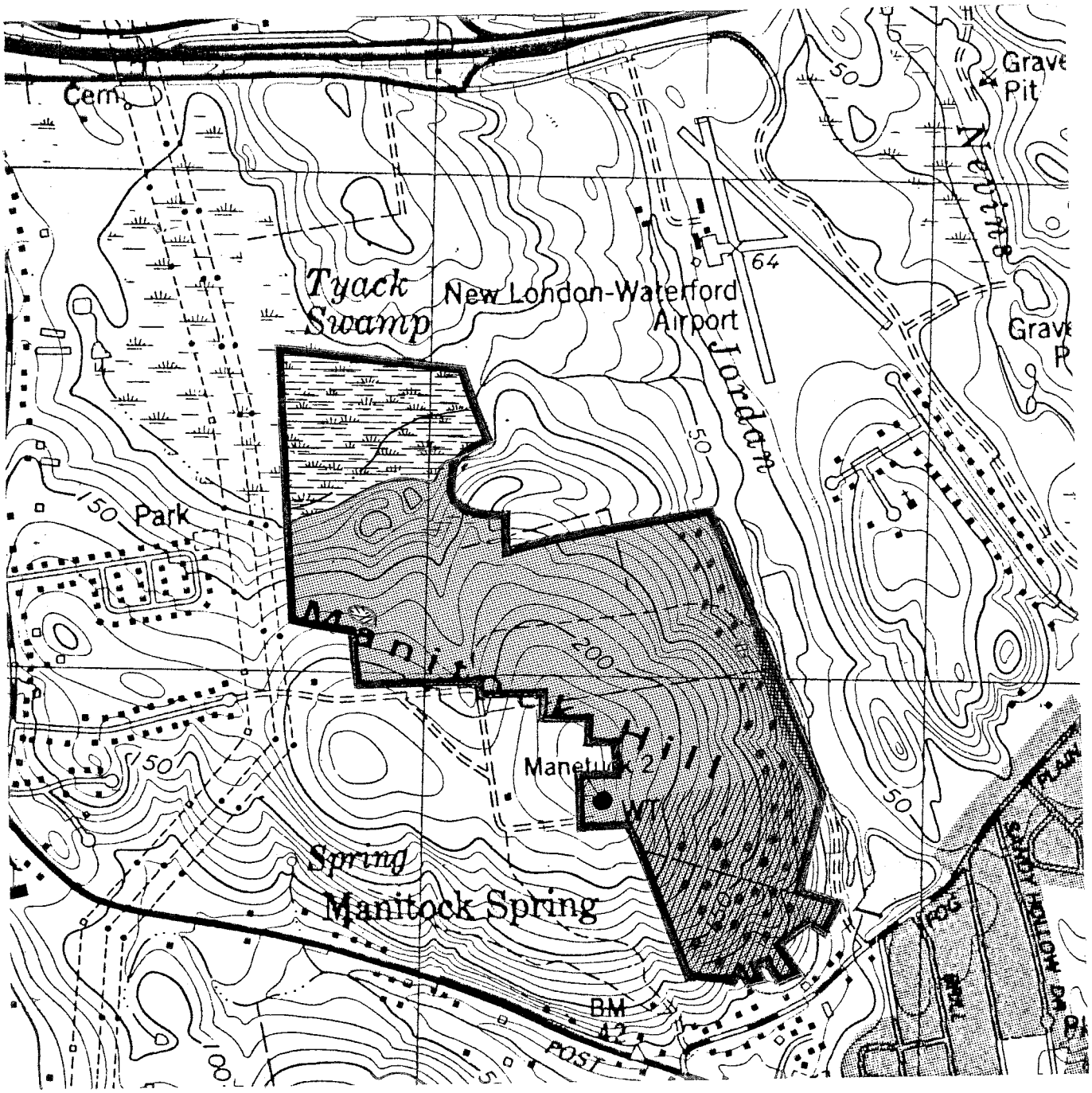
New London Gneiss (Joshua Rock Gneiss Member)
New London Gneiss Subunit
Mamacoke Formation Subunit



SURFICIAL GEOLOGY MAP

Scale 1" = 1000'





4. Soils Descriptions

*** Aa - Adrian and Palms mucks

These nearly level, very poorly drained soils are in pockets and depressions of stream terraces, outwash plains, and glacial till uplands. Slopes range from 0 to 2 percent. Adrian soils have a high water table which is at or near the surface for most of the year. Permeability is moderately rapid in the organic layers and rapid in the substratum. Palms soils have a high water table which is at or near the surface for most of the year. Permeability is moderately rapid in the organic layers and moderately slow in the substratum. The available water capacity is high for these soils. Runoff is very slow or ponded. These soils are strongly acid through slightly acid. These soils are not suited to cultivated crops. These soils are suited to trees. Windthrow is common because of shallow rooting depth above the water table. These soils are poorly suited to community development.

These soils are in capability subclass VIw.

* CbB - Canton and Charlton fine sandy loams, 3 - 8 percent slopes

These gently sloping, well drained soils are on glacial till upland hills, plains, and ridges. Permeability of the Canton soil is moderately rapid in the surface layer and subsoil and rapid in the substratum. Permeability of the Charlton soil is moderate or moderately rapid. The available water capacity in these soils is moderate. Runoff is medium. This soil warms up and dries out rapidly in the spring. These soils are well suited to cultivated crops. The hazard of erosion is moderate. These soils are suited to trees.

These soils are in capability subclass IIe.

CdC - Canton and Charlton extremely stony fine sandy loams, 3 - 15 percent slopes

These gently sloping and sloping, well drained soils are on glacial till upland hills, plains, and ridges. Stones and boulders cover 8 - 25 percent of the surface. Permeability of the Canton soil is moderately rapid in the surface layer and subsoil and rapid in the substratum. Permeability of the Charlton soil is moderate or moderately rapid. The available water capacity of these soils is moderate. Runoff is medium or rapid. These soils warm up and dry out rapidly in the spring. They are strongly acid or medium acid. These soils are not suited to cultivated crops. The hazard of erosion is moderate or severe. These soils are suited to trees.

These soils are in capability subclass VIIs.

CdD - Canton and Charlton extremely stony fine sandy loams, 15 - 35 percent slopes

These moderately steep to steep, well drained soils are on glacial till upland hills, plains, and ridges. Stones and boulders cover 8 - 25 percent of the surface. Permeability of the Canton soil is moderately rapid in the surface layer and subsoil and rapid in the substratum. Permeability of the Charlton soil is moderate or moderately rapid. The available water capacity of these soils is moderate. These soils warm up and dry out rapidly in the spring. They are strongly acid or medium acid. These soils are not suited to cultivated crops. The hazard of erosion is severe. These soils are suited to trees. Steepness of slope is a major limitation for community development.

These soils are in capability subclass VIIs.

*** Rn - Ridgebury, Leicester, and Whitman extremely stony fine sandy loams

These nearly level, poorly drained and very poorly drained soils are in drainageways and depressions of glacial till upland hills, ridges, plains, and drumloidal landforms. Stones and boulders cover 8 - 25 percent of the surface. The Ridgebury and Leicester soils have a seasonal high water table at a depth of about 6 inches. The Whitman soil has a high water table at or near the surface for most of the year. Permeability of Ridgebury and Whitman soils is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. The Ridgebury and Whitman soils are strongly acid through slightly acid. Permeability of Leicester soil is moderate or moderately rapid, it is very strongly acid through medium acid. Runoff for the Ridgebury and Leicester soil is very slow or slow. Whitman soil runoff is very slow, or the soil is ponded. The available water capacity for these soils is moderate. These soils are not suited to cultivated crops. The erosion hazard is slight. These soils are suited to trees. Windthrow is common because of the shallow rooting depth above the high water table. The major limiting factors for community development are the high water table and the slow or very slow permeability in the substratum.
These soils are in capability subclass VIIs.

SwB - Sutton very stony fine sandy loam, 0 - 8 percent slopes

This nearly level to gently sloping, moderately well drained soil is on upland glacial till plains, hills, and ridges. Stones and boulders cover 1 - 8 percent of the surface. The Sutton soil has a seasonal high water table at a depth of about 18 inches. Permeability is moderate or moderately rapid. The available water capacity is moderate. Runoff is slow or medium. Sutton soil warms up and dries out slowly in the spring. It is strongly acid or medium acid in the surface layer and

subsoil and strongly acid through slightly acid in the substratum. This soil is not suited to cultivated crops. The hazard of erosion is slight or moderate. This soil is suited to trees. The major limiting factor for community development is the seasonal high water table.

This soil is in capability subclass VIs.

SxB - Sutton extremely stony fine sandy loam, 0 - 8 percent slopes

This nearly level to gently sloping, moderately well drained soil is on upland glacial till plains, hills, and ridges. Stones and boulders cover 8 - 25 percent of the surface. The Sutton soil has a seasonal high water table at a depth of about 18 inches. Permeability is moderate or moderately rapid. The available water capacity is moderate. Runoff is slow or medium. Sutton soil warms up and dries out slowly in the spring. It is strongly acid or medium acid in the surface layer and subsoil and strongly acid through slightly acid in the substratum. This soil is not suited to cultivated crops. The hazard of erosion is slight or moderate. This soil is suited to trees. The major limiting factor for community development is the seasonal high water table.

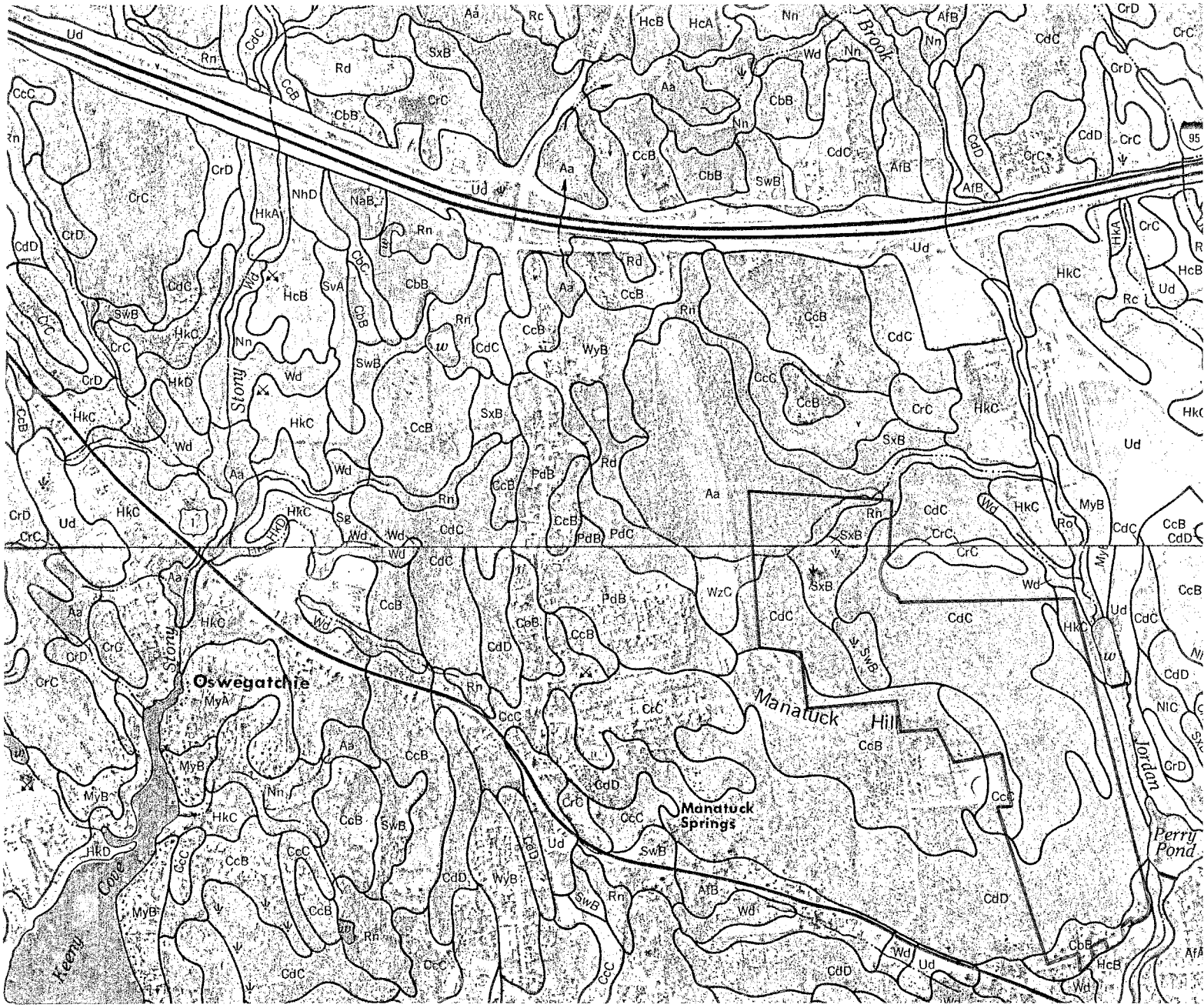
This soil is in capability subclass VIIs.

*** - Prime Agricultural Farmland**
**** - Farmland of Statewide Importance**
***** - Wetlands**

SOILS MAP

Scale 1" = 1320'

Approximate Site Boundary



5. Soil Resources

The wetland soils at the site had been mapped and flagged by a certified Soil Scientist. During the field walk, concerns were raised regarding the delineation in the area between proposed lots 93 and 94. This resulted in the addition of wetland areas to the originally mapped wetland. However, it should be noted that these areas were added because of the present surface hydrology and not because of soil type.

A Soil Erosion and Sediment Control Plan was not submitted with the project. Considering the environmentally sensitive nature of the project, it is strongly recommended that one be prepared and submitted for review. The following should be included with the plan.

A narrative describing:

the development the schedule for grading and construction activities including:

a. start and completion dates;

b. sequence of grading and construction activities;

c. sequence for installation and/or application of soil erosion and sediment control measures;

- sequence for final stabilization of the project site,
- the design criteria for proposed soil erosion and sediment control measures and storm water management facilities,
- the construction details for proposed soil erosion and sediment control measures and storm water management facilities,
- the installation and/or application procedures for proposed soil erosion and sediment control measures and storm water management facilities,
- the operations and maintenance program for proposed soil erosion and sediment control measures and storm water management facilities.

A site plan map at a sufficient scale to show:

- the location of the proposed development and adjacent properties;
- the existing and proposed topography including soil types, wetlands, watercourses and water bodies; the existing structures on the project site, if any;
- the proposed area alterations including cleared, excavated, filled or

graded areas and proposed structures, utilities, roads and, if applicable, new property lines;
- the location of and design details for all proposed soil erosion and sediment control measures and storm water management facilities;
- the sequence of grading and construction activities;
- the sequence for installation and/or application of soil erosion and sediment control measures;
- the sequence for final stabilization of the development site.

6. Hydrology

The entire site is located within the Jordan Brook watershed area. A segment of Jordan Brook parallels the site's eastern property line. At its point of outflow to Jordan Cove, Jordan Brook drains an area of 10 square miles or 6,400 acres. The site therefore represents 2.5 % of its watershed area. On the site, surface drainage can be subdivided into two areas: surface runoff arising in the northwest corner of the site generally flows northward via topographic swales to Tyack Swamp. The outlet for Tyack Swamp discharges to Jordan Brook northeast of the site. Approximately 34 homes are located in this subdrainage area. The remainder of the site drains directly to Jordan Brook via topographic swales.

Surface water bodies on the site have not been classified by the Department of Environmental Protection. Nevertheless, they are considered Class "A" water resources by default. A Class "A" water resource may be suitable for drinking, recreational or other compatible uses and may be subject to absolute restrictions on the discharge of pollutants, although certain discharges may be allowed. The segment of Jordan Brook that parallels part of the eastern property line is considered Class "B/A". This classification (B/A) indicates that currently the water quality is known or inferred to be degraded. "B/A" water resources are generally suitable for recreational, agricultural or certain industrial uses such as process or cooling waters. However, the Department of Environmental Protection's goal is to improve the water quality, through management to that of an "A" water resource.

Subdivision of the property as planned will increase runoff from the site. The major concerns with increased runoff is the potential for flooding and streambank erosion/surface water degradation. In order to thoroughly assess the impacts of postdevelopment runoff, the applicant should be required to prepare a runoff management plan.

A runoff management system controls excess runoff caused by construction operations, changes in land use or other land disturbances. This system is used to regulate the rate and amount of runoff and sediment from development sites during and after construction operations and to minimize undesirable effects such as flooding, erosion and sedimentation. Components may include, but are not

limited to dams, excavated basins, and in some cases infiltration trenches.

A runoff management system must be compatible with the floodplain management and stormwater management plans of the Town and with local regulations for controlling erosion, sediment and runoff. It should, whether as a single component or a combination of components, properly regulate storm discharges from a site to a safe, adequate outlet. Consideration should be given to the duration of flow as well as to the peak discharge. Adequate erosion control measures and other water quality practices must be provided. The components should be planned and designed to insure minimal impact on visual quality and human enjoyment of the landscape.

If the primary purpose of the runoff management system is to minimize flooding, the peak discharge from the 2-year, 10-year and 100-year frequency, 24 hour duration, type III distribution storms should be analyzed. No increase in peak flow from these storms should be allowed unless downstream increases are compatible with the overall floodplain management system. Some of the items to consider include:

1) The timing of peak flows from the sub-watersheds;

2) The increased duration of high flow rates which may cause streambank erosion;

3) The stability of the downstream channels; and

4) The distance downstream that the peak discharges are increased.

If the purpose of the runoff management system is to minimize erosion and sedimentation, the peak discharge from the 1-year, 2-year and 10-year frequency, 24 hour duration, type III distribution storms should be analyzed. Small storms (1 to 2 year frequency) are most important for streambank erosion control. Keeping the post-development 2-year frequency design storm within the streambanks is normally not sufficient to prevent downstream bank erosion, since the 2-year flood itself can be an erosive condition. Town officials did not indicate the presence of streambank erosion or flooding problems on Jordan Brook downstream of the site. This should be checked and, if necessary, should be addressed in the stormwater management plan. The Connecticut Guidelines for Soil Erosion and Sediment Control should be used as a guide relative to the runoff management plan.

If detention basin(s) are utilized cleaning and maintenance should be done in a manner consistent with maintaining a healthy stand of wetland vegetation. A sediment storage area (sediment forebay) is recommended at the inlet of the basin to trap sediment and act as a clean-out point. Sediment removal and plant harvest will remove pollutants from the basins. Care should be taken in the

disposal of this material.

Utilizing open water-type basins may cause temperature increases in streams. This can have a negative impact on aquatic life. For this reason, in-stream basins are not recommended. Shade trees left or replanted around basins can prevent water warming. In some cases, water can be outletted from the basin bottom where water temperatures may be cooler.

To be effective over the design life, runoff management systems must be properly maintained. A plan of operation and maintenance should be prepared for use by the owner or others responsible for the system to ensure that each component functions properly. This plan should provide requirements for inspection, operation and maintenance of individual components, including outlets. It should be prepared before the system is installed and should specify maintenance access. The minimum recommended width for an access right-of-way is 10 feet, and the maximum recommended around the perimeter of stormwater detention basins. The maintenance access should not be in wetland soils to prevent wetland disturbance and the difficulty of working in wet soil conditions.

Components of a runoff management system such as dams, and excavated basins should be owned by a unit of government that accepts responsibility for the component and can obtain the money necessary for operation and maintenance. Maintenance by individuals or homeowner associations may be limited by financial reserves and technical expertise.

If detention basins or dams are constructed on the site, appropriate safety features and devices should be installed around basins and dams to protect the public from accidents such as falling or drowning. Temporary fencing can be used until barrier plantings are established. A 3H:1V slope or flatter is recommended for public safety as steeper slopes may be difficult to climb.

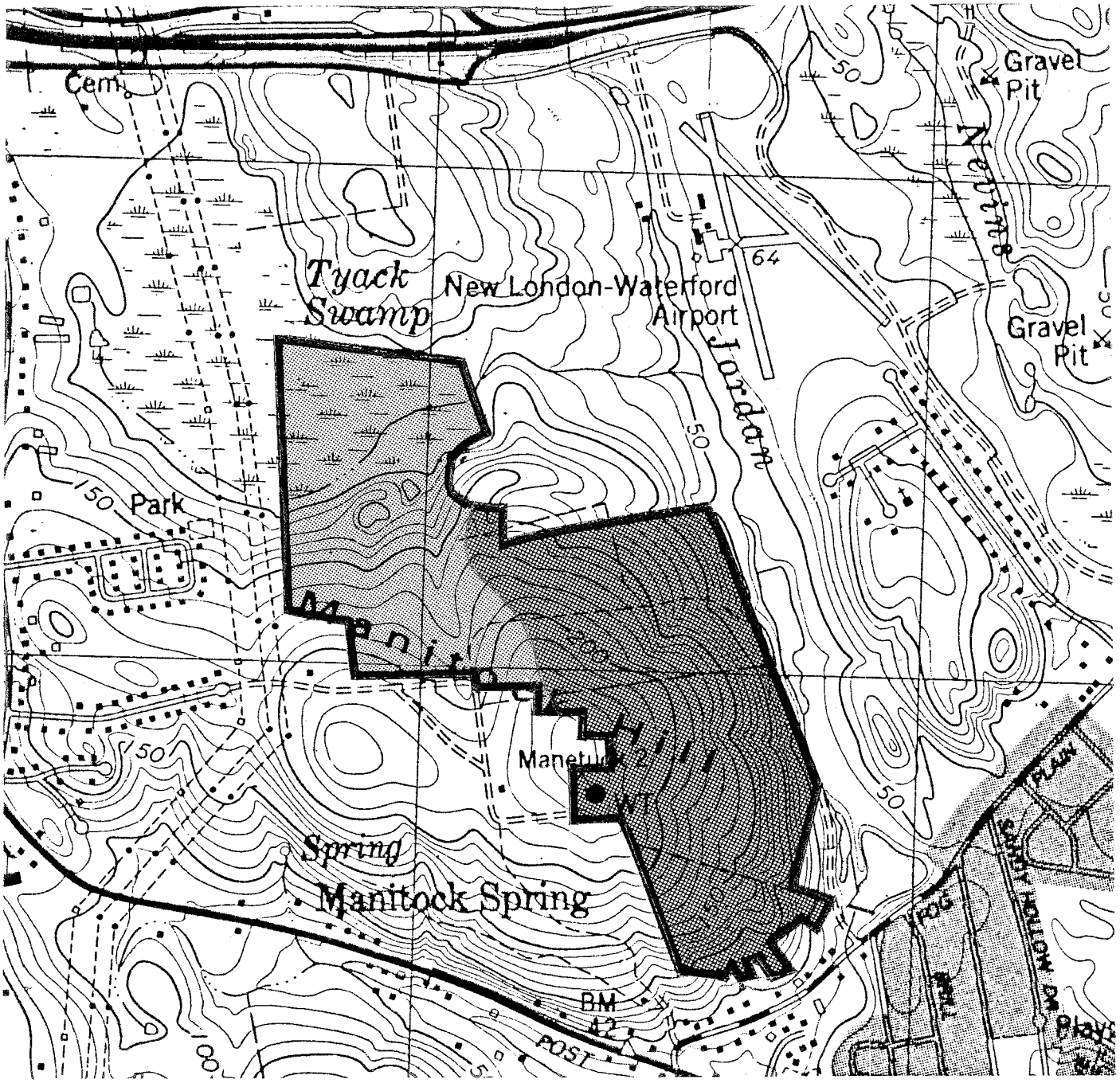
Due to the site topography, necessary grading for the new roads, utility lines, driveways and foundations and till soils that may contain silt and fine sand content, measures should be taken to minimize the potential adverse environmental impacts to wetlands and/or surface water as a result of erosion and sedimentation. This can be accomplished by producing a comprehensive E & S control plan to be enforced by the Town. During the construction period, control measures, including silt fences, haybales, temporary/permanent sediment basins which permit settling time for suspended solids, anti-tracking devices and minimizing land disturbance, should be used to minimize the potential for environmental damage to wetlands and surface waters on- and off-site.

WATERSHED BOUNDARY MAP

Scale 1" = 1000'

Portion of the site that drains to Tyack Swamp (the outlet stream for Tyack Swamp is tributary to Jordan Brook)

Portion of the site that drains to Jordan Brook



7. Geologic Development Concerns

Since on-site septic systems and wells (assuming the central pressure boosting station is installed) are not planned, the principal hydrogeologic concerns that would ordinarily be associated with a development of the proposed magnitude are lessened by the availability of municipal water and sewer mains. Nevertheless, there are several areas of concern from a geologic perspective that warrant careful examination with respect to the construction of the subdivision. They include the following:

1) The presence of shallow to bedrock areas and large surface boulders;

2) The presence of moderate to very steep slopes primarily in the southern parts that may require cuts and/or fills to accommodate roads and driveways for the development; and

3) The presence of regulated inland-wetland soils that range from poorly to very poorly drained.

The presence of bedrock outcrops in few areas and large boulders which mainly occur in the eastern and southern parts of the site suggests that blasting may be required for construction of foundations, utility lines, roads, and/or driveways.

Any blasting that takes place on the site should proceed only with great care and under the strict supervision of persons experienced with modern blasting techniques. If blasting is required on the site, a pre-blasting survey that includes surrounding residences and/or businesses should be required. The pre-blasting survey radius can be accurately determined based on the blasting requirements of the site but probably should not be less than 500 feet.

The major concerns with blasting in the area are the potential for undue seismic shock and airblast, which may damage neighboring properties. A thorough pre-blasting survey which will document pre-blast structural conditions of nearby buildings should be considered to minimize unwarranted damage claims. Also, the pre-blast survey should include collecting background water quality data and yield tests for nearby domestic wells that tap the underlying bedrock. They would likely be affected most by the blasting. However, the risk of changes to water quality or quantity for bedrock wells is reduced by the availability of public water in the area.

Because of the site's proximity to the Manatuck Spring Water Company, the applicant's technical staff should plan to meet with the Company to discuss their water supply source or sources with respect to blasting that may be required for the proposed subdivision.

As mentioned earlier, the bedrock underlying most of the site may have value for building stone or rip. Also, it is not known to cause adverse environmental impacts to the ground or surface water resources such as acid mine drainage. As such, no exceptional precautions regarding the use of the blasted rock for rip-rap on the site should be necessary.

The principal areas of steep slopes occur in the eastern and southern parts of the site. Steep slopes concentrated in the eastern parts are proposed as part of open space and, as such, should not be disturbed. On the other hand, in order to construct the main access road through the site particularly the segment that extends from station 0+00 to 9+00 in the southern parts will need to traverse hostile terrain. This work will undoubtedly include significant cuts which may encounter bedrock and require blasting, and fills and land grading. The proposed alternate route traverses less hostile terrain and would require less cuts and fills. It is suggested the applicant work with the Town to further study this alignment rather than the proposed road layout.

The presence of till soils that may contain fine-grained sediments such as silt and fine sand and steep slopes underscores that need for a comprehensive soil erosion and sediment control plan that is properly enforced by the town.

According to the site plans, regulated wetlands will be impacted as a result of a road crossing between station 40+00 and 42+00 on the main access road which will extend from Rockridge Road to Fog Plain Road. In addition the wetlands/ponds in the northern parts may be utilized for stormwater management (see *Hydrology* section).

Although undesirable, wetland road crossings are feasible but only if they are properly engineered. They should be constructed adequately above the surface elevation of the wetlands. This will allow for better drainage of the road and decrease the frost heaving potential. Road construction through wetlands should be done during the dry time of year and should include provisions for effective erosion and sediment control. Any unstable, organic or mucky material should be removed and replaced with a permeable road base material. A pipe that is properly sized should be located in the area of the proposed crossing to avoid altering the water levels on the south side of the road.

As a precautionary measure, all homes should be constructed with building foot drains. This will hopefully keep basements dry. Building foot drains should be tied into the stormwater drainage system, where possible.

8. Water Supply

Unless a central booster pumping station is installed to meet the anticipated pressure demands for homes constructed above elevation 180, the applicant's technical consultant indicates that bedrock floored wells may need to be installed for part of the subdivision. Each building lot would presumably be served by an individual well that is cased with steel pipe firmly into solid rock and completed as open boreholes in the metamorphic bedrock.

Typical well depths are expected to range between 150 feet and 300 feet. The local gneissic rock is not a prolific aquifer but it is usually adequate for most domestic purposes.

Yields from bedrock wells depend upon the number and size of water-bearing fractures that are intersected by the wells. Density and size of fractures in different bedrock zones vary widely, but they generally occur within the first few hundred feet of the surface. Because the distribution of fractures in bedrock is irregular, there is no practical way, outside of extensive geological testing, of predicting the yield of a well without drilling.

Every effort should be made to locate wells on a relatively high portion of the lot, properly separated from the sewer mains or any other potential pollutants (e.g., road drainage, curtain drain pipe, etc.) and in a direction opposite the expected groundwater movement.

All wells should be cased with steel pipe into the underlying bedrock and properly installed in accordance with all applicable State Public Health Code and Connecticut Well Drilling Board regulations to provide adequate protection of the quality of bedrock water. In addition, the town sanitarian must inspect and approve well locations.

The natural quality of groundwater should be good but there is always a chance for elevated iron and/or manganese levels. If these constituents are elevated a filter or treatment system may be necessary.

Groundwater beneath the site is classified by the Department of Environmental Protection as GA, which means it is suitable for private drinking water supplies without treatment.

9. The Natural Diversity Data Base

The Natural Diversity Data Base maps and files have been reviewed for the Manatuk Hill Subdivision site. According to the information, there are no known extant populations of "Federal Endangered" or "Threatened Species" that occur at the site in question.

However, the information indicates that a Connecticut bird "Species of Special Concern" may occur in the vicinity of this project. **Icteria virens (Yellow-breasted Chat)** is currently a "Species of Special Concern" in the state. This bird species appears to be restricted to the southern portion of the state and requires shrubby, overgrown fields. Yellow-breasted Chats have been proposed as a "State Threatened Species". The records indicate that territorial males were seen along the CL&P transmission lines in the past few years.

Natural Diversity Data Base information includes all information regarding critical biologic resources available to us at the time of the request. This information is a compilation of data collected over the years by the Natural Resources Center's Geological 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. Such new information is incorporated into the Data Base as it becomes available.

10. Wildlife Resources

Habitat Type Descriptions

The following habitat types are present on the Manatuck Hill Subdivision: mixed hardwoods and wetland/riparian habitat.

Mixed Hardwood Forest: This habitat consists of a variety of hardwood species including red maple, beech, red oak, elm, hickory, white oak and scattered white pine and cedar. Understory vegetation includes witchhazel, elderberry, multiflora rose, grape, blackberry and hardwood regeneration. Wildlife frequenting such habitat types include deer, fox, raccoon, gray squirrel, woodpeckers (pileated, hairy and downy), ovenbirds, scarlet tanangers, black-throated blue and green warblers, barred owls, broad-winged hawks and various non-game species such as shrews, voles and snakes.

Wetland/Riparian Habitat: This habitat type consists of various combinations of streams/brooks, open ponds, swamps and small marshy areas. Associated vegetation includes red maple, birch, alder, cattails, dogwood, jewel-weed, spicebush, sweet pepper bush, skunk cabbage, false helbore, duckweed and various grasses and sedges. Wildlife using such sites include deer, fox, raccoon, skunk, muskrat, mink, swallows, red-winged blackbirds, grackles, kingbirds, cedar waxwings, hooded and wilson's warblers, titmice, woodpeckers, wood ducks (forested wetland) and numerous amphibians and reptiles including water and garter snakes, salamanders, newts and spotted and painted turtles.

Impacts of Development

Upland Wooded Areas: Fragmentation and loss of habitat may lead to a decline in species diversity and richness. Wildlife populations will be reduced in proportion to the amount of habitat lost. Sensitive, interior species that require large tracts of undisturbed forest, such as veeries, ovenbirds and scarlet tanangers may decrease and no longer occupy the area.

Wetland/Riparian Habitat: Wetlands provide important habitat for a variety of wildlife species and function as areas for absorption of natural runoff. Wetlands also support a high diversity of wildlife due to the complexity of the vegetative structure, high productivity and abundant food supply which allows for a high carrying capacity (Brown et. al. 1978). Many species require access to streams or water body margins for survival even though they may spend much of their time in other habitats (Milligan and Raedeke 1986). Part of the food supply for many vertebrates is the high abundance and diversity of insect populations that are typical of wetland ecosystems (Brown et al. 1978).

Vegetation removal in wetlands may have severe impacts on wildlife, especially reptiles and amphibians. One or several of the cover, food, breeding and hibernation areas may be altered. Species dependent on specialized habitat are eliminated and more adaptable species are reduced in numbers (Campbell 1973). Barriers, such as roads, to seasonal movement and population dispersal are also serious threats (Campbell 1973). To minimize impact maintain a 100 foot wide buffer zone of vegetation around wetland/riparian areas. This buffer zone will help filter and trap silt and sediments, provide excellent wildlife cover and be an aesthetic and educational asset to the community.

Mitigation of Disturbance

There are several management guidelines which should be considered during the planning process in order to minimize adverse impacts on wildlife:

1. Make use of natural landscaping techniques (avoid and/or minimize lawns and

chemical applications) to lessen acreage of lost habitat and possible wetland contamination.

2. Maintain a 100 foot wide buffer zone of natural vegetation around wetland/riparian areas to help filter and trap silt and sediments. These vegetated zones provide excellent wildlife cover and travel corridors.
3. Stone walls, shrubs and trees should be maintained along field borders.

4. 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. Exceptionally tall trees are used by raptors as perching and nesting sites and should be encouraged.
d. Trees with vines (fruit producers) should be encouraged.
e. Brush debris could be windrowed to provide cover for small mammals, birds and amphibians and reptiles.
f. 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).

5. Implementation of backyard wildlife habitat management practices should be encouraged. Such activities involve providing food, water, cover and nesting areas.

On small acreages 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 for the residents of the development. 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 pine, White and Norway Spruce, Japanese cedar, Flowering dogwood, 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).

Management of Open Space Tracts

Wildlife Corridors - In any proposed development the delineation of open space/wildlife corridors should be identified early in the planning process. The

proper selection of habitats for incorporation into the open space system can make a major difference in the wildlife benefits to be incurred. A variety of habitat types should be retained to increase species diversity. Due to the impracticality of retaining one large area to include all the desired habitats, it is logical for an open space system to be based on a network of corridors. A corridor configuration essentially "hooks up"the different habitats into one contiguous system. This system enables wildlife species to utilize the different habitat components as required. The logical base for the wildlife corridor/open space system are the stream/wetland corridors. Woodlands are of importance to wildlife and the ecotones formed at wetland and woodland edges provide an additional habitat where a dense understory provides cover and screening from human disturbance. There should also be ancillary corridors that extend from this system into, and through, the developed area, thereby encouraging the movement of wildlife into and through the residential development.

Cluster Development

Cluster developments have superior ecological values to wildlife and are recommended over conventional developments. Properly planned development can provide better habitat for wildlife species primarily because of increased open space, vegetative corridors, sensitive landscaping, and aquatic habitat (ponds). Some wildlife using the site prior to development should remain and additional species should be supported with the establishment of new pond habitat. Cluster developments should be considered when developing similar urban estates because of their aesthetic and ecological benefits and marketing value.

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SPECIES LIST

REPTILES

Common Snapping Turtle
Painted Turtle
Spotted Turtle
Wood Turtle
Eastern Box Turtle
Eastern Worm Snake
Eastern Ribbon Snake
Northern Black Racer
Northern Ringneck Snake
Black Rat Snake
Eastern Milk Snake
Eastern Smooth Green Snake
Northern Redbelly Snake
Eastern Garter Snake

AMPHIBIANS

Jefferson's Salamander
Spotted Salamander
Marbled Salamander
Northern Dusky Salamander
Northern Two-lined Salamander
Northern Spring Salamander
Four-toed Salamander
Redback Salamander
Slimy Salamander
Mudpuppy
Red-spotted newt
Eastern American Toad
Northern Spring Peeper
Gray Tree Frog
Bullfrog
Green Frog
Pickerel Frog
Northern Leopard Frog
Wood Frog

MAMMALS

Opossum
Masked Shrew
Water Shrew
Smoky Shrew
Short-tailed Shrew
Least Shrew
Hairy-tailed Mole
Eastern Mole
Star-nosed Mole
Little Brown Bat
Keen's Myotis
Silver-haired Bat
Eastern Pipistrelle
Big Brown Bat
Red Bat
Hoary Bat
Beaver
Deer Mouse
White-footed Mouse
Boreal Red-backed Vole
Meadow Vole
Woodland Vole
Muskrat
Southern Bog Lemming
Norway Rat
House Mouse
Meadow Jumping Mouse
Wood!and Jumping Mouse
Porcupine
Coyote
Red Fox
Gray Fox

Eastern Cottontail
Eastern Chipmunk
Woodchuck
Gray Squirrel
Red Squirrel
Southern Flying Squirrel
White-tailed Deer
Raccoon
Short-tailed Weasel
Long tailed Weasel
Mink
Striped Skunk
River Otter

BIRDS

Northern Goshawk
Broad-winged Hawk
Rough-legged Hawk
American Kestrel
Ring-necked Pheasant
Wild Turkey
Red-shouldered Hawk
Red-tailed Hawk
Sharp-shinned hawk
Ruffed Grouse
Northern Bobwhite
American Woodcock

Killdeer
Mourning Dove
Yellow-billed Cuckoo
Eastern Screech Owl
Barred Owl
Short eared Owl
Common Nighthawk
Whip poor-will
Ruby-throated Hummingbird
Red-headed Woodpecker
Yellow bellied Sapsucker
Hairy Woodpecker
Pileated Woodpecker
Eastern Wood-Pewee
Acadian Flycatcher
Willow Flycatcher
Eastern Phoebe
Eastern Kingbird
Purple Martin
Northern Rough-winged Swallow
Cliff Swallow
American Crow
Black capped Chickadee
Red-breasted Nuthatch
Brown Creeper
House Wren
Marsh Wren
Common Barn-Owl
Great Horned Owl
Long-eared Owl
Northern Saw-whet Owl
Chuck will's-widow
Chimney Swift
Be#ted Kingfisher
Red bellied Woodpecker
Downy Woodpecker
Northern Flicker
Olive-sided Flycatcher
Yellow-bellied Flycatcher
Alder Flycatcher
Least Flycatcher
Great Crested Flycatcher
Horned Lark
Tree Swallow
Bank Swallow
Blue Jay
Fish Crow
Tufted Titmouse
White-breasted Nuthatch
Carolina Wren
Winter Wren
Gray Catbird

Northern Mockingbird
Eastern Bluebird
Gray cheeked Thrush
Hermit Thrush
American Robin
Ruby crowned Kinglet
Cedar Waxwing
Loggerhead Shrike
White-eyed Vireo
Yellow-throated Vireo
Philadelphia Vireo
Blue-winged Warbler
Tennessee Warbler
Nashville Warbler
Yellow Warbler
Yellow-rumped Warbler
GreenWarbler
Magnolia Warbler
Black-throated Blue Warbler
Pine Warbler
Palm Warbler
Blackpoll Warbler
Black and White Warbler
Prothonotary Warbler
Ovenbird
Louisana Waterthrush
Connecticut Warbler
Common Yellowthroat
Wilson's Warbler
Yellow-breasted Chat
Northern Cardinal
Indigo Bunting
Rufous-sided Towhee
Chipped Sparrow
Vesper Sparrow
Fox Sparrow
Lincoln's Sparrow
White throated Sparrow
Dark-eyed Junco
Red-winged Blackbird
Rusty Blackbird
Brown-headed Cowbird
Northern Oriole

Brown Thrasher
Veery
Swainson's Thrush
Wood Thrush
Golden-crowned Kinglet
Blue-gray Gnatcatcher
Northern Shrike
European Starling
Solitary Vireo
Warbling Vireo
Red-eyed Vireo
Golden-winged Warbler
Orange-crowned Warbler
Northern Parula
Chestnut-sided Warbler
Black-throated

Cape May Warbler
Blackburnian Warbler
Prairie Warbler
Bay-breasted Warbler
Cerulean Warbler
American Redstart
Worm-eating Warbler
Northern Waterthrush
Kentucky Warbler
Mourning Warbler
Hooded Warbler
Canada Warbler
Scarlet Tanager
Rose-breasted Grosbeak
Dickcissel
American Tree Sparrow
Field Sparrow
Sharp-tailed Sparrow
Song Sparrow
Swamp Sparrow
White-crowned Sparrow
Bobolink
Eastern Meadowlark
Common Grackle
Orchard Oriole
Pine Grosbeak

Purple Finch
Red Crossbill
Common Redpoll
American Goldfinch
House Sparrow
House Finch
White-winged Crossbill
Pine Siskin
Evening Grosbeak

Species potentially inhabiting habitats of study area.

* Connecticut Wildlife checklist of birds, mammals, reptiles and amphibians.

11. Fish Resources

Site Description

The proposed Manatuck Hill Subdivision borders Jordan Brook and Tyack Swamp Brook, two surface hydrological features of fisheries concern in the area. The 130 acre site may be subdivided into 104-110 single family homes (minimum lot size being 40,000 square feet) or a cluster development with unattached single family homes having lots approximately 15,000 square feet in size. The subdivision will most likely be served by town sewer and water. This report will address all fisheries concerns at the project site and delineate measures to mitigate expected impacts.

Fish Population

Jordan Brook is annually stocked by the Bureau of Fisheries with approximately 500 yearling (6-8") brook trout in the town of Waterford. Additionally, brown trout fry were stocked in Jordan Brook in the spring of 1987. Past fisheries surveys on Jordan Brook reveals fish specie diversity and abundance varies throughout the stream (ERT 1988). The following fish species have been documented in Jordan Brook: native brook trout, brown trout, fallfish, common shiner, golden shiner, blacknose dace, tessellated darter, creekchub sucker, American eel, largemouth bass, redfin pickerel, and pumpkinseed sunfish.

Jordan Brook is currently classified by the Department of Environmental Protection (DEP) as "Class B/A" surface water. Designated uses for this classification are: fish and wildlife habitat, recreational use, agricultural and industry supply, and other legitimate uses. Future goals are to upgrade the water quality classification of Jordan Brook to "Class A", where it could be utilized for a potential drinking water source.

Tyack Swamp Brook is classified as "Class A " surface waters. It likely does not support a fish population in the stretch that runs through the proposed development parcel; however, fish species endemic to Jordan Brook may seasonally utilize this watercourse near its confluence.

Impacts

The following impacts can result during the construction of subdivisions if proper mitigation measures are not implemented:

1. Construction site soil erosion and sedimentation of watercourses through increased runoff from unvegetated areas : This high density housing development will be constructed adjacent to steep slopes that drain into major aquatic ecosystems. During construction topsoil may be exposed and become susceptible to runoff events, especially if suitable erosion and sediment controls are not properly installed and maintained at the project site. Excessive sediment deposition could damage aquatic ecosystems of Jordan Brook and Tyack Swamp Brook in the following ways:

(1) Sediment reduces the survival of resident fish eggs and hinders the emergence of newly hatched fry. Adequate water flow, free of excess sediment particles is required for fish egg respiration and successful hatching.
(2) Sediment reduces the survival of aquatic macroinvertebrates. Since aquatic insects are important food items in fish diets, reduced insect populations levels in turn will adversely affect fish growth and survival. Fish require an excessive output of energy to locate preferred prey when aquatic insect levels decrease.
(3) Sediment reduces the amount of usable habitat required for spawning purposes. Excessive fines can clog and even cement gravels and other desirable substrate together. Resident fish may be forced to disperse to other areas not impacted by siltation.
(4) Sediment reduces stream pool depth. Pools are invaluable stream components since they provide necessary cover, shelter, and resting areas for resident fish. A reduction of usable fish habitat can effectively limit fish population levels.
(5) Turbid waters impair gill functions of fish and normal feeding activities of fish. High concentrations of sediment can cause mortality in adult fish by clogging the opercular cavity and gill filaments.
(6) Sediment encourages the growth of filamentous algae and nuisance proportions of aquatic macrophytes (CTDEP 1989). Eroded soils contain plant nutrients such as phosphates and nitrates. Once introduced into aquatic habitats, these nutrients function as fertilizers resulting in accelerated plant growth.
(7) Sediment contributes to the depletion of dissolved oxygen (CTDEP 1989). Organic matter associated with soil particles is readily decomposed by microorganisms thereby effectively reducing dissolved oxygen levels.

Jordan Brook in the area of development has no capacity to move fine streambed materials due to its low gradient. Consequently, any damage effected by silt deposition could be irreversible.

2. Aquatic habitat degradation in streams due to the influx of stormwater drainage : Stormwaters from the project site will outlet into two watercourses and their associated wetlands. Stormwaters from the road system can contain a variety of pollutants that are detrimental to aquatic organisms. Pollutants commonly found in stormwaters are: hydrocarbons (gasoline and oil), herbicides, heavy metals, road salt, fine silts, and coarse sediment. Nutrients in stormwater runoff can fertilize

stream waters causing water quality degradation. Additionally, fine silts in stormwaters that remain in suspension for prolonged periods of time often cannot be effectively removed from roadway catch basins and/or stormwater detention basins. Accidentally spilled petroleum based chemicals or other toxicants can precipitate partial or complete fishkills if introduced in high concentrations. Stormwater drainage can also result in increased stream flows.

3. Transport of lawn fertilizers and chemicals to watercourses : Runoff and leaching of nutrients from fertilizers on lawns will stimulate filamentous algae growth in nearby streams and degrade water quality. Introduction of lawn herbicides can result in "fish kills" and overall water quality degradation. Rooted or floating aquatic vegetation may proliferate in slower moving stream reaches of Jordan Brook.

4. Degradation of wetland habitat : Wetlands serve to protect stream water quality by: (1) controlling flood waters by acting as a water storage basin, (2) trapping sediments from natural and man-made sources of erosion, and (3) filtering out pollutants from runoff before they enter watercourses. Development which brings about polluted stormwaters, excessive stream sedimentation, lawn fertilizers, and lawn herbicides can negatively impact wetlands by hindering their ability to properly function.

Recommendations

Impacts may be minimized to some extent by implementing the following precautionary measures:

1. The proposed development site should be seriously considered for cluster development : a cluster development design will result in less disturbance of upland areas and allow for more lands to be designated as open space.

2. it is recommended that at the minimum, a 100 foot open space buffer zone be maintained along the wetland boundary of Jordan Brook and Tyack Swamp Brook : Research has shown that 100 foot buffer zones help prevent damage to wetlands and stream ecosystems that support diverse fish and aquatic insect life (USFWS 1984;USFWS 1986;0DFW 1985). These buffers will absorb surface runoff and other pollutants before they can enter wetlands, ponds, and stream ecosystems. It is recommended that the buffer zone adjacent Jordan Brook be in the form of a conservation easement so that the public can obtain unrestricted access and connect with other easements along the Jordan Brook corridor. Consideration should be given to constructing a footbridge across the brook to assist with corridor access.

3. Develop an aggressive and effective erosion and sediment control plan: install and maintain proper erosion and sedimentation controls during site construction

activities. This includes such mitigative measures as filter fabric barrier fences, staked hay bales, and sediment catch basins. Land disturbance and clearing should be kept to a minimum and all disturbed areas should be restabilized as soon as possible. Exposed, unvegetated areas should be protected from storm events.

4. The developer should submit a detailed stormwater management plan for town review : a management plan should determine if streamflows within either brooks will be significantly increased. The effective management of stormwaters and roadway runoff can only be accomplished through proper design, location, and maintenance of catch basins. Stormwaters should be only be outletted into non-wetland habitat; thus, avoiding direct contact with wetlands. Detention basins should not be constructed within wetlands. Maintenance of catch basins is very critical. Roadway catch basins should be regularly maintained to minimize adverse impacts to riverine/wetland habitats. The use of road salt to deice roads should be prohibited.

5. Limit liming, fertilization, and the introduction of chemicals to subdivision lawns : This will help abate the amount of additional nutrients to aquatic resources. Non-phosphorus lawn fertilizers are currently available from various lawn care distribution centers.

Summary

The Manatuck subdivision represents yet another in a long and continuing series of residential housing or industrial developments recently proposed or constructed within the Jordan Brook watershed. Development has occurred in many sensitive habitat types including uplands, wetlands, and streambelts. These developments continually threaten the water quality and fisheries resources of Jordan Brook. The Team's Fisheries Biologist has previously expressed concern to the Town of Waterford regarding uncontrolled development within the Jordan Brook watershed. Permanent environmental damage occurs when a watershed is inundated with development. Finally, as development continues, recommendations for effective, environmentally sound watershed management will be less easily accomplished and more costly. Without reasonable limits to development in the watershed, Jordan Brook will become environmentally and/or hydrologically unmanageable.

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12. Planning Concerns

This proposal would create approximately 109 single-family residential building lots as a cluster subdivision. This development would include 7,000 to 8,000 feet of new residential street and occur on approximately 130 acres of land. The proposed development will access existing town roads at Fog Plain Road and Rockridge Road.

The Regional Development Plan depicts this area as appropriate for Mixed Suburban Uses, which are economic and residential uses at densities ranging from one unit per 1.5 acres to two units per acre. The availability of both public water and public sewer systems to this area was a major consideration is this designation.

The Regional Development Plan also depicts the Jordan Brook area as a "Major Aquifer" area.

The local zoning designation for this area is similar to the regional designation being classified as a Residential District requiring minimum lot size of 40,000 square feet. Regulations permitting cluster residential subdivisions similar to the proposal are presently being developed.

Generally cluster development can allow more economical use of a site over conventional subdivision. Clustering is also an environmentally sound form of site design. It can allow for the utilization of the most buildable portion of a tract while leaving other areas untouched. This can preserve natural drainage systems, open space, and other significant natural features that help control stormwater runoff and soil erosion. Regulations must be comprehensive enough to address site concerns and contain the necessary requirements to guide development in a form which accomplishes the intent of clustering.

The adjacent Jordan Brook aquifer area requires that any use of and activity

on this parcel address this existing area.

The cluster development concept seems appropriate for property of this type with areas of development constraints. Clustered housing could assist in preserving the parcels natural resource areas.

The preliminary plan depicts an area as "open space B". This parcel seems to be accessible only to an adjacent proposed building lot. What is the intent of this parcel?

13. Road Layout and Traffic

Travelling from west to east the proposed new residential street will be a continuation of Rockridge Road which will access Fog Plain Road. In the vicinity of Fog Plain Road the property under review contains steep slope and large boulders. This southeastern portion of the property contains constraints for development primarily due to the steep slope and large boulders. Additionally, the proposed intersection of this new road and Fog Plain Road presents concern with regard to the sight clearance distance. While the southwestern sight clearance distance seems adequate the sight clearance distance northeasterly is poor with a distance of approximately 175 feet. A major obstruction is a knoll and trees at a bend in Fog Plain Road. If the trees are removed within the right-of-way and cuts made into the knoll the sight clearance distance could be improved, although there is still concern as to its adequacy.

The interior road layout seems appropriate as it provides access to the more buildable portions of the property without numerous cul-de-sac spurs.

With regard to traffic, the 109 single-family dwellings proposed have the potential to generate approximately 1,097 trips to and from this site each day. This would result in an A.M. peak of 82 trips and a P.M. peak of 109 trips to and from the site.* It is estimated that these vehicle trips will be rather evenly split, utilizing Rockridge Road to access I-95 via Cross Road and Fog Plain Road to gain access to Route 1, 85 and 156, particularly for the shopping areas.

Weekday traffic counts taken on Fog Plain Road in May of 1990 indicate that the average vehicle volume is approximately 1,768 vehicles per day.** Two way rural roads typically have a vehicle capacity of approximately 1,800 vehicles per hour.* This capacity number would be reduced on Fog Plain Road due to the numerous horizontal and vertical alignment changes. Even so, it is estimated that Fog Plain Road could handle an additional 550 vehicles.

Weekday traffic counts taken on Cross Road in July of 1986 indicate that the average vehicle volume is approximately 5,857 vehicles.** Roadways similar to

Cross Road typically have a vehicle capacity of approximately 1,800 vehicles per hour per lane.* Cross Road and Rockridge Road should adequately handle the additional traffic generated from this proposal.

*Data from the Institute of Highway Engineers - Trip Generation Report.
**Based on estimates from the Waterford Police Department.

ABOUT THE TEAM

The Eastern Connecticut Environmental Review Team (ERT) is a group of professionals in environmental fields drawn together from a varety of federal, state and regional agencies. Specialists on the Team include geologists, biologists, foresters, soil specialists, engineers and planners. The ERT operates with state funding under the supervision of the Eastern Connecticut Resource Conservation and Development (RC&D) Area --- an 86 town region.

The services of the Team are available as a public service at no cost to Connecticut towns.

PURPOSE OF THE TEAM

The Environmental Review Team is available to help towns and developers in the review of sites proposed for major land use activities. To date, the ERT has been involved in reviewing a wide range of projects including subdivisions, landfills, commercial and industrial developments, sand and gravel excavations, elderly housing, recreation/open space projects, watershed studies and resource inventories.

Reviews are conducted in the interest of providing information and analysis that will assist towns and developers in environmentally sound decision-making. This is done through identifying the natural resource base of the project site and highlighting opportunities and limitations for the proposed land use.

REQUESTING A REVIEW

Environmental reviews may be requested by the chief elected official of a municipality or the chairman of town commissions such as planning and zoning, conservation, inland wetlands, parks and recreation or economic development. Requests should be directed to the chairman of your local Soil and Water Conservation District and the ERT Coordinator. A request form should be completely filled out and should include the required materials. When this request is approved by the local Soil and Water Conservation District and the Eastern Connecticut RC&D Executive Council, the Team will undertake the review on a priority basis.

For additional information and request forms regarding the Environmental Review Team please contact the ERT Coordinator: 203-345-3977, Eastern Connecticut RC&D Area, P.O. Box 70, Haddam, Connecticut 06438.