Environmental Review Team Report

Evergreen

Chester, Connecticut

RC&D

EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

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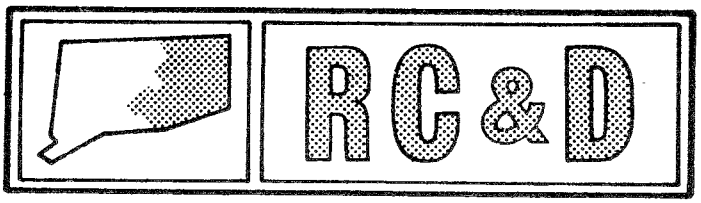
Chester, Connecticut

October 1984

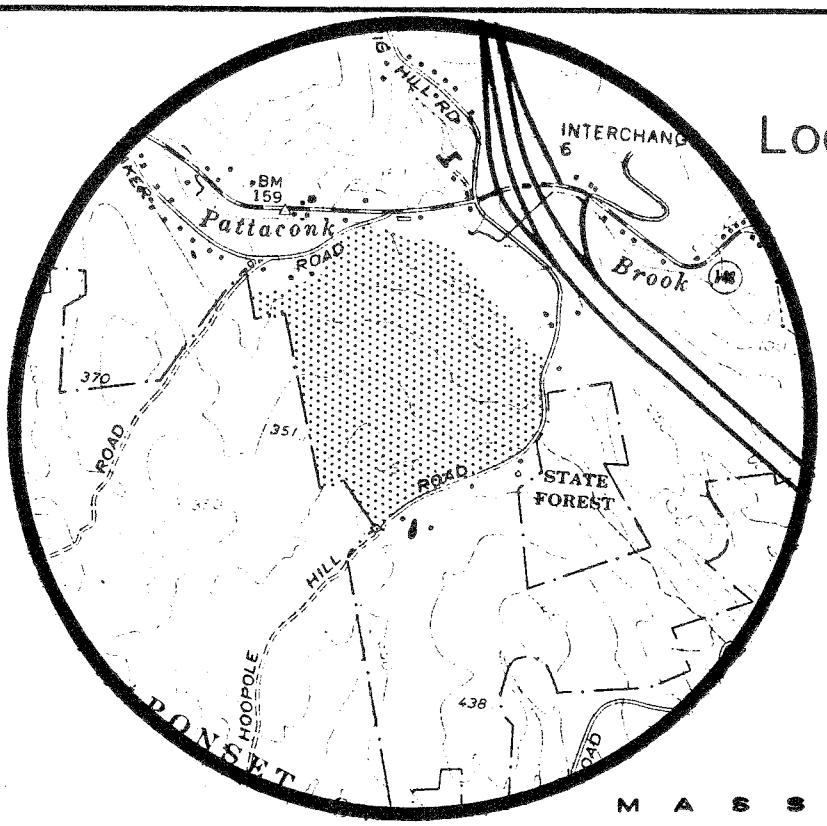


Eastern Connecticut Resource Conservation & Development Area

Environmental Review Team
PO Box 198
Brooklyn, Connecticut 06234

Location of Study Site

EVERGREEN
CHESTER, CONNECTICUT



EASTERN CONNECTICUT
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

ENVIRONMENTAL REVIEW TEAM REPORT
ON
EVERGREEN
CHESTER, CONNECTICUT

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

The soils of the site were mapped by a soil scientist from the United States Department of Agriculture, Soil Conservation Service (SCS). Reproductions of the soil survey map, a table of soils limitations for certain land uses and a topographic map showing property boundaries were distributed to all Team members prior to their review of the site.

The ERT that field-checked the site consisted of the following personnel: Pat Scanlon, District Conservationist, Soil Conservation Service (SCS); Bill Warzecha, Geologist, Connecticut Department of Environmental Protection (DEP); Rob Rocks, Forester, DEP; Richard Joly, Regional Planner, Connecticut River Estuary Regional Planning Agency; Don Capellaro, Sanitarian, State Department of Health; Judy Wilson, Wildlife Biologist, DEP; and Jeanne Shelburn, ERT Coordinator, Eastern Connecticut RC&D Area.

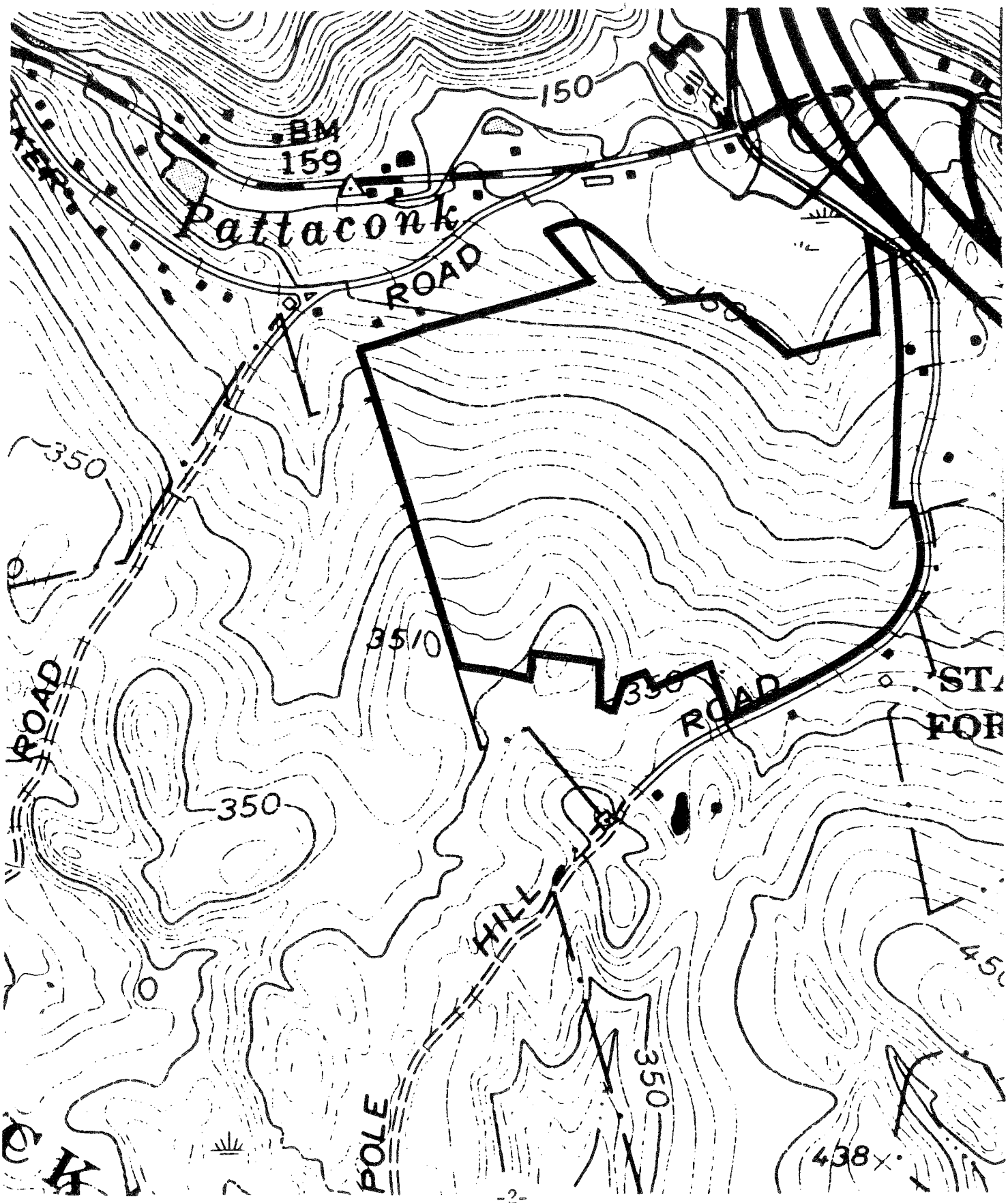
The Team met and field checked the site on Tuesday, September 18, 1984. Reports from each contributing Team member were sent to the ERT Coordinator for review and summarization for the final report.

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 developer and the Town of Chester. The results of this Team action are oriented toward the development of a better environmental quality and the long-term economics of the land use.

The Eastern Connecticut RC&D Area Committee hopes that this report will be of value and assistance in making any decisions regarding this particular site.

If you require any additional information, please contact: Ms. Jeanne Shelburn, Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, Box 198, Rte. 205, Brooklyn, Connecticut 06234, 774-1253.

Topography	Site Boundary	0 660' scale	N



INTRODUCTION

The Eastern Connecticut Environmental Review Team was asked to prepare an environmental assessment for a proposed subdivision in the Town of Chester. The property is approximately 95 acres in size and is located on the northern side of Hoopole Hill Road. Gregory Cook is the developer of the project and preliminary plans have been prepared by F. A. Hesketh and Associates, a Bloomfield engineering firm.

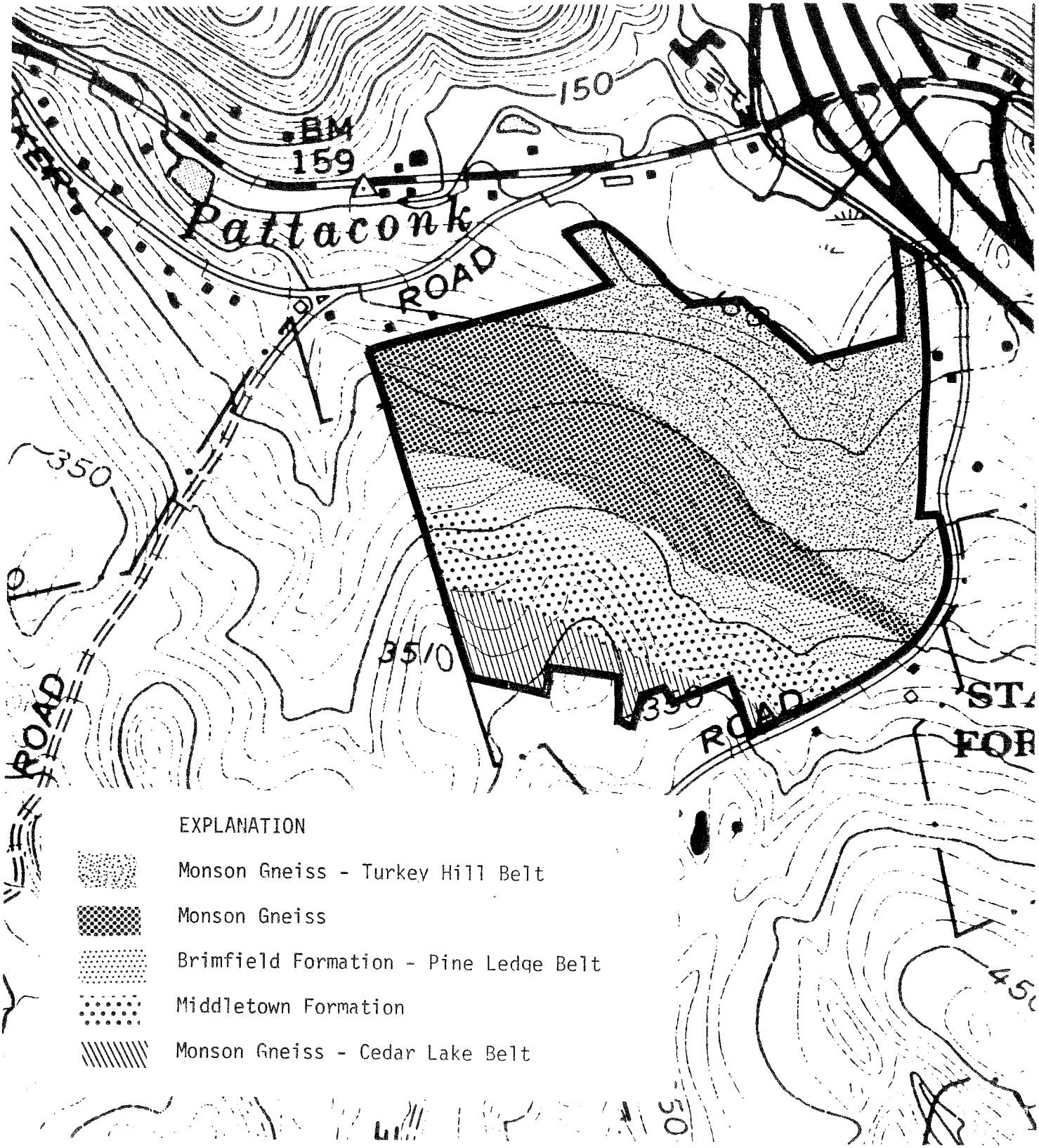
Preliminary plans dated September 23, 1984, show 25 lots of two or more acres each. On-site septic systems and wells will be needed to serve each lot. A single roadway will extend north into the property from Hoopole Hill Road, terminating in a cul-de-sac, to provide access to interior lots. The development will be known as "Evergreen."

The Evergreen site is gently sloping in its eastern central and southwestern portions and more steeply sloping in the northern and southern portions. Two intermittent streams and their associated wetland areas cross the property in a north/south direction. Soil maps also show some soil areas with seasonally high water tables on the site. The property is fully forested at present, some management cutting was done approximately 20 years ago.

The Team is concerned with the effect of this proposal on the natural resource base of this site. Although many severe limitations to development can be overcome with proper engineering techniques, these measures can become costly, making a project financially unfeasible for a developer. Slope, wetland areas and seasonally high water tables are the major limiting factors on this site. The large lot sizes, however, appear to have left sufficient area to work around these limitations. Wetland crossings will be needed for the driveways on lots 4 and 5, as well as for Evergreen Hill Drive near lot 21. Sediment and erosion control measures should be in place prior to construction of these crossings.

The following sections of this report discuss limiting factors and potential mitigation measures in detail. The Team hopes that this report will be of use to the Town and developer in making future decisions regarding this proposal.

Bedrock Geology



Adapted from Bedrock Geologic Map of the Deep River Quadrangle (QR-13), by Lawrence Lundgren.

ENVIRONMENTAL ASSESSMENT

TOPOGRAPHY

The subject parcel is ±95 acres in size and is located on the northern side of Hoopole Hill Road. Land slopes moderately northward towards Pattaconk Brook. Elevations on the property range from a low of approximately 140 above mean sea level along the northern boundary, to a high of approximately 370 feet above mean sea level at the southern boundary. At least three intermittent drainage channels and their accompanying wetlands traverse the parcel generally in a north-south direction. Water in these channels is ultimately transported to Pattaconk Brook.

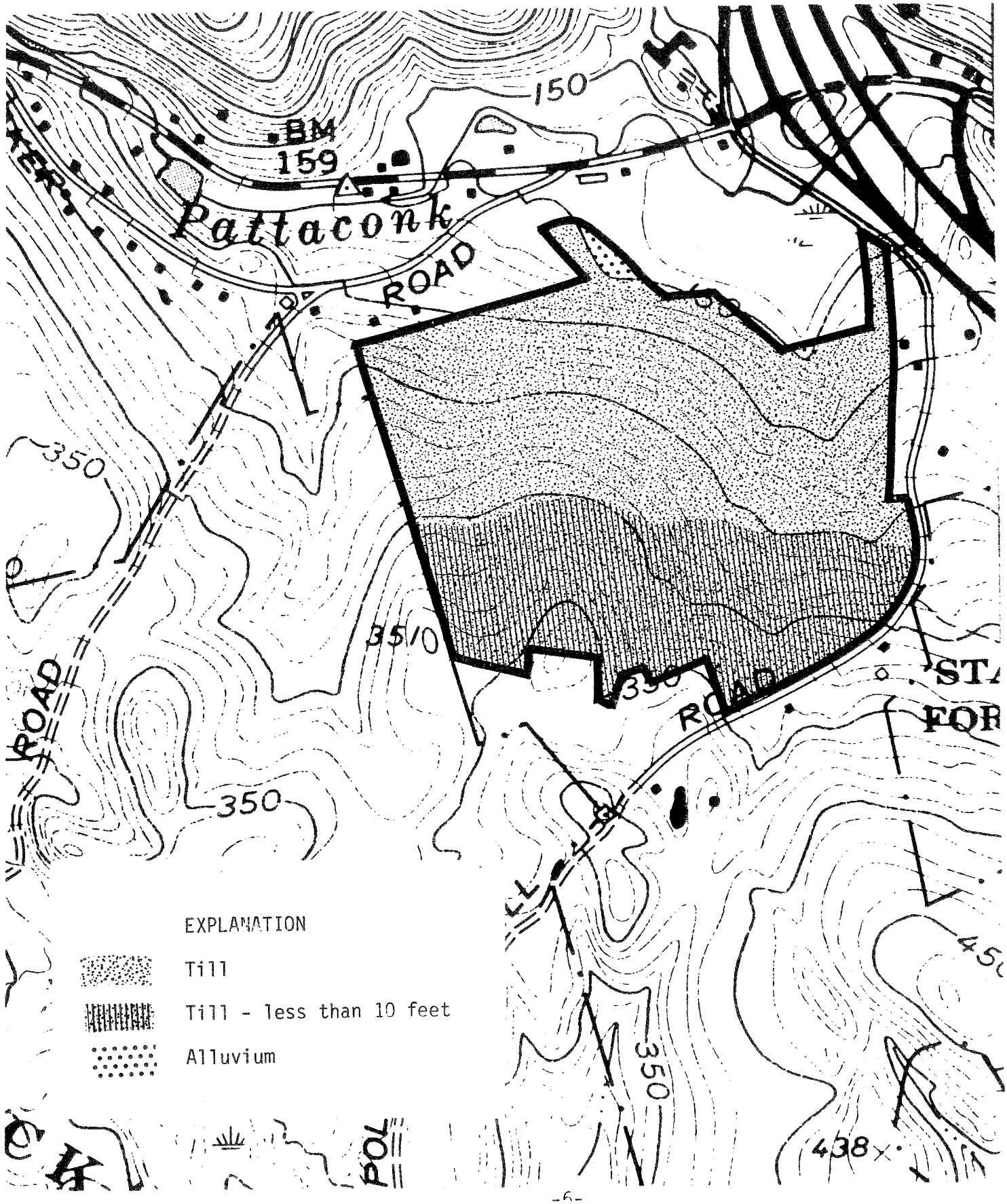
GEOLOGY

The "Evergreen" site is located within the Deep River topographic quadrangle. A bedrock geologic map of that quadrangle has been published by the Connecticut Geological and Natural History Survey (Map QR-13, by Larry Lundgren, Jr.). The bedrock underlying the site consists predominantly of metamorphic rocks (rocks geologically altered by great heat and pressure in the earth's crust), generally gneisses, which are interbedded with amphibolite layers. A single unit of micaceous schist (Brimfield formation-Pine Ledges Belt) traverses the southcentral portions of the property.

The term "gneiss" refers to a crystalline rock in which light-colored minerals, usually quartz and feldspars, alternate with layers of dark colored minerals, usually micas and hornblende. "Schists" are also crystalline rocks where the alignment of elongated, platy, and flaky minerals predominate throughout the rock. As a result, the rock has a slabby or well-layered structure. The term "amphibolite" refers to a rock which consists of the dark-colored minerals amphibole and plagioclase feldspar. A map accompanying this report shows the various rock types underlying the site.

The surficial geology of the Deep River quadrangle has been published by the U.S. Geological Survey (GQ-1370, by Richard Foster Flint, 1975). Till is the surficial deposit (overlying bedrock) on the parcel. It is a glacial sediment composed of rock particles and fragments of widely varying sizes and shapes. Till was deposited directly by glacier ice without substantial reworking by meltwater streams. Due to this mode of deposition, there is little sorting by grain size in this deposit. As a result, it consists of a generally structureless mixture of clay, sand, silt, gravel and boulders. The texture of till varies greatly from place to place. Commonly, the upper portion of the till is sandy, stony and loose, while at depths, ranging between 2 and 4 feet below ground surface, the looser till may give way to a hard,

Surficial Geology



compact, finer-grained till. Shallow compact layers on the site may be encountered with soils delineated as Paxton and Woodbridge on the accompanying soils map. Thickness of the till is probably not much more than 10 feet. It is probably most shallow in the southern half of the parcel.

Overlying till, primarily along intermittent watercourses traversing the parcel, are bands of seasonally wet areas. These areas, which contain regulated inland-wetland soils, are delineated by the symbol Lg (Leicester, Ridgebury and Whitman soils) on the accompanying soils map.

Another type of surficial deposit found on the site is alluvium. It covers two small areas in the northern section of the site. "Alluvium" consists of well-sorted sand and silt darkened by organic matter. It commonly contains beds of gray clay and/or gravel. These deposits are also regulated inland-wetland soils.

The major limiting geologic factors in terms of developing the site for residential homes includes (1) moderate slopes which extend throughout the site; (2) the presence of inland-wetland soils; (3) the presence of some compact till soils, which tend to have slow percolation rates and seasonally high groundwater tables; (4) numerous surface boulders, which may interfere with landscaping and may be costly to remove; and (5) shallow depth of soil to bedrock, particularly in the southern portions.

These limitations will affect the proper installation and functioning of on-site sewage disposal, the construction of the interior road system and the placement of house foundations.

Based on the subdivision plan, it appears the interior road will cross the inland-wetland soils within the parcel. Wetland crossings are generally feasible provided they are properly designed (e.g., culverts are properly sized and installed, permeable road base fill material is used). The roads should be constructed properly above the surface elevation of the wetlands. This will allow for better drainage of the roads and decrease the frost heaving potential of the road. It is recommended that any road construction through wetland areas be done during the dry time of the year with adequate provisions for effective erosion and sediment control. Detailed plans for any proposed road crossing through wetlands should first be submitted to the proper Town authorities and commissions for their review, comment and final approval prior to beginning any construction.

Houses constructed with full basements in areas which have seasonally high water tables may result in wet basements. Where possible, building footing drains should be installed around homes, which will hopefully minimize the chance of a wet basement.

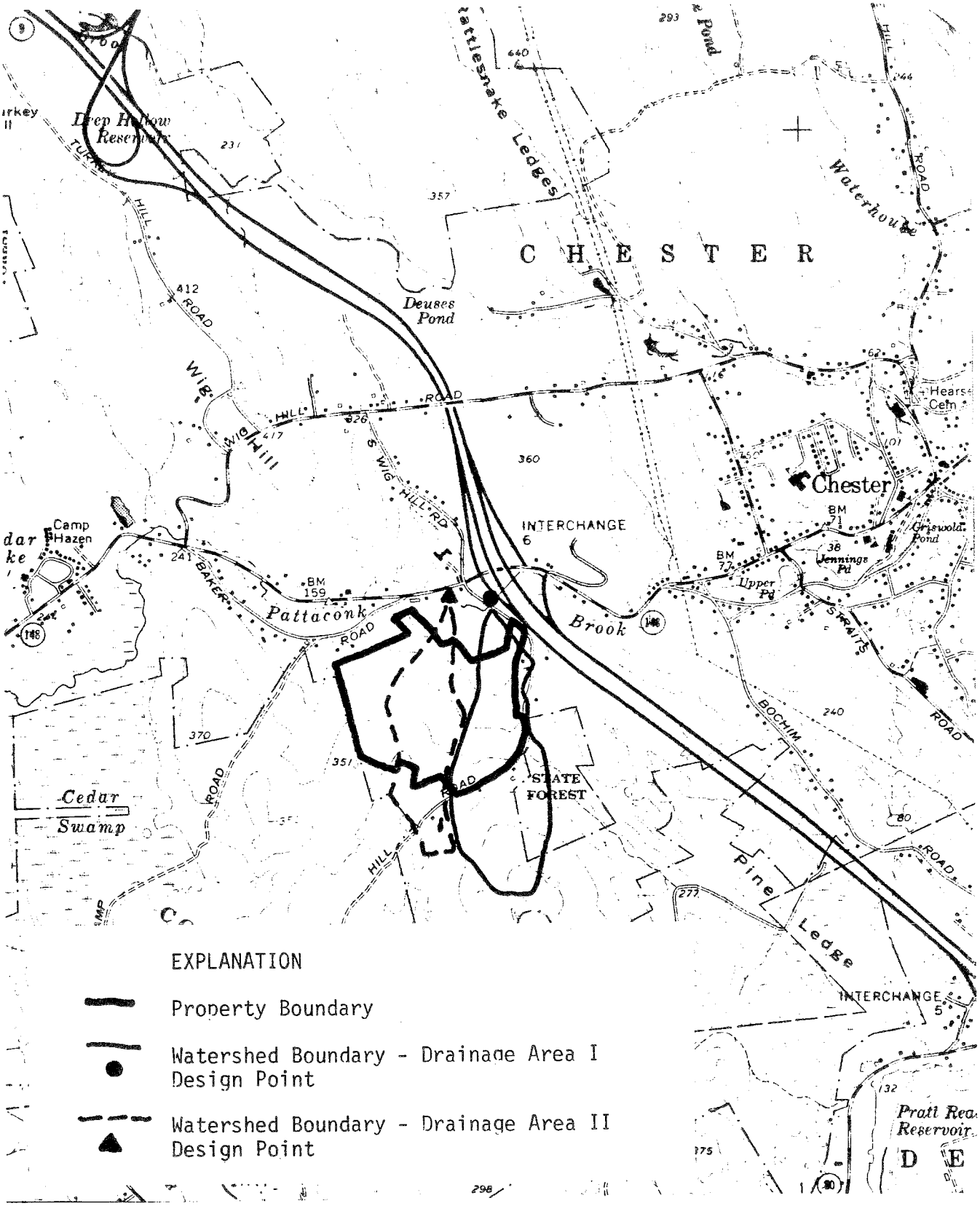
HYDROLOGY

The parcel lies in the watershed of Pattaconk Brook. Surface runoff from the site flows into any one of the intermittent watercourses traversing the property. These intermittent drainage channels ultimately route the water into Pattaconk Brook.

Drainage Areas

0 2000'
scale

N



Storm water increases will arise primarily from the conversion of pervious soils to impervious surfaces such as roofs, paved roads and driveways, compaction of soils during the construction phase, and from the removal of vegetation.

Estimates were made of runoff and peak flow increases that would be experienced following development. These estimates have been prepared for a 1- year, a 50 year and a 100 year storm. Peak flows were calculated for the point at which each stream discharges into Pattaconk Brook. The two design points and their corresponding watersheds are shown in the accompanying Drainage Area Map. The method used to make these estimations is described in Technical Release No. 55 of the Soil Conservation Service. Lot 8 is not included in the drainage calculations because it does not fall in either watershed. Peak-flow increase from this lot alone should be insignificant. It was assumed that houses constructed on lots 18-23 would fall within drainage area II. Results are given in tables. It must be remembered that the estimates in the tables are meant only to indicate the prospective magnitude of the increases; they are not designed to indicate absolute flow rates (which may be significantly greater or less than the corresponding estimates) nor should they be used as engineering data.

ESTIMATED AVERAGE RUNOFF DEPTHS (INCHES) FOR DRAINAGE AREA I AND II

Drainage Area I	10 year Storm	25 year Storm	50 year Storm	100 year Storm
Present Conditions	1.88"	2.32"	2.85"	3.49"
Post Development	1.96"	2.40"	2.95"	3.60"
(Present Increase)	4 percent	3.5 percent	3.5 percent	3 percent
Drainage Area II	**10 year Storm**	**25 year Storm**	**50 year Storm**	**100 year Storm**
Present Conditions	1.65"	2.06"	2.57"	3.10"
Post Development	1.81"	2.23"	2.76"	3.39"
(Present Increase)	10 percent	8 percent	7 percent	6.5 percent

ESTIMATED PEAK FLOWS (CUBIC FEET PER SECOND) FOR EACH WATERSHED

Drainage Area I	10 year Storm	25 year Storm	50 year Storm	100 year Storm
Presently	79	101	130	167
After Development	93	115	147	189
(Percent Increase)	18 percent	14 percent	13 percent	13 percent

Drainage Area II	10 year Storm	25 year Storm	50 year Storm	100 year Storm
Presently	43	56	72	94
After Development	49	63	81	105
(Percent Increase)	14 percent	12.5 percent	12.5 percent	12 percent

As the figures given above suggest, peak flow increase to Pattaconk Brook from each watershed analyzed may be expected to be moderate following development. These increases may be explained by the percentages of impervious surfaces planned on each lot and by the piping of runoff. The increase would be especially critical in view of the moderate to steep slopes on the site. These conditions may create a risk of erosion along banks of streams traversing the parcel thereby increasing siltation to downstream areas.

The Town has indicated to Team members that they would like to see off-site flows following the development be maintained at present levels. The most likely resolution for controlling peak-flows would be the installation of one or more detention basins. A detention basin(s) might also be constructed to serve a sediment retention function. Prior to subdivision approval, it is recommended that the applicant be required to submit detailed hydrological information on pre- and post-development peak flows from the site. Estimates should be provided for a 10, 25, 50 and 100 year design storm. In addition, hydraulic calculations should be prepared to justify culvert sizes. If storm-water control facilities (detention basins) are installed, detailed design specification should also be submitted. All storm drain outlets should include a designed energy dissapator or help protect areas below the outlet from eroding.

Although the increases in runoff depths are 10% or less for all storms analyzed, the presence of moderate to steep slopes may aggravate erosion and sedimentation, particularly during the construction phase. For this reason, sediment control would be needed to prevent increased loading of sediment to intermittent stream courses traversing the site and ultimately Pattaconk Brook. It is, therefore, recommended that a comprehensive erosion and sediment

control plan be developed covering each stage of the proposed project.

Based on present plans the last 500-600 feet of the interior road would be constructed on a slope at a relatively steep grade (approximately 10%). Development would need to be carefully planned in this area in order to avoid serious erosion and mass movement (large scale sliding of overburden) problems.

SOILS

An SCS detailed soil map and the table "Soil Limitations for Certain Land Uses" are included in the appendix to this report. All of the soil groups except the Canton and Charlton very stony fine sandy loams on 8-15% slopes (CcC), the Paxton and Montauk very stony fine sandy loams on 8-15% slopes (CrC) and the Charlton component of the Charlton-Hollis complex (CrC), have severe limitations for most residential land uses. A severe limitation indicates that one or more soil properties or site features are so unfavorable or difficult to overcome that special designs, construction effort or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

The Canton and Charlton very stony fine sandy loams on 8 to 15% slopes (CrC) and the Canton and Charlton extremely stony fine sandy loams on 3 to 15% slopes (CdC) are well drained soils on hills and ridges of glacial till plains. The soils have good potential for community development. Stoniness and slope are the main limitations. Onsite septic systems need careful design and installation to prevent effluent from seeping to the surface.

The Charlton-Hollis very stony fine sandy loam on 3 to 15% slopes (CrC) is a complex of gently sloping and sloping, well drained and somewhat excessively drained soils on ridges where the relief is affected by the underlying bedrock, and on upland glacial till plains. This complex has fair potential for community development. The shallow depth to bedrock in the Hollis soils and the bedrock outcrops make excavation difficult. Onsite septic systems require very careful design and installation, and an area of more than 2 acres is sometimes needed as a suitable site for an onsite septic system.

The Leicester, Ridgebury and Whitman extremely stony fine sandy loams (Lg) are nearly level to gently sloping, poorly drained and very poorly drained soils in drainageways and depressions of glacial till uplands. These soils are inland wetlands regulated under PA 155. They have poor potential for community development due to wetness and stoniness.

Paxton and Montauk very stony fine sandy loams on 8 to 15% slopes (PdC) are sloping, well drained soils on drumlins and glacial till plains of glaciated uplands. These soils have fair potential for community development. They are mainly limited by a slowly permeable or very slowly permeable substratum. Onsite septic systems require careful design and installation. Steep slopes of excavations slump when saturated. Artificial drains help prevent wet basements. Lawns are often wet and soft in autumn and spring. The Paxton and Montauk extremely stony fine sandy loams on 3 to 15% slopes (PeC) have the same limitations as the above complex as well as additional limitations due to steep slopes and stoniness.

The Woodbridge extremely stony fine sandy loam, 3 to 15% slopes (WzC) is a gently sloping, moderately well drained soil on the side slopes of drumlins and glacial till uplands. The soil has fair potential for community development. The main limitations are wetness, the slowly permeable or very slowly permeable substratum, and stoniness. Steep slopes of excavations slump when saturated. Onsite septic systems need very careful design and installation, and sites require filling in places. Removal of stones and boulders is necessary for most uses. Lawns are very wet and soggy from autumn until midspring and for several days after heavy summer rains.

Sediment and Erosion Control

Erosion and sediment control concerns are addressed by the inclusion of the following information on the plans submitted for this review: the location of filter fabric or hay bale erosion checks, the placement of erosion control measures at pipe outlets, and the limits of clearing. Other concerns with this development which should be examined are the sharp angles of the open channels used to direct streamflow under the road, the need for a construction entrance that will minimize tracking of soil off the site by construction vehicles, and the presence of subsurface flows which could damage the new roadway if not properly handled by engineering design.

To assure proper functioning of the erosion control measures during and after construction, a sediment and erosion control strategy should be developed for the site which includes the above data and additional information in a plan format. Such information should include a narrative describing the development, the schedule and/or staging plan for grading and construction activities, design criteria for proposed soil erosion and sediment control measures and stormwater management facilities and construction details for these control measures. An operations and maintenance program should also be developed.

The plan map should have notes describing a work sequence for grading and construction activities, for installation and/or application of soil erosion and sediment control measures, and for final stabilization of the development site. Design details for all proposed soil erosion and sediment control measures should also be included on the map.

The sediment and erosion control plan, if properly compiled and implemented, should result in a development that has minimal erosion and sedimentation during construction, is stabilized and protected from erosion when completed, and does not create offsite erosion and/or sedimentation problems.

The publication, Connecticut Guidelines for Soil Erosion and Sediment Control is a useful reference available from the Middlesex County Soil & Water Conservation District in Haddam. Technical assistance in development of sediment and erosion control plans is also available from the District upon request.

VEGETATION

The 95± acre tract which is proposed for subdivision along the northern side of Hoopole Hill Road in Chester may be divided into three vegetation types. These include a two-aged mixed hardwood stand totaling approximately 76 acres; a stream belt/wetland zone which totals about 15 acres; and a hemlock stand which is approximately 4 acres. The transition zones between these stands are rather wide, resulting in mapping and acreages which are only approximate.

During the 1960s this entire tract was harvested of all its merchantable trees of sawtimber size. The smaller trees which were left in the residual stand have grown into the healthy high quality, well spaced trees which are present today. The scattered eastern red cedar which are present throughout the drier portions of this property are remnants from the early 1900s when the majority of this tract was open pasture land. The soils which are present, even in the wetland areas, are well suited to growing trees.

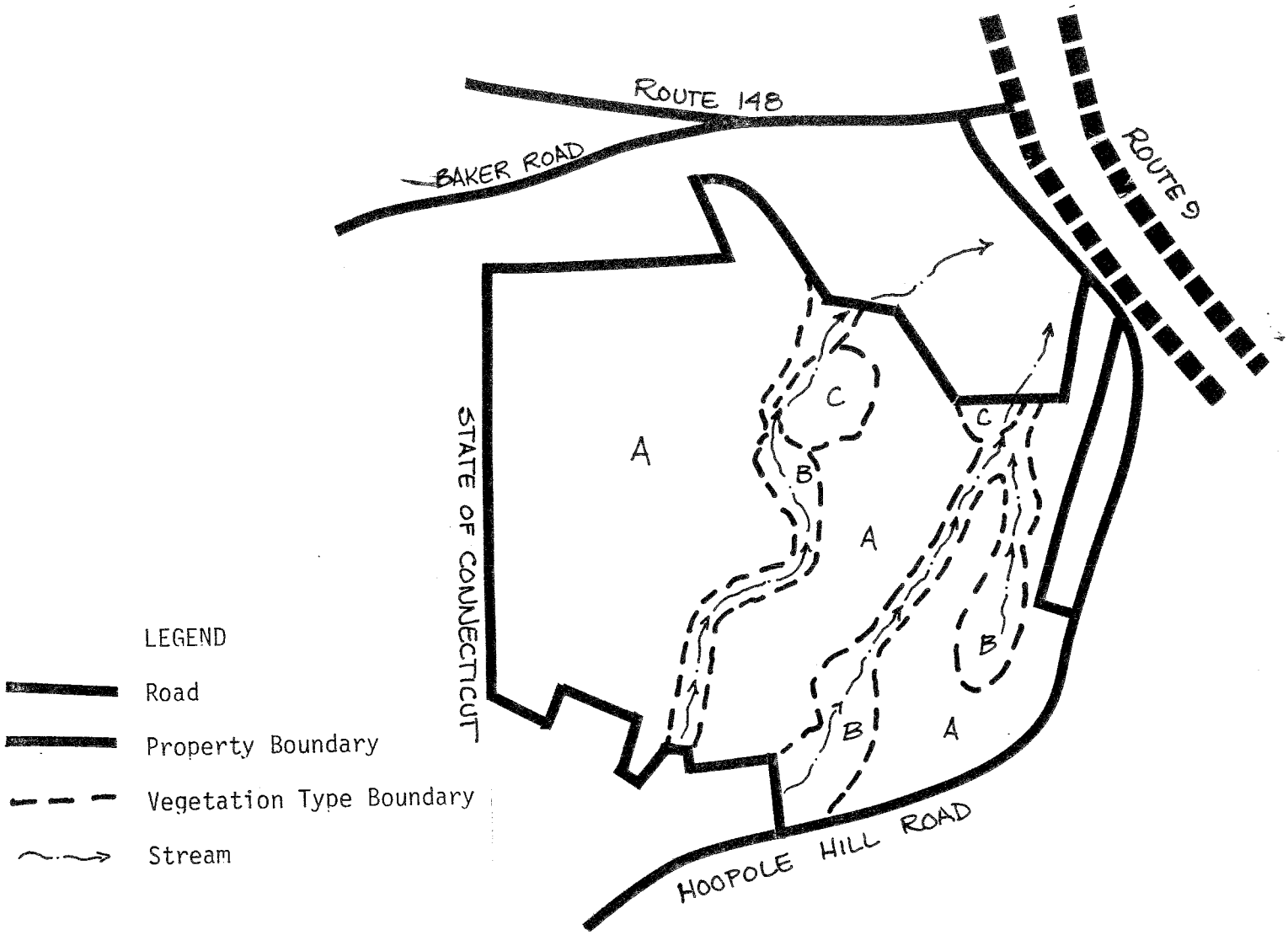
The large healthy trees which are present throughout this tract should be considered for retention because of their high aesthetic and shade value. Loss of trees to windthrow in the stream belt/wetland zone may be intensified if linear clearings are made in or along these areas. Impact on vegetation resulting from road crossing of the stream belt/wetland zone should be minimal, providing culverts are properly sized and properly placed. Low thinnings implemented on an individual lot basis, that remove undesirable pole-size trees would help to improve aesthetics and provide lot owners with a limited supply of fuelwood. Utilization of the trees removed during construction would be desirable.

Vegetation Type Descriptions

Stand A (Mixed Hardwoods): This healthy, fully-stocked two-aged stand totals approximately 76 acres. It is made up of high quality sawtimber-size red oak, black oak, white oak, sugar maple, tulip tree, yellow birch, black birch, white ash, shagbark hickory, mockernut hickory and scattered American beech. Medium quality sapling to pole-size black birch, red maple, mockernut hickory, sassafras and occasional eastern hemlock are also present. The understory shrub layer consists of maple-leaf viburnum, witch hazel, blue beech, hop hornbeam, flowering dogwood, hazelnut, highbush blueberry, shadbush and mountain laurel. Ground cover and herbaceous vegetation is dominated by partridgeberry, wood aster, wild sarsaparilla, dolls eyes, pipsissewa, spotted wintergreen, rattlesnake plantain, Indian pipe, pinesap, Virginia creeper, poison ivy, Pennsylvania sedge, Christmas fern, evergreen woodfern, lady fern, hayscented fern and club moss.

Stand B (Stream Belt/Wetland Zone): Healthy pole to sawtimber-size red maple, yellow birch, white ash and American elm are present in these fully-stocked areas which total approximately 15 acres. Sweet pepperbush, spice bush, highbush blueberry, mountain laurel, deciduous holly and scattered eastern white pine form a moderately dense understory. Ground cover consists of swamp dewberry, wild ginger, violets, wild geranium, Solomon's seal, false Solomon's seal, skunk cabbage, touch-me-not, false nettle, poison ivy, sensitive fern, cinnamon fern and sphagnum moss.

Vegetation



VEGETATION TYPE DESCRIPTIONS *

STAND A: (Mixed Hardwoods-76 acres) Two aged. Fully stocked, Pole and Sawtimber size, healthy as is. Poor quality pole size trees could be removed to improve aesthetics.

STAND B: (Stream Belt - 15 acres) Fully stocked, pole to sawtimber size, healthy as is.

STAND C: (Hemlock - 4 acres) Fully stocked, all size , hardwoods could be removed for fuelwood to release crowding.

* Seedling Size: Trees less than 1 inch in diameter at breast height (DBH).
Sapling Size: Trees 1 to 5 inches in DBH.
Pole Size: Trees 5 to 11 inches in DBH.
Sawtimber Size: Trees 11 inches and greater in DBH.

Stand C (Hemlock): All size classes of eastern hemlock are present within this 4± acre fully stocked stand. Pole to small sawtimber-size red maple, yellow birch, black birch, black oak and white oak are intermixed. Declining mountain laurel and widely scattered hemlock and black birch seedlings are present in the understory. Ground cover vegetation is sparce throughout this area, however, where it is present it consists of Christmas fern, Canada mayflower, wood aster and club moss.

Aesthetic Considerations

Many of the large healthy trees which are scattered throughout this property have high aesthetic and shade value. These high value trees should be selected for retention and worked into the final site plan for the proposed development. Recent research has shown that trees on a house lot may enhance the value of that house lot by as much as twenty percent.

It should be noted that trees are very sensitive to the condition of the soil within the entire area under their crowns. Development practices near trees such as excavation, filling and grading for construction of roadways and buildings may disturb the balance between soil aeration, soil moisture level and soil composition. These disturbances may cause a decline in tree health and vigor, potentially resulting in tree mortality within three to seven years. Mechanical injury to trees may cause the same results. Dead trees reduce the aesthetic quality of an area and may become hazardous and expensive to remove if near roadways, buildings or utility lines.

Care should be taken during the construction period not to disturb the trees that are to be retained. Special care should be taken near hemlock trees because of their shallow root systems. In general, healthy and high vigor trees should be favored for protection over unhealthy trees because they are usually more resistant to the environmental stresses brought about by construction.

Where feasible, trees should be retained in small groups or "islands." This practice lowers the possibility of soil disturbance and mechanical injury. Individual trees and "islands" of trees should be temporarily, but clearly marked so they may be avoided during construction.

Several species of flowering trees and shrubs, including flowering dogwood, shadbush and mountain laurel are present throughout this tract. These flowering species should be retained where feasible for their aesthetic value. The flowering of these species can be stimulated by allowing increased direct sunlight to reach them. This can be accomplished by removing the trees in the overstory which are blocking the sunlight.

Limiting Conditions/Potential Hazards

Windthrow is a potential hazard in the stream belt/wetland zone. Tree root depth is restricted by saturated soils in these areas. Under these conditions trees are unable to become securely anchored and are susceptible to windthrow. These conditions may be intensified if linear openings, which allow wind to pass through rather than over these areas, are made. Openings and clearings in and along side these wetland areas should be avoided if at all possible.

Management Considerations

Trees which are unhealthy and not growing vigorously due to crowded conditions are most susceptible to further degradation from environmental stresses brought about by development, disease, insect infestation and adverse weather conditions. Improvement thinnings, which remove undesirable trees and reduce competition for space, sunlight, nutrients and water between the high quality residual trees will, over time, allow trees to improve in health, vigor, and stability. These thinnings when implemented properly can improve the aesthetic value of an area, improve tree health and vigor, improve wildlife conditions and provide wood products.

The undesirable and unhealthy pole-size trees present in the understory throughout this tract could be removed after subdivision has taken place on an individual lot basis. This low thinning would improve aesthetics by making the area more open and park like. It would also provide future lot owners with a limited supply of fuelwood. Removing the poor quality hardwoods from the hemlock area, also on an individual lot basis, would improve cover conditions for wildlife by stimulating low herbaceous growth and hemlock reproduction.

The trees which are removed from the areas to be cleared for roadways, house lots and driveways should be utilized as sawtimber and/or fuelwood.

WATER SUPPLY

The water needs of each residence in the subdivision would be served by individual onsite wells. Bedrock appears to be the only suitable aquifer within the site. Bedrock generally provides small, but reliable yields of groundwater. However, since the yield of a given well depends upon the number and size of water bearing fractures that it intersects, and since the distribution of fractures in bedrock is irregular, there is no practical way of predicting the yield of a well drilled in a specific location. In Connecticut Water Resources Bulletin No. 31, many wells in the lower Connecticut River Basin, of which the subject parcel is a part, are analyzed in terms of yields and chemical quality. Of those wells (314) studies that tapped cyrstalline metamorphic rock, which is similar to the type underlying the site, 90 percent yielded just under 2 gallons per minute (gpm) or more, 60 percent yielded 5 gpm or more and only 10 percent yielded approximately 18 gpm or more. An average household usually may be adequately served by a yield of 3 gpm or more. A household may be able to get by with less than 3 gpm if ample storage is provided.

Each well should ideally be located on a relatively high portion of a lot, properly separated from the sewage disposal system or any other potential pollutant (e.g., fuel oil storage tank, storm drainages, etc.) and in a direction opposite the expected direction of groundwater movement.

Of particular concern in some portions of the site are areas having moderate to steep slopes.

The access road in these areas will require heavier application of road salt and sanding during winter storms than, for example, on roads in areas where slopes are more gentle. In this regard, added precaution should be taken when locating water supply wells so that they do not become contaminated with road salts.

The initial quality of the groundwater may be expected to be good. However, Connecticut Water Resources Bulletin No. 31 suggest that bedrock underlying the site may be a source for elevated levels of iron and/or manganese. If elevated iron and/or manganese levels are present in the water, it may be necessary to provide suitable treatment filters.

WASTE DISPOSAL

Geologic limitations will weigh heaviest on the ability to provide adequate subsurface sewage disposal systems, which would serve homes constructed in the subdivision. Subsurface sewage disposal systems will generally not function properly with only normal design and installation in these areas because of slow percolation rates and seasonally high water tables. Therefore, it appears that proper planning, engineering will be necessary in order to surmount most of the limitations mentioned in the Geology section of this report. Subsurface sewage disposal systems typically constructed in till soils with compact layers require installation of groundwater control drains and placement of proper fill material to elevate leaching systems above seasonally high groundwater tables.

Because of the moderately large lot sizes (2 or more acres) presently proposed, it seems likely that this would allow the applicant greater flexibility for finding a suitable area for a sewage disposal system than, for instance, would be possible with a one acre lot. However, if some of the geologic limitations discussed earlier predominate on a particular lot, finding a suitable area for the installation of a sewage disposal system may still be problematic.

Detailed soil testing must be conducted by the Town sanitarian or in his presence on each lot. The project engineer should address all site constraints and provide additional information so that an accurate assessment of the suitability of each lot can be made. Once septic systems are engineered and approved by the proper authorities (i.e., state and local health departments), it is imperative that the systems be installed properly according to design specifications and also be properly maintained (e.g., pumped regularly--3-5 years--by the homeowner).

PLANNING CONCERNS

This subdivision proposal would be compatible with surrounding land uses which are either residential, farming or state forest. Fire protection is a concern for the site because of the lack of access to a pond. Consideration should be given to the development of a pond or fire well for fire protection purposes.

SAFE SIGHT DISTANCES FOR PASSENGER CARS EXITING FROM DRIVEWAY ONTO TWO- AND FOUR-LANE ROADS

	Two-Lane Roads		Four Lane Roads	
Operating Speeds	Left Turn	Right Turn	Left Turn	Right Turn
20 mph	150'	130'	130'	130'
30	350	260	220	260
40	530	440	380	440
50	740	700	620	700
60	950	1050	950	1050

Sight distances are mainly for urban highways. It is recommended that for rural highways, the distances should be increased by 10 percent.

There are several concerns with the access road to this site. The sight distance at Hoopole Hill Road is difficult because of the curve in Hoopole Hill Road at that point. The two sharp curves in the proposal for Evergreen Hill Drive cause dangers for driving and sight distance problems for driveways in the vicinity of those curves. The 2900 foot length of the road is longer than is advisable for a cul-de-sac. A cul-de-sac of this length brings about potential problems with emergency vehicle access that are more serious than for a road with two points of access. The Connecticut River Estuary Regional Planning Agency recommends a maximum cul-de-sac length of between 700 and 1000 feet depending on topography. The last 600 feet of the proposed road climbs a steep slope and it appears that even the cul-de-sac itself would be built on a slope. This causes difficult driving in the winter and the extensive use of road salts which can pollute the wetlands and seasonal brooks that are located on this site.

The development of a good road design for this site is made difficult by the wetlands and steep slopes on the site and the limited access that this site has to the existing road network in the area. The Town should work with the developer to see if the road design can be improved so that it better addresses the design problems noted above and the natural features of the site. The following are points suggested for discussion:

1. Clear an area along Hoopole Hill Road in order to maximize the sight distances for the proposed road. The Connecticut River Estuary Regional Planning Agency recommends the following minimum sight distances based on design speed of the road.

- 350' for 30 m.p.h. design speed
  425' for 35 m.p.h. design speed
- 475' for 40 m.p.h. design speed
  525' for 45 m.p.h. design speed

2. Increase the radius of the curves in Evergreen Hill Drive in order to reduce the danger of the sharp curves that are proposed.

3. Provide safe sight distances for driveways by locating them properly and clearing vegetation as necessary. The sight distance standards for driveways recommended by the Connecticut River Estuary Regional Planning Agency are included in the following table.

4. Move the cul-de-sac at the end of the road to the level area just above the present location of this cul-de-sac.

5. Have the applicant develop alternative road designs that would deal with the problems noted earlier in this section.

WILDLIFE CONCERNS

Description of Area: Mature mixed hardwoods cover most of the 95 acres of the proposed development site. There is a small hemlock stand.

There are several intermittent streams that form small wetland areas. Elevations range from about 150 feet to about 350 feet.

Wildlife Recommendations: Developing any area by building on it will leave the majority of the area unavailable for wildlife to use.

Development will decrease the amount of habitat simply because the land will be occupied by physical buildings. The quality of the habitat may be decreased because an undeveloped area of land will be broken up with buildings and human activity.

Some species which require larger undeveloped areas will probably be forced out or will reduce their use of the area. They may be able to move into adjacent undeveloped areas if there is suitable habitat available and the competition with other species already occupying the area is not to great.

Other species which are more adaptable to man's presence will probably remain and their use of the area may even increase. Some new species may even be attracted to the area.

If the following general wildlife recommendations are carried out the impact to some species using the area can be lessened. The area may be made even more attractive to some species such as songbirds.

1) Clearing - when the intitial clearing for building is done, try to leave as many trees and shrubs as possible, especially those useful to wildlife. Some useful species include:

white oak (Quercus alba)	quaking aspen(Populus tremuloides)
red oak (Quercus rubra)	red-osier dogwood (Cornus stolonifera)
black cherry (Prunus serotina)	apple (Malus spp.)

2) Landscaping - on a 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 (especially for songbirds) but will also be more aesthetically pleasing for the residents of the development.

Leave as many snag trees (standing dead trees) and den trees (trees with holes) as possible. These trees are used by insect eating birds and cavity nesting birds and mammals.

Plant trees and shrubs which are useful to wildlife and landscaping such as:

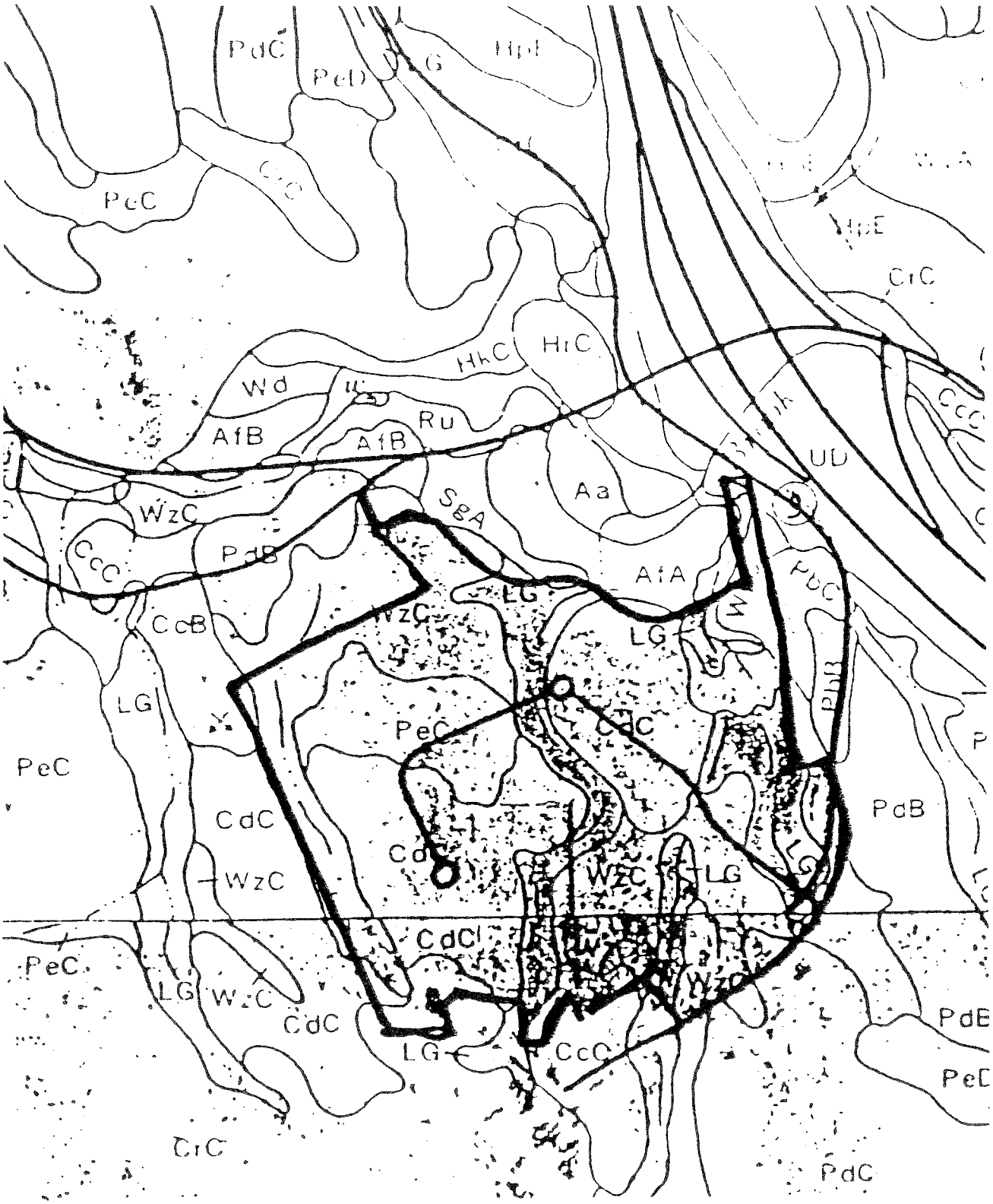
Japanese barberry (Bergeris vulgaris)
flowering dogwood (Cornus florida)
honeysuckle (Lonicera spp.)
juniper (Juniperus spp.)
bayberry (Myrica pensylvanica)
maple-leaved virburnum (Viburnum acerifolium)
chokecherry (Prunus virginiana)
American holly (Ilex opaca)
American mountain ash (Sorbus americana)
Autumn-olive (Elaegnus umbellata)
winterberry (Ilex verticillata)
American cranberrybush (Viburnum trilobum)
red maple (Acer rubrum)
red-osier dogwood (Cornus stolonifera)
alternate-leaf dogwood (Cornus alternifolia)

A variety of trees and shrubs should be used. Most species of wildlife need to have cover when they move from place to place. By leaving corridors of vegetation this will allow wildlife to utilize the area and also have access to adjacent areas. Large expanses of lawn with no trees or shrubs present should be discouraged. These factors will allow wildlife to better utilize the area and thus make it more attractive to wildlife.

3) Hemlock Stand - evergreens provide both food and cover to a variety of wildlife such as deer and grouse. Young stands from about 5 - 15 years old provide the best cover because they are still dense close to the ground. The value of an evergreen stand is even greater if it is close to a food source such as bushes that provide berries.

Appendix

Soils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PdE
PeD
CrC
PdC

SOIL LIMITATIONS FOR CERTAIN LAND USES

Map Symbol	Soil Name	Principal Limiting Factors	On-site Sewage	Urban Use Limitations: Buildings with Basements	Urban Use Limitations: Streets and Parking	Landscaping
CcC	Canton and Charlton very stony fine sandy loams, 8-15% slopes	Slope Large stones	Moderate	Severe	Moderate	Moderate
CdC	Canton and Charlton extremely stony fine sandy loams, 3-15% slopes	Large stones Slope	Severe	Severe	Moderate	Severe
CrC	Charlton-Hollis very stony fine sandy loams, 3-15% slopes	Slope Large stones Depth to bedrock	Moderate to Severe	Moderate to Severe	Moderate to Severe	Moderate to Severe
LG *	Leicester, Ridgebury & Whitman extremely stony fine sandy loams	Wetness Large stones Frost action	Severe	Severe	Severe	Severe
PdC	Paxton & Montauk very stony fine sandy loams, 8-15% slopes	Slope Percs slowly Large stones Frost action	Severe	Moderate	Moderate	Moderate
PeC	Paxton & Montauk extremely stony fine sandy loams, 3-15% slopes	Large stones Frost action Slope Percs slowly	Severe	Severe	Moderate	Severe
WzC	Woodbridge extremely stony fine sandy loam, 3-15% slopes	Frost action Large stones	Severe	Severe	Severe	Severe

* Inland wetland soil regulated under P.A. 155

SOIL INTERPRETATIONS FOR URBAN USES

The ratings of the soils for elements of community and recreational development uses consist of three degrees of "limitations:" slight or no limitations; moderate limitations; and severe limitations. In the interpretive scheme various physical properties are weighed before judging their relative severity of limitations.

The user is cautioned that the suitability ratings, degree of limitations and other interpretations are based on the typical soil in each mapping unit. At any given point the actual conditions may differ from the information presented here because of the inclusion of other soils which were impractical to map separately at the scale of mapping used. On-site investigations are suggested where the proposed soil use involves heavy loads, deep excavations, or high cost. Limitations, even though severe, do not always preclude the use of land for development. If economics permit greater expenditures for land development and the intended land use is consistent with the objectives of local or regional development, many soils and sites with difficult problems can be used.

Slight Limitations

Areas rated as slight have relatively few limitations in terms of soil suitability for a particular use. The degree of suitability is such that a minimum of time or cost would be needed to overcome relatively minor soil limitations.

Moderate Limitations

In areas rated moderate, it is relatively more difficult and more costly to correct the natural limitations of the soil for certain uses than for soils rated as having slight limitations.

Severe Limitations

Areas designated as having severe limitations would require more extensive and more costly measures than soils rated with moderate limitations in order to overcome natural soil limitations. The soil may have more than one limiting characteristic causing it to be rated severe.

About the Team

The Eastern Connecticut Environmental Review Team (ERT) is a group of professionals in environmental fields drawn together from a variety of federal, state, and regional agencies. Specialists on the Team include geologists, biologists, foresters, climatologists, soil scientists, landscape architects, archeologists, recreation specialists, engineers and planners. The ERT operates with state funding under the supervision of the Eastern Connecticut Resource Conservation and Development (RC&D) Area.

The Team is 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 activitis. To date, the ERT has been involved in reviewing a wide range of projects including subdivisions, sanitary landfills, commercial and industrial developments, sand and gravel operations, 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 officials 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. This request letter should include a summary of the proposed project, a location map of the project site, written permission from the landowner allowing the Team to enter the property for purposes of review, and a statement identifying the specific areas of concern the Team should address. 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 regarding the Environmental Review Team, please contact Jeanne Shelburn (774-1253), Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, P.O. Box 198, Brooklyn, Connecticut 06234.