environmental review team report

ROLLING ACRES ESTATES

Salem, Connecticut

RC & D

EASTERN CONNECTICUT
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

ASSISTED BY: U.S. DEPARTMENT OF AGRICULTURE,
SOIL CONSERVATION SERVICE AND COOPERATING AGENCIES

ENVIRONMENTAL REVIEW TEAM REPORT
ON
ROLLING ACRES ESTATES
SALEM, CONNECTICUT

SEPTEMBER, 1976

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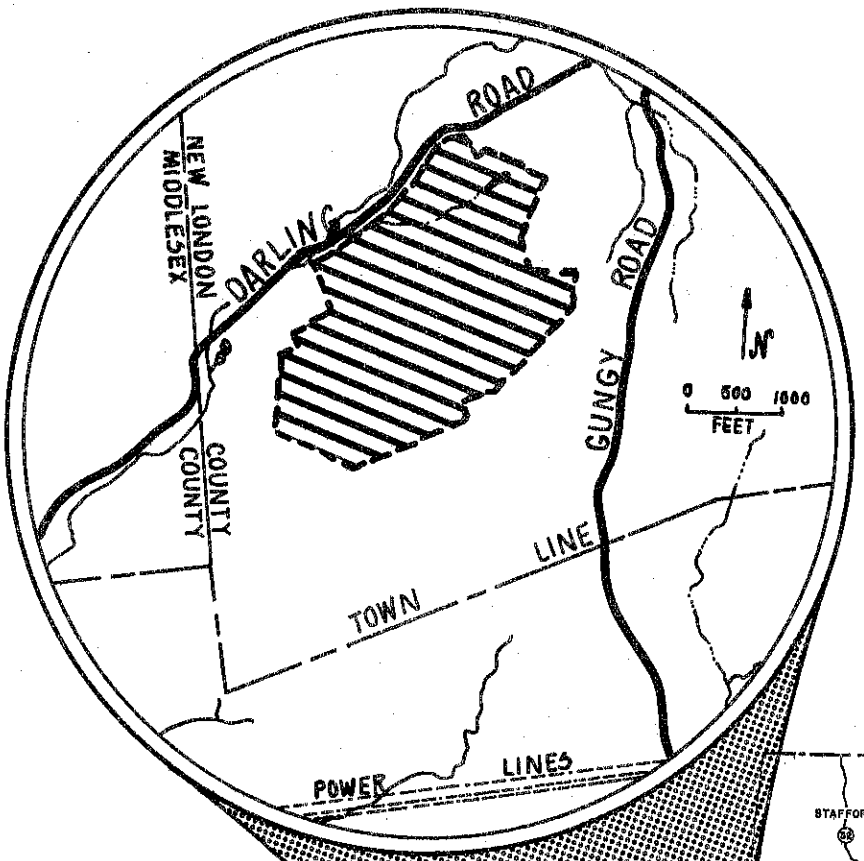
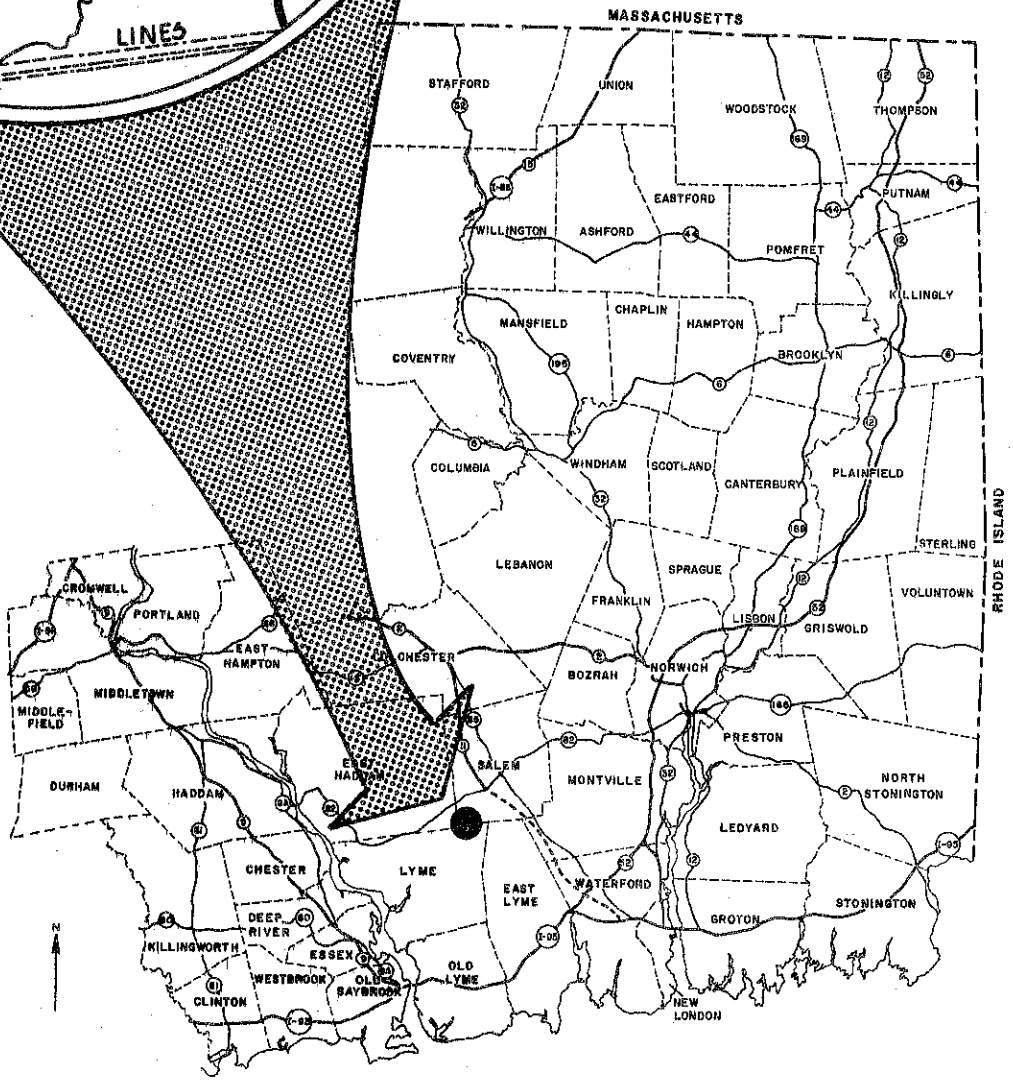
EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT PROJECT
Environmental Review Team
139 Boswell Avenue
Norwich, Connecticut 06360

LOCATION OF STUDY SITE

ROLLING ACRES ESTATES
SALEM, CONNECTICUT





EASTERN CONNECTICUT
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

ENVIRONMENTAL REVIEW TEAM REPORT
ON
ROLLING ACRES ESTATES
SALEM, CONNECTICUT

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

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

The ERT that field-checked the site consisted of the following personnel: Sherman Chase, District Conservationist, SCS; Allan Williams, Geographer, Connecticut Department of Environmental Protection (DEP); Donald Capellaro, Sanitarian, Connecticut Department of Health; Thomas Seidel, Regional Planner, Southeastern Connecticut Regional Planning Agency (SCRPA); and Linda Simkanin, ERT Coordinator, Eastern Connecticut RC&D Area. Also contributing to the report: Richard Hyde, Geologist, DEP.

The Team met and field-checked the site on Thursday, July 22, 1976. Reports from each Team member were sent to the ERT Coordinator for review and summarization for the final report.

This report is not meant to compete with private consultants by supplying site designs or detailed solutions to development problems. This report identifies the existing resource base and evaluates its significance to the proposed development and also suggests considerations that should be of concern to the developer and the Town of Salem. The results of this Team actions 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: Miss Linda M. Simkanin, Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, 139 Boswell Avenue, Norwich, Connecticut 06360, 889-2324.

INTRODUCTION

The Eastern Connecticut Environmental Review Team was asked to review approximately 107 acres of land for which is proposed a 70 lot single-family home subdivision. The preliminary plans carve the site into lots just slightly larger than one acre each.

At the time of the review, five houses were under construction on property fronting along Darling Road. The remainder of the site is presently undeveloped and is zoned for residential use on one acre lots. Water retrieval and sewage disposal would have to be developed on-site. The present land uses include wooded upland slopes, with half of the site exceeding a 15% grade. Some intermittent streams drain portions of the property.

Some aspects of the proposed development discussed by the Team involve on-site sewage disposal. Due to slope and soils conditions, it appears necessary to locate these systems first before establishing lot lines. In addition, the proposed density of 70 one acre lots appears too high given the site limitations. An erosion and sediment control plan is also advised.

The report will also describe the natural characteristics of the site including topography, geology, soils, and forest cover. Consideration will be given to the compatibility and suitability of the proposals relative to the natural resource base. Comments or recommendations made within the report are presented for consideration by the developer and the town in the preparation and review of the development plans, and should not be construed as mandatory or regulatory in nature.

TOPOGRAPHY AND GEOLOGY

The site under review in Salem is located in the southwest corner of the Town. As illustrated on the TOPOGRAPHY MAP on the following page, approximately one-half of the site is characterized by a rugged terrain with slopes exceeding 15%. The broad hilltop exhibits much less variation in topography. Much of the hilltop area is seasonally wet as a high water table appears to be supported in the thicker low permiability tills.

Surficial Geology

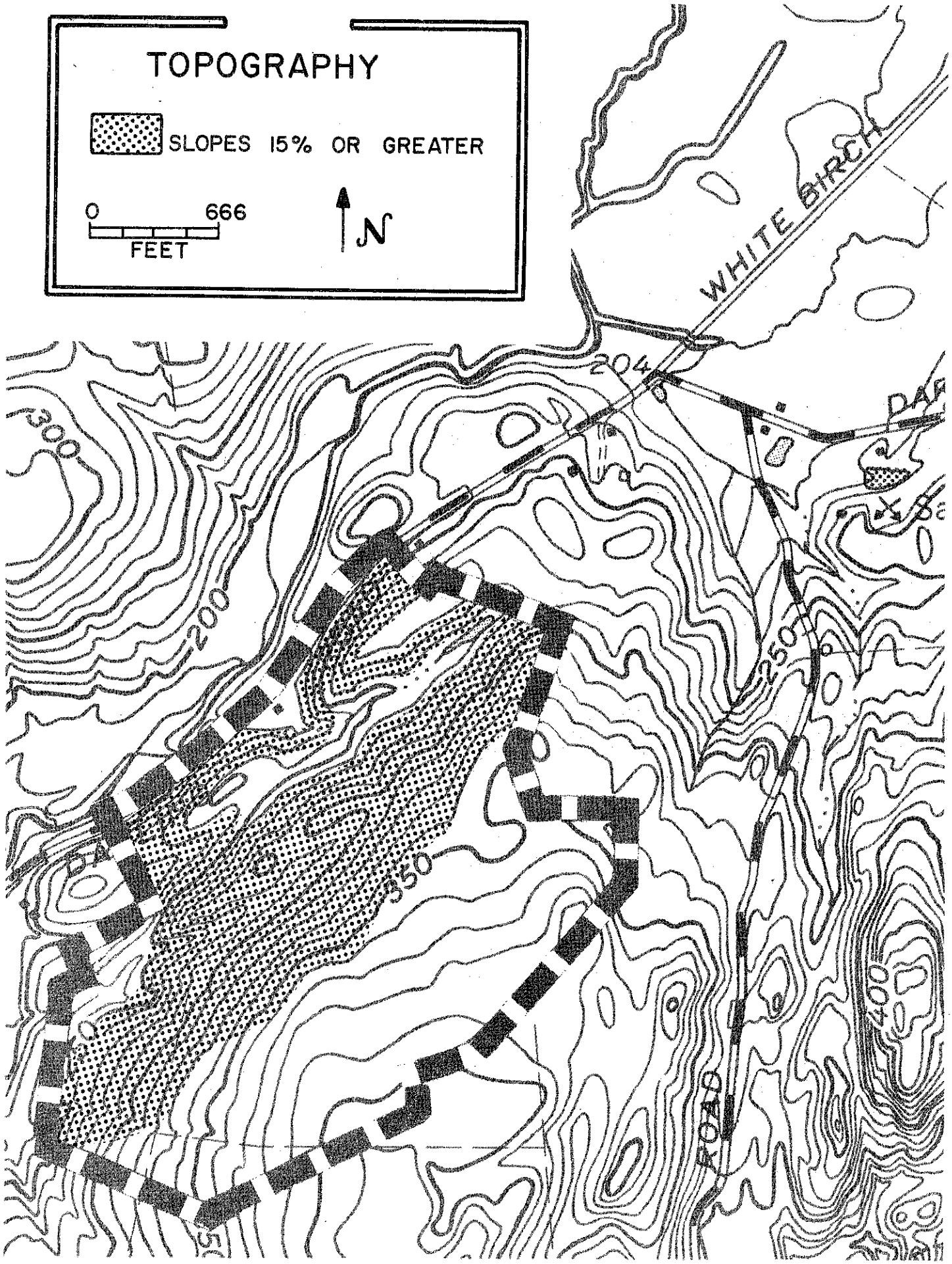
In terms of the overburden, the primary unconsolidated deposits lying on top of the bedrock surface, examination of test pits and disturbed areas around the house construction sites indicates the area is underlain by a material called glacial till by the geologist. From this parent material, the various soil types develop in the 3 to 5 feet below the land surface depending on such local factors as slope, drainage, and thickness influence soil profile formation. Glacial till is the predominant overburden found in Connecticut, particularly in the eastern and western uplands. It was formed when glacial ice melted releasing the debris that was trapped on, in, and that which was pushed along under the active ice. As melting occurred some of these particles were carried away by the meltwater streams to form the stratified sand and gravel deposits primarily found in stream valleys, but much of the debris just cropped in place once glacial activity ceased. This property is located in such an area. By definition till, "hardpan" or "boulderclay", terms more commonly used by the non-geologist, is a heterogeneous material composed of various mixtures of boulders, gravel, sand, silt, and clay particles, none of which are significantly sorted or stratified according to their grain sizes, as is the case with waterlain and windblown deposits. To restate, till is simply the mass of various size particles that remained in place after all glacial ice melted.

The thickness of till overburden varies from place to place but averages 10 feet to 15 feet throughout the state. Based on the locations of exposed bedrock in the area and the depth of overburden materials as indicated by the test holes dug on site, it appears that much of the property probably is consistant with the 10 feet to 15 feet state average. As a general rule, however, overburden thickness decreases toward higher land to the southeast. Bedrock outcrops are exposed along the top of the hill and in the steep areas off the property to the southeast. A few scattered outcrops may be found along the northwestern flank.

Bedrock Geology

The bedrock outcrops mapped at the top of the hill, along the southeastern margin of the property, by Mr. Lawrence Lundgren in his "Geologic Map of the Hamburg Quadrangle" QR No. 19, indicated the rock trends in a north by north-easterly direction and dips to the northwest, plunging into the earth, at an angle ranging from 25° to 50°. Most of the property, except along the southeast boundary, the type rock falls into the Mamacoke Formation; a light to dark gray quartz-feldspar-biotite gneiss in which biotite (10 to 20 percent) is evenly distributed. A gneiss is a coarse-grained crystalline rock in which bands rich in granular minerals alternate with band of flat and platty minerals.

At the top of the hill the Plainfield Formation rocks begin. These are well-bedded gray to white quartzites and micaceous or feldspathic quartzites. Quart-


TOPOGRAPHY
SLOPES 15% OR GREATER
0
666
FEET
N
WHITE BIRCH
204
300
200
250
350
400
ROAD

zites are rocks, as gneisses, formed under extreme temperature and pressure, but is composed predominately of the mineral quartz.

Both the gneiss and the quartzite are sturdy rocks and present no difficulty in terms of foundation support. The only problem area with such rocks is where the slope of the land is parallel with the dip, osplunge, of the rock as is the case with some areas upslope from Darling Road. Where bedrock is exposed in this area, none, however, was observed. There is potential for rockslides to occur as a natural peeling off. If rock in this area is uncovered and left exposed, there is a possibility for frost action combined with natural ground water movements down slope to create a situation condusive to rocksliding.

SOILS

A detailed soils map of the properties is given in the Appendix to this report. As the map is an enlargement from the original 1320'/inch scale to 660'/inch, the soil boundary lines shown should not be viewed as absolute boundaries, but rather as guidelines to the distribution of soil types on the property. The soils map, along with the Special Soils Report, Southeastern Connecticut Region (USDA, SCS, 1969), can serve as an educational tool regarding the identification and interpretation of soils. The natural soil group is also given for each soil. The Natural Soil Group Report published by SCS and the New London County Cooperative Extension Service provides a clear explanation of the natural soil groups.

With the examination of the soils map, and the accompanying chart indicating general soils limitations for various land uses (also found in the Appendix), a correlation between the soils and the surficial geology can be seen. The Rolling Acres property is primarily composed of soils in Natural Soil Group "C". These "C" soils are upland soil types over compact glacial till (hardpan). Of the soil series representative of the site, there are Montauk, Woodbridge, and Paxton.

The Montauk series (C-1a), are well drained upland soils with slowly to very slowly permeable fragipan at depths of 30 to 40 inches. The subsurface and subsoil textures above the fragipan are very friable to friable fine sandy loams. There may be a temporary perched water table above the fragipan in wet seasons. This was observed in the field and mentioned in the section on surficial geology. Because of restricted internal drainage water moves laterally down the slope over the pan in wet seasons and after heavy rains. Montauk soils are on slopes ranging from gently sloping to steep.

The Woodbridge series (C-2a), are moderately well-drained upland soils with a slowly permiable fragipan at about 2 feet in depth. Surface and subsoil textures above the fragipan are friable fine sandy loams. The lower subsoil is mottled, indicating a waterlogged condition from late fall until spring and after heavy rains in summer. These soils are moderately permeable above the fragipan. Water moves laterally down slope over the fragipan in wet seasons. Woodbridge soils are on slopes ranging from nearly level to sloping. The greater portion of these soils, however, are on slopes of 2 to 8 percent. Surface stoniness varies from essentially stone-free on areas where stones have been removed to extremely stony.

The Paxton series (C-1e), are well-drained soils with a slowly to very slowly permeable fragipan at about 2 feet in depth. The surface and subsoil textures above the fragipan are very friable to friable fine sandy loams. The fragipan

restricts internal drainage. A temporary perched water table may form above the fragipan in wet seasons and after heavy rains. Seep spots occur seasonally on slopes as water moves laterally down slope over the pan. Paxton soils are on slopes ranging from gently sloping to steep. Surface stoniness varies from essentially stone free on areas where stones have been removed to extremely stony. The Paxton soils are associated with moderately well drained Woodbridge, poorly drained Ridgebury, and very poorly drained Whitman soils.

The most imposing site limitations are the steep slopes and the hardpan soils. Homes can be designed for slopes, and they can also be located on less steep portions of the property. Steep slope areas should be avoided if possible when locating on-site septic systems. The Water Compliance Unit of DEP should be contacted where septic systems will be constructed on slopes of fifteen percent or greater. Steep slopes combined with the fragipan both along Darling Road and elsewhere on the site may suggest that homes be protected with curtain drains or similar devices, especially where homes are placed in a deep cut. The hardpan will cause the water table to rise during times of heavy rainfall and this is one reason for the moderate to severe ratings for on-site sewage and basements. Subsurface sewage disposal systems can be designed to function satisfactorily in hardpan soils. Engineering provisions must be made to compensate for the soil limitations.

Provisions should also be made to prevent excessive erosion and sedimentation during development. Therefore, it would be desirable to have a plan for erosion and sedimentation control prior to further development on-site. The change from overgrown pasture and woodland to development will increase the run-off during storm flow. Provisions should be made to accommodate the added runoff without causing harmful effects on land users within the watershed's downstream area. In areas where homes and roads are planned, sediment and erosion control plans should be developed and implemented. Components of effective sediment and erosion control include, but are not limited to, keeping much of the area under existing vegetative cover and keeping areas devoid of cover exposed for the shortest practical period of time. Permanent roads should be installed as early as possible. Temporary seeding and munching may be necessary if development becomes protracted. Also with regard to stream run-off, the Team questions whether the existing road culvert on Darling Road is capable of handling the increased run-off post-development. The subdivision plan should also design for surface water control.

FOREST COVER

Vegetation over the entire site is primarily mixed deciduous hardwood trees with occasional conifers scattered throughout. The understory consists of sparse to moderately dense understory plants including hardwood sprouts, shrubs, and vines. Wetland plants are common along the stream in poorly drained areas. In an area of suspected perched water table on one of the broad hilltops of the site, there was an extensive stand of red maples - a good indicator of a high water table. Many old field types including cedars cover the steep slopes along Darling Road.

AESTHETICS AND PRESERVATION

While the area is not recognized in the Connecticut Natural Areas Inventory, the site does provide aesthetically pleasing surroundings, and appears to support a varied wildlife. Numerous deer tracks, especially along the intermittent stream watercourse in the 43M soil area were observed in the field.

The proposed development is located in a low density residential, agricultural, undeveloped area of Salem. The Region's 1968 Historic Preservation Plan described the area as particularly scenic enhanced by the lineal distribution of predominantly Colonial houses along Darling Road. The State Plan of Conservation and Development depicts the area as suited for limited development. This means that the area is planned to remain open or developed at low densities with all uses served by on-site disposal systems. The State Plan also depicts the East Branch Brook north of Darling Road as a proposed open space and recreation area. The USDA, SCS also identifies East Branch Brook as a streambelt in its streambelt report for the Town of Salem. This report also indicates that the portion of East Branch Brook near the Salem-Lyme town line is the upstream end of a potential water impoundment site identified in the Connecticut River Basin Study.

Either of the above proposed uses for the Brook would argue for an erosion and sedimentation control plan for the proposed development so that during and after construction the storm water drainage does not affect the quality of water in the Brook. Controlling storm drainage runoff will also preserve the scenic qualities of the Brook which is a definite asset to southwest Salem.

Section 8 of the Salem subdivision regulations requires 5% of a development over 50 acres to be dedicated open space unless 90% of the lots exceed 50,000 square feet each. In the preliminary subdivision plan examined by the Team, 35 lots exceed 50,000 square feet and 38 are 50,000 square feet or less. Unless this is changed so that 66 lots (90%) exceed 50,000 square feet, then 5% of the total tract or about 5.4 acres will have to be dedicated to open space and recreation uses under the existing subdivision regulations.

HAZARDS

Since there is no flood potential hazard for the site, the major hazards include some areas of excessively steep slopes (greater than 15%), and the widespread presence of fragipan. The fragipan creates a situation where permeability above the hardpan is moderate but ground water is drastically reduced from percolating freely into the pan below. Often during wet times of the year, excess water in the soil moves down slope, above the hardpan, flooding basements and interfering with proper operation of septic leachfields if curtain drains are not incorporated in the overall site design. Additional difficult conditions associated in hardpan soils include their easy succeptability to erosion especially on steep slopes when the vegetative cover has been removed in the construction and landscaping process. Care should be taken to minimize the area exposed to only that necessary for immediate construction. In addition, once stripped of cover the land should be quickly utilized and landscaped to minimize erosional problems. The perched water table present on some hilltop areas should also be of concern when designating lots.

ROADS

Darling Road will provide the only access to the proposed development. This is a narrow local street with scattered low density residential development and agricultural uses along it. East of the proposed development, Darling Road and White Birch Road lead to Route 82 and Route 11 about 1.5-2 miles each of the site. To the west Darling Road intersects Route 156 about 2 1/2 miles from the site in Lyme. If traffic increases in the future from the two proposed roads entering and exiting onto Darling Road, circulation could be improved by extending the eastern cul de sac from the top of the development east to join Gungy Road. This would permit another means of access for service vehicles such as fire trucks, school buses, oil trucks, snow plows and ambulances as well as automobiles.

It is not good planning to design long roads on a grade steeper than 8%. Section 7 of the Salem subdivision regulations allows for a maximum grade of 10%, therefore the Planning and Zoning Commission should examine the preliminary subdivision plan since the road planned at present exceeds a 10% grade.

WATER SUPPLY

As the proposed Rolling Hills Estates subdivision lies beyond any public water systems indicated in the Regional Water Supply Plan, water will have to be provided on-site.

On-site water supplies may be obtained from the bedrock aquifer. The bedrock is relatively hard and dense and composed of tightly interlocking mineral grains which do not contain a high percentage of interconnected pare space. Consequently, wells drilled in rock of this type are almost completely dependent on the water flowing through joints or cracks in the rock that the well shaft happens to intersect. If the well is located in an area where numerous large openings occur below the water table, then water yields will tend to be high. But, if few openings exist then the amount of water potentially available will be low. Except in cases of fault zones, which may extend deep into the earth, the greatest number of rock openings are formed between 200 to 250 feet down. Below this point the weight of the overlying rock tends to decrease the possibility for openings to exist. As a general rule, the capacity for rock to yield water to a well decreases with depth. Statistically, crystalline bedrock in this area of the state will yeild at least 3 gallons of water per minute in 75% of the cases.

The Team was informed that individual drilled wells were planned for the five houses presently under construction along Darling Hill Road. Assuming that individual wells will be the developers choice for the entire development, the wells should be located towards the higher portion of the lots, keeping them removed from local sources of pollution. In general the direction of ground water flow is usually similar to that of the surface flow. Drilled wells will normally yield sufficient water in order to meet the average daily water consumption for the domestic needs of single family dwellings. In addition to having a safe water supply, the mineral content should be such that the water does not impart a disagreeable taste, cause staining or otherwise have undesirable properties. Where high concentrations of iron and/or manganese are present, treatment of the water will be needed.

The alternate to having individual wells would be the installation of a central or public water supply. While such a system has certain advantages, it would not seem economically feasible for the proposed development due to an extensive distribution system. The main considerations in such a system, however, are the proper location of the well(s) (protection-control radius) from potential sources of pollution, adequate yield to provide sufficient water for the size and needs of the project, and obtaining water of acceptable sanitary and mineral quality. The most desirable area for a system (excluding possible yield) would be the upper terrain, which would be relatively unencumbered from sewage disposal and which should also benefit from gravity flow.

WASTE DISPOSAL

The proposed subdivision lies beyond any public sewerage systems proposed in the Regional Sewerage Plan. Consequently, sewage disposal would have to be developed on-site.

Soil survey mapping data, visual observations and consideration of the sloping topography would indicate that conditions in general are not particularly suitable for subsurface sewage disposal. A large percentage of the hillside is apparently underlain with hardpan soil which can restrict the downward movement of water and/or sewage effluent. This coupled with a steep slope can cause the effluent to travel laterally with possible problems occurring downgrade of a system. Several test pits which had been previously dug indicated the hardpan layer began at varying depths and that the hardpan itself did not appear to be excessively compacted, as is sometimes the case. The lower to middle portion of the property tends to have the greatest slope and several crossing watercourses. The upper easterly part appears to be wet with evidence of a seasonal drainage or watercourse which follows down the hillside, eventually joining one of the main streams (above the area of the existing older house on Darling Road). In light of the soils on this site with slope, high-water table, and fragipan limitations it is recommended that the percolation tests be conducted in March or April, and that provisions be made in the design of the septic systems to compensate for these soil limitations.

In considering a possible subdivision on this property, the overall density level should be of prime importance. Where there are a number of adverse factors to contend with, one acre or slightly larger lots does not in general afford sufficient area. More detailed site investigations should be made of possible sites which may be suitable for subsurface sewage disposal systems. The subdivision in turn should then be layed out to reflect this basic information.

It was noted the location of the houses in Section I of the subdivision for sewage disposal, was not particularly good. In most cases if the houses had been set back farther from the road or building line more area would have been available for sewage disposal. In addition the slope and cut on some of these lots for driveways also imposed restrictions. With better planning of the house sites in terms of topography, property lines, driveways, etc., sewage disposal would have been greatly simplified, knowing it was being placed to its surroundings. Given the site limitations for on-site subsurface sewage disposal, it appears necessary to locate septic systems first before establishing lot lines.

SERVICES TO SUPPORT DEVELOPMENT

Supporting commercial development exists in Colchester, Norwich, and the Montville-New London area. With the future extension of Route 11 to Route 161 in Montville, travel to East Lyme, Waterford and New London will be easier. Since no public transportation is planned for the Salem area, the private automobile will be the primary means of transportation.

The Salem elementary school is located about 3 1/2 miles east of the proposed development on Route 85, while the nearest fire department in Salem would be about 4-4 1/2 miles on Route 85 in Salem. The Chesterfield fire department in Montville would be about 5 - 5 1/2 miles as would the fire department in Lyme at Hamburg. All of these fire departments are located at the extremity or beyond the recommended safe service radius for fire protection, a factor to be considered in the local review process.

SURROUNDING LAND USES AND ALTERNATIVE USES

Surrounding land uses are low density, scattered residential, agricultural, and undeveloped. The Salem Town Plan recommends this area for low-intensity uses such as large lot scattered residences, agriculture, recreation-open space or undeveloped. All of these intended uses are intended to preserve the rural character of the town. Even though the lots proposed are larger than an acre, the cumulative effect of 73 houses on 108 acres in a conventional subdivision will be to change the immediate area from rural to suburban in character.

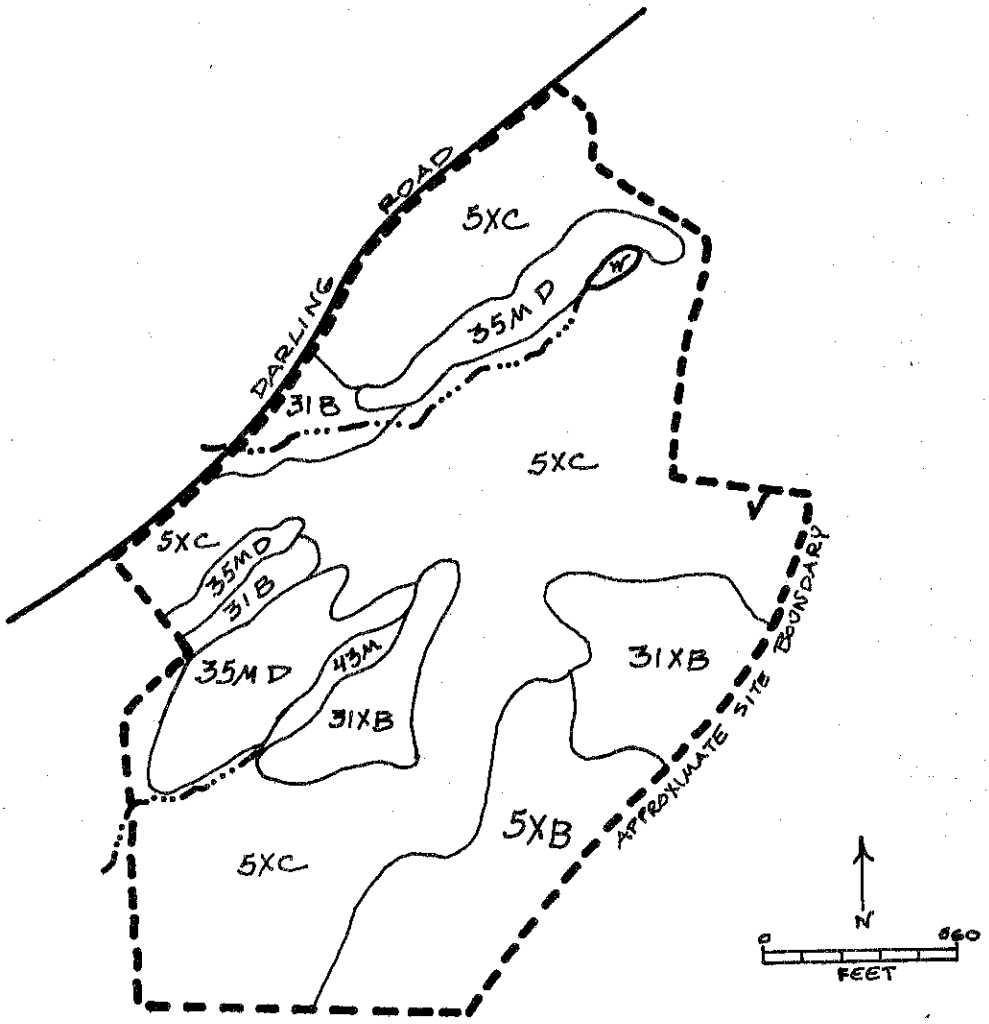
One possible alternative use would be undeveloped. The area is too forested to be used for agriculture. The area lacks utilities and major arterial access to be used for large commercial or industrial uses. The challenge will be to design the development taking into account the limitations imposed by the slope and soil conditions so that the rural character and attractiveness of the area can be maintained and not lost in the development process.

APPENDIX

SOIL MAP

ROLLING HILLS ESTATES

SALEM, CONNECTICUT



The map is an enlargement from the original 1320'/inch scale to 660'/inch.

Prepared by: UNITED STATES DEPARTMENT OF AGRICULTURE, Soil Conservation Service.

ADVANCE COPY, SUBJECT TO CHANGE. *JUNE, 1976*

SALEM: ROLLING HILLS ESTATES SUBDIVISION

PROPORTIONAL EXTENT OF SOILS AND THEIR LIMITATIONS FOR CERTAIN LAND USES

Soil Series	Natural Soil Group	Soil Symbol	Approx. Acres	Percent of Acres	Principal Limiting Factor	Urban Use Limitations*			
						On-Site Sewage	Buildings with Basements	Streets & Parking	Land-Scaping
Montauk	C-1a	5XB	13.5	12.6	Fragipan	3	2	2	2
Montauk	C-1a	5XC	64.0	59.5	Fragipan,slope	3	2	2	2
Woodbridge	C-2a	31B	4.3	4.0	Wet	3	2	2	2
Woodbridge	C-2a	31XB	12.2	11.3	Seasonal high water table	3	2	2	2
Paxton	C-1e	35MD	12.4	11.4	Stony,slope	3	3	3	3
**Leicester-Ridgebury Whitman	B-3b	43M	1.2	1.2	Highwater table,stony	3	3	3	3
TOTAL:			107.6	100%					

* Urban Use Limitations: 1 = slight; 2 = moderate; 3 = severe (see back of this page for a further explanation of limitation classifications).

** Public Act 155 Inland wetland 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.