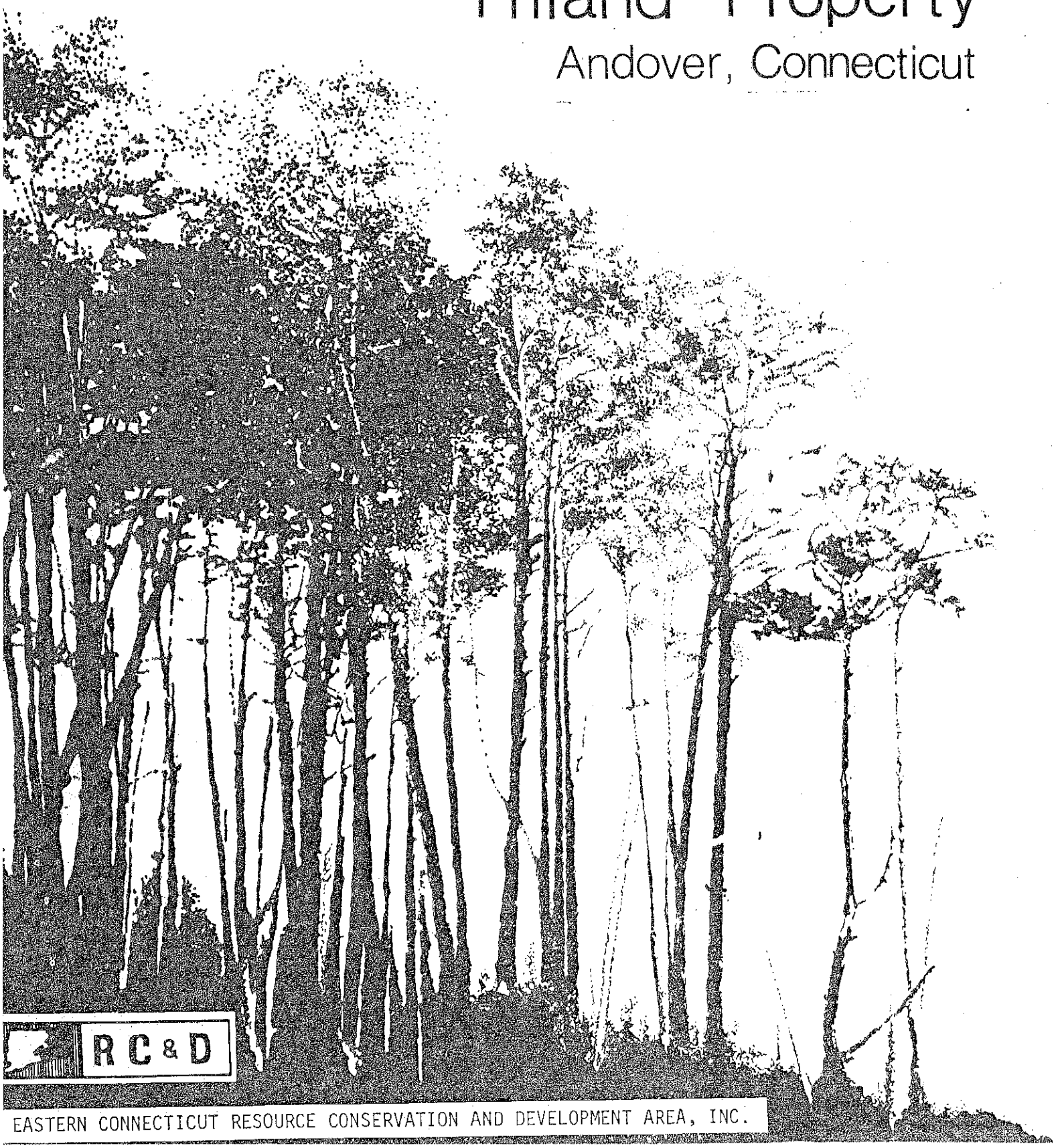
Environmental Review Team Report

Friland Property

Andover, Connecticut



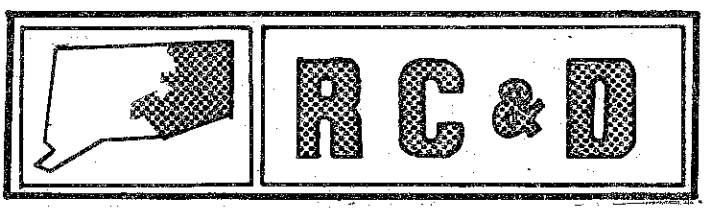
R C & D

EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

Environmental Review Team Report
on

Friland Property
Andover, Connecticut

April 1982

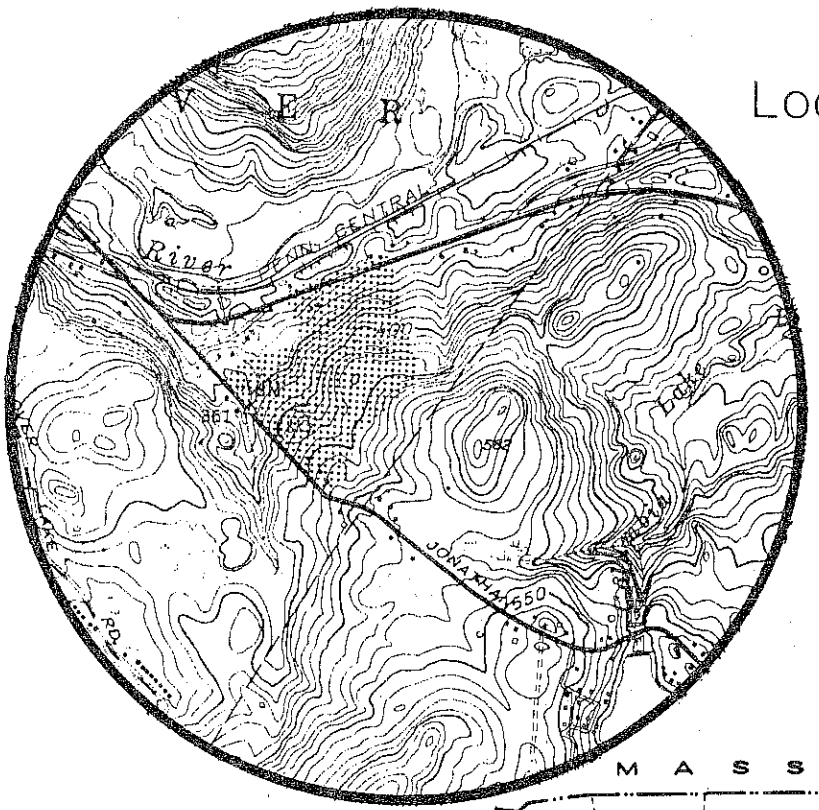


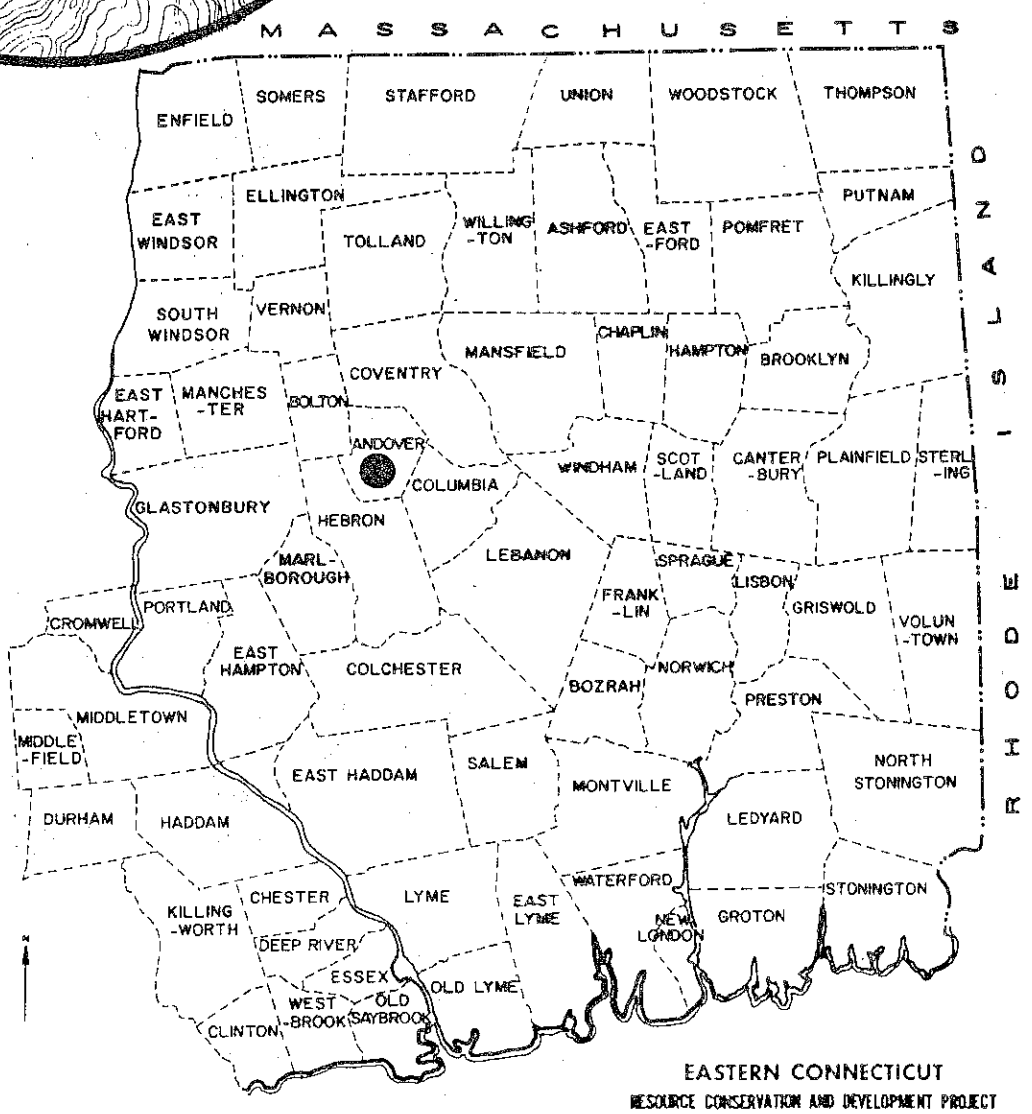
eastern connecticut resource conservation & development area

environmental review team
139 boswell avenue
norwich, connecticut 06360

Location of Study Site

FRILAND PROPERTY
ANDOVER, CONNECTICUT





ENVIRONMENTAL REVIEW TEAM REPORT
ON
FRILAND PROPERTY
ANDOVER, CONNECTICUT

This report is an outgrowth of a request from the Andover Planning and Zoning Commission to the Tolland 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: Joseph Neafsey, District Conservationist, SCS; Jim Parda, Forester, Connecticut Department of Environmental Protection (DEP); Michael Zizka, Geologist, DEP; Don Capellaro, Sanitarian, State Department of Health; Tom Maziarz, Transportation Planner, Capitol Region Council of Governments; and Jeanne Shelburn, ERT Coordinator, Eastern Connecticut RC&D Area.

The Team met and field checked the site on Thursday, February 4, 1982. 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 Andover. 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 Project 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, 139 Boswell Avenue, Norwich, Connecticut 06360, 889-2324.

Topography

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scale

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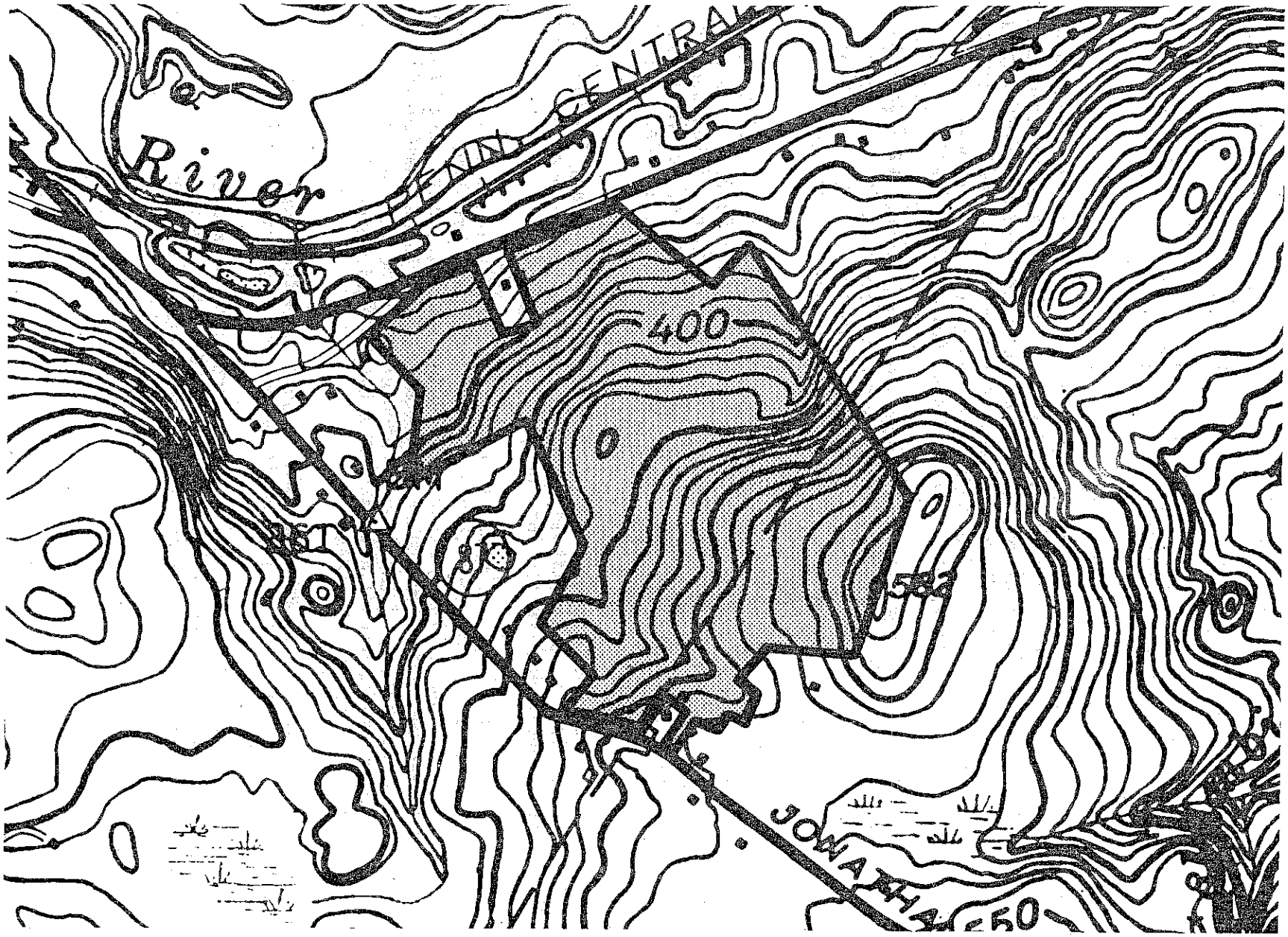

INTRODUCTION

The Eastern Connecticut Environmental Review Team was asked to prepare an environmental assessment for a proposed residential development in the towns of Andover and Columbia. The property is approximately 75 acres in size and is located south of Route 6 and north of Route 87 on the Andover-Columbia town line. The site is presently in the private ownership of Fri-land Equities, Inc.

A gravel excavation of a portion of the site has been approved by the Andover Planning and Zoning Commission. This excavation is planned to take place prior to any residential development of the site. No preliminary plans for the residential development have been prepared at this time. The area is presently zoned for single family homes on one acre lots, however, the developer is considering establishment of condominiums in this area if allowed by zoning and site constraints. Condominiums (multi-family housing) are allowed in Andover on a two-unit per acre basis. Water and waste disposal would be provided through on-site means. The developer intends to use information provided in this report to help in the planning process for this project.

ENVIRONMENTAL ASSESSMENT

GEOLOGY

The site is located in an area encompassed by the Columbia topographic quadrangle. A bedrock geologic map of the quadrangle, prepared by G.L. Synder, has been published by the United States Geological Survey (Map GQ-592). A preliminary surficial geologic map of the quadrangle, prepared by M.A. Zizka, is on file at the Department of Environmental Protection's Natural Resources Center in Hartford.

Bedrock crops out along a steep ravine in the east central portion of the property and on the top of the hill in the southeastern corner. Most of the bedrock exposed on or underlying the site is classified as Hebron Formation. The formation consists of fine-grained, gray-black to gray-green interlayered biotite schist, biotite-hornblende schist, and calc-silicate rock with minor layered biotite gneiss. A "schist" is a structurally layered crystalline rock. A "gneiss" is a banded or streaked crystalline rock. Both the schists and the gneisses on the site contain variable percentages of quartz and feldspar. A silvery-weathering, medium-grained biotite-muscovite gneiss classified as part of the Tatnic Hill Formation is found on the hilltop in the southeastern corner of the site. This formation locally grades into rusty-weathering muscovite-graphite schist. Deep wells drilled on the site, particularly near the top of the hill, may pass through the Hebron Formation and into the Tatnic Hill Formation.

Surficial geologic materials are those unconsolidated mineral and organic materials that overlie bedrock. These materials may also be called "overburden." On this site, the mix of various types of overburden is unusual. Two types of glacial sediment predominate: till and stratified drift. As glacier ice moved

Surficial Geology

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scale

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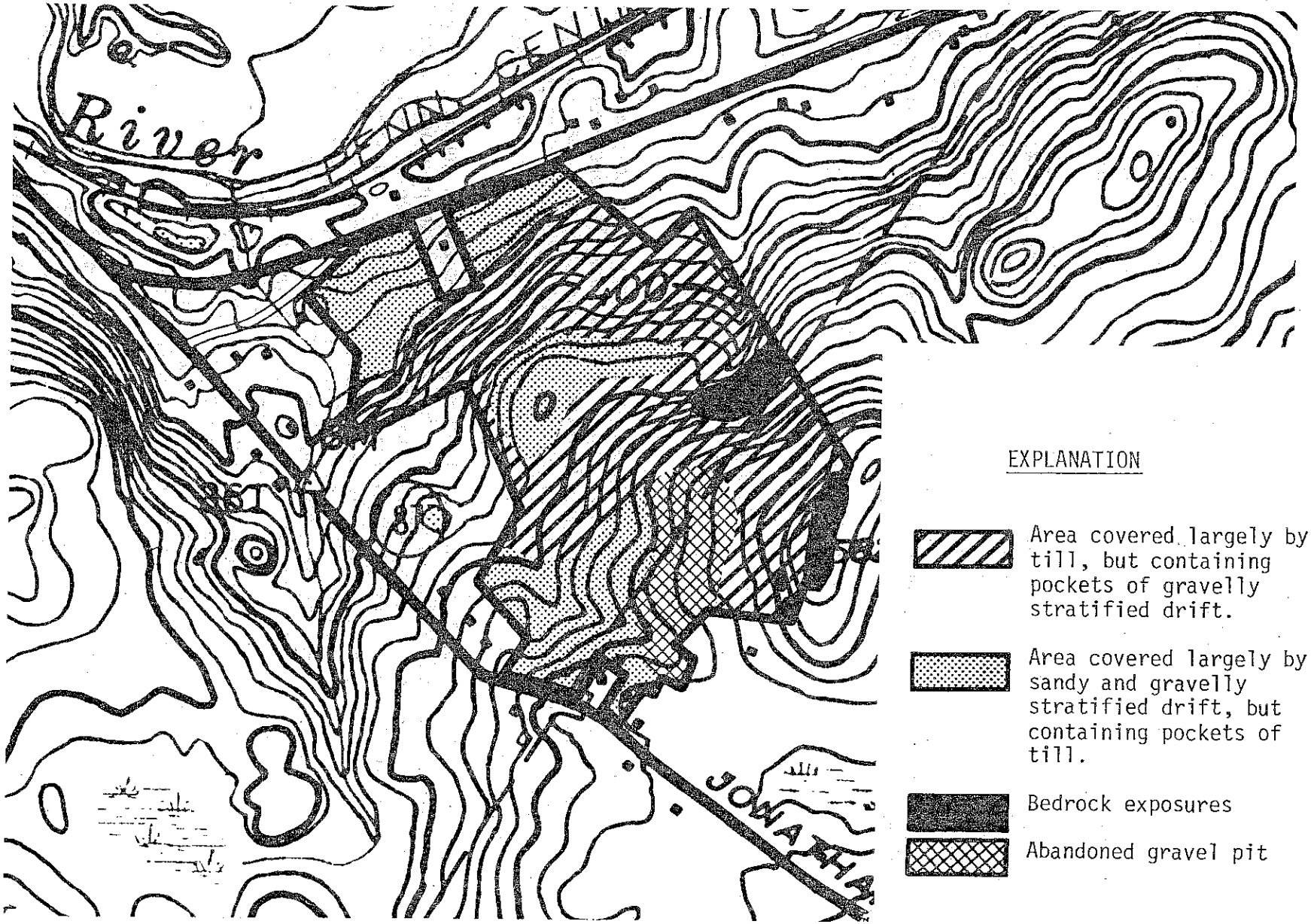

through the region, it collected and transported rock particles and preexisting overburden. Much of this transported debris was redeposited directly from the ice, either by being plastered onto the land from beneath the ice mass or by being let down gently as the ice later wasted. The resulting deposit was till. Because of its peculiar origin, till contains a nonsorted mixture of particles ranging in size from clay to large boulders. The till may be sandy, stony, and loose, or silty, less stony, and tightly compact.

When the glacier ice began to melt, it sent forth streams of meltwater, often with torrential flows. These streams were filled with rock debris from the ice, and they redeposited this debris in well-sorted to poorly sorted layers. Sand and gravel were commonly deposited near the ice, while silt and clay were washed further downstream to be deposited in lakes or in the sea. The resulting deposits are known as stratified drift.

Stratified drift deposits in Connecticut are most commonly found in stream valleys, whereas till covers most of the upland areas. On this site, however, several bodies of stratified drift occur near the top or on the flank of the hill. Several mining operations for sand and gravel have taken place on the hill, exposing these deposits. Nevertheless, the principal overburden on the site seems to be till. Apparently, as the ice began to thin during glacial retreat, the hilltop was exposed while ice remained in the Hop River valley. Meltwater streams flowed along the edge of the ice or through fissures or holes in the ice. Patchy deposits of stratified drift were left on the hillside as the ice continued to waste down into the valley.

The result of this unusual pattern of deposition was the patchwork of till, stratified drift, and bedrock outcrops that makes up the site. It is clear, then, that the opportunities for specific developmental activities may vary considerably from point to point within the site. The southwestern portion of the parcel appears to have the greatest potential for development. Steep slopes, compact till, and rock are more limiting in the central and southeastern sections. A cluster development in the southwestern section, leaving the other sections undeveloped, would be more practical from a geological standpoint than a standard subdivision of the entire parcel.

HYDROLOGY

The parcel is located within the watershed of Hop River, which is located a few hundred feet north of the site. There are at least two intermittent streams, but no perennial streams, on the property. One stream originates in a wetland in the approximate center of the site, and flows east and then north through a rock-bordered ravine. The wetland is proposed to be the location of a stormwater detention pond. The second intermittent stream originates in or near the abandoned gravel pit and flows northward, passing out of and back into the property along the irregular western boundary.

Development of the site will cause increases in the volume of runoff. These increases would be caused by removal of vegetation, compaction of soil, and creation of impervious surfaces, such as roofs and parking areas. The amount of the increases will depend upon the ultimate density of development.

It is clear that runoff increases could cause erosion problems on the site. When the Team visited the site on February 4, 1982, it observed a deep gully in the old gravel pit where water from melting snow and ice was being channeled. The erosion was aggravated by the absence of a vegetative cover and by the steep slope. If residential development is concentrated in and around the gravel pit rather than spread throughout the site, it will be easier to control the extra runoff both because of the smaller area of development and because of the more moderate slopes in the vicinity of the gravel pit. On the other hand, the clearing and excavation that will accompany the planned gravel-removal activities in other portions of the property will partially offset any gains that would result by concentrating the development. In addition, the very concentration of buildings and pavement will make it particularly crucial that stormwater-control facilities be adequately designed and installed.

As mentioned earlier, the developer has proposed to install a stormwater detention pond in the small wetland near the center of the parcel. This facility might also serve a sediment retention function. If sediment does accumulate in the pond, it will have to be removed periodicially in order to assure that the runoff-storage capacity of the pond is not seriously diminished. Since the intermittent stream that flows from the wetland passes through a residential area along Route 6 and since this stream would be affected by runoff flows from the development, the stormwater detention pond preferably should be designed to accommodate at least a 50-year frequency storm.

SOILS

A detailed soils map of this site is included in the Appendix to this report, accompanied by a chart which indicates soil limitations for various urban uses. As the soil map is an enlargement from the original 1,320 feet/inch scale to 660 feet/inch, the soil boundary lines should not be viewed as absolute boundaries, but as guidelines to the distribution of soil types on the site. The soil limitation chart indicates the probable limitations for each of the soils for on-site sewerage, buildings with basements, buildings without basements, streets and parking and landscaping. However, limitations, even though severe, do not preclude the use of the land for development. If economics permit large expenditures for land development and the intended objective is consistent with the objectives of local and regional development, many soils and sites with difficult problems can be used. The soils map, with the publication Soil Survey, Tolland County, Connecticut, can aid in the identification and interpretation of soils and their uses on this site. Know Your Land: Natural Soil Groups for Connecticut can also give insight to the development potentials of the soils and their relationship to the surficial geology of the site.

The site is geologically complex. Sand and gravel terraces, glacial till soils, shallow to bedrock soils and extremely stony soils are found on the parcel. Drainage conditions vary from excessive to poorly drained and several wetland areas and watercourses exist. Slopes range from slight to steep. The southwest corner of the property is an abandoned gravel pit. This area is actively eroding and the exposed material varies with respect to texture and drainage conditions.

Major mapping unit series on the site include:

Gloucester Series (GaB, GaC, GeC)

This series consists of somewhat excessively drained soils on uplands. They formed in glacial till derived mainly from gneiss and granite. Typically, they have a very dark grayish brown sandy loam surface four inches thick. The subsoil from four-thirteen inches is dark yellowish brown gravelly sandy loam, and from thirteen-twenty-seven inches is light yellowish brown gravelly loamy sand. From twenty-seven to sixty inches, it is light yellowish brown very gravelly loamy coarse sand.

These soils have moderate limitations for septic tank leaching fields due to the potential for smearing the trench walls during construction and the relatively poor renovation capability of the substratum. These limitations can be overcome with good engineering and construction techniques.

Hinckley Series/Terrace Escarpments (HkC, Tg)

The Hinckley Series consists of deep excessively drained soils on terraces, outwash plains, deltas, kames and eskers. They formed in water sorted material. Typically, these soils have a very dark grayish brown loamy sand surface seven inches thick. The subsoil layers from seven to fifteen inches are strong brown and yellowish brown gravelly loamy sand. From fifteen-eighteen inches, the subsoil is yellowish brown gravelly sand. The substratum from eighteen to sixty inches is light olive brown stratified sand, gravel and cobblestones.

These soils have severe limitations for septic tank absorption fields due to the poor filtering capacity of the subsoil. This limitation can be overcome somewhat by good engineering design and control of separation distance to wells or aquifers.

Sutton Series (SxB)

The Sutton Series consists of deep moderately well drained soils on uplands. They formed in glacial till. Typically, these soils have a very dark grayish brown fine sandy loam surface layer six inches thick. The subsoil layers from six to twenty-eight inches are dark brown and yellowish brown fine sandy loam with mottles below twelve inches. The mottled substratum from twenty-eight to thirty-six inches is brown fine sandy loam and from thirty-six to sixty inches is light olive brown gravelly sandy loam.

These soils have severe limitations for septic tank leaching fields due to the seasonally high water table and potential for trench smearing during construction. These limitations may be overcome by restricted percolation testing, installation of curtain drains and/or filling and careful construction techniques.

Leicester Series (Lg)

This series consists of deep poorly drained soils on uplands. They formed in glacial till. Typically, these soils in a wooded area have a black fine sandy loam surface layer six inches thick. The mottled subsoil from six to twenty-three inches is grayish brown, light brownish gray and pale brown fine sandy loam. The mottled substratum from twenty-three to sixty inches is dark yellowish brown fine sandy loam.

These soils have severe limitations for septic tank absorption fields due to a high water table. The limitations are not easily overcome.

Scarboro Series (Sf)

This series consists of deep, very poorly drained soils on terraces and outwash plains. They formed in thick sand deposits. Typically, these soils have a three inch black mucky peat layer over a six inch very dark brown mucky sandy loam layer. The subsurface layer from six to thirteen inches is gray loamy sand. The substratum from three to sixty inches is olive gray, grayish brown and light yellowish brown loamy sand, loamy fine sand and coarse sand. The substratum may be stratified.

These soils have severe limitations for septic tank leaching fields due to the high water table. The limitations are very difficult to overcome and are considered as least suitable for this type of use. They have good potential for pond construction.

Because of the complexity of the site and the intensive development proposed, a detailed soil survey should be prepared by a private soils consultant. This information should be used in planning housing location and layout, road construction and on-site sewage disposal area. The map should also locate wetland and watercourses and can be used to identify potential pond sites and critical areas that need special treatment or protection during the development process.

On request, this office can review the detailed mapping and provide appropriate interpretations.

With careful planning, this site has the capability to support residential development. The density and number of units would depend on the conditions revealed by on-site investigations and locations of on-site sewage disposal areas and water supply. Because of site conditions, clustered residential development appears to be the more appropriate alternative for the site.

SEDIMENT AND EROSION CONTROL/STORMWATER MANAGEMENT

The variability of conditions on the old gravel pit site will require that the developer prepare and implement a sediment and erosion control plan to protect the site prior to the construction phase. Diversions, stone lined waterways, sediment retention areas, subsurface drainage and critical area stabilization are some of the conservation practices that may be used to prepare the site for construction. This planning and land treatment will benefit the developer by reducing lost construction time, improving the marketability of the units and reducing future maintenance and repair costs.

The stormwater system that is designed for the site should be incorporated into the sediment and erosion control plan. A large wetland area is located northeast of the old gravel pit and currently receives runoff from the disturbed area. This area is suitable for dugout pond construction and can be considered for a stormwater detention site. Pond spoils not used in dike construction can be used as fill or graded and landscaped.

On request, the Tolland County Soil and Water Conservation District can provide assistance in preparation of these plans or review them for adequacy.

If the Town of Andover requires the developer to prepare a sediment and erosion control plan and a stormwater management plan, it should also be prepared to inspect the site to ensure the required practices are installed.

VEGETATION

The tract proposed for residential development can be divided into five vegetative types. These include two mixed hardwood stands totaling approximately 49 acres; a gravel pit of approximately 13 acres; a softwood/hardwood stand of 7 acres; and an old field of 6 acres.

Approximately 40 acres has received a recent timber harvest in which about two-thirds of the total sawtimber volume was removed from the property. Many undesirable trees of little or no commercial value (culls) remain in the stand. These culls could present a high risk in the stand due to splits, leaning and large dead branches and should be removed.

Vegetation Type Descriptions:

Type A. Mixed hardwoods (black oak, white oak, red oak, black birch, red maple, hickories, white ash, sugar maple). This 40± acre stand is fully stocked and still somewhat crowded even after the harvest. Trees are primarily pole-sized with scattered sawtimber sized trees. The stand is presently healthy and of medium quality. The understory vegetation is predominantly huckleberry, highbush blueberry on the upper slope and maple-leaved viburnum and hardwood regeneration on the lower slope. The ground cover consists of fern, princess pine, poison ivy and club mosses.

Type B. Open land/Gravel Pit. This 13± acre stand is an old gravel pit reverting to poor quality hardwood vegetation, such as black birch, honey locust, trembling aspen, bigtooth aspen, and gray birch. The stand is understocked with seedling size vegetation growing in patches scattered over the area. Understory species consist of sweet fern, goldenrod, and meadowsweet. Ground cover vegetation consists of occasional grassy areas.

Type C. Mixed hardwoods (red maple, white ash, yellow birch, sugar maple). This 9± acre stand is composed of pole-sized trees and some small sawtimber in a fully-stocked condition. The understory is composed of spicebush and highbush blueberry. The ground cover is fern, sphagnum moss, poison ivy, and skunk cabbage. The overstory trees are healthy with potential for good growth due to moderately well-drained soils.

Type D. Softwood/Hardwood (white pine, black oak, red oak, red maple, black birch). This stand is 7± acres of large sawtimber sized white pine with pole-sized mixed hardwoods as co-dominant species. The understory vegetation is white pine and hardwood regeneration. The ground cover is pine needles. The large white pines are fully-stocked, medium quality and healthy.

Type E. Old Field (alder, pussy willow, trembling aspen, gray birch). This stand is 6± acres of understocked shrubs, brush and grasses. The understory is composed of bayberry, goldenrod, red cedar, steeple bush. The ground cover is primarily grass.

Vegetation

0 660' scale

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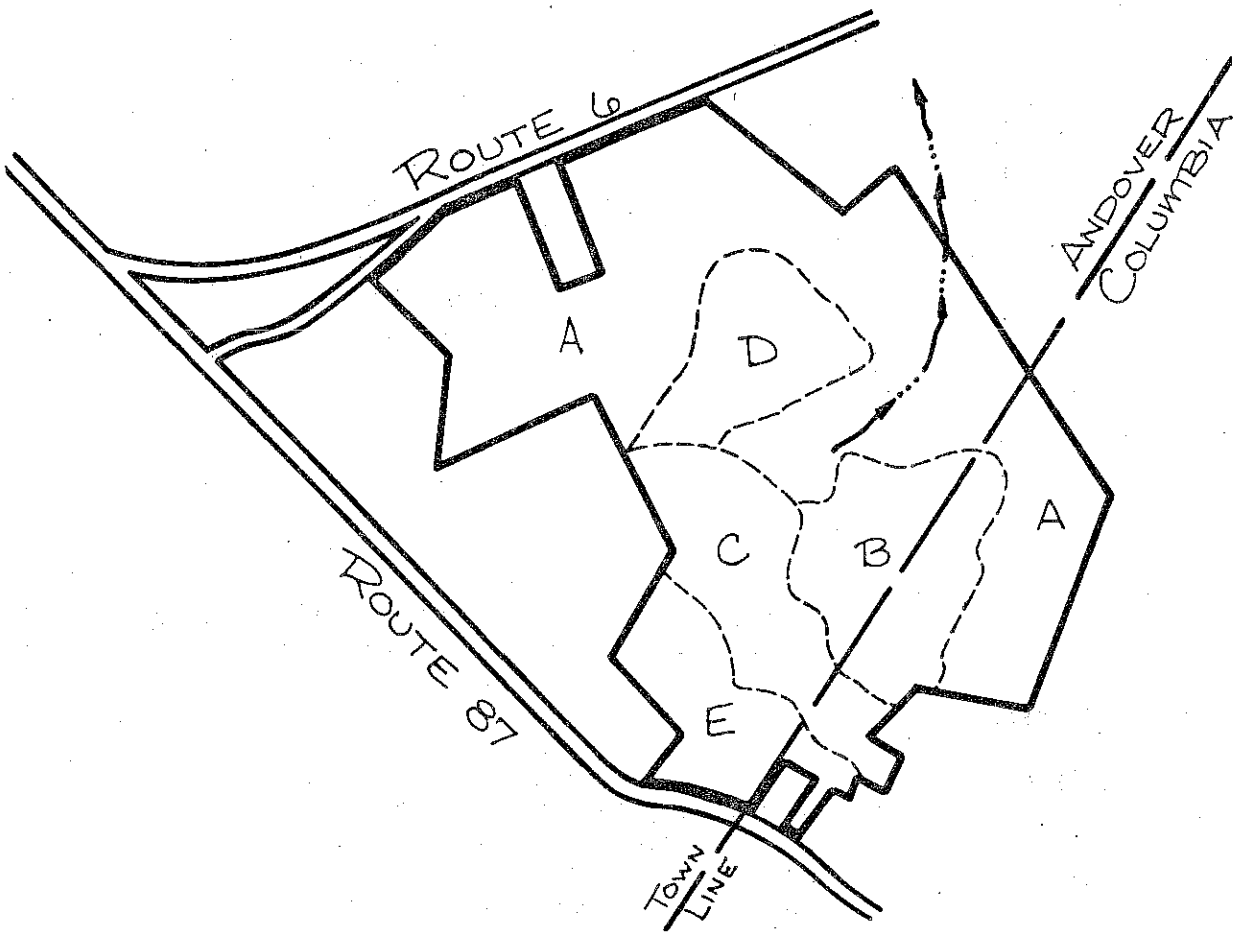

EXPLANATION

- Asphalt Road
- Property Boundary
- Intermittent Stream
- Vegetation Type Boundary

VEGETATION TYPE DESCRIPTION *

Type A. Mixed Hardwoods. Pole-size, fully-stocked. 40 + acres.
Type B. Open Land/Gravel Pit. Under-stocked. 13 + acres.
Type C. Mixed Hardwoods. Pole-size, fully-stocked. 9 + acres.
Type D. Softwood/Hardwood. Sawtimber-size, fully-stocked. 7 + acres.
Type E. Old Field, Shrub-brush. Understocked. 6 + acres.

* Seedling-size = trees less than 1 inch in diameter at 4.5 feet above ground (d.b.h.)
Sapling-size = trees 1 to 5 inches in d.b.h.
Pole-size = trees 5 to 11 inches in d.b.h.
Sawtimber-size = trees greater than 11 inches in d.b.h.

Large, healthy trees are a prime consideration for aesthetic value in and around residential areas. In Types A and D, large, healthy hardwoods and conifers should be retained to enhance aesthetics, especially along the stream. Type A, having been recently logged, would be improved aesthetically by the cleanup of tops. These tops can be utilized as fuelwood. Many cull trees which have no commercial value, due to cracks, seams, hollow trunks, large dead branches, and broken limbs can also be removed. These are often hazardous to personal safety. However, den trees which are utilized by wildlife should be retained. These are trees with openings at the base and useful holes for both birds and small mammals.

Type C is the only stand that is seasonally wet with a hardpan soil, rocks, and seasonally high water table. Any harvest should occur during extremely dry months or when frozen. This area may also be subject to windthrow. Any trees with lean, sprung roots or cracks are subject to uprooting or breakage in high winds and wet soil conditions. Type C and lower slope areas in Type A have this potential hazard. Type B, due to its exposed soil and patchy vegetation, displays erosion potential. This area and abandoned gravel pits can be reclaimed by planting forest seedling stock, such as white pine and larch. This material can be planted in April. Spacing of seedlings can be 8' x 8' or 10' x 10'. Grasses and hardwood vegetation may seed in naturally, but prompt soil stabilization is better to minimize erosion and sedimentation. The Soil Conservation Service can offer more detailed advice as needed.

Management Considerations

Type A has been logged within the past year of about two-thirds of the total volume on the land. However, this stand is still somewhat crowded (too many trees/acre). The stand is mostly pole-sized trees that are healthy with some scattered cull trees. Removal of the culls would imporve aesthetics and reduce hazards as well as give additional sunlight to improve growth on the existing healthy pole trees. In addition to cull removal, tops from the harvested trees should be removed for use as fuelwood.

In Type D, retain all the large white pine. The hardwood poles in the understory contain eight-ten cords/acre and can be removed for fuelwood. This will favor the young white pine regeneration, provide wildlife food from stump sprouts and help to promote species diversity on the property as a buffer against insect and disease attack.

Type C is a fully stocked pole stand which is crowded. There are approximately twenty cords/acre in fuelwood sized trees. Of these, six cords/acre can be removed, taking the poorest trees or the most undesirable one-third of the trees. This will reduce crowding, remove the poorest growing stock, and promote the best trees for future growth. White ash can be favored over sugar maple, and yellow birch over red maple. This area has seasonal limitations on harvesting due to wetness. Operations should be restricted to August through February.

In Types B and E, management is limited to reclamation and preservation respectively.

Forest management advice is available as a cost free service from the State of Connecticut, Department of Environmental Protection. The County Service Forester is located at DEP Headquarters in Marlborough.

Residential developments built in clusters favor the retention of large tracts of forest available for management and personal enjoyment. This area provides for the retention of Types A, C, and D as forest land with potential for good forest management, in combination with residential development.

WILDLIFE CONCERNS

With the exception of the gravel excavation area, the site is a mature hardwood forest area with small areas of conifers interspersed. The hardwood area has recently been harvested with the larger timber removed. The thinning will improve growing conditions for the understory plants and eventually benefit local wildlife such as deer which use the area intermittently for browse and possibly for cover and water. Pond construction can benefit wildlife if spoil is stabilized with a grass-legume mix and clump planting of fruiting shrubs are made. Groups of conifers will also benefit non-game birds. Conifer underplanting in the wooded areas, revegetation and wildlife plantings in the gravel excavation areas are recommended. In addition, landscaping developed areas in favor of wildlife is desirable and will greatly benefit local birds and mammals.

Planning assistance for wildlife areas or revegetation can be obtained through the Tolland County Soil and Water Conservation District.

WATER SUPPLY

No public water-supply lines are available to this site, so water would have to be provided by on-site wells. The most likely source of supply would be bedrock. Bedrock is commonly capable of providing small but reliable yields to individual wells. A survey of bedrock wells in the Shetucket River basin showed that 90 percent of the wells yielded at least three gallons per minute, a rate suitable for the needs of most families. If the parcel were divided into individual lots, most lots would be expected to accommodate an adequate well. However, since the yields of bedrock wells depend upon the number and size of water-bearing fractures that the wells intersect, and since the fractures are distributed irregularly through the rock, there is always a chance that a bedrock well will turn out to be dry.

If the cluster development were created as planned, a community well supply would be needed. Assuming that each individual in the development would require 75 gallons of water per day, a well yielding 3 gallons per minute could serve the needs of 57 persons. A well yielding 10 gallons per minute would be capable of serving 192 persons. Storage facilities (tanks, etc.) would be needed to assure that sufficient quantities and pressure of water would be available during peak demand periods.

If more than one well is needed to fulfill the needs of the residents of the development, the wells should each be separated by at least 300 feet, if possible. This will help to prevent the interference of one well with another during pumping.

Wells should be located as far from any septic system as possible. Also, if possible, the wells should be placed uphill from the septic system.

WASTE DISPOSAL

As the town(s) does not have a municipal sewerage system, any housing development would have to be served by on-site subsurface sewage disposal facilities. Due to the rural character of the towns, it is assumed that the communities would want to avoid public sewers. The allowable density level of dwellings is one measure by which the town(s) can better control and prevent or minimize public health problems and protect surface and groundwater resources.

Based on visual observations of the site and a review of soil mapping data, it appears that considerable land area would not be particularly favorable for sewage disposal purposes. The topography has been extensively changed by the former sand and gravel removal operation and will undergo further alterations by the proposed new gravel operations. In addition, the east and west sides of the property have watercourses. The east side also has a steep slope with considerable rockiness and a shallow depth to bedrock. It also appears this rocky terrain extends somewhat further towards the west than is indicated by the soils and site boundary map.

While it is recognized that a number of the soils on the property would be suitable for sewage leaching systems, the configuration of the existing land along with further changes (gravel removal) makes utilization of favorable areas difficult. In general, the property appears to be better suited for a cluster design rather than a standard subdivision layout. Although there has apparently been no actual on-site testing for sewage disposal, it seems the more feasible areas for this purpose lie towards the south side of the property (mainly in Columbia) and also in the area of the proposed gravel operation. Due to the rise in elevation at the south side, sewage would no doubt require pumping. The other area would lend itself to a gravity flow, particularly if most of the dwellings were to be located in the central portion of the property where the former gravel operation was conducted. At the time, there was noted to be a considerable volume of groundwater seepage coming from the up hill side of the embankments that were made in the area.

Detailed site testing should be conducted on the property in order to define the areas and limitations (groundwater, bedrock, soil(s) percolation and permeability) for sewage disposal. In addition to the health department, the site will need to meet the various requirements of the Department of Environmental Protection, particularly as it relates to the "hydraulic capacity" of the property to be able to accept the projected sewage flow.

In this regard, one must consider what would be a satisfactory or workable density (number of units) for the development within the confines of pertinent regulations and requirements.

PLANNING CONCERNS

Two development options were evaluated, a 112 unit condominium development and a 56 unit single family home subdivision. In both cases, the housing units would be clustered on the southern part of the site and access would be via Route 87. The developer is considering two driveway locations. These are shown on Map A as the north driveway and the south driveway. (The south driveway is an existing dirt driveway into the property). The conclusions stated below are based on these conditions.

Traffic Generation

The condominium proposal would generate slightly more traffic than the single family home development, but the difference would be minimal. Neither development would generate more than 600 trips per day or 70 trips during the peak commuter hour.

Roadway Congestion

There appears to be adequate roadway capacity on both Route 87 and Route 6 to handle the additional traffic either development would generate. Current traffic volumes on Route 87 are less than 15 percent of the capacity of the road. Traffic volumes on Route 6 are less than 55 percent of the road's capacity.

Traffic Safety

1. South Driveway Location:

   In general, the sight distance from the south driveway location is adequate. However, minor improvements should be made if a driveway is placed at this location. It is recommended that the berm on the south side of the driveway be reduced or eliminated. The berm is very close to Route 87 and forces drivers leaving the site to drive their cars close to the travel lane of Route 87 in order to observe traffic northbound on Route 87. With this minor improvement, drivers should be able to observe oncoming northbound traffic up to 600 feet away without encroaching on the pavement of Route 87.

   On the north side of the drive, some mailboxes, a telephone pole and a few small trees (bushes) are minor obstructions to sight distance. The trees should be removed and, if possible, the mailboxes should be relocated.

2. North Driveway Location:

   Sight distance at the north driveway location is inadequate. The possible driveway location is on a section of Route 87 that has both a relatively steep grade and sharp curve (horizontal curvature). It is recommended that a driveway not be constructed at this location.

TRAFFIC REVIEW DATA

Traffic Generation*

Assumption 1: 112 condominiums

570 = vehicles trips per day (based on a trip generation rate of 5.1 trips per dwelling unit per day)

56 = vehicle trips in morning peak hour (based on a trip generation rate of 0.5 trips per dwelling unit per hour)

67 = vehicle trips in afternoon peak hour (based on a trip generation rate of 0.6 trips per dwelling unit per hour)

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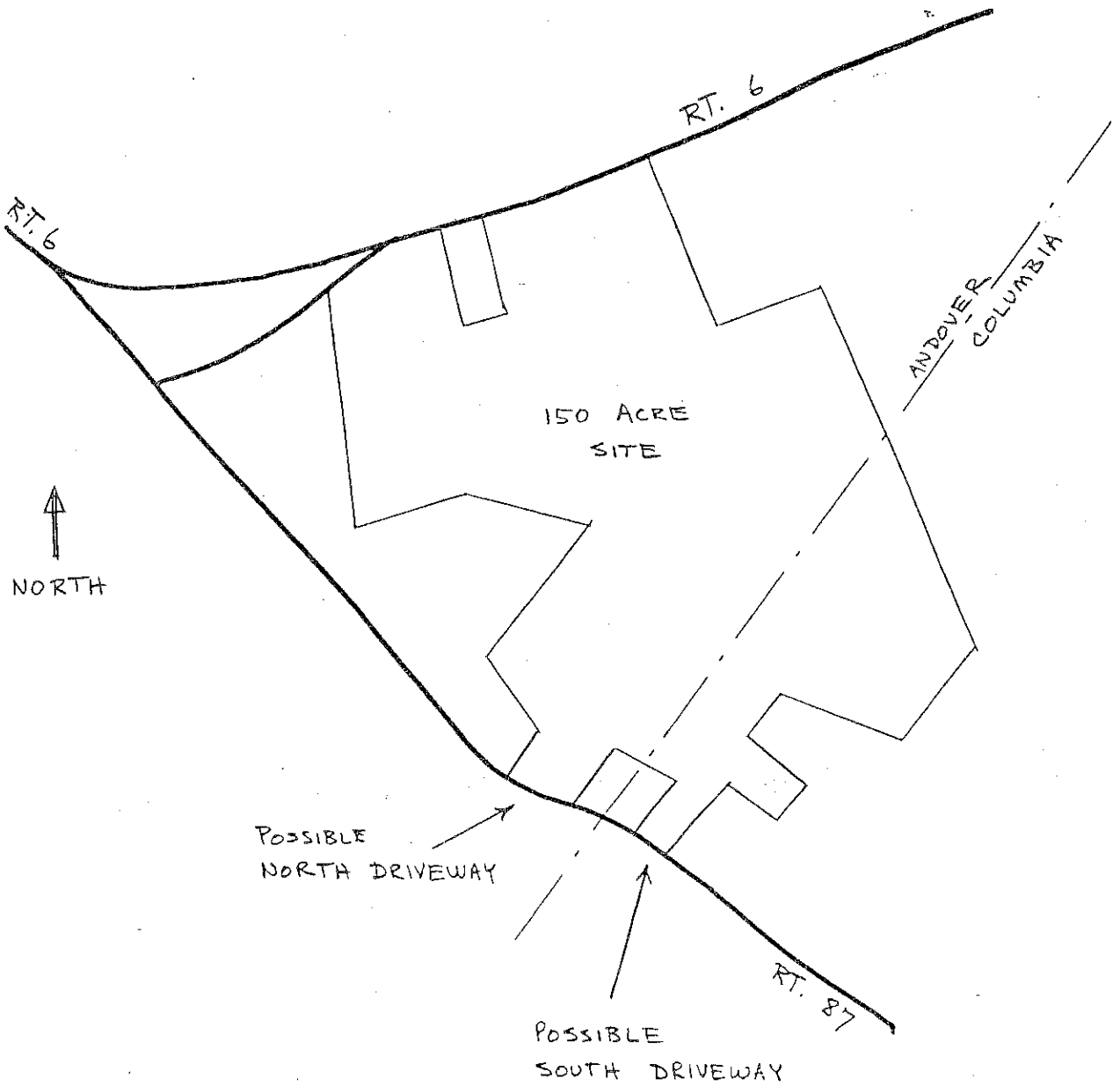
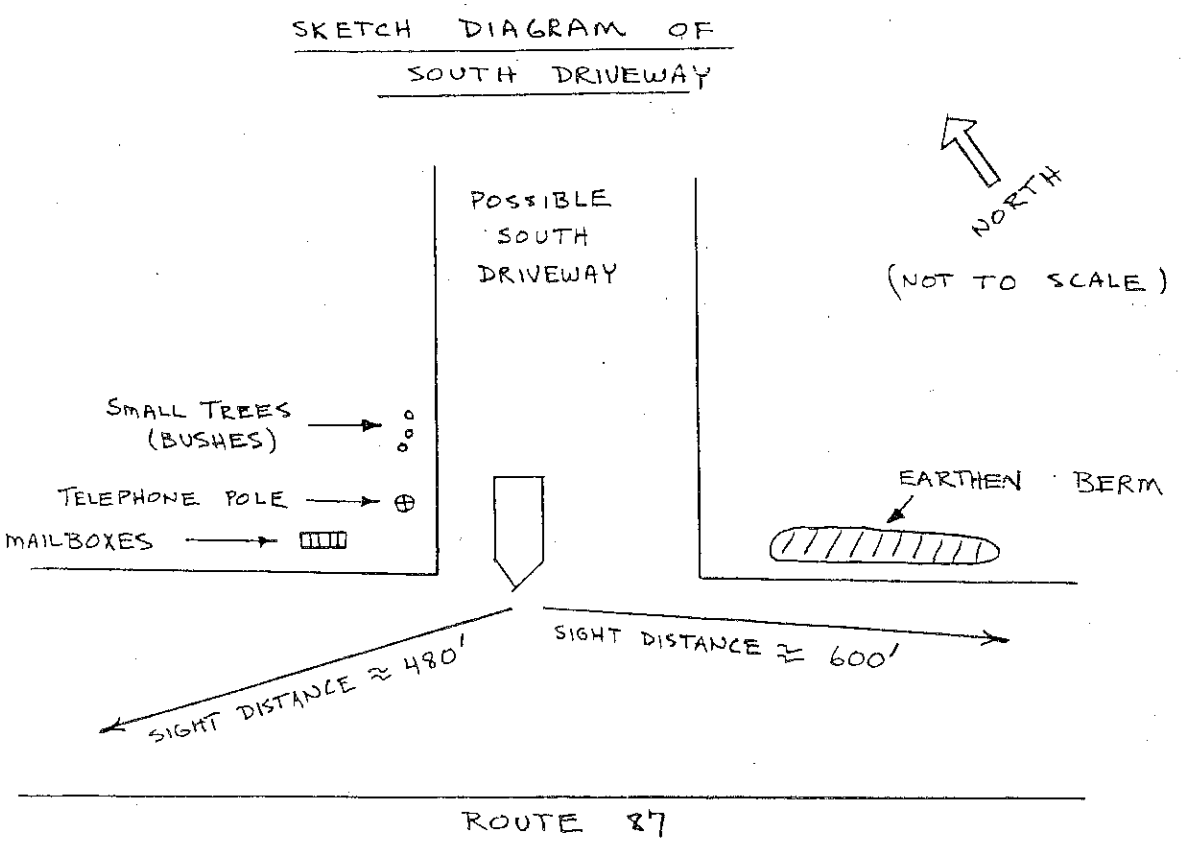
* Trip rates were obtained from "Trip Generation," Institute of Transportation Engineer, 1979.

POSSIBLE DRIVEWAY LOCATION



map not drawn to scale

TRAFFIC SAFETY: SIGHT DISTANCES*



No measurements were taken at the northern driveway location, but based on visual observations it was concluded that sight distance at that location was inadequate.

Based on a field review conducted on February 4, 1982

Assumption 2: 56 single family homes

560 = vehicle trips per day (based on a trip generation rate of 10.0 trips per dwelling unit per day)

45 = vehicle trips in morning peak hour (based on a trip generation rate of 0.8 trips per dwelling unit per hour)

56 = vehicle trips in afternoon peak hour (based on a trip generation rate of 1.0 trips per dwelling unit per hour)

Roadway Congestion*

Route 87 Data: (vicinity of Columbia/Andover Town Line)

Capacity	=	1,417 vehicles per hour
Volume	=	1,600 vehicles per day (1980 ADT) 175 vehicles per peak hour (11% of ADT)
Volume/Capacity Ratio	=	175/1,417 = o.124 (or 12.4%)

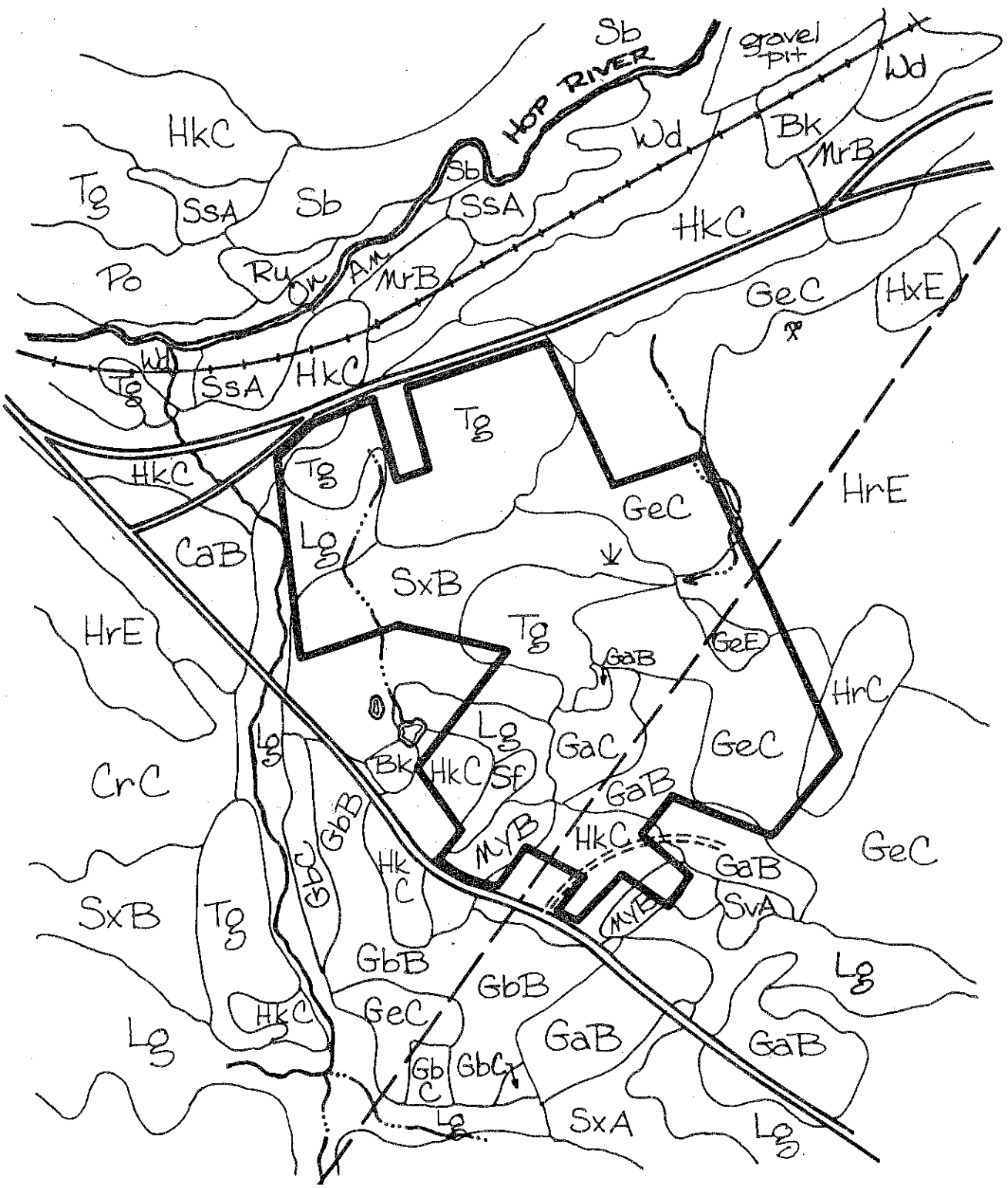
Route 6 Data: (vicinity of Route 87)

Capacity	=	1,620 vehicles per hour
Volume	=	7,800 vehicles per day (1980 ADT) 858 vehicles per peak hour (11% of ADT)
Volume/Capacity Ratio	=	858/1,620 = 0.529 (or 52.9%)

* Traffic volume data obtained from "Traffic Volumes on State Roadways: 1980," Connecticut Department of Transportation. Capacity data was obtained from a computer printout of Volume/Capacity Ratios for State Highways prepared by the Connecticut Department of Transportation in 1979. The volume/capacity ratios were updated using the 1980 traffic volume data.

Appendix

Soils	Site Boundary	0 660' scale	N



Fri-Land Equities
Andover, Connecticut

TABLE OF INTERPRETATIONS

Map Symbol	Drainage	Wetlands	Depth to Watertable	Depth to Bedrock	Septic Tank Absorption Fields - Limitations
GaB	Ex	No	6'+	5'+	Moderate - Smears
GaC	Ex	No	6'+	5'+	Moderate - Smears
GeC	Ex	No	6'+	5'+	Moderate - Smears
HkC	Ex	No	6'+	5'+	Severe - Poor Filter
HrC	W	No	6'+	10-20"	Severe - Depth to Bedrock
HrE	W	No	6'+	10-20"	Severe - Depth to Bedrock
Lg	P	Yes	0-1.5'	5'+	Severe - Wetness, Stones
MyB	Ex	No	6'+	5'+	Severe - Poor Filter
SxB	M	No	1.5-3.5	5'+	Severe - Wetness, Stones
Sf	VP	Yes	+1.0/-1.0'	5'+	Severe - Ponding, Poor Filter
Tg	Ex	No	6'+	5'+	Severe - Poor Filter, Slope

Ex - Excessively Drained
W - Well Drained
M - Moderately Well Drained
P - Poorly Drained
VP - Very Poorly Drained

See Connecticut Agricultural Experiment Station Bulletin #776
Soil Interpretations for Waste Disposal
By David E. Hill, June 1979, for detailed interpretations

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 activities. 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 (889-2324), Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, 139 Boswell Avenue, Norwich, Connecticut 06360.