Environmental Review Team Report

Baxter Road Condominiums

Willington Connecticut

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EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

Environmental Review Team
Report

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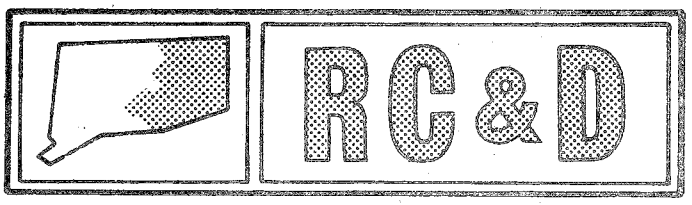
Willington Connecticut

July 1983

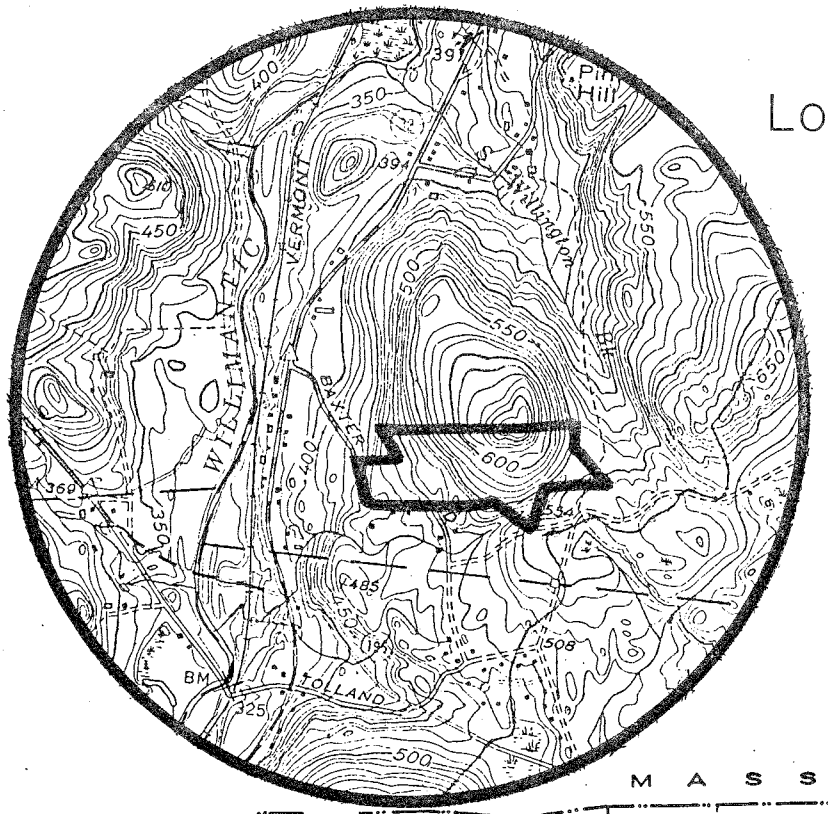


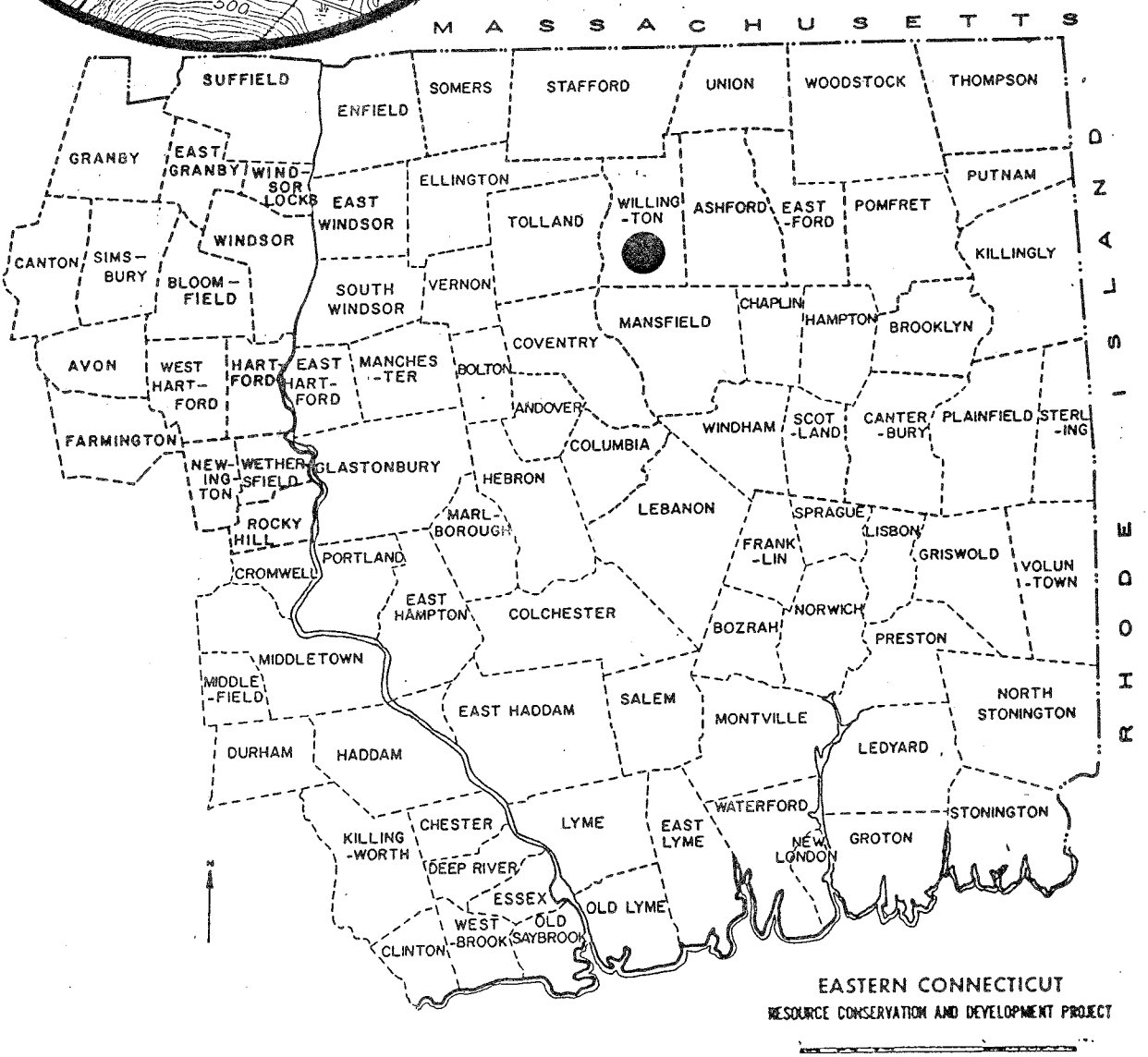
Eastern Connecticut Resource Conservation & Development Area

Environmental Review Team
PO Box 198
Brooklyn, Connecticut 06234

Location of Study Site

BAXTER ROAD CONDOMINIUMS
WILLINGTON, CONNECTICUT





ENVIRONMENTAL REVIEW TEAM REPORT
ON
BAXTER ROAD CONDOMINIUMS
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: Joseph Neafsey, District Conservationist, SCS; Jim Parda, Forester, Connecticut Department of Environmental Protection (DEP); Bill Warzecha, Geologist, DEP; Don Capellaro, Sanitarian, State Department of Health; Meg Reich, Windham Regional Planning Agency; David Cherico, Sanitary Engineer, DEP; and Jeanne Shelburn, ERT Coordinator, Eastern Connecticut RC&D Area.

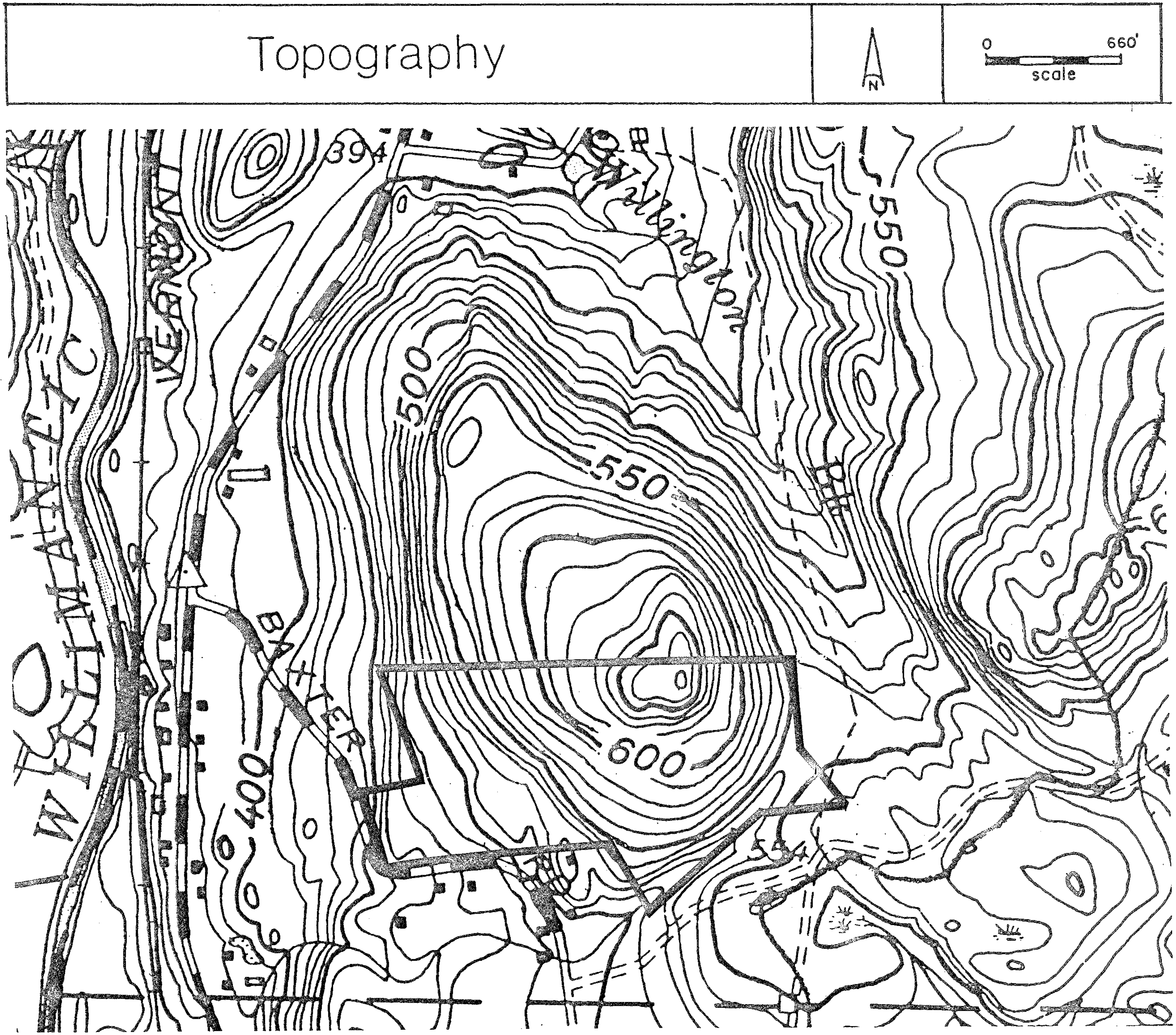
The Team met and field-checked the site on Thursday, June 2, 1983. Reports from each contributing member were sent to the ERT Coordinator for review and summarization for the final report.

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 long-term economics of 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, P.O. Box 198, Brooklyn, Connecticut, 06234, 774-1253.

Topography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INTRODUCTION

The Eastern Connecticut Environmental Review Team was asked to prepare an environmental assessment for a proposed zone change and condominium development in the town of Willington. The site is approximately 39 acres in size and is located on Baxter Road, near the Willington/Mansfield town line. The property will be developed by Thomas J. Crossen, Jr. and Joseph C. Mihaliak. Kasper Associates has prepared a schematic design plan for the proposal.

The current design scheme calls for 34 condominium units to be developed on site. These units would be constructed in five six-unit buildings and one four-unit building. All will be two bedroom units. No public water or sewer facilities will be available to the site, so the developers are proposing to provide a community well or wells and on-site septic disposal facilities. Traffic access to the site will be via Baxter Road which is also a dead-end road. In order for the developer to proceed with these plans, a zone change will be necessary.

The Team is concerned with the effect of the proposed development on the natural resource base of this site. Although severe limitations can be overcome with appropriate engineering techniques, it is important to note that these measures can become costly, making a project financially unfeasible for a developer. This site has a number of natural limitations which must be considered during the planning process. These include extremely steep slopes and wetland areas. These natural constraints will effect roadway and building layout, septic system design and location. If these limitations can be overcome, the site appears to be compatible with the proposed use.

Team concerns are discussed in detail in the following sections of this report.

ENVIRONMENTAL ASSESSMENT

GEOLOGY

The site which is approximately 39 acres in size is located on Baxter Road, approximately one mile south of South Willington Center. Topography on the site ranges from gently sloped throughout the southwest portions, to moderately and very steeply sloped throughout the remaining portions. Land surface elevations on the site rises to the east, from 450 feet above mean sea level along Baxter Road to 670 feet above mean sea level at the peak of Baxter Mountain. Elevations were taken from the South Coventry topographic quadrangle, published by the United States Geological Survey (USGS).

The only watercourses observed on the site appeared to be two small intermittent streams. One stream emanates in the eastern portion of the site and flows in a southwest direction along the property line until it meets a more defined watercourse south of the site. The other watercourse drains a small wetland area in the southern

section of the site. It flows in a southerly direction towards Baxter Road. (See accompanying Drainage Area Map).

The proposed condominium site is located in an area that is encompassed by the South Coventry topographic quadrangle. A bedrock geologic map of the quadrangle was prepared by Richard J. Fahey and Maurice H. Pease, Jr. and is on open file at the Natural Resources Center of the Department of Environmental Protection in Hartford. The surficial geologic map of the quadrangle by Larry Frankel has been partially completed and is available for review purposes at the Natural Resources Center.

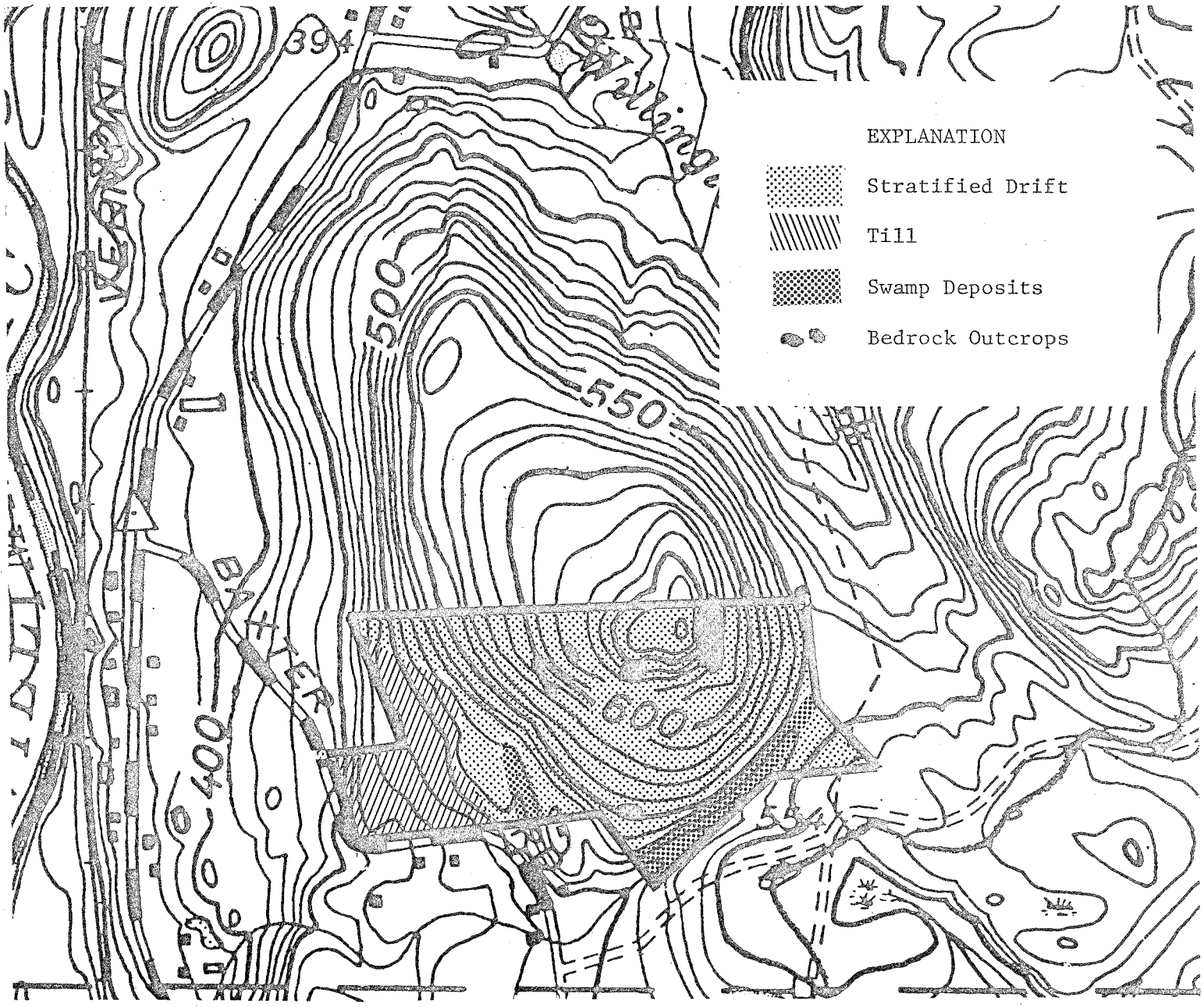
Bedrock outcrops were observed in spotted locations throughout the face of steep slopes in the central section of the site as well as on top of Baxter Mountain. The bedrock underlying and cropping out on the site consists primarily of the Hamilton Reservoir Formation. These rocks are metamorphic; that is, crystalline rocks which were formed under great heat and pressure millions of years ago. They are predominantly thinly layered-fine grained, light-brownish gray to olive brown, brown biotite-schist interlayered with medium grained light to dark gray quartz oligoclase biotite gneiss. "Schist" is a crystalline rock in which platy, flaky or elongate minerals have become aligned to form distinct layers. This structure gives the rock a slabby appearance and often allows the rock to be easily split along the layers. "Gneisses" are a crystalline rocks in which thin layers of elongate minerals which are often dark colored alternate with layers of rounder minerals which are usually light colored. This structure gives the rock a banded appearance and does not produce the distinct parting surfaces that are typical of schists. The gneisses and schists on the site do not form distinct zones of outcrop, rather, they blend into one another and are often seen together in a single exposure.

Surficial geological materials are those unconsolidated rock, organic or man-made materials that overlie the solid bedrock. They include both soil and subsoil layers and are referred to as "overburden". The most widespread surficial geologic material found on the site is till. It covers the central and eastern portion of the site. Till, which is a glacial sediment, consists mainly of a non-sorted clay, gravel and boulders. Till was deposited directly from glacier ice without subsequent reworking by meltwaters to any great degree. It ranges in texture from sandy friable and stony, to silty and tightly compact. The latter type is usually found when depths of till are ten feet or greater. Where tills are less than ten feet thick, they tend to be friable and of sandy texture. The till deposits on the site probably range in thickness from zero, where bedrock outcrops are, to ten feet at various points within the site.

Another type of glacial sediment found on the study site is stratified drift. Stratified drift consists of sands and gravels that were deposited by glacial streams. This deposit is located throughout the southwest portion of the site where the primary and reserve on-site sewage disposal system is proposed. Thickness of these deposits is approximately 10 feet throughout this area.

In the southeastern and southern part of the site, primarily along the intermittent streams, till or bedrock is overlain by swamp deposits. Swamp deposits consist of silt, clay, sand and organic materials that settled to the bottom of a sluggish or stagnant water body.

Surficial Geology



Drainage Areas

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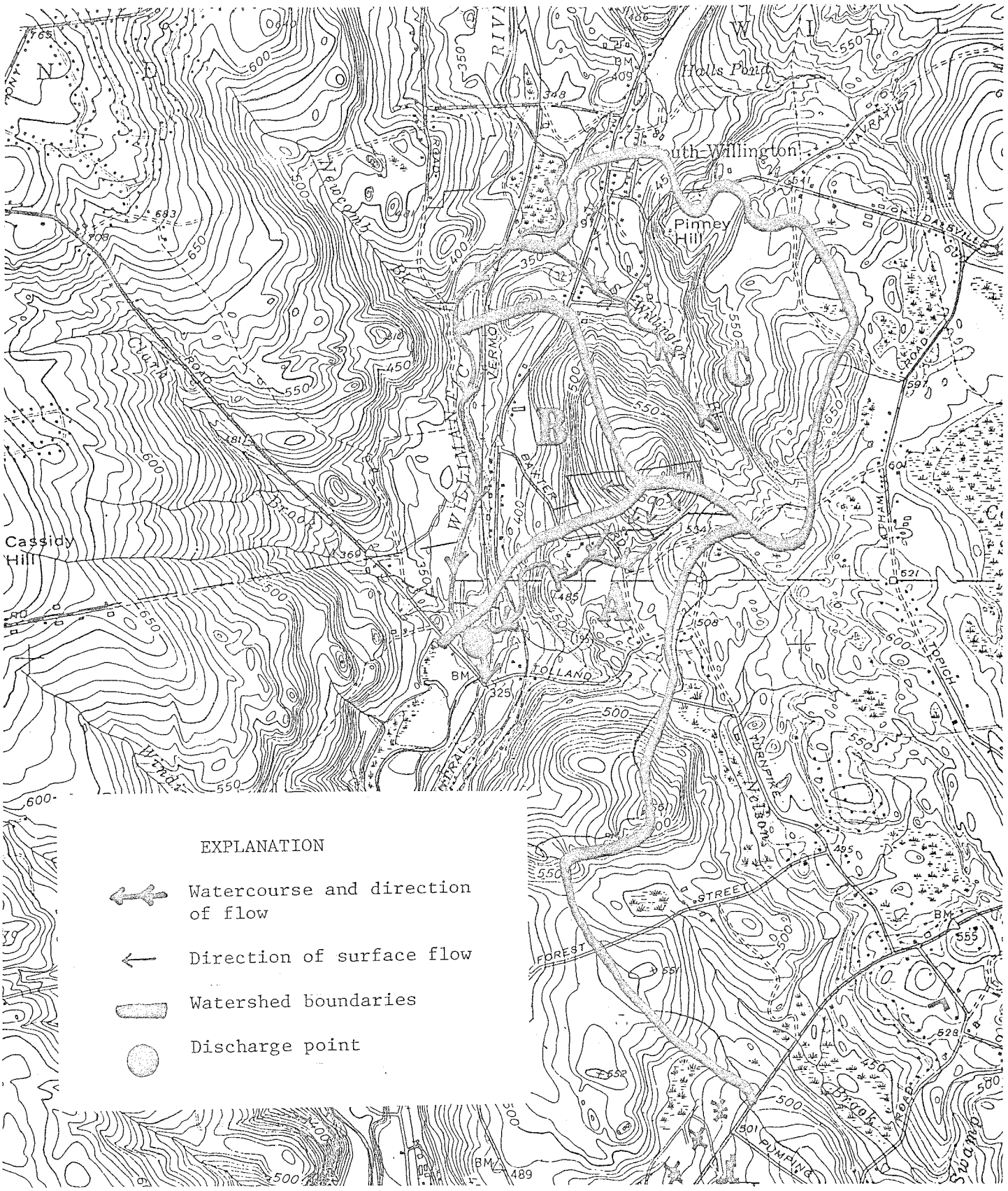


In terms of the proposed condominiums, the mineralogy of the bedrock that underlies the site may have an impact on the quality of water. Moderate to excess concentration of iron and/or manganese are often found in wells in the vicinity of the site as well as the town.

In general, the till should pose no difficult problems for development. This, of course, is provided that the sewage disposal system(s) is located in the area where soil testing was conducted, which was throughout the southwest portion of the property. Stoniness is likely to be a nuisance in some areas. However, areas of steep slopes are more likley to limit development. Shallow depth of soils to bedrock conditions are found primarily in the eastern section of the property.

HYDROLOGY

The site is located within the Willimantic River watershed, which is located approximately 1000 feet west of the parcel. Surface runoff drains in three different directions on the site. Zone A, which comprises the largest area of the site drains south to southeast into an intermittent stream. This stream which flows in the southerly direction eventually drains into a more well defined unnamed stream and finally discharges into the Willimantic River. There were no watercourses observed in Zone B. Direction of surface drainage in this zone is generally to the west. However, due to the sandy/gravelly nature of the underlying soil in this zone, most rainfall is probably absorbed quickly into the ground. During periods of very heavy rainstorms runoff drains from this section through natural swales into low lying areas and remains there until it evaporates or is absorbed into the ground. Zone C which comprises the smallest piece of the parcel drains primarily eastward by sheet flow into South Willington Brook.

Development of the site will cause increases in volume of runoff. These increases would be caused by removal of vegetation, compaction of soil, and creation of impervious surfaces. The major runoff increases would be expected from the access road and parking areas as well as roof tops. Additional runoff could cause increased overland erosion and increases to peak flood of streams on the site.

Although there was no plan, by itself, to allow the determination of the effect from storm sewering or waste water discharges, an estimate may be made of the runoff change likely to occur from land use modification alone. By using Technical Release No. 55 published by the Soil Conservation Service, the team analyzed the effect of development on runoff under both the present conditions and the proposed condominium development. Rainfall data were taken from U.S. Geological Survey records. Runoff amounts were calculated for storms having average period of recurrence of 10 years, 25 years, 50 years and 100 years. In any given year, these rainfall amounts have, respectively, a 10 percent, 4 percent, 2 percent and 1 percent probability of occurring. Each storm would have a duration of 24 hours.

Average Storm Frequency	10 YEARS	25 YEARS	50 YEARS	100 YEARS
Runoff before development (inches)	1.00	1.49	1.80	2.45
Runoff after development (inches)	1.19	1.73	2.06	2.61
Percent Increase	19%	16%	14%	7%

*NOTE: The flow rates listed above are only estimates based on broad assumptions. They should not be used as exact data for any engineering purposes.

As the table shows, the increases are significant, but they are not as large if the property were developed in other ways. The estimates reflect an average increase for the site; actual increases will be greater in areas of more concentrated development and less in areas of lesser disturbance. Due to the increases in storm-water runoff volume which will occur with development of this site, it is recommended that a detailed storm management plan which incorporates erosion and sedimentation control be prepared for this project for town review. This should include road and parking lot storm drains, roof runoff and measures to control hillside runoff. A decentralized system is advisable, which utilizes the topography and natural drainageway present on the site.

Runoff problems would occur mainly in the central and eastern portions of the site as a function of the steep slopes and the cuts and fills that would be required for development. Runoff problems associated with the western section of the site should, by comparison with the other portions of the property, be minimal, as slopes are gentle to moderate. The small wetland area in the southeast section of the site should serve as a natural retention area for runoff mitigating any increases in flow rates and also as a natural buffer, intercepting runoff from the steeper sloped areas to the east, thus protecting the proposed sewage disposal system from surface runoff.

SOILS

A detailed soils map of this site is included in the Appendix to this report accompanied by a detailed soils description and a chart which indicates soil limitations for various urban uses. As the soil map in an enlargement from the original 1,320'/inch scale to 660'/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 sewage disposal, buildings with basements, streets and parking, landscaping, camp sites, picnic areas, playgrounds and trails and paths. 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 interpretations 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.

Soils in the proposal area correlate well with the mapped information, however, there are two exceptions of which the developers should be aware.

An inclusion of Leicester, Ridgebury, Whitman Complex exists on the western side of the property between the HkC mapping unit and the CrC mapping unit. A small seasonal pond exists on the north side of this inclusion. Drainage from this pond flows north and runoff soaks into the ground and/or flows overland. A developed spring feeds a small stream which drains south through the southern half of this inclusion and crosses Baxter Road through a 15" culvert. This area of poorly drained soils should be identified as wetlands on the site plan. The developer should apply to the DEP Water Resources Unit for a permit if activity in this area is anticipated.

The existence of a shallow developed spring and the wetland itself indicates the potential presence of large quantities of ground water in the vicinity of two proposed buildings. Test pits are suggested to determine if a perched water table or ledge are present at the proposed building sites. Subsurface water control measures may be required.

Retaining the wetland area and minimizing disturbance during construction is suggested. The area serves as a natural diversion for both surface and subsurface water and provides protection for the proposed septic leaching fields in the Hinckley soil to the west.

An inclusion of soils with D slopes (25% - 36%) exists between the PdB and CrC mapping units in the central part of the property. The steep slopes will cause problems with road construction and careful planning will be required to install a successful access road.

One alternative might be clustering of buildings to minimize road construction on steep slopes. Proper site preparation, building design, and landscaping would retain the private wooded sites desired by the developers. A shorter road system would be less expensive to construct and maintain.

A private soil consultant should be present when test pits are dug. A detailed soil map and interpretations can be developed which will aid in the design of the project. Wetlands can also be delineated at this time.

Erosion and Sedimentation Controls

A detailed erosion and sediment control plan should be developed and implemented for the site. This plan should be integrated into the stormwater management plan. The Connecticut Erosion and Sediment Control Handbook is an excellent guide for plan development. It is very important to protect the existing wetlands on the site from siltation as removal of silt and debris would be difficult without major alterations of the area.

The site appears to be compatible with the proposed use if an adequate septic system can be designed; and if a site plan for buildings and roadways can be developed which avoids the steep slopes present on the site.

On request the Tolland County Soil and Water Conservation District can provide technical assistance to the developers or the project engineer on development or review of erosion and sediment control and stormwater management plans.

VEGETATION

The tract which is proposed for condominium development can be divided into 3 vegetative units. These include an old field of approximately 3 acres, a mixed hardwood stand of 12 acres and an oak-hickory stand about 24 acres in size.

Large healthy trees and any flowering shrub present, especially in stand 2, should be considered for retention because of their high aesthetic value. The high risk trees, present in stand 2 should be removed prior to development to prevent windthrow after roads and buildings are present. Improvement thinnings in stands 2 and 3 prior to development would reduce crowding, remove high risk trees, result in a healthier, more stable forest over time and produce some revenue.

Vegetation Descriptions

Stand 1: (Old field, 3 acres) This stand is composed of grasses and scattered white pine and hardwood trees between 3 and 12 feet tall. The trees are widely scattered throughout the old field.

Stand 2: (Mixed hardwoods, 12 acres) This stand is composed of red oak, scarlet oak, white oak, hickory, white pine, red maple, and sugar maple. Understory vegetation consists mostly of fern, poison ivy, and oak and pine regeneration.

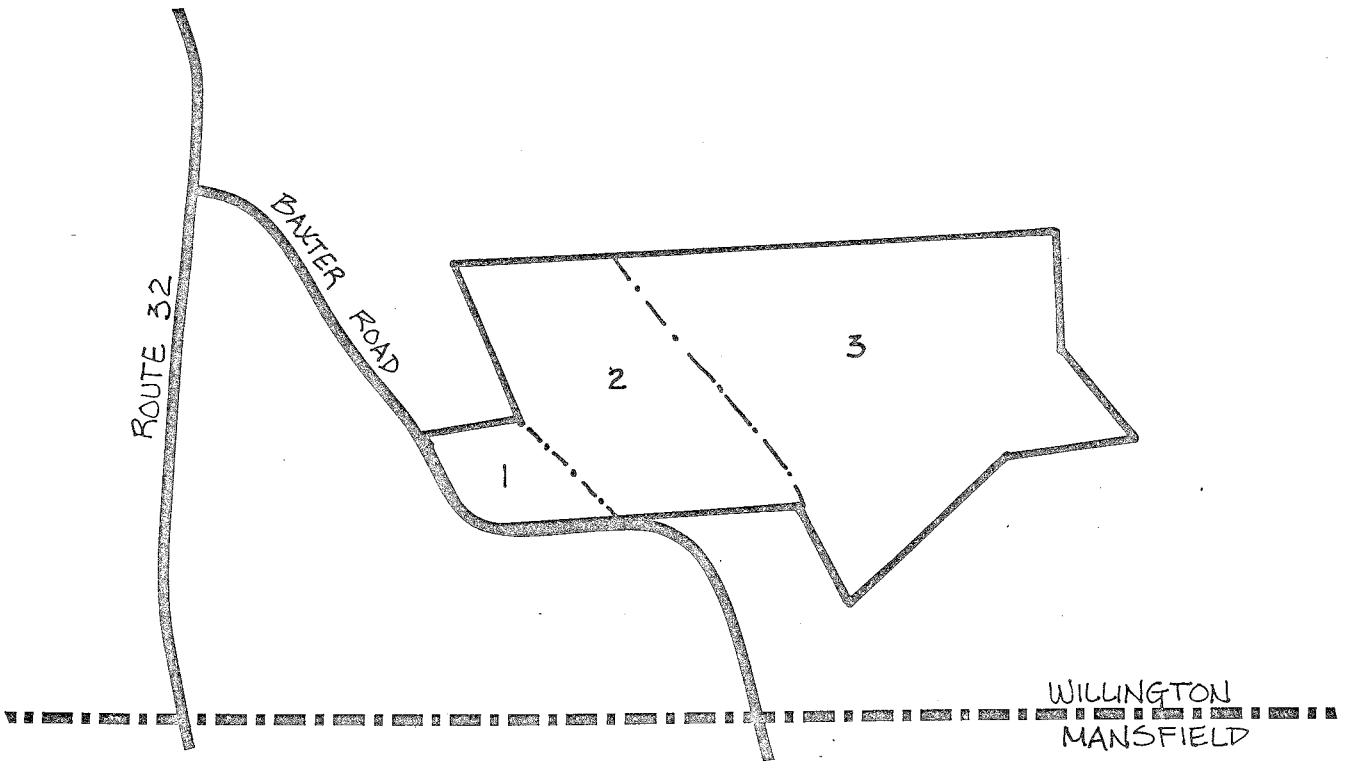
Stand 3: (Oak-Hickory, 24 acres) This stand is composed of 90% scarlet oak with white oak, black oak, red oak, red maple and pignut hickory. Understory vegetation is predominantly oak regeneration and scattered white pine saplings which were severely damaged by recent gypsy moth infestations and may not recover.

Aesthetic Considerations

Many of the large, healthy red oak and white pine in stand 2 have high aesthetic and shade value. The high value trees should be selected for retention and worked into the final site plan for the proposed development.

Trees are very sensitive to the condition of the soil within a 30-40 foot radius from their base. Development practices such as clearing, excavation, filling and root butting for road and building construction can disturb the balance between aeration, soil moisture and soil composition. These disturbances can cause a decline in tree health and vigor resulting in mortality within 3-5 years, windthrow during soaking rains with wind, or limb breakage from ice and snow. Care should be taken during the construction period not to disturb the trees that are to be retained. Special care should be taken near white pine trees because of their shallow root systems. In

Vegetation



STAND 1 (Old Field) 3 acres.

STAND 2 (Mixed Hardwoods) 12 acres, fully stocked, sawtimber size class.

STAND 3 (Oak-Hickory) 24 acres, fully stocked, pole size class.

general, healthy, high vigor trees (red oak and white pine) should be favored for protection over unhealthy trees because they are usually more resistant to environmental stresses brought about by construction.

Where feasible, trees should be retained in small groups or "islands". This practice lowers the possibility of soil disturbance and mechanical injury. Individual trees and "islands" of trees should be temporarily, but clearly marked so they would be avoided during construction. The cutting and removal of understory vegetation on these "islands" will produce aesthetically pleasing "Park-Like" appearance.

Limiting Conditions and Potential Hazards

Windthrow and crown breakage is a potential hazard when harvesting or clearing around white pine. Pines are subject to windthrow in water saturated soils, breakage from ice and snow, and blowdown when trees are removed nearby and the taller, top heavy pine no longer have other trees to rely on nearby for stability. Thinnings near the larger white pine should remove the overmature pine with poor crowns and some of the shorter oaks, retaining the well-formed pines and taller well-formed red oak.

Management Considerations

Trees which are unhealthy and not growing vigorously due to crowded conditions or insect and disease attack are the most susceptible to degradation from environmental stresses and adverse weather. Improvement thinnings, which remove undesirable trees and reduce competition for space, sunlight, nutrients and water between the high quality residual trees, will over time, allow trees to improve in health, fill out their crowns and improve the aesthetic quality of an area. These thinnings, when properly implemented can improve the aesthetic value of an area, improve tree health, improve wildlife habitat conditions, provide wood products and revenue.

The trees present in stand 2 are generally unhealthy once they reach 22 inches in diameter due to poor crowns with not enough needles in the pines to support the growth of a large tree. In this stand some of the largest pine (greater than 20 inch diameter) and the scarlet oaks with lean or crown dieback should be removed. These trees that are showing signs of decline represent about 1/3 of the volume in the stand. These trees could be sold, with the help of a private forester for sawtimber and generate a small amount of revenue.

The trees in stand 3 are not overly crowded, but are showing signs of severe decline with crown dieback from recent gypsy moth caterpillar infestations. Over the next 5 years mortality will increase so that up to 10% of the trees will die. This represents approximately 2 cords of firewood per acre. To reduce the chances of future mortality and improve the health of the forest, a regeneration harvest can take place. Seven to nine cords of fuelwood per acre of the poorest quality trees (total 170-215 cords) can be removed in a Shelterwood Regeneration Harvest. Trees with lean, buttrot, crown dieback and mortality should be sold utilizing the services of a private forester. This type of harvest would promote a new forest to grow in the understory (oaks and pines), provide deer browse and retain the best half of the existing trees which would be well formed and capable of producing seed.

The above proposed harvests should take place prior to development. A public Service Forester or private forester should be contacted to help with the implementation of the suggested thinnings. Trees to be removed should be marked, tallied and sold with payment in advance.

WATER SUPPLY

The proposed condominiums are planned to be served by on-site water supply well or wells, since a public water supply line is not available. It appears that the only aquifer on the site, that is likely to be capable of supplying the condominiums, is a bedrock based well or wells. Since present plans seem to indicate the utilization of a community type water supply, it is strongly recommended that the developers first contact the Public Water Supply Section of the State Department of Health Services to discuss the proposed water supply. The well location, water quality, yield along with plans for pumpage, storage and distribution would also have to be reviewed and approved by the Public Water Supply Section.

As indicated above, the principal aquifer on the site is bedrock. Although bedrock wells are rarely capable of supplying large quantities of water on a sustainable basis, they can supply a small quantity of groundwater. An analysis of selected drilled wells tapping bedrock in the Shetucket River Basin indicated that 90% of the wells yielded at least 3 gpm (gallons per minute) which is usually adequate for most households. However, there were a few wells where the yield was more than 50 gpm and only a few instances where yields of holes drilled in bedrock were insignificant or there was no water at all. (Source: Connecticut Water Resources Bulletin, No. 11, Part 2 Shetucket River Basin). Bedrock transmits water by means of interconnected fractures which tend to be concentrated in the upper 150-200 feet of the rock. The yield of a given well, therefore, depends upon the number and size of water-bearing fractures that it intersects. Because these fractures are unevenly and unpredictably distributed through bedrock, there is no practical way to select a specific site for a bedrock well. For the same reason, the average yield of a group of wells drilled on the property cannot be predicted.

Assuming an average unit occupancy of 4 persons and an average per capita water use of 75 gallons per day, the average daily water demand of the proposed condominium site would be about 10,200 gallons per day, so a total well yield of at least 10 gallons per minute would probably be capable of serving the needs of the development. There was no data, i.e. well completion reports, available to the Team which would indicate whether or not neighboring bedrock wells have attained yields of 10 gpm. Storage facilities 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 be separated as much as possible. This will help prevent the interference of one well with another during pumping.

Wells should be located as far removed from sources of pollution, i.e., septic systems, fuel oil storage tanks, road salt, etc., as possible. They should be located at a relatively high point on the property in a direction which is opposite the expected flow of any pollutants.

The water quality should be good. As explained in the Geology section of this report, some rock layers may give undesirable high concentration of iron and manganese.

Based on Figure 47 of the Connecticut Water Resources Bulletin No. 11, the subject site lies within an area where excess concentrations of iron and manganese are common. The iron and manganese are noticeable by their reddish or blackish, respectively, staining qualities. Filters are available to remove most undesirable mineral induced concentration of elements in well water.

WASTE DISPOSAL

This proposal of 34 condominium units with two bedrooms per unit will generate 10,200 gallons/day of domestic sewage (150 gallons/bedroom). Under Sec. 22a-430 (formerly Sec. 25-54i) of the Connecticut Statutes this development will require a permit from DEP as the flow exceeds 5,000 gallons/day within one property. It should be noted that if any of the six separate building units tie into a common "community septic system" this Department can not issue a permit unless the town forms a Water Pollution Control Authority to insure the effective maintenance and operation of the system.

The following are typical steps in the Department of Environmental Protection permit process:

1. Application
2. Staff tentative determination
3. Public notification of hearing
4. Approval of plans and specifications
5. Construction-preparation of as-built plans
6. Permit to discharge

During the application process it must be demonstrated that the proposed site has adequate land area to accomodate a leachfield system based upon long term acceptance rates, the site has adequate hydraulic capacity, and the discharge will be renovated in quality to drinking water standards prior to crossing property lines or reaching surface waters.

In addition to the above requirements, site review determined a wetland area existing in the vicinity of where two of the units are proposed. This wetland serves as a buffer for hillside runoff and should not be disturbed. These units will have to be relocated to preserve this wetland.

Additional comments concerning septic waste disposal can be found in the Appendix to this report.

PLANNING CONCERNS

Willington's Plan of Development proposes this area be utilized for residential development. The plan recommends a two acre minimum lot size throughout the Town for residential construction (including one unit per two acres for cluster housing). Cluster housing is recommended to be clustered with no more than 4 units per structure. Willington's zoning regulations require 80,000 square foot lots for residences in the R-80 zoning district in which this parcel is located.

The Zoning regulations allow for the Planning and Zoning Commission to designate Designed Development Zones including a Designed Community Residential (DCR) Zone, by petition. This development is proposed under the DCR regulations, which allow two bedroom units at 50,000 sq. ft./unit. This 39.1 acre parcel with 34 units would have 50,094 sq. ft./unit.

Section 4.744 e.2. requires, however, that poorly drained soils not be used in calculating the lot size per unit. A small portion of poorly drained Leicester, Ridgebury, Whitman very stony complex soil (map symbol Lg) runs along the southern edge of the property. Whether this area of soil is large enough to affect the number of units allowed on the parcel can only be determined by knowing how much area is in poorly drained soils.

Site Design

The six buildings planned for development are approximately centered on the site, which should provide adequate buffering from adjacent properties as long as the vegetation in the 200' required setback is retained.

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 take solar orientation into account. The topography of the site could make it difficult and costly to orient buildings toward true south, but within constraints of the topography the building could be oriented in a more northwesterly 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. Section 8-2 of the Connecticut General Statutes states 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 may 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 heal 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)).

The project developers and engineers were amenable to orienting the buildings in a more southerly direction, within the constraints of the topography when it was suggested to them at the site. (Since that discussion, the Team Planner received a revised site plan showing buildings located for solar access.)

The driveway into the site runs perpendicular to the topography between the first five buildings, then turns at the 5th building in a southerly direction and runs with the topography to the uppermost building. As so oriented, the section of driveway more or less between contour lines 530' and 560' may be too steep to efficiently function without substantial cut and fill in constructing the paved surface. (Slope calculated from the site plan indicates a 27% existing grade between contour lines 535' and 560'.)

At the site it was suggested to the project developers and engineers that this upper driveway section be reoriented to avoid this steep alignment. The Planning & Zoning Commission should pursue a driveway alignment which would avoid such a steep grade. The possible solution suggested at the time was to circumvent the steep area by turning the driveway south at approximately the 535' contour line, running the driveway along the contour line then loop the driveway eastward and then northward to access the two uppermost buildings via a switchback.

The revised site plan showing buildings located for solar access also shows the driveway alignment modified in a more southeasterly direction which in effect, lessens the slope of the driveway (22%) on existing grade between contour lines 535' and 560'.

Ultimately the slope of the driveway, as built, will be determined by the amount of cut and fill proposed. This issue will be addressed in the Final Site Plan if the rezoning is allowed. A driveway grade adequate for fire and emergency vehicle access as well as one convenient for residents and snow removal should be sought. Generally, paved roads and highways should not exceed a 10% grade.

The average commercial vehicle can ascend a continuous 17% grade in low gear. Generally such a steep grade is not recommended for any use other than ramps or short driveways. (A local example of a 14% grade is the section of Chesnut Street in Willimantic between Prospect Street and Summit Street.)

In a DCR zone 25% of the site is to be permanently reserved for common open space. This development meets this requirement. However, the DCR regulations also require that 1000 sq. ft. of open space per bedroom "be developed for active and passive recreational use by both adults and children residents in high density residences."

Section 4.744h. defines OPEN SPACE STANDARDS for the DCR zone. The Final Site Development Plan submitted (if the DCR zone is designated) should address these open space requirements, specifically how the open space is to be developed.

A bus stop, as required by 4.744g. should be designed in conjunction with school authorities and operators of the school bus service.

TRAFFIC

Access to this development will be via Route 32 and Baxter Road. Route 32 is a major artery in the region and the town. Average daily traffic (ADT) volume in 1980 on Route 32 from the Route 195/Route 32 intersection to the Mansfield/ Willington town line was 4600 vehicles. ADT for the section from the Mansfield/ Willington town line to Route 74 (formerly 44) was 4,000 vehicles. This proposed condominium development will be accessible only via Route 32 since Baxter Road dead ends.

In Connecticut, condominiums generate a mean of 5.3 trips per day (range of 4.8 - 5.7).* Thus, this development can be expected to generate approximately 180 vehicle trips per day.

Both Baxter Road and Route 32 should be able to accomodate this added traffic easily.**

The intersection of Baxter Road and Route 32 has adequate site line distances to allow safe and efficient traffic flow.

The Regional Transportation Plan for the Windham Region (1976 & 1982 update) cites the need for reconstruction of Route 32 through South Willington. A new segment, west of the existing route which would bypass the center of South Willington was recommended in the 1976 plan. A corridor analysis by WRPA is scheduled for 1983. Such improvements are not currently expected to extend as far south as the Baxter Road intersection. However, such improvements would make travel on Route 32 through South Willington more efficient and ultimately safer.

SERVICES TO SUPPORT DEVELOPMENT

Willington has services typical of 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 and another at Old Farms Road and Y Road. Both of these firehouses are in relatively close proximity to this site. 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.

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

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*Trip Generation Study of Various Road Uses, Supplement A, Israel Zevin, Traffic Statistics Unit, Bureau of Planning & Research, ConnDOT, March 1975.

**See Appendix I, Traffic Volume & Capacity of Selected Town Roads - Windham Planning Region, December 1977.

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.

The developers hope to attract first homebuyers and/or retired persons to this condominium development. If such buyers actually do reside here, then there may be no school age children who would need to be accomodated in local schools.

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 34 proposed units might produce approximately 24 school age children.

However, condominiums generally house families more similar to apartment dwellers than single family home dwellers where numbers 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 34 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.

Solid Waste

Solid waste from the proposed condominium project will probably be disposed of at the Willington town landfill located off Hancock Road. This landfill is one of the last permitted by DEP and its expected useful life is anticipated to be a number of years into the future.

This 34 unit development, like any new residential development, will effectively shorten the life of the landfill. Each person can be expected to generate approximately 0.7 tons of solid waste each year.

The number of persons living in each unit will influence the amount of waste generated.

The developers hope to attract retired persons and/or first homebuyers to these two bedroom condominium units. If this is the case, then two persons per household could be anticipated and therefore 47.6 tons of solid waste per year from the complex.

Average 1980 household size in Willington was 2.77 persons per household, while average family size was 3.27 persons per family. Based on average household size, 65.9 tons of solid waste could be anticipated per year from the complex.

In either case, this development would increase the town's solid waste by 1.5 to 2% per year.

COMPATABILITY WITH SURROUNDING LAND USE

This site is located in an area with a relatively low density of development surrounding the site. A handfull of single family homes exist along Baxter Road interspersed amidt undeveloped tracts of land. A few scattered more densely developed areas exist nearby - Rockridge Condominiums in Mansfield and Barbara Manor in Willington.

The Village of South Willington is approximately a mile from the site and the developing commercial area at the four corners intersection of Routes 195 and 32 is approximately 3/4 mile from the site.

While the proposed development will bring a relatively intense degree of residential development into a previously sparsely developed area, the DCR zone requirements for a 200 foot setback from property lines should maintain the relative rural character of development in the area.

With adjacent landscaping, screening or preservation of existing vegetation, this development should pose no problems of compatability with surrounding land use.

ALTERNATIVE LAND USE

This site lends itself well to the clustered type of residential development which is proposed. A traditional single family home subdivision of large lots (2 acres) would also be suitable, but perhaps difficult to adopt to the topography of this site. A traditional 2 acre subdivision on this 39.1 acre parcel could accomodate approximately 18 lots, thus 18 housing units or approximately half the number of condominium units proposed. Ultimately, the number of people who would live in either type of development would, however, be approximately equal.

The 2 bedroom condominium would generally house 2 person households, thus approximately 68 residents. A single family home subdivision would more probably be developed with 3 bedroom homes; 3.29 persons per family would probably reside in such homes (Willington's average family size), thus the 18 homes could be expected to house approximately 59 persons, or only 9 fewer than the condominium units.

Commercial or industrial development would not be suitable for this site.

Open space uses, always an alternative land use, would be suitable, although the site has few unique attributes to cause it to be utilized as parkland.

OPEN SPACE

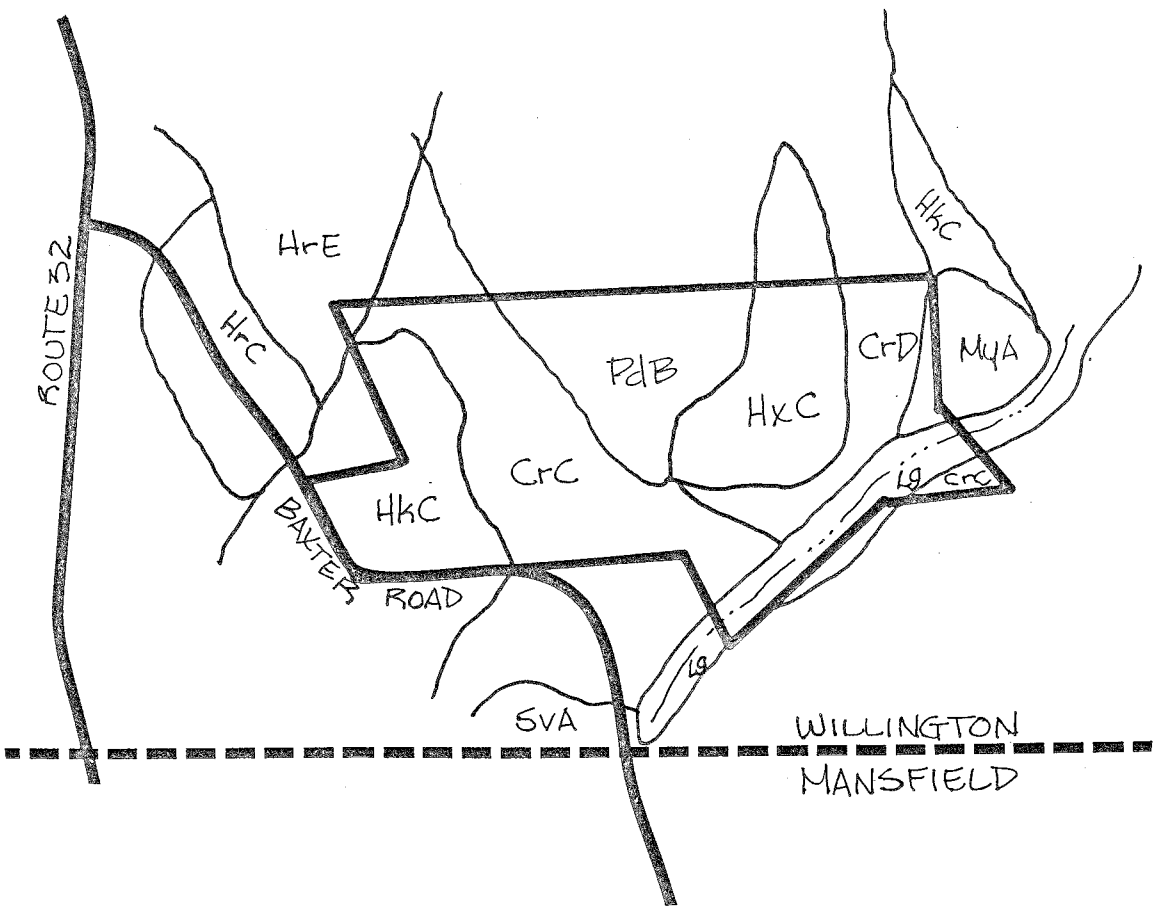
The developers have indicated that the open space on the parcel will be managed as woodland for passive recreation. It is suggested that a consulting forester be retained to develop a forest management plan for the area before any firewood or timber cutting is done. The plan will specify which trees to retain and provide a planting plan to enhance the area for the future owners. An open space plan should also be developed to give the homeowners' association a framework on which to base decisions concerning recreation. This plan can be based on the forester's recommendations.

Appendix

Soils

0 660'
scale

N



ERT - BAXTER ROAD CONDOMINIUM - WILLINGTON, CT

SOILS AND THEIR LIMITATIONS FOR CERTAIN LAND USES

Map Symbol and Soils Series	Septic Tank Absorption Fields	Dwellings with Basements	Roads and Streets	Roadfill	Drainage Class
CrC Charlton very stony fine sandy loam 3-15% slopes	Moderate, Slope	Moderate, Slope	Moderate, Slope	Good	Well Drained
Lg Leicester, Ridgebury, Whitman very stony complex	Severe, Wetness, Stones	Severe, Wetness,	Severe, Wetness, Frost Action	Poor	Poorly Drained
HkC Hinckley gravelly sandy loam 3-15% slopes	Severe, Poor Filter	Moderate, Slope	Moderate, Slope	Good	Well Drained
PdB Paxton stony fine loam 3-8% slopes	Severe, Percs Slowly	Moderate, Wetness	Moderate, Wetness, Frost Action	Good	Well Drained
HxC Hollis extremely rocky fine sandy loam 3-15% slopes	Severe, Depth to Rock	Severe, Depth to Rock	Severe, Depth to Rock	Poor, Area Reclaim, Thin Layer	Well Drained
CrD Charlton very stony fine sandy loam 15-25% slopes	Severe, Slope	Severe, Slope	Severe, Slope	Fair, Slope	Well Drained
MyA Merrimac sandy loam 0-3% slopes	Severe, Poor Filter	Slight	Slight	Good	Well Drained

ERT - BAXTER ROAD CONDOMINIUM - WILLINGTON, CT

SOILS AND THEIR LIMITATIONS FOR CERTAIN LAND USES

Map Symbol and Soils Series	Septic Tank Absorption Fields	Dwellings with Basements	Roads and Streets	Roadfill	Drainage Class
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HkC Hinckley gravelly sandy loam 3-15% slopes	Severe, Poor Filter	Moderate, Slope	Moderate, Slope	Good	Well Drained
PdB Paxton stony fine loam 3-8% slopes	Severe, Percs Slowly	Moderate, Wetness	Moderate, Wetness, Frost Action	Good	Well Drained
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CrD Charlton very stony fine sandy loam 15-25% slopes	Severe, Slope	Severe, Slope	Severe, Slope	Fair, Slope	Well Drained
MyA Merrimac sandy loam 0-3% slopes	Severe, Poor Filter	Slight	Slight	Good	Well Drained

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 consistant 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 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.

ADDITIONAL COMMENTS - ON-SITE SEPTIC DISPOSAL SYSTEMS

The area designated for a comunity on site sewage disposal system would be in the semi-open feild area near the southwest corner. This area had been previously tested by the developer, engineer and the department of Environmental Protection (Water Compliance Unit). A number of monitoring pipes for ground water levels have also been installed. Based on soil service mapping data and site testing, this is generally a well drained area, although at the low point, ground water was relatively high (around 4 feet). Several holes in the wooded terrain, a short distance above the feild area where some of the lower condominium buildings would be located, also has ground water in the range of 4-5 feet. A wet area with an apparent seasonal drainage outlet, was noticable a short distance beyond one of the holes. The steepest terrain is found in the area of the middle two buildings with a continual but more gradual rise, particularly towards the more southerly building of the upper two buildings. No apparent soil testing was done in the upper terrain. However, based on soil data and visual observation, this area apparently has underlying bedrock close to ground surface.

A community or a centralsubsurface sewage disposal system serving more than one building appears desirable, as soil conditions and drainage in the lower area appears to be generally more favorable for a leaching purposes. The sloping terrain would also allow for a gravity collection system. One negative concern, however, may be the highly permeable nature of the soils that do not filter and renovate sewage in the usual range. This could serve as a restrictive factor for some of the parameters to be addressed in the actual desigh of a system.

Subsequent to the review, it was indicated theTown of Willington does not have a local water pollution control agency. It is understood the Department of Environmental protection, as part of the review process for a community sewage system and approval to discharge, would require the town to have such an agency. As a result, this could definetly have an effect on the manner in which the subsurface sewage disposal facilities are planned. Certainly if any other areas, immediate to the various proposed buildings, are considered for leaching purposes, these areas would need to be tested and evaluated. These areas no doubt, due to slope and probable shallow rock, would be much more difficult to utilize, and in some of the areas, conditions may not be suitable.

1. Building Orientation by Itself Can Save Money

Solar energy is a practical, low-cost source of energy that should be considered in the design of buildings and communities. It can be used in a variety of ways including heating domestic hot water, space heating and for the generation of electricity. Regardless of its end use application, solar energy systems require proper orientation to the sun and protection against unwanted shading.

Proper orientation of buildings to the sun and solar access protection have taken on greater importance in recent years as conventional fuels have increased in cost.

A conventional dwelling unit having a normal amount of south facing window area requires 13 to 15 percent less energy to heat than if the same dwelling unit faced due east or west (see Table 1). Of course, the advantages of proper building orientation to the sun become much more important when a dwelling unit is designed for maximum use of solar energy. For example, a recent study of a hypothetical solar dwelling unit in southern New England found that if the solar dwelling unit faced south it would require 13.5 percent less energy than the same dwelling unit facing due east or west.

Table 1

Percent of Heating Supplied by Solar Energy
In a Conventional Dwelling Unit in Southern New England

Orientation from True South in Degrees	Percent of Annual Space Heating Load Supplied
0	13.6
30	11.6
45	9.4
60	6.8
90	1.1

Source: Central Naugatuck Valley Regional Planning Agency, Waterbury, Connecticut

2 Subdivision Design Can Foster the Use of Solar Energy

To a great extent the future of solar energy as a viable energy alternative will depend upon the way neighborhoods are designed today. Where land is developed to foster the natural use of the sun, solar energy systems will be easily incorporated into the design of future homes. Developers, builders, site planners, and surveyors can play a critical role in the long-term growth of solar energy systems by becoming conscious of site design techniques that encourage solar-conscious subdivisions of land.

Figure 3

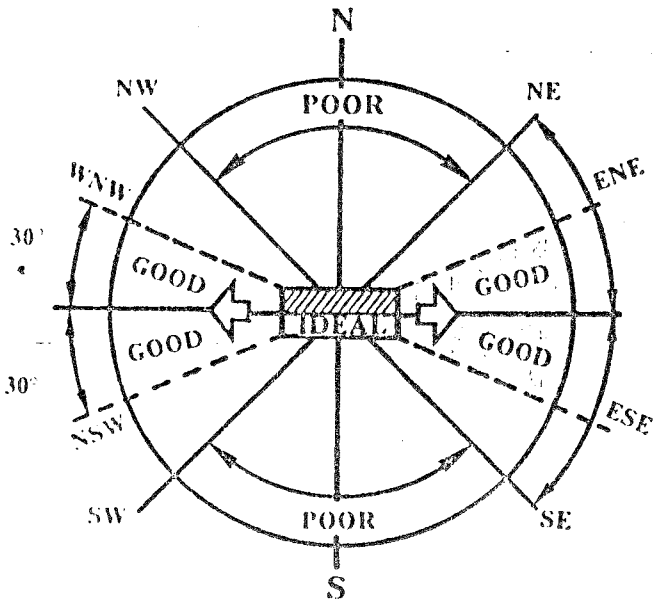
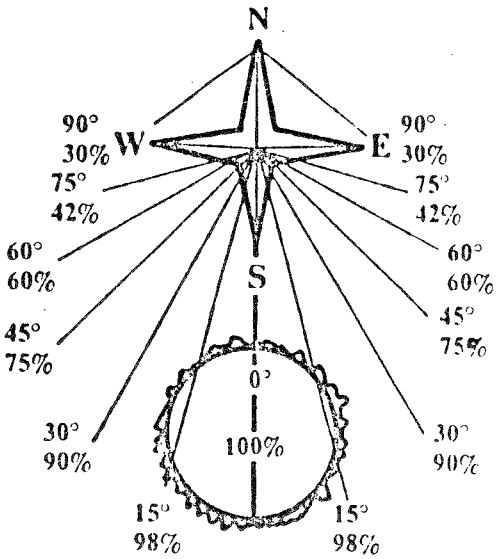


Figure 4



About the Team

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

The Team is available as a public service at no cost to Connecticut towns.

PURPOSE OF THE TEAM

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

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

REQUESTING A REVIEW

Environmental reviews may be requested by the chief elected officials of a municipality or the chairman of town commissions such as planning and zoning, conservation, inland wetlands, parks and recreation or economic development. Requests should be directed to the Chairman of your local Soil and Water Conservation District. This request letter should include a summary of the proposed project, a location map of the project site, written permission from the landowner allowing the Team to enter the property for purposes of review, and a statement identifying the specific areas of concern the Team should address. When this request is approved by the local Soil and Water Conservation District and the Eastern Connecticut RC&D Executive Council, the Team will undertake the review on a priority basis.

For additional information regarding the Environmental Review Team, please contact Jeanne Shelburn (774-1253), Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, P.O. Box 198, Brooklyn, Connecticut 06234.