Environmental Review Team Report

# Excess Water Co. Lands

## Killingworth, Connecticut

R C & D

EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

Environmental Review Team
Report

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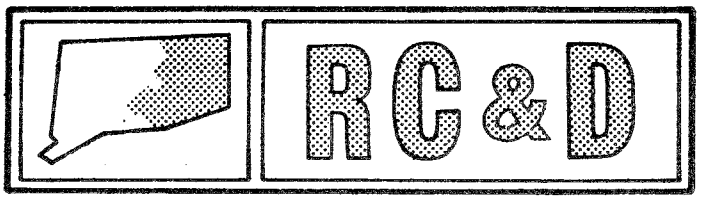
## Killingworth, Connecticut

August 1984




Eastern Connecticut Resource Conservation & Development Area

Environmental Review Team
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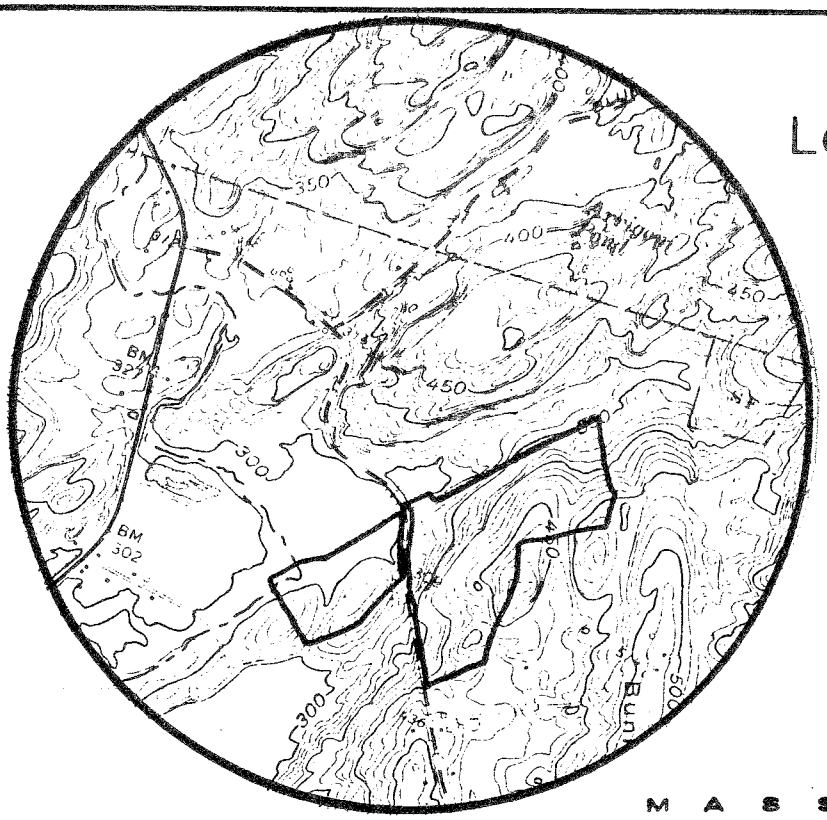
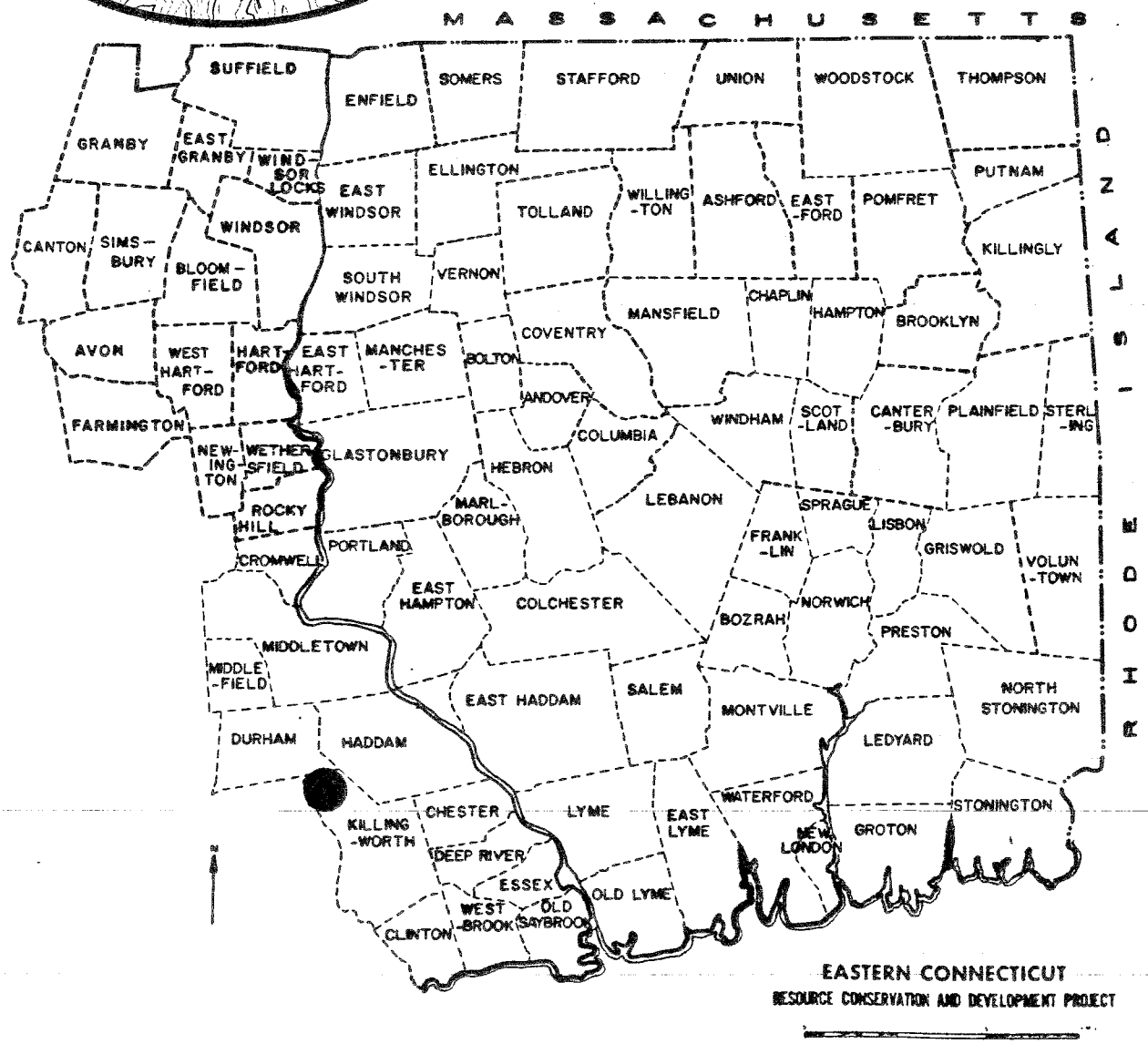



# Location of Study Site

EXCESS WATER COMPANY LANDS
(ROUTE 148/DURHAM TOWN LINE)
KILLINGWORTH, CONNECTICUT



# ENVIRONMENTAL REVIEW TEAM REPORT
# ON
# EXCESS WATER COMPANY LANDS
# (ROUTE 148/DURHAM TOWN LINE)
# KILLINGWORTH, CONNECTICUT

This report is an outgrowth of a request from the Killingworth Inland Wetlands 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 as a project measure. The request was approved and the measure reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The soils of the site were mapped by a soil scientist of the United States Department of Agriculture (USDA), Soil Conservation Service (SCS). Reproductions of the soil survey map as well as a topographic map of the site were distributed to all ERT participants prior to their field review of the site.

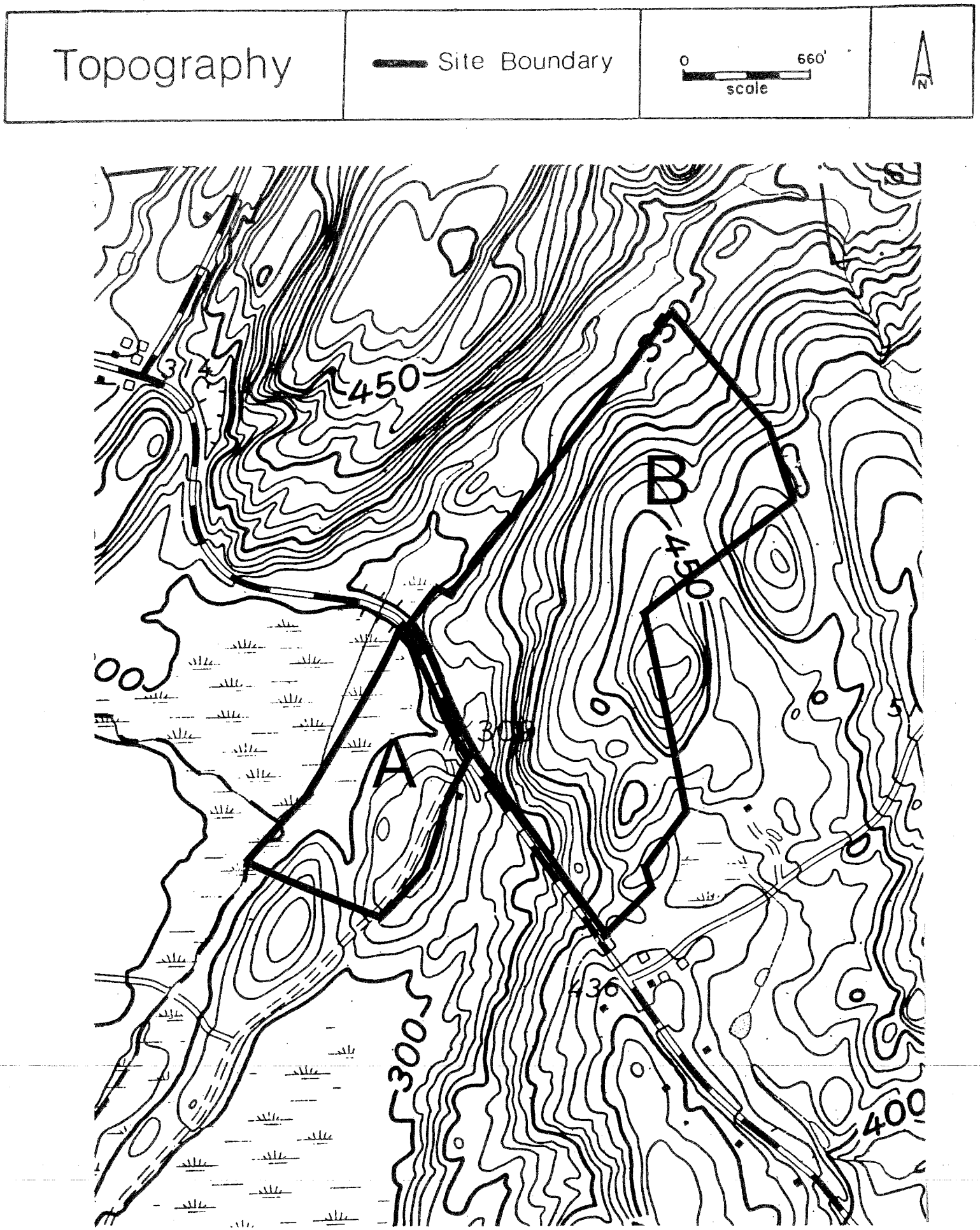
The ERT that field-checked the site consisted of the following personnel: Pat Scanlon, District Conservationist, SCS; Bill Warzecha, Geologist, Connecticut Department of Environmental Protection (DEP); Karl Lutz, Biologist, DEP; Rob Rocks, Forester, DEP; Donald Capellaro, Sanitarian, Connecticut Department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

The Team met and field-checked the site on Thursday, May 26, 1983. Reports from each 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 Killingworth. 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 you will find this report of value and assistance in making your decisions on this particular site.

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

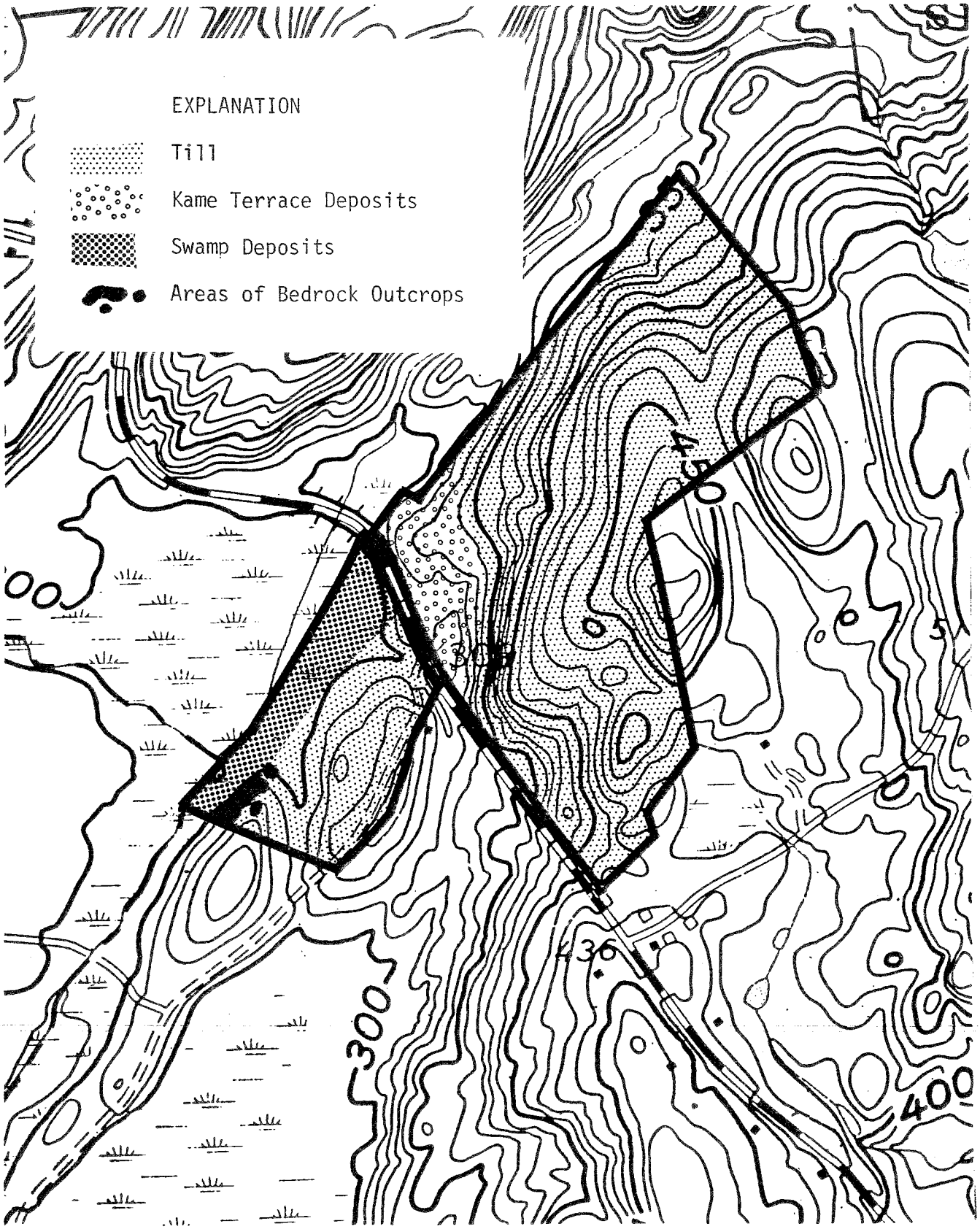

Topography
Site Boundary
0
660'
scale
N
450
A
B
300
436
400

# INTRODUCTION

The Eastern Connecticut Environmental Review Team was asked to prepare an environmental assessment for potential subdivision of an ±80 acre site in the Town of Killingworth. The South Central Connecticut Regional Water Authority (formerly the New Haven Water Company) is considering disposal of some of their excess watershed lands. The study site is located on Route 148 near the Durham town line. For ease of description, the site was divided into "Parcel A" located on the western side of Route 148, and "Parcel B" located on the eastern side of Route 148. No site development plans have been proposed at this time, however, the site is zoned for two acre single family residential development and the Team was asked to evaluate it as such. No public water or sewer service is available to this site.

The Team is concerned with the effect of this potential development 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. Severe limitations to development and certain mitigation measures are discussed in the following sections of this report. Due to the current stage of the project development, particularly the lack of preliminary site development plans, the comments made are general in nature. Should more detailed information be desired when site plans become available, it is suggested that the Town and developer contact the Team at that time.

# Surficial Geology



# ENVIRONMENTAL ASSESSMENT

## TOPOGRAPHY

Parcel "A" of the site, which is ±14 acres in size, is located in northwest Killingworth approximately one mile from the Durham town line. This parcel consists primarily of a small bedrock controlled hill. Elevations on this parcel range from ±300 feet above mean sea level along the wetlands northwest of the site to ±340 feet above mean sea level at the top of the hill in the southeast section of the property. Slopes on this parcel are gentle to moderate.

No watercourses were observed on the site. Wetlands cover approximately one-third of the area throughout the northwest portion. Elevations were taken from the published Durham topographic quadrangle map.

Parcel "B" of the site consists of an irregularly shaped parcel, ±63 acres in size and is located on the east side of Route 148 opposite parcel "A" about one mile from the Durham town line. It is composed of a bedrock controlled hill west of Bunker Hill in northwest Killingworth. The site is characterized by steep slopes throughout the central section. However, the flat land at the summit of the hill is characterized by gentle slopes with some relatively flat areas.

Elevation on this site range from ±300 feet above mean sea level along the western property line to ±480 feet above mean sea level at the peak of the hill in the eastern section of the property. These elevations were taken from the published Durham topographic quadrangle. Although no large watercourses flow within the parcel, a small intermittent stream was observed in the western section. Also, a wet area in the northeastern section of the site is drained by a small, intermittent watercourse.

## GEOLOGY

The bedrock geologic map of the quadrangle has not been completed to date. However, the surficial geologic map (GQ-756) for the quadrangle was prepared by Howard E. Simpson and published by the United States Geological Survey.

Bedrock underlying or cropping out on both of the sites is referred to as Monson Gneiss (Source: Preliminary Bedrock Geological Map of Connecticut, by John Rogers). Monson Gneiss is a rock formation that consists of a gray, quartz-plagioclase gneisses and amphibolites. Bedrock outcrops on parcel "A" were observed primarily in the southern section. Depth to bedrock throughout the site is probably shallow ranging from zero where bedrock outcrops to probably not more than five feet in most areas between the outcrops.

Although no bedrock outcrops were observed in Parcel "B" during an inspection of the site, there may be areas where outcropping occurs. As in parcel "A", underlying bedrock throughout this site is probably at shallow depth--less than 10 feet.

Surficial geologic materials are those unconsolidated mineral and organic materials that overlie bedrock. These materials are sometimes referred to as "overburden." On parcel "A" there are two types of overburden. The predominate type is till, which was deposited directly from the glacial ice sheet. The till contains a poorly sorted mixture of clay, silt, sand, gravel and boulders. The texture of till may vary from place to place; it may be sandy or silty, compact or loose, stony or not stony. Based on surficial geologic mapping information and visual observation of the surficial deposits, it appears the till is somewhat less compact and contained a high percentage of sand sized material. Thickness of till in this area probably ranges from zero where bedrock outcrops to probably not more than five feet in areas between the outcrops.

The other type of sediment which is confined primarily in the western half of the site are swamp deposits. Swamp deposits consist of partially decayed vegetation intermixed with differing amounts of silt, sand and a little clay. Thicknesses of these deposits probably range between two and five feet.

As in parcel "A", till is the predominating sediment overlying bedrock on parcel "B". The texture of the till on this parcel is probably more compact than that found on parcel "A". Thickness of till on this parcel would be the same as parcel "A".

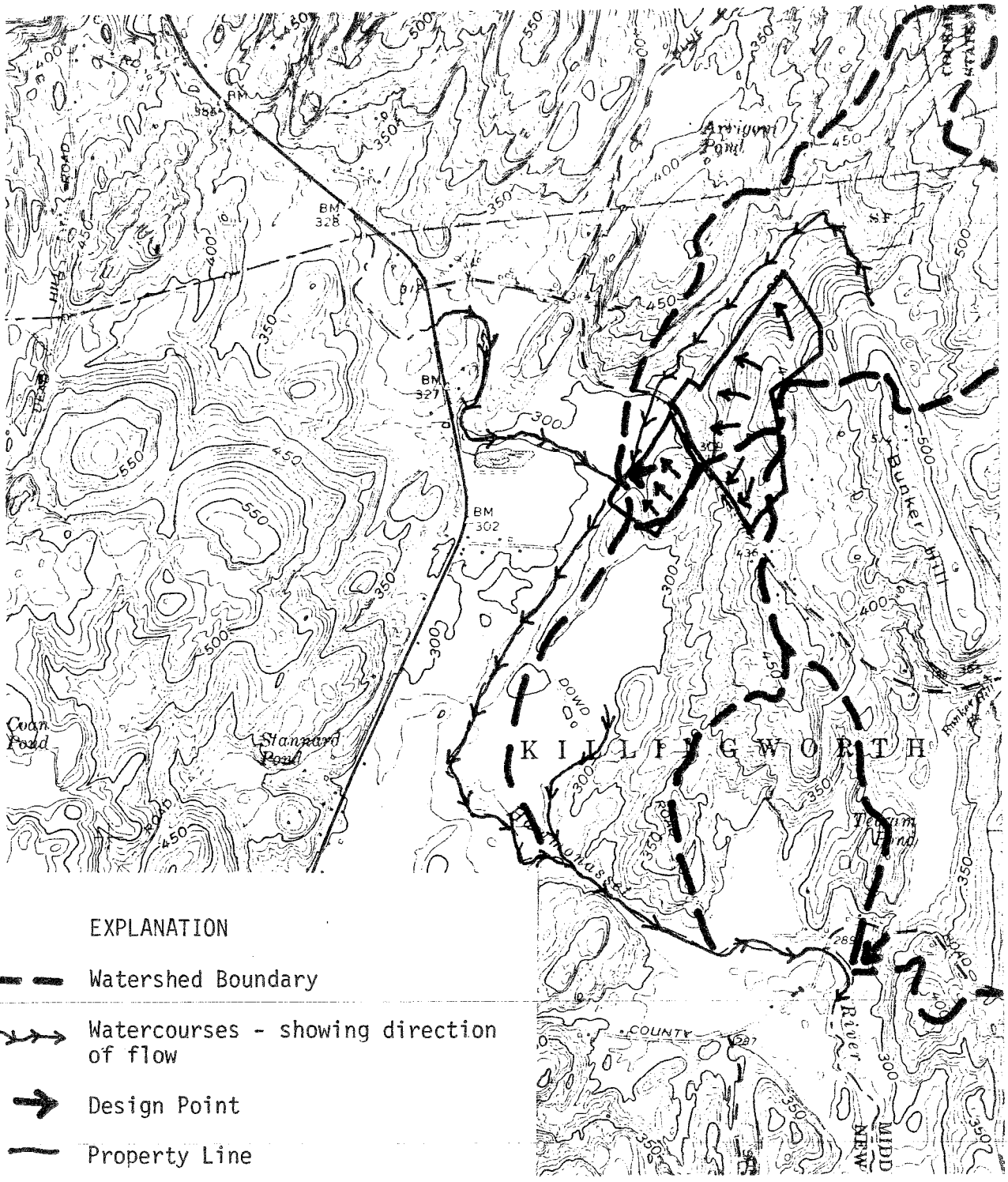
Another type of glacial deposit on this site is a stratified drift form called a kame terrace. This deposit, which covered an area of approximately 3 acres in the western section of the site, consisted of a terrace like form composed of a medium sand to cobbley gravel. Kame terraces develop when meltwater streams deposited sand and gravels between the melting glacier or a stagnant ice sheet and a higher valley wall. After the ice melted, the deposit was left standing. It appears much of this deposit has been extracted and removed.

Based on visual observations--the topography, geologic and soil mapping data--it appears that most areas within the parcels "A" and "B" would not be particularly favorable for on-site sewage disposal purposes. The main areas of concern on both parcels include (1) shallow soil cover above bedrock, (2) the potential for seasonally high groundwater table, (3) moderate to steep slopes, and (4) wetland areas. In order to determine the number of residential lots which may be obtained on either parcel, emphasis must be placed on identifying suitable areas for sewage disposal systems placement. That way, the land is developed in accordance with the soils' ability to properly treat and dispose of septic effluent from homes. On-site testing would be required in order to have specific information regarding depth to bedrock, groundwater levels, depth to compacted soil layers and seepage ability of soils. This testing should be conducted in areas where the actual septic systems would be located and in the presence of the local sanitarians.

# Drainage Areas

0 2000' scale

N




EXPLANATION

- Watershed Boundary
- Watercourses - showing direction of flow
- Design Point
- Property Line
- Direction of surface runoff

## HYDROLOGY

Both parcels lie within the watershed of an unnamed tributary of the Hammonasset River. Drainage from parcel "A" flows generally in a north to northwest direction towards wetlands. The wetland itself is drained by the tributary which ultimately discharges into the Hammonasset River southeast of the parcel.

Most of parcel "B" drains in a north to northwest direction into the same unnamed tributary mentioned above. A small area, comprised of ±13 acres in the southern portion of parcel "B" drains in a south to southwest direction towards a wetland. The outlet stream for this wetland also discharges into the Hammonasset Rover.

Development of these parcels for residential homes will cause increase in the volume of runoff. These increases would be caused by removal of vegetation, compaction of soils and creation of impervious surfaces such as roof tops, paved driveways and roads. The amount of increase will depend upon the ultimate density of development. The additional runoff could cause increased overland erosion, especially in areas of steep slopes, and could increase the peak flood flows to the unnamed stream northwest of both sites. If residential development occurs on the parcels, these potential problems should be addressed by formulating and implementing an erosion and sediment control plan particularly during the construction phase. This plan should also indicate how increased runoff created by development on the parcels will be handled. Particular attention, as mentioned earlier, should be directed at areas of steep slopes where runoff problems would most likely occur. Construction in these areas needs to be carefully planned in order to avoid serious erosion problems.

Both parcels "A" and "B" also lie within a public water supply watershed area, therefore, development must comply with all applicable sections of Section 9-13-B32 Sanitation of Watershed of the State Public Health Code.

## SOILS

A detailed soils map of the property is included in the appendix to this report. As the soil map is an enlargement from the original 1,320 feet/inch scale to 660 feet/inch, the soil boundary lines are not absolute and should be used merely as guidelines to the distribution of soil types on the site. A summary of the limitations of these soils for septic systems and building site development appears in the appendix. The area is composed of soils developed from glacial till. Depth to bedrock varies from very shallow to greater than 60 inches deep, making the placement of homes, septic systems and roads on the site critical. Major wetlands (Aa) are on the southwest edge of the property. A small area of wetlands (Lg) extends into the extreme southeastern section.

Most of the soils have stones and boulders on the surface. Stone sizes range from 10 inches to greater than 48 inches in diameter and occur frequently enough to make construction costly.

The following is a brief description of the soils contained in each mapping unit and their potentials for community development.

Aa -This mapping unit occurs on 0 to 2 percent slopes. The Adrian soils are very poorly drained and classify as wetlands. They have dark decomposed organic layers over gray sand. These soils have a poor potential for community development. They have a high water table at or near the surface most of the year and are subject to flooding or ponding. The organic layers have very low strength and stability. If fill is placed on top of the organic layers, the fill will settle over a period of several years. If the soils are drained, the organic material subsides, and the surface of the soil is lowered. Excavating is difficult because the side slopes slump readily, and the escavations fill with water. On-site septic disposal systems cannot feasibly be used on these soils.

CdC - This mapping unit is composed of Charlton soils on 3 to 15 percent slopes. The Charlton soils typically have a dark brown, extremely stony fine sandy loam surface layer over a yellowish brown gravelly sand loam subsoil and substratum. At this location stones and boulders occur throughout the soils. The rock fragments interfere with the installation of septic systems and escavation of the soils for building slab or basement foundations. Access roads are also difficult to construct around these rock fragments. Special design of spetic systems is needed on these soils.

CrC - This mapping unit is composed of Charlton and Hollis soils occurring in an intermingled pattern on the landscape. Slopes are 3 to 15 percent. The Charlton soils typically are brown, fine sandy loam to a depth of 60 inches or more. The surface of these soils is very stony. The surface stones and slope of these soils result in a fair potential for community development. Special design of septic systems may be needed in these soils.

The Hollis soils are less than 20 inches deep to bedrock. They are very stony, grayish and yellowish brown sandy loams over unweathered schist bedrock. The rock fragments on the soil and shallow depth to bedrock give this soil a poor potential for site development. Excavations for roads and building foundations may require blasting. Septic systems have to be specially designed in order to properly renovate effluent and prevent downslope break out of septage which could contaminate water courses.

HkC - This mapping unit is composed of Hinckley soils on 3 to 15 percent slopes. These soils typically have a dark grayish brown gravelly sandy loam surface layer 8 inches thick. The subsoil is brown gravelly sand 17 inches thick over a very gravelly sand substratum to a depth of 60 inches or more.

These soils have fair potential for community development and are mainly limited by the amount of gravel they have throughout their depth. Steep side slopes of excavations are unstable. Septic systems need careful design and installation because of the soils' high permeability rate and poor filtering actions, which can result in groundwater contamination from septic effluent.

HpE - This mapping unit is composed of Hollis and Charlton soils occurring in an intermingled pattern on the landscape. Slopes are 15 to 40 percent. The surface of these soils is extremely stony.

The Hollis soils are less than 20 inches deep to bedrock. They are typically extremely stony, grayish to yellowish brown fine sandy loams over unweathered schist bedrock.

The Charlton soils typically are brown fine sandy loam and gravelly fine sandy loam to a depth of 60 inches or more.

This map unit has poor potential for community development. It is limited mainly by steep slopes and stoniness for both types, and the shallowness to bedrock on the Hollis soils. Septic systems require very careful design and installation to insure that effluent does not seep to the surface downslope from the leaching fields. On the shallow Hollis soils effluent may seep into cracks in the bedrock and pollute groundwater. The extremely stony surface of the Charlton and Hollis soils make excavations for roads and buildings difficult. Excavations on the Hollis soils may require blasting.

Lg - In this area, this mapping unit is composed of Leicester and Ridgebury soils on 0 to 3 percent slopes. These soils are poorly drained and classify as wetlands. Both soils have extremely stony surfaces, and in places, stones and boulders occur throughout the soil. Typically, the Leicester soils have a dark brown fine sandy loam surface layer 7 inches thick. The subsoil is grayish brown, mottled, fine sandy loam 26 inches thick over a mottled, brown fine sandy loam and gravelly sandy loam substratum to a depth of 60 inches or more.

The Ridgebury soils typically have a very dark gray fine sandy loam surface layer 7 inches thick. The subsoil is grayish brown, mottled, fine sandy loam and sandy loam 17 inches thick over a mottled, firm, fine sandy loam substratum to a depth of 60 inches or more.

Both soils have poor potential for community development. They are limited mainly by their seasonal high water table and stoniness. The Ridgebury soils are also limited by a slowly permeable substratum. These soils are difficult to excavate because of the high water table and stoniness. The steep slopes of excavations tend to slump when saturated. These soils have poor potential for building foundations and basements because the footings generally are below the depth of the high water table and basements tend to be wet. Septic systems do not function well without very unusual and costly design and installation. Even if carefully designed, they often have a high failure rate. The stones and boulders associated with these soils will interfere with foundation excavations and installation of septic systems.

WzC - This mapping unit is composed of the Woodbridge soils on 3 to 15 percent slopes. Typically, the Woodbridge soils have an extremely stony, dark brown fine sandy loam surface layer 3 inches thick. The subsoil is yellowish brown, mottled, fine sandy loam 24 inches thick over a mottled, firm, slowly permeable, fine sandy loam substratum to a depth of 60 inches or more.

These soils have a poor potential for community development. They are limited mainly by a seasonal high water table at a depth of about 18 inches and stoniness. These soils are difficult to excavate since at this location stones and boulders occur throughout their depth. Because of the seasonal high water table, excavations are frequently inundated. When the soils are saturated, steep slopes of excavations are unstable and tend to slump. Basements will be wet unless foundation drains are installed. On-site septic systems generally will not function with normal design and installation because of the seasonal high water table and the slowly permeable substratum. Very careful design and installation are required to insure that septic systems function satisfactorily and that effluent

does not seep to the surface downslope from the leaching field. The presence of stones and boulders will hinder the installation of these systems.

Sediment and Erosion Control

Except for a small area of abandoned pasture within the parcel section southwest of Route 148, most of the parcel is wooded. Development of the site could result in severe soil erosion and sedimentation of wetland areas, if adequate erosion control measures are not provided. Steep slopes and shallow-to-bedrock soils increase the erosion risk. Soils with surface stones and shallow soil areas can be difficult to revegetate once disturbed.

Development plans for the site should include a detailed sediment and erosion control plan and provisions for management of stormwater runoff from the site. Stormwater controls should consider not only increased volume but also the increased flow velocities. The offsite impacts of changed runoff volumes and rates should also be considered.

## VEGETATION

This site which is proposed for sale and eventual development into two-acre and larger house lots may be divided into four major vegetation types. These include three mixed hardwood stands, which total 59± acres; hardwood swamp which totals approximately 6 acres; old field, 4± acres; and oak ridge 3± acres. These vegetation types are described below and depicted on the accompanying vegetation type map.

The healthy trees and flowering shrubs which are present throughout much of this site, have aesthetic value and should be retained. Improvement thinnings throughout the property prior to development or on an individual house lot basis would reduce crowding and result in healthier, more stable trees over time.

Vegetation Type Descriptions

Type A (Mixed Hardwoods) - This ±49 acre stand is fully stocked with pole-size black oak, white oak, mockernut hickory, shagbark hickory, American beech, black birth and red maple. A small portion of this stand, located along the access roads, have been thinned for fuelwood and are healthy at present. Trees in other areas are declining in health and vigor due to crowding.

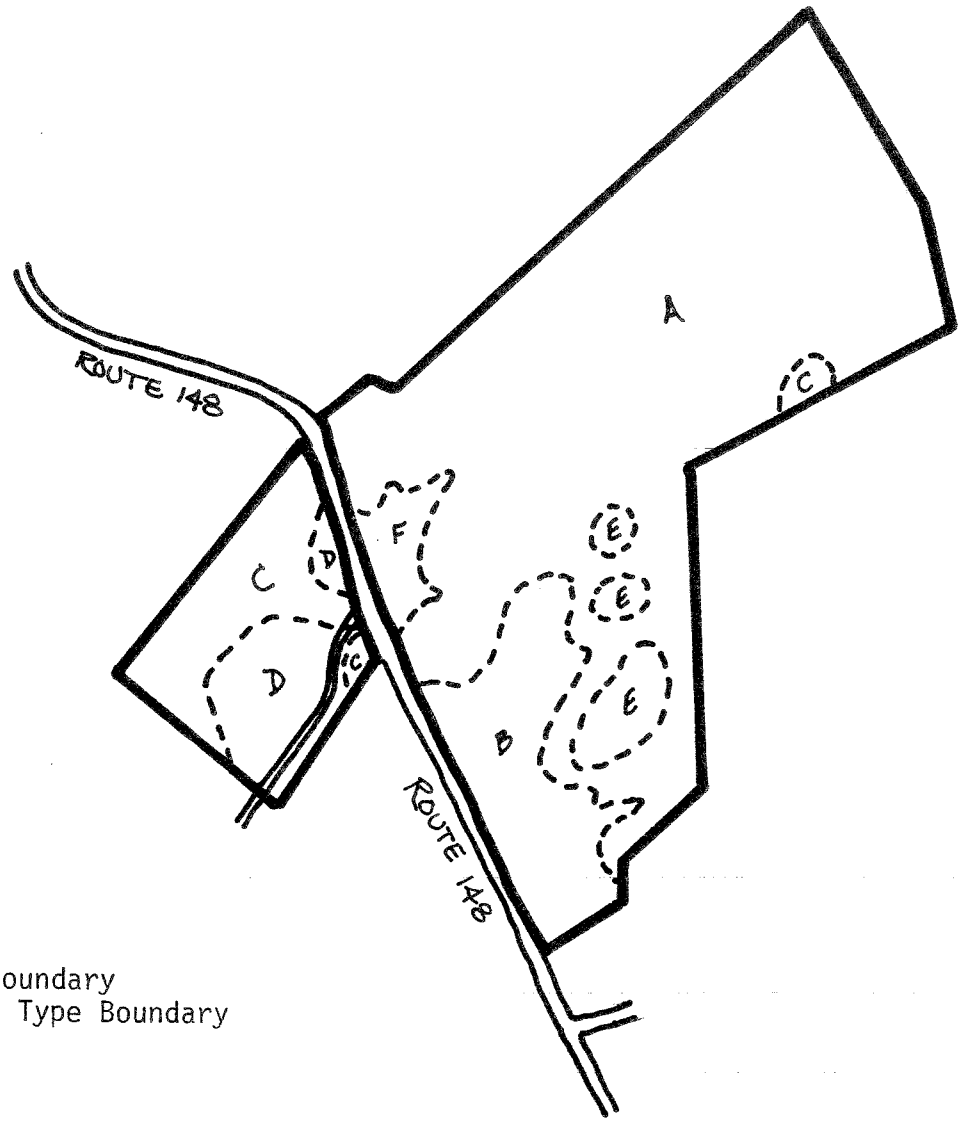
The understory in this stand is dominated by maple leaf viburnum, witch-hazel, mountain laurel, shadbush, flowering dogwood, azalea, Eastern red cedar and hardwood tree seedlings. Ground cover vegetation is comprised of white wood aster, Canada mayflower, wild sarsaparilla, lowbush blueberry, Pink Lady's slipper, lobed hepatica, Pennsylvania sedge, club moss, hayscented fern and Virginia creeper.

Type B (Mixed Hardwoods) - Pole to sawtimber-size red oak, black oak, black birch, red maple and shagbark hickory are present in this ±8 acre fully stocked stand. Many of the larger trees are reasonably healthy, however, their growth rates have slowed considerably in the last 5 to 10 years due primarily to crowding.

# Vegetation

0 660
scale

N




LEGEND

Roads
Property Boundary
Vegetation Type Boundary

Vegetation Type Descriptions*

Type A: (Mixed Hardwoods, 49+ acres) Pole size, fully stocked.

Type B: (Mixed Hardwoods, 8+ acres) Pole to sawtimber size, fully stocked.

Type C: (Hardwood Swamp, 6+ acres) Sapling to pole size, overstocked.

Type D: (Old Field, 4+ acres) Sapling size.

Type E : (Oak Ridge, 3 acres) pole size, understocked.

Type F : (Mixed Hardwoods, 2 acres) Pole to sawtimber size, overstocked.

* Seedling Size = Trees less than 1 inch diameter at 4½ feet above the ground (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.

Mountain laurel, maple-leaf viburnum, flowering dogwood and witch-hazel are present in the understory along with scattered American chestnut and highbush blueberry. Ground cover vegetation consists of Pennsylvania sedge, clubmoss, wild sarsaparilla, white wood aster and Canada mayflower with occasional pockets of Christmas fern and hayscented fern.

Type C (Hardwood Swamp) - Two hardwood swamp areas which total approximately 6 acres are present within this tract. Crowded sapling and occasional pole-size red maple of poor to medium quality dominate the area. A dense understory of arrowwood, highbush blueberry and sweet pepperbush have become established where the red maple is sparce. Tussock sedge, skunk cabbage, false hellebore, sphagnum moss, cinnamon fern, sensitive fern, royal fern and swamp dewberry are also present.

Type D (Old Field) - The old field vegetation type covers about 4 acres of this tract. Eastern red cedar, flowering dogwood, gray stemmed dogwood, gray birch, red maple seedlings, choke cherry, arrowwood, spirea, raspberry, bayberry, and highbush blueberry form the woody component of the vegetation which is present.

Several years ago white pine seedlings were planted in this area. Some of these seedlings have been damaged by the white pine weevil, however, the majority appear healthy. The herbaceous vegetation found in this area consists of grasses, goldenrod, milkweed, common mullein, cinquefoil, fringed polygala, black-eyed-Susan, ox-eyed-daisy, bluets, Canada mayflower, hayscented fern, sensitive fern and club moss.

Type E (Oakridge) - Poor quality pole-size chestnut oak, white oak, black birch and scattered red maple are present on three knolls which total approximately three acres. The trees which are present appear stunted and malformed as a result of the lack of moisture characteristic of the shallow to bedrock soils which prevail. The understory vegetation consists of widely scattered mountain laurel, witch-hazel and American chestnut. Ground cover is made up of huckleberry, club moss, rock polypody and sheep laurel.

Type F (Mixed Hardwoods) - The moisture conditions are very favorable on this two acre area which is over stocked with pole to sawtimber-size tuliptree, sugar maple, red maple, white ash and yellow birch. The trees in this area are declining in health and vigor due to their crowded condition. Spice bush, sweet pepperbush, witch-hazel, mountain laurel, azalea and flowering dogwood are present in the understory. Ground cover consists of jack-in-the-pulpit, wild geranium, violets, aster, Virginia creeper, poison ivy, lady fern, cinnamon fern, evergreen woodfern and sensitive fern.

## Aesthetic Considerations

Present within the mixed hardwood stands B and F are many large reasonably healthy trees which have high aesthetic and shade value. These trees should be located and temporarily but clearly marked for retention prior to subdivision of this property.

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, driveways and dwellings 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 five 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, dwellings or utility lines.

Care should be taken during the construction period not to disturb the trees that are to be retained. 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 groups or "islands." This practice lowers the possibility of soil disturbance and mechanical injury. Individual trees and islands of trees near focal points of construction should be temporarily, but clearly marked so they may be avoided by construction machinery.

Several species of flowering trees and shrubs, including flowering dogwood, mountain laurel, shadbush and azalea 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

The soils which are present within the hardwood swamp area (vegetation type C) are saturated with water for the greater part of the year. This condition limits the potential for tree growth, because tree roots do not have the proper aeration and are therefore unable to become securely anchored. These trees will become increasingly susceptible to windthrow as they grow larger.

Where soils are excessively drained and extremely shallow to bedrock, tree growth and stability is also limited. Trees in the oak ridge areas (vegetation type E) are unable to trap enough moisture for proper growth and therefore appear stunted and unhealthy. Under these conditions they are also susceptible to windthrow, because their root systems are unable to penetrate the bedrock to become firmly anchored. The potential for windthrow may be reduced if the underlying bedrock is highly fractured. In this situation, tree roots are able to become more stable by penetrating cracks and fissures.

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 trees which are present in vegetation types A, B, and F are declining in health and vigor as a result of their crowded condition. Under these circumstances the trees are under stress, and major disturbances in their environment such as changes in soil conditions, and mechanical injury caused by construction, may rapidly degrade their health. A fuelwood thinning in these strands, following the "crop tree selection method" (preferably prior to construction so that the entire area is treated) would help to reduce the crowded condition and improve health and vigor.

Under the "crop tree selection method," 100 of the highest quality trees growing on each acre should be identified (tree spaced about 20' x 20' will equal 100 trees per acre), and one, two or three trees that are in direct competition with each of those identified should be removed. The 100 trees per acre that are selected as crop trees should be healthy, large crowned, and show little or no signs of damage. Trees which are not competing with the 100 selected trees should not be removed, unless they are of poor quality or damaged.

Ideally, the above proposed improvement thinning should take place prior to the development of this property. This will allow uniform quality of the thinning operation. If, however, this is not feasible, these thinnings could take place on an individual lot basis after the subdivision has taken place. Regardless, all suitable trees removed during clearing operations should be utilized as fuelwood.

## WILDLIFE

Section A is a unique wildlife area in that it provides an open grassy-brushy area in an otherwise uniform habitat. The more diversity in habitat types, the more valuable an area is for wildlife. Keeping this section in this open to semi-open state will serve to maintain diversity of habitat. There was strong evidence of heavy deer use on this site.

The wetlands, in this section, are also a heavily used wildlife area and provides a good water source and thick protective cover. It should not be altered in any way.

Section B is a good wildlife site. Most of the overstory trees are old enough to produce an adequate food supply (nuts, berries, seeds, etc.) for wildlife and large enough to supply natural cavities for nesting sites. The west facing slope with thick evergreen laurel present makes an excellent wintering area for a variety of wildlife species, especially deer. Several den sites were also observed in the rocky outcrops.

Development of any of these sites will displace the animals presently using these areas. Some species may adapt to the disturbance, but others will be forced out of the area entirely. The wetland areas are heavily used, valuable wildlife areas and should be protected from disturbance at any cost.

Through simple forestry cutting operations, further steps can be taken to improve these areas for wildlife. Also, if development does take place, there are many mitigating measures that can be taken to help the wildlife resource. Additional information on wildlife improvement practices can be obtained through the Wildlife Office in Marlborough (295-9523).

## WATER SUPPLY

There is no public water supply accessible to either parcel. If the properties were developed for residential purposes, it appears that individual on-site wells tapping the underlying bedrock would be the likely source of water. These wells would have to be drilled into the bedrock aquifer because of the lack of suitable sand and gravel deposits or till deposits for shallow wells. While till is present over most of parcels "A" and "B", its thickness is probably inadequate and its permeability too low to serve as a reliable source. Bedrock, in most cases, provides yields that are small but sufficient for domestic purpose. In the lower Connecticut River basin 314 wells tapping crystalline rock were surveyed for Connecticut Water Resource Bulletin #19. Of these, approximately 70 percent yielded about 4 gallons per minute and approximately 80 percent yielded 3 gpm or more. On the other hand, less than 20 percent yielded 11 gpm or more. This information suggests that a suitable water supply may be obtainable on both parcels, however, larger supplies are unlikely. The probability of obtaining a certain supply at a particular location on either parcel is virtually impossible to determine, as the ultimate yield depends upon the number and size of water bearing fractures that are intersected by the well. The distribution of these fractures in bedrock is highly irregular.

## WASTE DISPOSAL

On-site sewage disposal would be limited by wetlands, steepness of slope, depth to underlying bedrock or rock outcrops on the ridges. Areas where bedrock is less than 5 feet below ground surface and/or where slopes exceed 25% are to be recognized as areas of special concern and require detailed investigation and plans for sewage disposal systems. Because most of the soils throughout this area are shown to be a complex of more than one kind, adequate on-site testing and investigation should be done to locate areas with the more favorable soil (i.e., Charlton versus Hollis) conditions for possible sewage disposal purposes. A plan of development (layout of lots) should be based on realistic conditions rather than perhaps just dividing the property into a set number of lots based on zoning and overall acreage, with insufficient supporting data for the feasibility of sewage disposal. Portions of this property do not lend themselves to subdivision development. The area in general should present some major difficulties.

## PLANNING CONCERNS

The parcel of land currently owned by the South Central Connecticut Water Authority lies in the northwest quadrant of the Town of Killingworth. It is included in the rural residence district under Killingworth's zoning regulations, as is most of the rest of the Town's land area.

The principal uses to which the parcel could legitimately be put in the future under the existing zoning rules as a matter of right include one-family dwellings; two-family dwellings; customary home occupations involving no more than two non-residents of the premises that do not "noticeably change the apparent residential character of the premises"; municipal offices, firehouses, public schools, colleges and camps owned and operated by a governmental unit; churches, parish houses, convents and similar religious buildings; boarding houses; agricultural and related animal-raising pursuits, except the commercial raising of fur-bearing animals or swine; vegetable stands; parks, playgrounds and similar open reservations maintained by either governmental units or non-profit organizations, including "game raising, hunting and other conservation activities carried on under private or public ownerships."

In addition to the above list, certain other uses may be established by special exception granted by the Killingworth Planning and Zoning Commission. These include private schools and colleges, clubs, libraries, museums, auditoriums, community houses and public health nursing service facilities; hospitals or convalescent homes, provided the site meets space requirements (8000 sq. ft. per patient); veterinary hospitals on 3 acres or more; livery, boarding or riding stables on seven acres or more; commercial greenhouses on 3 acres or more; and cemeteries.

The minimum lot area required in a rural residence district for residential use by one family is two acres. Hence, a two-family dwelling would require four acres of land.

As the foregoing indicates, the typical regularly permitted uses are low-intensity ones in keeping with the rural character of the community. These would be the sort of uses to which the water company land is most likely to be put. The northwest section is one of the least populated areas of town, but both parcels do front on a state highway (Route 148), making them prime candidates for potential future development as Killingworth has been growing recently at a faster rate than the rest of the towns of the Estuary Regional Planning Area. There is, on the other hand, no central public water supply system nor sewerage system anywhere in Killingworth to influence one way or another the value or the timing of development of these parcels compared to any other parcels which may be on the market elsewhere in town at the same time.

Should the parcel become the subject of a special exception application for any of the previously mentioned potential uses, the planning and zoning commission must consider the probable effect of such use on the enjoyment, usefulness and value of premises in the general neighborhood; the pattern, flow, intensity or character of traffic and the degree of traffic congestion produced thereby; the degree of population concentration and building density resulting from such use and the availability of necessary public facilities and services required by it; and its effect on the natural, scenic or historic environment immediately surrounding it.

From a general planning point of view, the parcel does not stand out as a unique parcel performing any special natural function for the Town if left in an undisturbed state. It has site constraints typical of both Killingworth land. It will most likely be sold eventually for private development, at which time any localized natural or man-made features worthy of protection or preservation should be considered as part of the site planning process.

TABLE

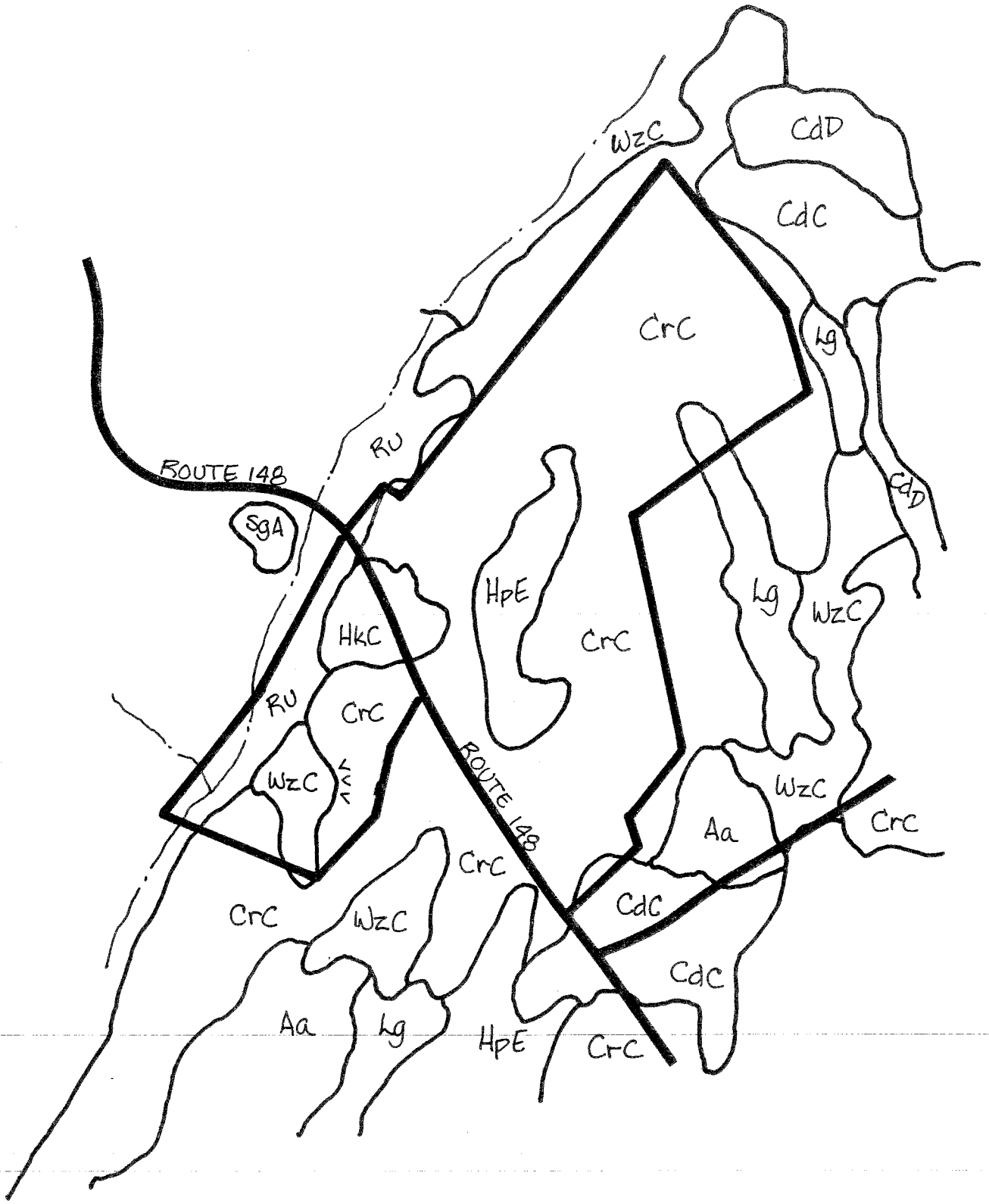
1980 EXISTING LAND USE

| Land Use Category | | Estimated Acreage |
|---|---|---|
| Residential* | | 3052 |
| Commercial* | | 50 |
| Industrial | | 88 |
| Institutional & Governmental | | 109 |
| Reserved Open Space | | 5381 |
| ... Public Water Supply | 1839 | |
| ... State Parks and Forests | 2155 | |
| ... Town & Private, Non-Profit Recreation & Conservation Lands | 1387 | |
| Farmland * | | 312 |
| Roads and Utilities | | 491 |
| Other Vacant, Private Lands and Waters | | 13557 |
| TOTAL | | 23,040 [36 sq. miles] |

* Per 1980 Grand List.

# Appendix

# Soils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CrC
WzC
ROUTE 148
WzC
Aa
CrC
CrC
CrC
WzC
CdC
CdC
Aa
Lg
HpE
CrC

Parcel 2

| Soil Symbol and Name | Dwellings Without Basements | Dwellings With Basements | Lawns and Landscaping | Septic Tank Absorption Fields | Local Roads and Streets |
|---|---|---|---|---|---|
| CdC Canton & Charlton Extremely Stony FSL's 3-15% | Severe: large stones | | | | Moderate: large stones |
| CrC Charlton-Hollis Very Stony FSL's 3-15% | Charlton → Moderate: slope, large stones<br>Hollis → Severe: depth to rock | | | | Charlton → Moderate: slope<br>Hollis → Severe: depth to ro |
| HkC Hinckley Gravelly SL 3-15% | Moderate: slope | | Severe: small stones, droughty | Severe: poor filter, slope | Moderate: slope |
| HrE Hollis-Charlton Extremely Stony FSL's 15-40% | Severe: slope, depth to rock, large stones | | | Hollis → Severe: slope, depth to rock, large stones Charlton → Severe: slope, large stone | Severe: slope, depth to rock |
| LG* Leicester, Ridgebury, Whitman Extremely Stony FSL's | Severe: large stones, wetness, frost action | Severe: large stones wetness | | All → Severe: wetness large stones Ridgebury and Whitman → perc slowly | Severe: wetness frost action |
| Ru* Rumney FSL | Severe: floods, wetness frost action | Severe: floods, wetness | | | Severe: floods, wetness, frost action |
| WbC Woodbridge Extremely Stony FSL 3-15% | Severe: frost action large stones | Severe: wetness, large stones | Severe: large stones | Severe: percs slowly | Severe: frost action |

* Designated Wetland Soil Regulated Under PA 155

** Prime Farmland Soil

FSL - Fine Sandy Loam SL - Sandy Loam

# 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 devel opment. 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 o 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.