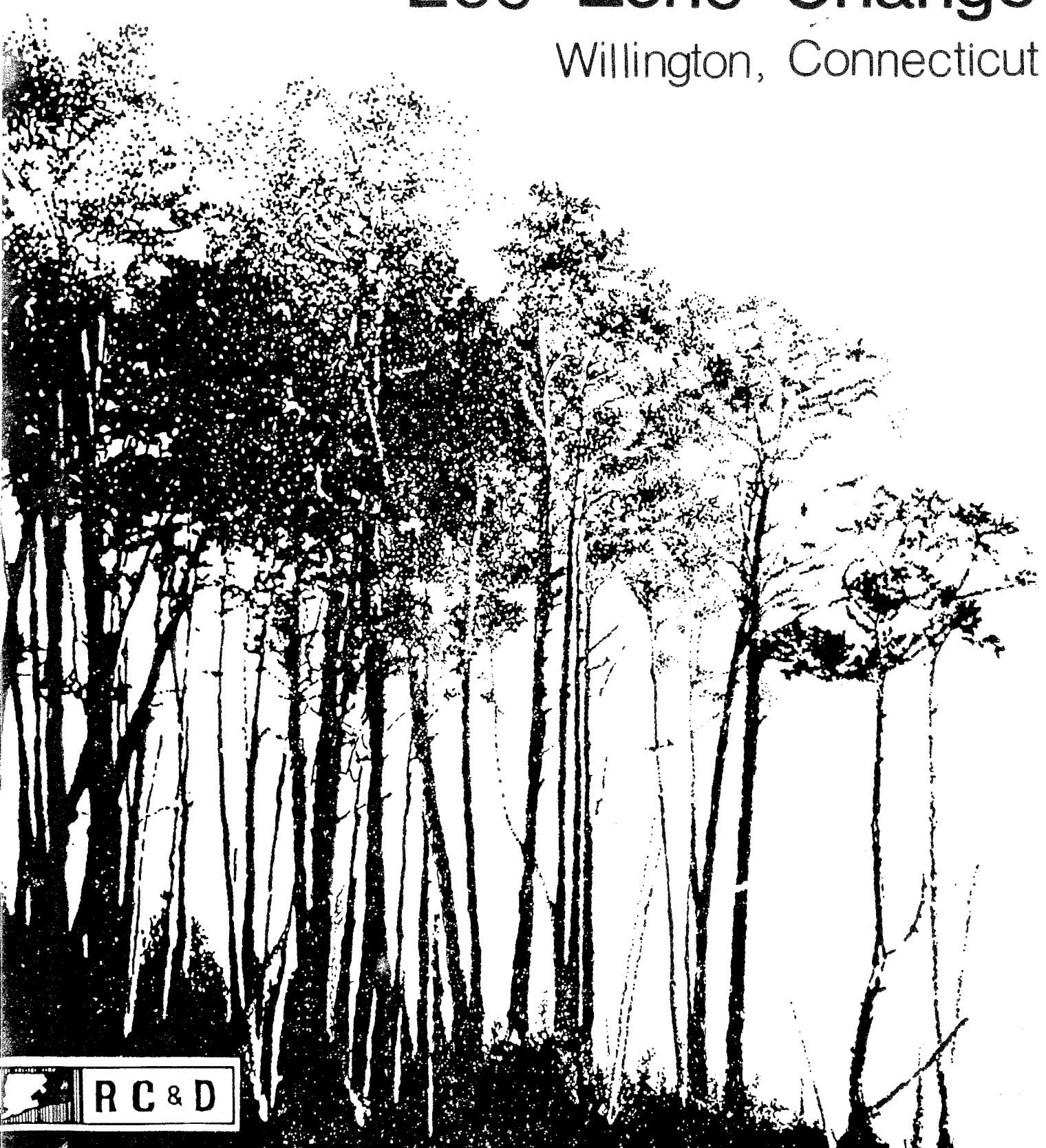


Environmental Review Team Report

Lee Zone Change

Willington, Connecticut

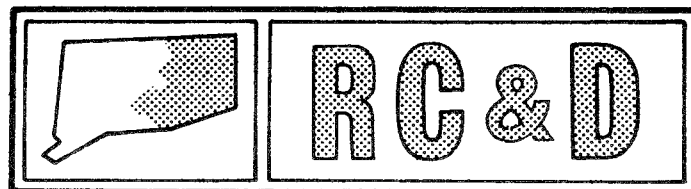


EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

Environmental Review Team
Report

Lee Zone Change
Willington, Connecticut

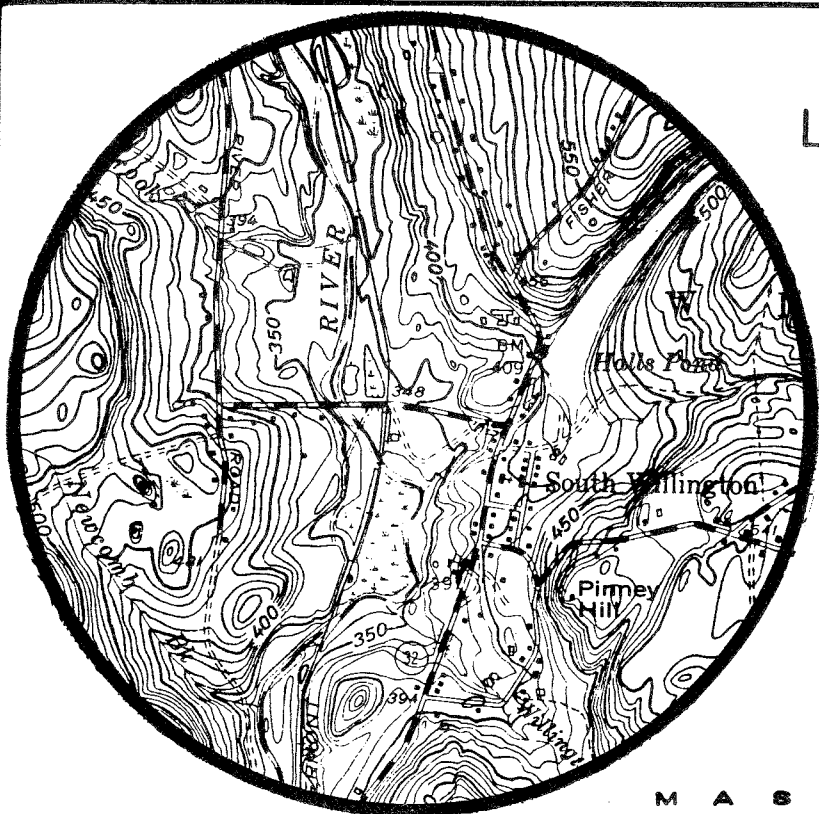
September 1984



Eastern Connecticut Resource Conservation & Development Area

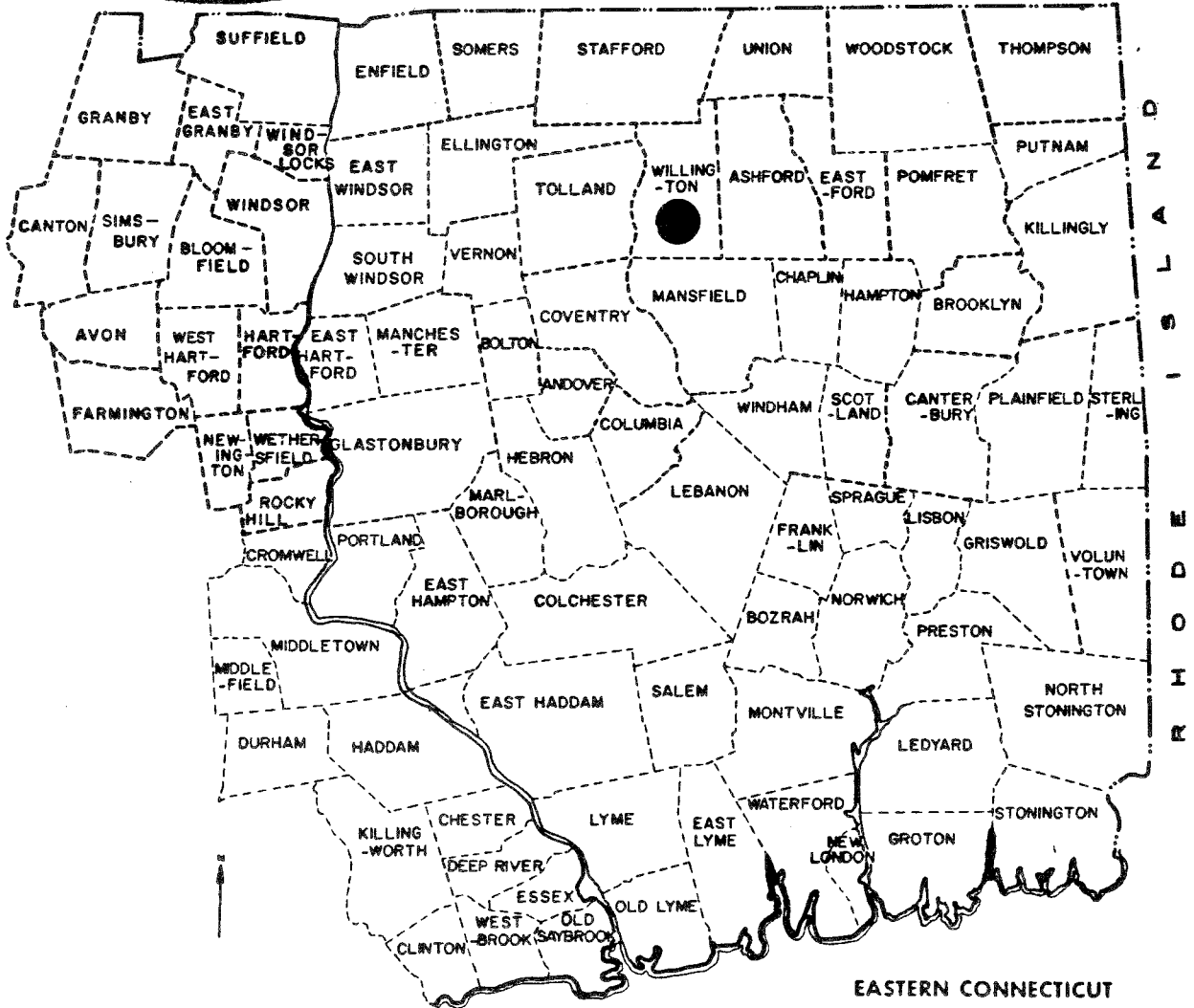
Environmental Review Team
PO Box 198
Brooklyn, Connecticut 06234

Location of Study Site



LEE ZONE CHANGE
WILLINGTON, CONNECTICUT

M A S S A C H U S E T T S



EASTERN CONNECTICUT
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

ENVIRONMENTAL REVIEW TEAM REPORT
ON
LEE ZONE CHANGE
WILLINGTON, CONNECTICUT

This report is an outgrowth of a request from the Willington 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: Joe Neafsey, District Conservationist, SCS; Al Roberts, Soil Scientist, SCS; Bill Warzecha, Geologist, DEP; Dave Cherico, Sanitarian, DEP & Water Compliance; Meg Reich, Planner, Windham Regional Planning Agency; and Jeanne Shelburn, ERT Coordinator, Eastern Connecticut RC&D Area.

The Team met and field-checked the site on Thursday, May 3, 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 Willington. 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, RT 205, Brooklyn, CT 06234, 774-1253.

Topography

— Site Boundary



INTRODUCTION

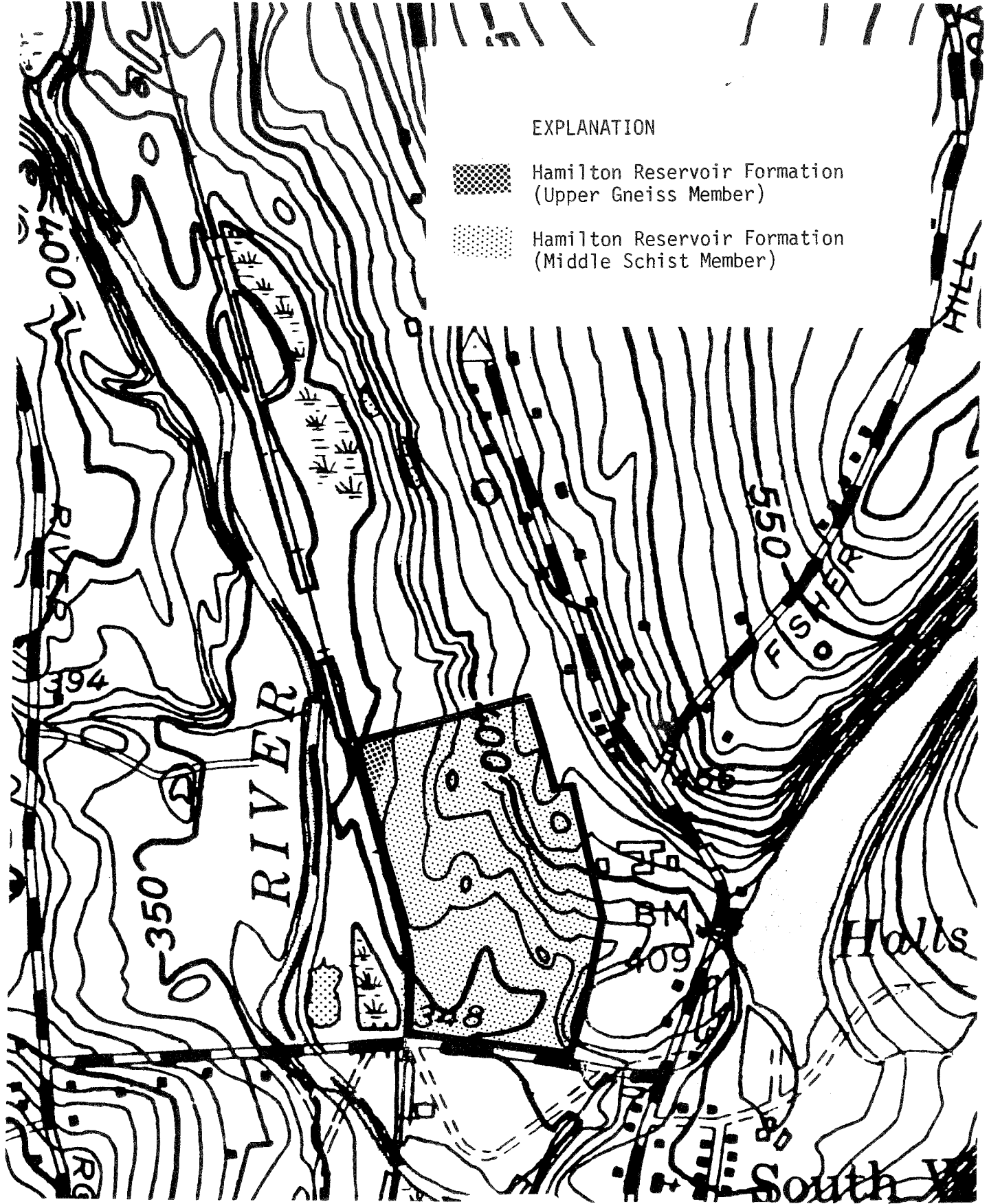
The Eastern Connecticut Environmental Review Team was asked to prepare an environmental assessment for a proposed condominium development and zone change in the Town of Willington. The site is approximately 45 acres in size and is located north of Depot Road, east of the Central Vermont Rail right-of-way and west of the former Jury's Tavern restaurant. The property is presently in the private ownership of Richard Lee. Preliminary development plans have been prepared by Gardner and Peterson Associates, a Tolland, Connecticut engineering firm.

Preliminary plans show four structures to be built on the site. No fixed number of units has been decided upon at present, however, at the pre-review meeting the representative from Gardner and Peterson indicated that 30 units would be allowed under the proposed zone change. The proposed buildings will be served by on-site septic systems and an on-site community well(s). A single road will provide access into the site from Depot Road. Parking for the residents will be provided adjacent to this access road.



The property has a diverse topography, ranging from knobby and steep in the eastern section, to gently sloping/flat in the western section near the railroad right-of-way. Most of the site is presently vegetated with grasses and shrubs, as it was formerly used as pasture land. The low lying area to the west is known to flood on occasion. Portions of the northwestern sections of the property have been excavated for gravel in the past.

The Team is concerned with the impact of the proposed development on the natural resource base of the 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. In the following sections of this report, Team members have discussed possible limiting factors and mitigation measures in detail for the benefit of the Town commissions reviewing this project and the developer. Determination of the underlying aquifer potential is beyond the scope of the ERT investigation and will require the services of a private consulting geohydrologist.

Bedrock Geology



EXPLANATION

-  Hamilton Reservoir Formation (Upper Gneiss Member)
-  Hamilton Reservoir Formation (Middle Schist Member)

ENVIRONMENTAL ASSESSMENT

TOPOGRAPHY

The proposed condominium site (Parcel B) is ±35 acres in size and is located north of Depot Road, east of the Central Vermont Rail right-of-way and west of the former Jury's Tavern restaurant. The Parcel 'A' section of the property, which consists of ±10 acres and which lies west of Parcel 'B' was not included in this report.

As indicated by the accompanying topographic map, the site is characterized by slight to moderate slopes. The steepest slopes are evident in the eastern sections of the site and are associated with rock outcrop areas. In addition there are steep slopes in the southeast corner of the property. However, these slopes are associated with those surficial (unconsolidated materials overlying bedrock) deposits, which are delineated as Tg (Terrace escarpment) on the accompanying soils map. The topography rises from the southwestern part of the site to the northeast corner. Maximum and minimum elevations on the site are ±140 feet and 350 feet above mean sea level, a difference of about 60 feet.

GEOLOGY

The site is encompassed entirely by the South Coventry topographic quadrangle. Both the bedrock and surficial geological maps have not been published to date. However, there is preliminary information for both maps which may be reviewed at the Department of Environmental Protection's Natural Resource Center in Hartford.

Bedrock is visible in three areas within the site, which includes (1) the eastern portion where buildings are proposed to be constructed (primarily in the area designated as HxE on the accompanying soils map); (2) along the Central Vermont Railway tracks in the western limits of the site; and (3) in the west central parts of the site, where sand and gravel deposits had been extracted.




The predominant rock type underlying and/or found to be cropping out on the site is classified as Hamilton Reservoir Formation (Middle Schist Member). This unit consists of a light-gray to rusty-brown, medium-grained schist composed of the minerals quartz, feldspar, biotite, sillimanite and garnet. The term "schist" refers to a crystalline, metamorphic rock (rock altered by high temperature or pressure) whereby elongate or flaky minerals (biotite) become aligned giving the rock a slabby or well-layered structure. Because of its structure, the rock commonly splits apart easily.

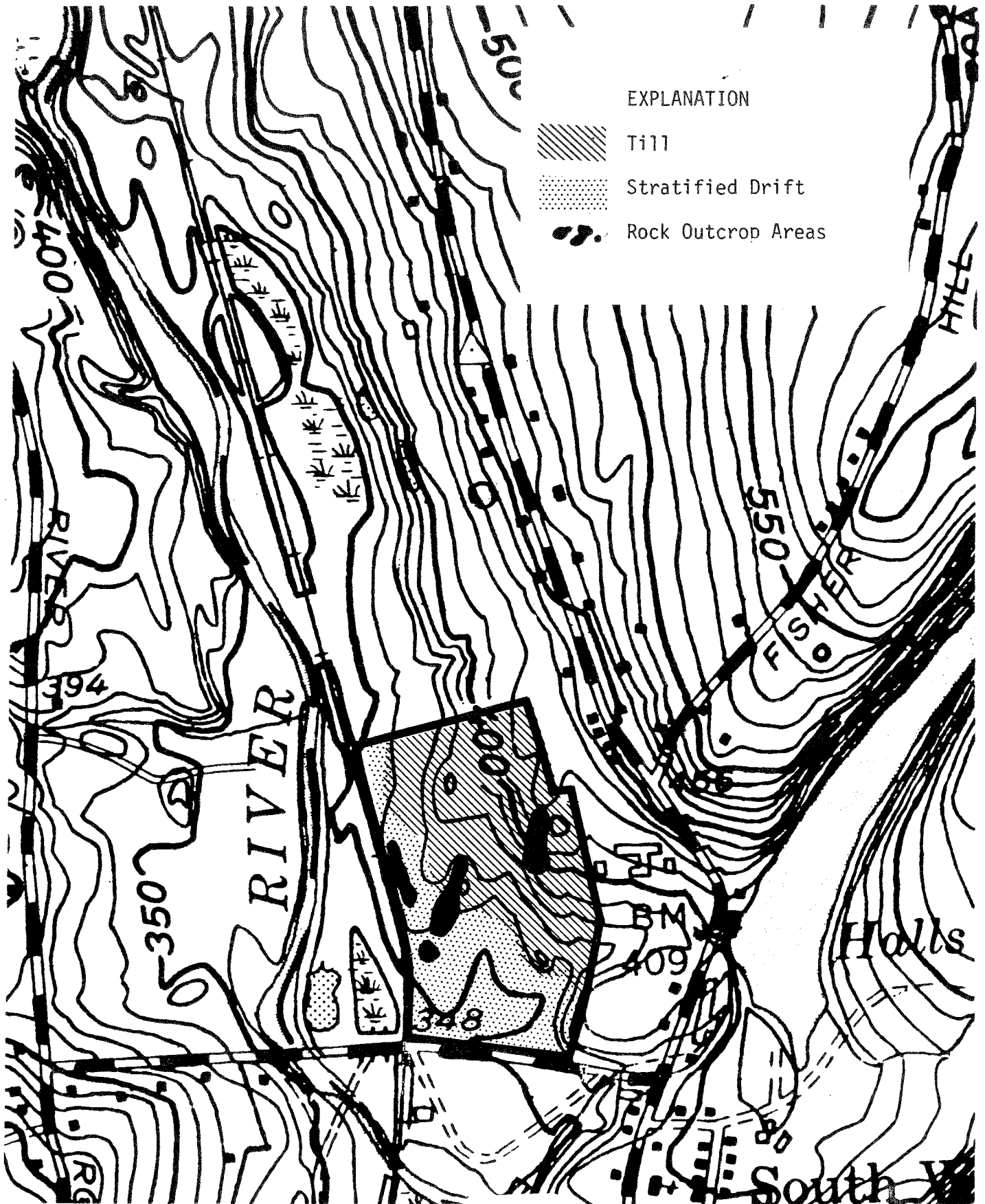
The other rock type found on the site which underlies the northwest corner is another member of the Hamilton Reservoir Formation, referred to as the Upper

Surficial Geology



EXPLANATION

-  Till
-  Stratified Drift
-  Rock Outcrop Areas



Gneiss Member. This rock unit consists of a light-gray to dark-gray, medium grained gneiss composed of the minerals quartz, feldspar, biotite, muscovite and garnet. Like the schist rocks mentioned above, gneisses are also metamorphic rocks. In gneisses thin bands of elongate or platy minerals, i.e., biotite and muscovite micas alternate with layers of granular minerals, i.e. quartz and feldspar. The alternation of these minerals gives the rock a distinct banded appearance.

The surficial geologic materials overlying bedrock on the site are till and stratified drift. Till, which covers most of the northern portions of the site is a glacial sediment that was deposited directly from a glacial ice sheet. Till consists of a generally nonsorted, structureless mixture of clay, silt, sand, gravel, and boulders. The texture of till may vary greatly from place to place. It is generally sandy, stony and loose in the upper portions, but at depth (3 to 5 feet) or occasionally at shallower depths, it becomes hard, compact and finer-grained (silty). Thicknesses of till ranges from zero in rock outcrop areas to probably not more than 10 feet at various points between outcrops.

Land surface throughout the southern half of the parcel is dominated by the distinct hummocky topography and geologic structure of "ice-contact stratified drift." Stratified drift, another type of glacial deposit, consists primarily of relatively well-sorted sand and gravels which are formed by the deposition of sediments in glacial meltwater streams. The description "ice-contact" means the sediments were deposited on, under, or adjacent to wasting blocks of glacier ice. Based on soil mapping information and visual inspection, the western portions were mined for sand and gravel in the past. As a result of this mining operation, bedrock has been exposed in this area. Sand and gravel deposits, particularly in the south-east corner of the parcel, may have potential for on-site construction uses, i.e., road base, backfill, etc. Thicknesses of the stratified drift probably range from a few inches at the till and/or bedrock contact to not more than 39 feet throughout the remainder of the site. It is probably most thick in the southern limits (Source: Connecticut Water Resources Bulletin No. 11 - Shetucket River Basin).

Some seasonally wet areas are visible mainly in topographic swales, along intermittent drainage channels, in low-lying areas and in the area where sand and gravel has been mined.

The proposed 30 unit condominium development will be served by on-site septic systems and a community well or wells. The major limiting geologic factors which may pose problems with regard to developing the parcel include: (1) the occurrence of bedrock at or near ground surface in the area of the proposed building, (2) the presence of moderate slopes, and (3) the presence of well-drained sand and gravel soils which commonly have rapid seepage rates. In addition, wetness and frost action may be encountered with some of these till-based soils. This will weigh heaviest in the construction of roads, driveways and building foundations. As a result, consideration should be given to the installation of building footing drains.

Based on site plans submitted by the project engineer, it appears buildings would be placed in the rocky, till covered areas and septic systems placed on or near areas covered by "good" soils, i.e. sands and gravels. As mentioned earlier, the sand and gravel soils are highly porous by nature and may offer limited opportunity to renovate septage. However, rainfall infiltrating these soils will generally be greater, resulting in a slightly higher rate of natural dilution.

On-site tests should be conducted in the proposed leaching field area to determine groundwater levels, depth to bedrock, and soil permeability. These factors will help to determine whether the expected volume of effluent will cause any significant or potentially harmful degree of degradation to groundwater in the area. Since effluent flows from the proposed development will exceed 5,000 gallons per day, the Department of Environmental Protection's Water Compliance Unit will be required to review and permit the engineering design and installation.

The Town expressed concerns on the day of the field review as to whether or not the stratified drift on the site has potential as a large volume groundwater source. If the materials do have potential for supplying large volumes of groundwater, the proposed residential use may not be permitted according to the town's zoning laws. The potential of any particular location as a large volume sand and gravel aquifer depends upon the texture and thickness of the deposits at that location, the proximity to watercourses and the size of those watercourses as well as the size and use of the upstream drainage basin. At the present time, the exact saturated thickness of the deposits are not known, but according to Connecticut Water Resources Bulletin #11, the stratified drift may be as much as 39 feet thick. In order to determine whether the stratified drift on the property does, in fact, have potential for yielding large volumes of groundwater, it will be necessary to conduct a detailed study of the local groundwater levels and stratified drift deposits. Since this is out of the ERT's scope, the services of a qualified professional geologist and/or geohydrologist would be necessary to provide this information. Methods used may include the drilling of test holes and placement of groundwater level observation wells in conjunction with geophysical surveys, i.e. resistivity survey and seismic refraction. Studies using the above information should provide sufficient information on the type of geologic materials present, the depth to the water table and bedrock, the thickness of the saturated zone and the deposits potential, in order to determine whether or not the deposits have potential for a large volume groundwater source.

The occurrence of bedrock at or near ground surface throughout the area proposed for buildings may be a hindrance in terms of the development. Blasting will probably be required in order to establish the internal road network and parking areas. In view of the moderate slopes in this area, it is recommended that a detailed erosion and sediment control plan be formulated and followed through implementation of the project, particularly if blasting is required.

HYDROLOGY

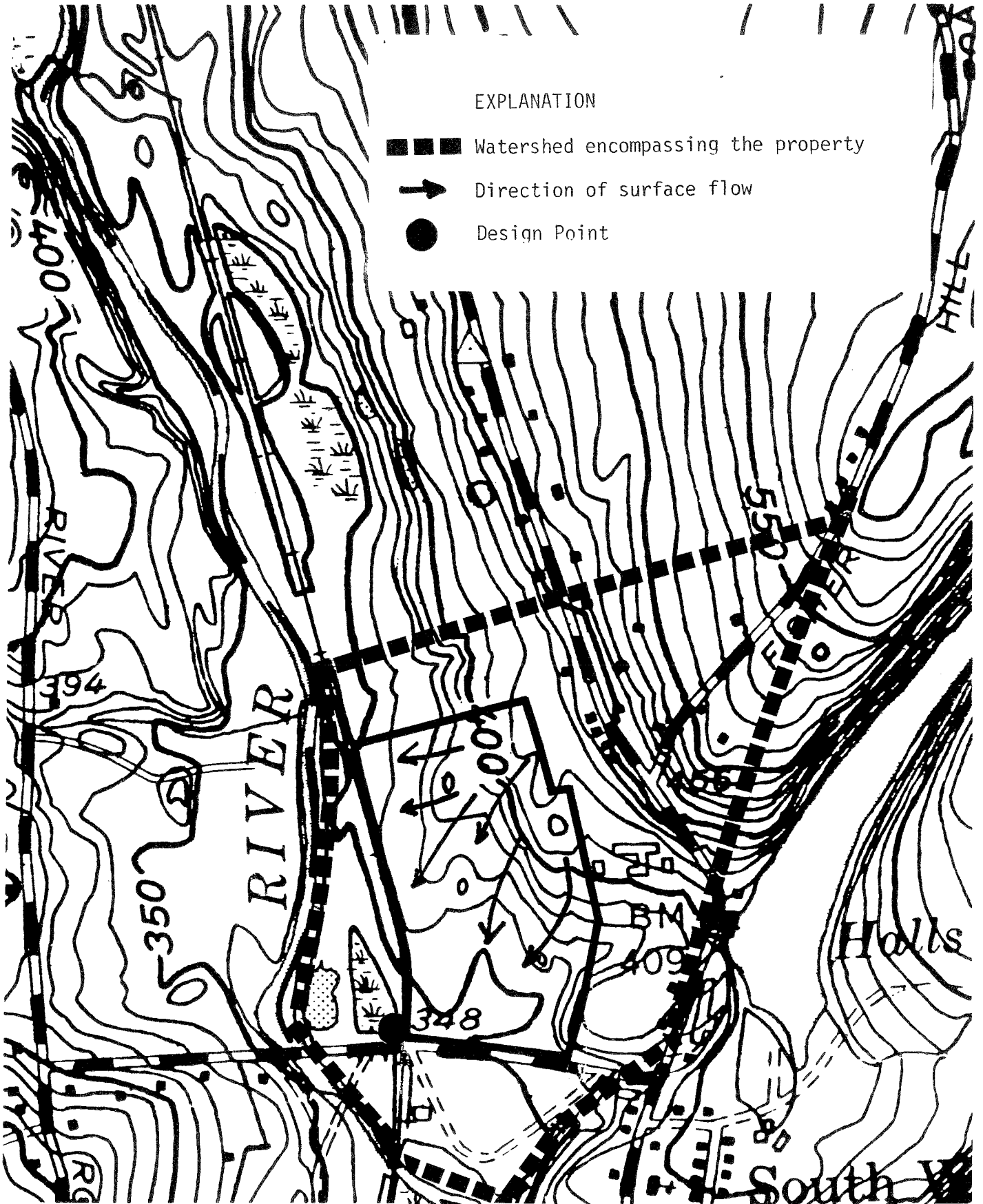
The parcel is located within the watershed of the Willimantic River, which is located between 200 feet and 400 feet west of the site. Several intermittent drainage channels are visible on the property. Surface runoff on most of the site flows by sheet flow and intermittent drainage swales to local discharge points. Water is then routed via the channels towards the topographic low depression in the southwest corner of the site. According to the project engineer, this area will be the proposed detention area for post development stormwater flows. Surface runoff in the northern portions of the site flows westward towards the railroad tracks. A stone lined culvert passing under the railroad track intercepts the water in this area, ultimately emptying into the Willimantic River.

Drainage Areas



EXPLANATION

- Watershed encompassing the property
- ➔ Direction of surface flow
- Design Point



Development of the site will cause at least a slight increase in the volume of runoff. These increases would be caused by removal of vegetation, compaction of soil and creation of impervious surfaces, such as roof tops and parking areas. It is possible to estimate the increases in runoff by using the Soil Conservation Service runoff curve-number method, as outlined in Technical Release No. 55. The curve numbers relate the amount of precipitation during a storm event to the amount of runoff from the land. Criteria for determining the curve numbers include soil type, land use and the type of vegetative cover. Estimates were made for four different rainfall events, the 10-year, 25-year, 50-year and 100-year storm. These storms respectively have a 10 percent, 4 percent, 2 percent and 1 percent probability of occurring in any given year. The estimates are shown in the following table:

Table 1

Estimated runoff depths, in inches, for pre-development and post-development conditions. It should be noted the design point for the watershed containing the proposed development was assumed to be the low-lying area in the southwest corner of the site (proposed stormwater detention area).

	10-year	25-year	50-year	100-year
Rainfall over 24 hours in Tolland County	4.8"	5.5"	6.2"	6.9"
Present condition runoff	.88"	1.23"	1.63"	2.06"
Runoff after condo- minium development	.94"	1.31"	1.72"	2.15"
Percent Increase	7%	6.5%	5.5%	4%

Note: The runoff depths listed above are only estimates based on broad assumption; they should not be used as exact data for any engineering design purposes.

For the watershed containing the proposed development, the runoff curve number may be estimated to increase by 1 (from 55 to 56). For example, under these conditions runoff depth for a 25-year storm event would increase from 1.23 inches to 1.31 inches; an increase of about 6.5 percent. The percent increases for all rainfall events are less than 10 percent.

A stormwater management plan, which incorporates erosion-sediment control measures should be included with the final condominium development proposal. In view of the moderate slopes in the area of proposed building, runoff from a storm drainage system on the condominium site could have potential for erosion. Detailed design specification for all stormwater control facilities should be submitted by the applicant prior to approval of the development so appropriate town officials may review them. If the Town has no town engineer, perhaps the services of a professional engineer could be contracted so the plans as well as drainage computations can be reviewed.

FLOODPRONE AREAS

A Flood Boundary and Floodway Map has been prepared by the Federal Emergency Management Agency for the Town of Willington. This study includes maps which identify areas throughout the Town which are subject to flooding during the 100- and 500-year storms. A '100' year flood is a flood with a one chance in 100 or 1% chance that it will happen in any year. A '500' year flood would have a one chance in 500 or 0.2% chance of occurring in any given year. It should be pointed out this does not mean a flood of the magnitude mentioned above will occur only once in a 100- or 500-year period. The probability of occurrence remains the same each year regardless of what happened the year before.

Based on the FEMA map, the 100-year flood limit includes a portion of the low-lying swampy area in the northwest corner of the site. The 500-year flood limit includes most of the low-lying area within the 350 foot contour line in the southwest corner of the parcel.

In addition, there may be some swampy or topographically low-lying areas within the site that may be subject to wetness and perhaps inundated during periods of heavy rains.

SOILS

The site is approximately 45 acres in size and is located northeast of the intersection of Depot Road and the Central Vermont Railroad. The plans submitted by Gardner and Peterson Associates shows there will be five buildings and three on-site septic systems. Each building will have six two-bedroom units. It is estimated that approximately 9,000 gallons of effluent will be discharged into the area per day. A single well is proposed to serve this community.

Accompanying this section of the report is a soils map, with the approximate boundary of the proposed development, and a chart listing the soils and their interpretations for the planned use.

Walpole (Wd) is listed on the chart but does not appear on the attached soil map. This is an inclusion of the area identified on the soils map as SsA--Sudbury fine sandy loam. Walpole soils are poorly drained with a seasonal water table at or near the surface from fall to spring. These soils are commonly in low lying stream terrace areas of the outwash plains. This wet area extends the width of the property from the southwest corner to the east around the terrace escarpment. Walpole soils are regulated inland wetlands by Public Act 155. The permeability is moderately rapid in the surface layer and subsoil and rapid or very rapid in the substratum.

SsA - Sudbury soils are moderately well drained with a seasonal water table between 14 and 24 inches of the surface from fall to spring. These soils are on higher elevations of the stream terrace than the associated Walpole soils. The permeability is moderate in the surface and subsoil and rapid in the substratum. These soils are sandy and gravelly throughout.

Other wet soils on the southern end of the parcel are in the area mapped as Ma--made land. Made land delineations at this site are cut and fill areas.

Sand and gravel was taken from the area leaving pits that were excavated to the ground water table. Some of the pits in this area are filled with water for most of the year. An intermittent stream drains from the north through the area to the Willimantic River. Areas filled are the railroad track beds and the adjacent area around the tracks.

Soils on the site mapped with the symbol Tg are interpreted for the Hinckley series with 30 percent slopes. Hinckley soils are high stream terrace excessively drained soils with rapid permeability on kames. Two well-defined kames are on this parcel and is mapped HkC--Hinckley gravelly sandy loam, 3 to 15 percent slopes and Tg--Terrace escarpments, sand and gravel. MrB--Merrimac and AbB--Agawam soils are somewhat excessively and well-drained sandy and gravelly soils of the stream terrace. These soils have moderate to rapid permeability with water tables deeper than six feet.

The soils on the northern one-third of the parcel are upland till soils on bedrock controlled landscapes. They are mostly the well-drained Charlton soils with water tables deeper than six feet. In areas of Hollis soils the bedrock is within 20 inches of the surface. These soils are mapped in a complex over parts of this landscape. Excavations to find the deeper Charlton soils are required in order to adequately place a septic system with leaching trenches. One small area of Lg--Leicester, Ridgebury and Whitman soil encroach upon the parcel in the northwest corner along a small intermittent stream. These soils are regulated inland wetlands under Public Act 155. A small area of moderately well-drained Sutton soils are just to the east of the large bedrock outcrop area mapped HxE. These soils have a seasonal water table between the depths of 14 and 24 inches from fall to spring. They have moderate to moderately rapid permeability.

Sediment and Erosion Control

A sediment and erosion control plan should be developed and implemented for this site. This plan should be able to utilize fairly simple measures to protect the site while construction is in progress.

WILDLIFE

The project area is within the Willimantic River stream corridor. Wildlife habitat can be enhanced by maintaining the meadow on the south side of the site and wooded areas to the north. The abandoned gravel pit is slowly becoming re-vegetated with grasses and shrubs; and if left undisturbed, will eventually become good wildlife habitat.

VEGETATION

The site was formerly used as pasture land and remains primarily vegetated by grasses. Several groupings of trees and shrubs occur in the western portion of the site as well as along the property boundary with Depot Road.

WATER SUPPLY

Since no public water supply line is available to the site, an on-site water supply well or wells would have to serve the proposed development. According to present plans, the well(s) would be located north of the proposed buildings. It appears the underlying bedrock is the only suitable aquifer for the well or wells in the proposed area unless the hydrogeologic characteristics of the stratified drift has potential for yielding a large volume of groundwater to wells. However, because leaching fields are proposed in the vicinity of these deposits and because gravel packed stratified drift wells would have to be located down gradient from the proposed septic systems, it seems likely there would be a greater risk of well contamination. Therefore, the proposed bedrock well location appears to be the most suitable area, based on present plans. This, of course, is based on the premise that the well or wells are properly separated from all sources of pollution (i.e., septic systems, fuel oil storage tanks, etc.) for the site, as well as off the site.

Water is supplied to a bedrock based well through fractures in the rock. Because of the uneven distribution of the fracture system, it is very difficult to predict the potential yield from any new drilled well.

Under present plans, the developer intends to utilize a community well or wells to serve the needs of the development. If a design standard of 150 gallons per day per bedroom is used, a total of 9,000 gallons of water would be required for thirty two-bedroom units. This amount of water would require a well producing at least 8 gallons per minute. This yield was calculated on an 18-hour pumping period. According to Water Resources Bulletin #11, a survey of 134 wells tapping bedrock in the Shetucket River Basin yielded at least 3 gallons per minute ninety percent of the time; few wells yield more than 50 gallons per minute. There is a chance it may be necessary to drill more than one well, perhaps even a series of wells to ensure adequate amounts of water to users on the water supply. Provisions should be made for storing at least one third the peak daily demand about 3,000 gallons and preferably a full day's water requirement in case there are problems with the project's pump system.

Since the Public Water Supply section of the State Health Department reviews and approves community water supplies, they should be contacted as soon as possible in order to discuss the following: (1) projected needs of the development in terms of water quantity, (2) location of the community well or wells on the site, (3) water quality testing requirements, and (4) plans for pumpage, storage, treatment, if necessary, and the distribution system. Consideration should be given in advance to providing for proper operation and maintenance of the community water supply system. The developer(s) should consider drilling the well or wells first, test for water quantity and quality prior to any actual construction on the site.

The actual quality of the water should be good. According to Connecticut Water Resources Bulletin #11, the site lies in an area where some rock layers may give undesirable high concentrations of iron and/or manganese. In addition, the rock unit may contain some sulfidic schist layers, which may produce high sulfide levels. The sulfide would be recognizable by its foul smell and the iron or manganese by its reddish or blackish staining qualities. Several types of filters are available to remove most undesirable mineral-induced concentrations of elements in well water.

WASTE DISPOSAL

Preliminary site testing for the proposed condominium development off Depot Road, Willington has been supervised by the Water Compliance Unit of Department of Environmental Protection. As with any subsurface project requiring a permit from DEP, the project's engineer must demonstrate the following items before a permit will be issued:

- (1) The site can handle the projected volume of effluent without surface failure.
- (2) The size of the system is designed based on the long term acceptance rate of the surrounding soils.
- (3) The wastewater will be renovated to drinking water standards at either the property line, drinking water supply well or surface water body-dependent of which has the closest travel time from the system.

As long as this project requires a Department of Environmental Protection permit (Q>5,000 gpd or community systems), the pollutant renovation requirements will address the Town's concern about aquifer potential and possible pollution in this area.

PLANNING CONCERNS

Relationship to Regional Plans/Zoning

The Windham Regional Planning Agency's Regional Growth and Preservation Guide Plan recommends the area proposed for this condominium development for Low Density Rural use, with a prevailing density for residential development of one dwelling unit on two acres of land. Willington's Plan of Development recommends residential use for this property in its Proposed Land Use Map (No. 3), with an overall density of one unit per two acres for single family homes and cluster housing. Apartment development is recommended to be limited.

A development of this type could be allowed by Willington's "Designed Community Residential Zone" if the property, now zoned R-80, were rezoned to a DCR zone, in accordance with the Town's zoning regulations. These regulations, Sections 4.744 and 4.73 prohibit "high intensity uses" which would include residential buildings containing more than two units, or any use which discharges into a subsurface disposal system 1,000 gallons or more of sanitary effluent per day, from the following:

1. Any soil in which bedrock is shown to be closer than 10' to the surface of the ground.
2. Any inland wetland or watercourse as defined in P.A. 72-155 as amended.
3. Any soil in which groundwater is present within 4½ feet of the surface of the ground at least one to two months of the year unless groundwater can be adequately lowered and monitored for a period of one year.

4. Any soil overlay or adjacent to a potential swuigert (large volume ground-water source) as indicated by map number g. of Section 4.731 of these regulations.
5. Any soil having a percolation rate slower than 1" in 20 minutes for more than 25% of the tests performed.
6. Any soil demonstrated to have a compact glacial till (hardpan) layer, as defined by the National Cooperative Soil Survey, within 10 feet of the surface of the ground.
7. Any soil laying at a slope greater than 15%.
8. Any area subject to flooding.

From Willington's Plan of Development maps, the natural resource maps on file at the office of Willington's Planning and Zoning Commission (referred to in Sec. 4.731) and site inspection it would seem that some of the constraints listed above apply to all or part of this site. For example, there are some small bedrock outcrops on the upper eastern portions of the site and resource maps show areas which may have bedrock within 10 feet of the surface on the site. While it might be inappropriate to construct a high intensity use on a parcel with a large area of bedrock outcrops or with thin soil overlaying bedrock, there seem to be only isolated areas on this parcel which have bedrock close to the surface. Construction of septic system leach fields in such areas might not be appropriate, but the small areas of bedrock close to the surface in this parcel should not preclude high intensity uses altogether.

The Water Related Resources map referred to in section 4.731 indicates part of this site is within an area which contains saturated sand and gravel. High intensity uses are prohibited, according to par. (4) of Section 4.732.c. in soils overlaying or adjacent to large volume groundwater sources. Large volume groundwater sources are shown on that map as located to the north and south of this site. The Willington Planning and Zoning Commission must determine whether this site is "adjacent to" a potential large volume groundwater source. Ultimately, the purpose of prohibiting such high intensity uses in a large volume groundwater source is to protect the possibility of utilizing that resource for a public drinking water supply in the future. Tolland already does so with its well and pumping station across the Willimantic River from this site. That well serves 160 families in Tolland, mostly in 2 subdivisions about 2 miles from the well. Willington may want or need to develop a public water supply in the future in the large volume groundwater source areas which are mapped as being north and south of this site.

The maps referred to in Section 4.731 are "considered as only suggestive of the natural resource factors in fact present on the site and it shall be the responsibility of the applicant to conduct sufficient on-site inspections and tests to establish conclusively the presence or absence of such critical natural resource factors." If the Commission wishes to pursue this matter further, it has this recourse.

High intensity uses are also prohibited from any area subject to flooding (Sec. 4.732.c.(8)). The maps prepared by the Federal Emergency Management Agency (FEMA) indicate that the southwest corner of this site is within the 500-year flood limit (see "Floodway" map, panel 2 of 8, June 15, 1982). FEMA's "Flood Insurance

Rate Map" (panel 14 of 20, June 15, 1982) indicates this area as in flood zone B, defined as,

"Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)"

No high intensity uses (buildings), access to such uses, septic systems or wells are proposed to be sited in or through the flood area. Again, even though there is some flood prone property on the site, none of the developed uses are proposed to be sited there, so that the high intensity use of the entire parcel should not be prohibited due to the presence of some areas subject to flooding.

Section 4.33 defines Flood Plain Use, but only regulated construction in "A" zones. These regulations would not apply on any of the site east of the railroad tracks since that area is not covered by the Flood Plain regulations.

To summarize, even though high intensity uses are not permitted in soils with various constraints (here groundwater sources, shallow depth to bedrock and flood areas), section 4.732 of Willington's Zoning regulations states;

"Because of their potential negative impact on the environment, certain uses shall be considered high intensity uses and shall be permitted only upon a site which has been proven to be composed of an adequate quantity of suitable soils."

Ultimately the Willington PZC must determine whether an "adequate quantity" of suitable soils exist. It would seem, however, that bedrock outcrops and areas prone to flooding are fairly minimal, provide few constraints to development, and could be easily incorporated into the open space in the development. The groundwater constraint is an issue for the Commission to determine. The site is mapped as a "saturated sand and gravel" area, not a "large volume groundwater source." The issue is whether this site is considered "adjacent" to a large volume source.

The State's Conservation and Development Policies Plan 1982-1985 recommends the area surrounding this site to be utilized as part of a Rural Community Center in South Willington. Rural Community Centers "may be determined by municipalities as suitable for future clustering of more intensive housing . . ." Where such centers are located in watershed areas tributary to existing or potential public water supply sources, however, the State Department of Health Services should require and support measures necessary to prevent any adverse impacts upon water quality from waste discharges and surface water runoff, according to the State plan.

Traffic/Transportation Issues

The 1982 Regional Transportation Plan and Willington's Plan of Development both cite the high priority need for improvements to Route 32 in the section through South Willington, which would provide the major access to this condominium complex via Depot Road. Both plans call for relocation and/or reconstruction to correct steep changes in elevation and sharp horizontal curves in the vicinity of Fisher Hill Road. The 1976 regional plan recommended a new segment of Route 32 be located west of the existing route, which would bypass the center of South Willington and could affect this site.

The Connecticut's Department of Transportation's 1984 Master Transportation Plan schedules reconstruction of portions of Route 32 from the Eastern Connecticut Expressway (I-84) to I-86 between 1987 and 1994. Trade-in funds from I-84 are to be utilized for such improvements. If the road is reconstructed in this problem area in Willington, it is conceivable that any new alignment of the road might be located closer to this proposed condominium project.

Depot Road will provide adequate access to the condominium complex. The driveway into the complex should be located so that flooding does not impair access to the development.

If 30 two-bedroom units are constructed in this complex, then approximately 1.37 vehicles per occupied unit or 41 more motor vehicles can be expected to be owned by the residents. In Connecticut, condominiums generate an average of 5.3 trips per day. Thus, this development can be expected to generate about 160 vehicle trips per day.

River's Edge condominiums, across from this site on Depot Road, has 16 units and probably generates about half that amount of traffic since it was half the number of units.

These trips will add to the traffic on Route 32, but not substantially. Route 32 currently carries approximately 4,000 vehicles as average daily traffic between the Mansfield/Willington town line and Route 74.

Site Design

The three structures planned for this development are located on the upland portions of the site.

The site slopes westward and the buildings are sited generally parallel to the contour lines. Thus, each building faces west and is sited appropriately in relation to the topography, but does not particularly take solar orientation into account. Within the constraints of the topography, the buildings could be oriented in a more southerly direction than proposed in the preliminary site plans.

Orienting buildings in a more southerly direction could provide passive solar heating gains for each unit, ultimately reducing heating costs for the owners. Connecticut General Statutes state that zoning regulations may encourage energy efficient development, as follows:

Such regulations may also encourage energy-efficient patterns of development, the use of solar and other renewable forms of energy, and energy conservation. The regulations also provide for incentives for developers who use passive solar energy techniques, as defined in subsection (b) of section 8-25, in planning a residential subdivision development. The incentives may include but not be limited to, cluster development, higher density development and performance standards for roads, sidewalks and underground facilities in the subdivision (CGS 8-2).

(b) The regulations adopted under subsection (a) of this section may also encourage energy-efficient patterns of development and land use, the use of solar and other renewable forms of energy, and energy conservation. The regulations shall require any persons submitting a plan for a subdivision to the commission under subsection (a) of this section to demonstrate to the commission that he has considered, in developing the plan, using passive solar energy techniques which would not significantly increase the cost of the housing to the buyer, after tax credits, subsidies and exemptions. As used in this subsection and section 8-2, passive solar energy techniques mean site design techniques which maximize solar heat gain, minimize heat loss and provide thermal storage within a building during the heating season and minimize heat gain and provide for natural ventilation during the cooling season. The site design shall include, but not be limited to: (1) House orientation; (2) street and lot layout; (3) vegetation; (4) natural and man-made topographical features; and (5) protection of solar access within development. (CGS 8-25(b)).

School bus stop location and open space plans for active and passive recreation required in the DCR zone should be addressed in the final site plan.

Services to Support Development

Willington has services typical for a rural town with a population of less than 5,000. Police protection is provided by State Troopers and Town Constables.

Fire protection is provided by two volunteer fire companies located at Route 32 and Depot Road adjacent to this site and another at Old Farms Road and Y Road. Water with which to fight fire is provided by ponds, streams and fire ponds or tanker trucks. Need for a fire pond in this development should be determined with the advice of the fire companies which will be responding to the fire, however, the proximity of the Willimantic River may make such provisions unnecessary.

There is a fire hydrant system in South Willington, but it is privately owned, and currently serves only the Hall Mill Complex.

Water for the development is proposed to be supplied by on-site wells. This would be appropriate, but there may be an option if the developer chooses to pursue it. The South Willington Public Water Supply, a privately owned company which supplies much of the village of South Willington, could be extended to this development.

Library facilities are located in Hall Memorial School in South Willington in close proximity to the condominium proposal.

Willington has two schools, the Willington Center School on Old Farms Road, grades K-3, and Hall Memorial School in South Willington, grades 4-8. High school students are bused to adjacent towns. Impact of this development on Willington's schools is difficult to determine since the number and type of units had not been firmly established by the developers at the time of the ERT review. Thirty, two-bedroom condominium units was the estimate on the day of the ERT field review. A three to four bedroom single family home might be expected to produce an average of 1.4 school children. If we assume these two bedroom condominiums would generate half of that number, then the 30 proposed units might produce approximately 21 school age children. However, condominiums generally house families more similar

to apartment dwellers than single family home dwellers where number of school children are concerned. A 1971 WRPA study, "Rural Apartments in the Windham Region" showed that in Willington there were about 0.03 pupils per apartment unit. This low rate reflects the University students who live in Willington's apartments. Applying this rate to this 30 unit condominium would mean that one pupil could be anticipated. The actual number of children anticipated will depend upon whether the units are owner occupied or rented and whether the residents are university students, retired persons, newly married couples buying their first home, or established families with children. If this development generated the same number of school aged children as single family homes would, approximately 42 school aged children would need to be accommodated by the schools.

If age breakdown follows past trends, then about 30 percent of the students might be expected to be of the ages which attend Center School or at most 13 students, 44 percent or 18 students for Hall School and 26 percent or 11 students for area high schools. Willington's Plan of Development (page 32) states that if sixty students a year (spread over all grades) were added to the school population, this would not over tax present school capacities.

This development itself, therefore, would not tax the Town's services. However, with the new developments currently under construction/development (Deer Run Estates--a 50 lot subdivision, and the 34 unit condominium complex on Baxter Road, along with other scattered single family home development), the school's capacity may be strained if many of these new housing units are constructed and occupied by families with school aged children over a short period of time--the next two years or so.

Solid waste from this development will most probably be disposed of at the Willington town landfill off Hancock Road, with a relatively long expected life time--until the year 2008, according to the State's Draft Solid Waste Management Plan, August 1983.

This new 30 unit development, as any new development, will effectively shorten the life of the landfill. Each occupant can be expected to generate 7/10 ton of solid waste each year. Based on 1980 census data, Willington's average household of 2.77 persons would generate 58 tons per year. The town currently generates about 3,389 tons/year. Therefore, this condominium complex, if fully occupied, could increase the town's solid waste disposal needs by about 1.7 percent. This development itself will not tax the landfill's capacity, but all the new developments in Willington will combine to effectively shorten the life expectancy of the landfill.

Natural and Historic Considerations

This site has historic and natural features which should be preserved. Perhaps most notable are the large majestic trees lining Depot Road. They form a canopied entrance to the village of South Willington as one approaches along Depot Road, the approach used by most people in the village's heyday when the train station was located there. These historic trees should be preserved and maintained, irrespective of whether this condominium project is developed. None of the trees should be removed, except those diseased or broken beyond reclamation. None should be removed to create a driveway into this or any other development. These trees are a natural and historic resource to be preserved.

This site was once part of the Hall property. The property now adjacent to this site, the former Jury's Tavern and Molly Malone's Pub, which was destroyed by fire, was once an historic barn built by William Henry Hall to house his prize-winning cattle. This condominium site was part of the grazing land for the cattle and later for racehorses which the Hall family owned.

There are large corner and gate posts on the site which no longer form an enclosure. These posts could be incorporated into a landscaping plan in the required buffer zone. If they can be preserved, they should be.

The site also contains large stonewalls which should remain undisturbed, and the breaches recently cut should be restored or repaired to make attractive entranceways into the adjacent woodland. There are two stone lined vaults with concrete lids in the field where the condominium buildings are proposed. They seem to be part of some sort of water delivery system. Mr. Clyde Hall was contacted for information. He suggests they are part of the piped, underground spring system which supplies a house on the corner of Fisher Hill Road and Route 32, and that there are similar vaults on the east side of Route 32. It seems that the vaults on the condominium site currently simply serve to drain this water to the river. The groundwater flow, if disturbed or permanently interrupted by on-site construction, may cause drainage problems. This issue should be further investigated and drainage properly accommodated.

Compatibility with Surrounding Land Use

This site is located on the "edge" of town, adjacent to the Willimantic River and the Town of Tolland, but separated from the river by Central Vermont rail lines currently utilized only by freight trains. Depot Road is to the south of the site, with the 16 unit Riverview Condominiums across the street.

Properties along Route 32 which are adjacent to the site include the volunteer fire department on the corner of Depot Road and Route 32, single family homes and the remnants of the former restaurant--Jury's Tavern and Molly Malone's Pub which was devastated by fire. Part of that property is utilized as apartments. To the north of this site is an industrial use.

The village of South Willington contains mixed uses including the Hall Manufacturing Complex, a convalescent home, a church, a unique natural hemlock ravine which channels the Conant Brook into Hall's Pond, a town recreation area at Hall's Pond for swimming, and single family homes as well as multi-family dwellings.

This proposed use could be compatible with the various surrounding land use.

Alternative Land Use

This site has some areas of prime agricultural soil, but not enough contiguous area to recommend preservation for agricultural use. These areas could be appropriately utilized for grazing animals as it was years ago.

The site contains three distinct areas: lowland fields, upland fields, and upland forest. Each would be suitable for different purposes. The lowland field areas are subject to flooding and should be left in some low intensity use, such as open space, pasture or cropland, or recreation use.

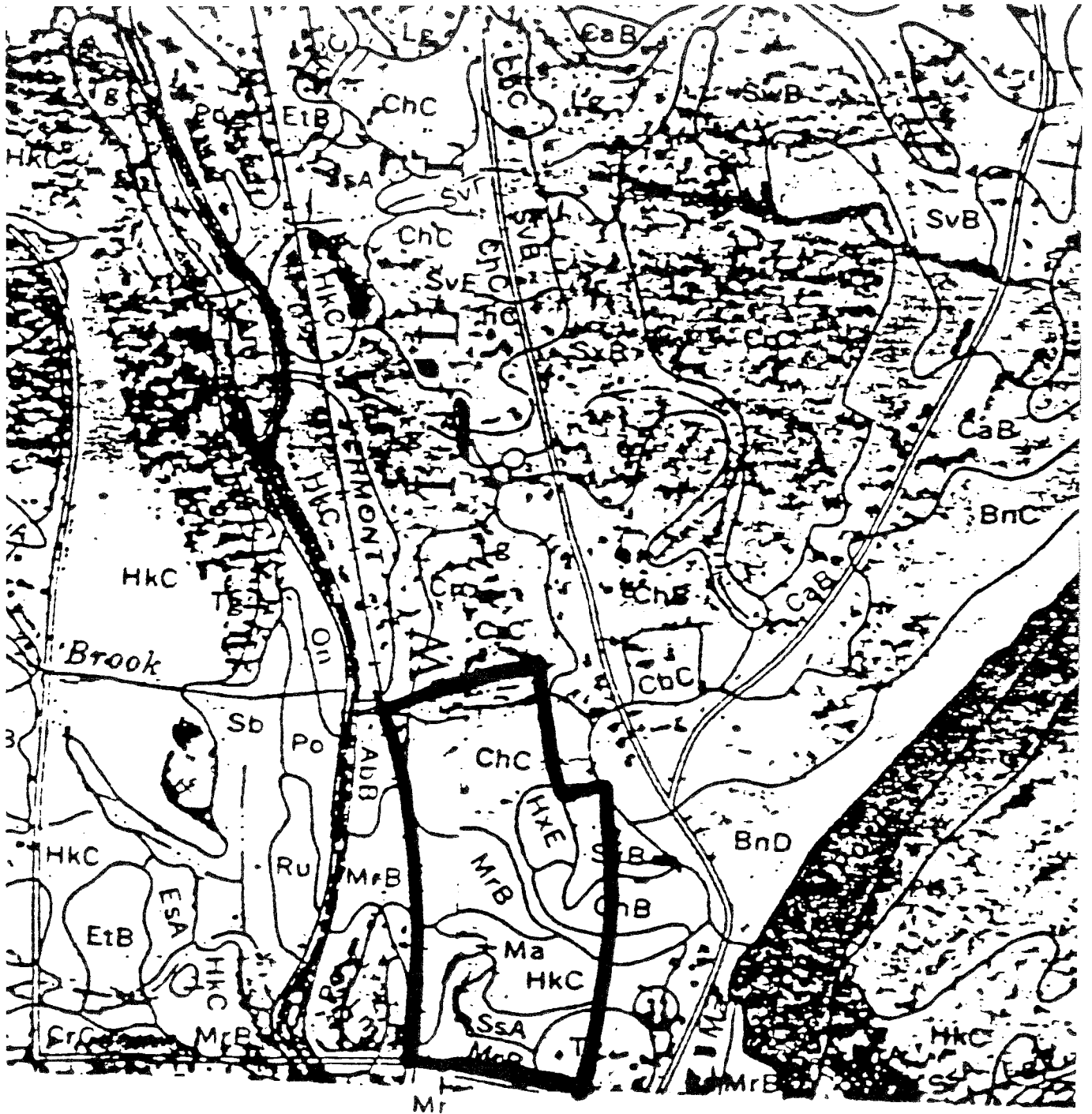
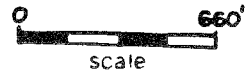
The upland field and wooded areas are suitable for low density residential development, and perhaps even some low density commercial uses considering the proximity to the village. Due to these differing conditions, a planned community approach is most appropriate for this site.

The site could also be utilized as open space or recreation area, or simply undeveloped, always an alternative land use. Proximity to the Willimantic River makes water based recreation use particularly attractive.

The designed community approach as applied in the proposed condominium development is appropriate because the dwellings are clustered in the areas most suitable for building and the forest and lowland field areas are left undeveloped, to be used for open space.

Appendix

Soils



INTERPRETATIONS FOR COMMUNITY DEVELOPMENT
WILLINGTON, CONNECTICUT

SOIL MAP SYMBOL AND SOIL NAME	DWELLINGS WITHOUT BASEMENTS	DWELLINGS WITH BASEMENTS	LAWNS AND LANDSCAPING	SEPTIC TANK ABSORPTION FIELDS	LOCAL ROADS AND STREETS
HxE - 15 to 35%, stony Charlton	Severe-slope	Severe-slope	Severe-slope	Severe-slope	Severe-slope
Hollis	Severe-slope, depth to rock	Severe-slope, depth to rock	Severe slope, thin layer	Severe-slope depth to rock	Severe-depth to rock, slope
*Lg - 0 to 5%, stony Ridgebury	Severe-wetness	Severe-wetness	Severe-wetness	Severe-wetness, percs slowly	Severe-wetness, frost action
Leicester	Severe-wetness	Severe-wetness	Severe-wetness	Severe-wetness	Severe-wetness, frost action
Whitman	Severe-ponding	Severe-ponding	Severe-ponding	Severe-ponding, percs slowly	Severe-large stones, ponding
Ma - Made land (SEE NARRATIVE)					
#MrB - 0 to 3% Merrimac	Slight	Slight	Slight	Severe-poor filter	Slight
#SvB - 3 to 8% Sutton	Moderate-wetness	Severe-wetness	Moderate-wetness	Severe-wetness	Severe-frost action
#SsA - 0 to 6% Sudbury	Moderate-wetness	Severe-wetness	Slight	Severe-wetness, poor filter	Moderate-wetness, frost action

INTERPRETATIONS FOR COMMUNITY DEVELOPMENT
WILLINGTON, CONNECTICUT

SOIL MAP SYMBOL AND SOIL NAME	DWELLINGS WITHOUT BASEMENTS	DWELLINGS WITH BASEMENTS	LAWNS AND LANDSCAPING	SEPTIC TANK ABSORPTION FIELDS	LOCAL ROADS AND STREETS
Tg - 30% Terrace Escarpment	Severe-slope	Severe-slope	Severe-small stones, droughty, slope	Severe-slope, poor filter	Severe-slope
*Wd - Walpole	Severe-wetness	Severe-wetness	Severe-wetness	Severe-wetness	Severe-wetness, frost action

*Designated inland wetland soil by Public Act 155
#Prime farmland soil

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 (774-1253), Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, P.O. Box 198, Brooklyn, Connecticut 06234.