

**environmental review team report**

**brown  
property**

SPRAGUE,  
CONNECTICUT



**EASTERN CONNECTICUT  
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT**

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

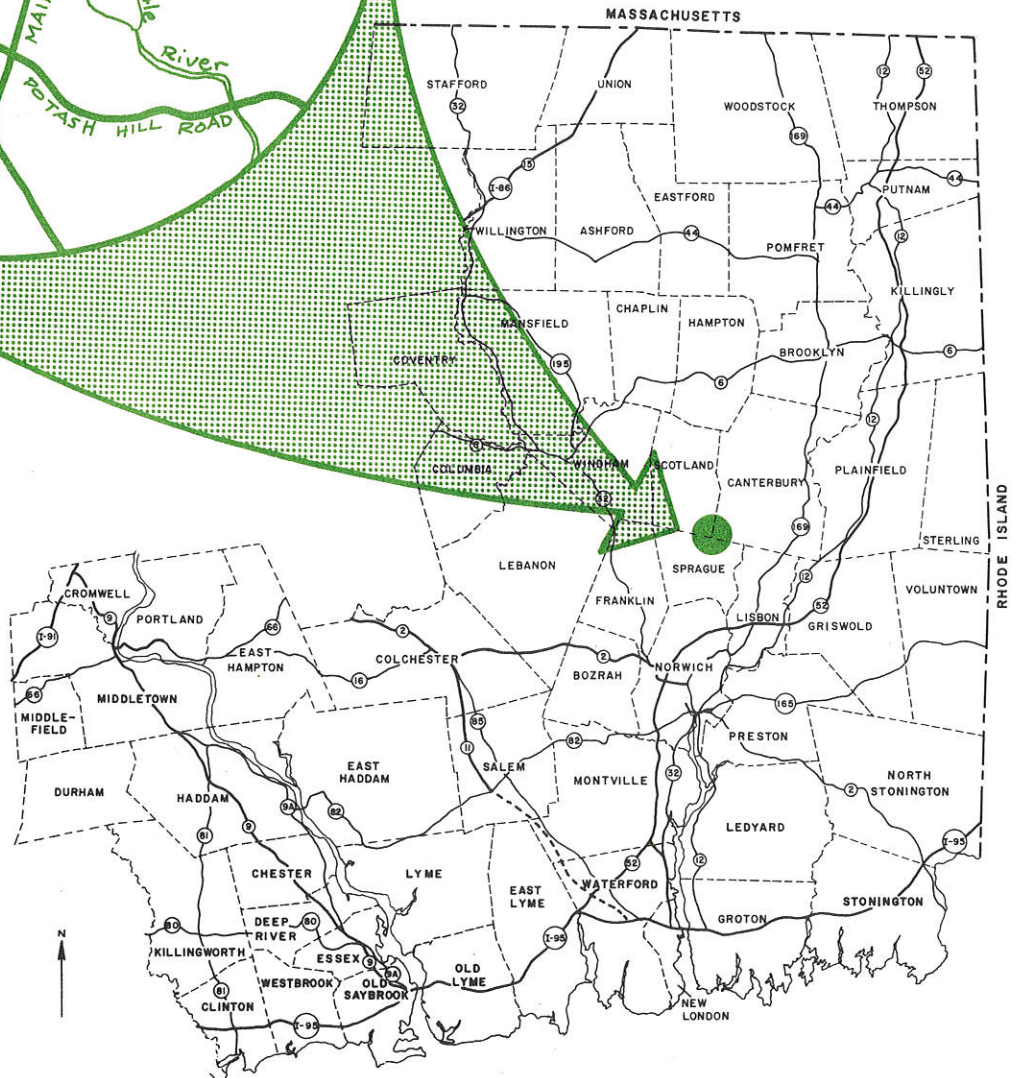
ENVIRONMENTAL REVIEW TEAM REPORT  
ON THE  
BROWN PROPERTY  
SPRAGUE, CONNECTICUT  
MAY, 1974

*Preparation of this report has been,  
in part, assisted by a grant from the  
New England Regional Commission  
administered by the  
Southeastern Connecticut  
Regional Planning Agency*

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

# LOCATION OF STUDY SITE

**BROWN PROPERTY  
SPRAGUE, CONNECTICUT**



**EASTERN CONNECTICUT  
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT**



ENVIRONMENTAL REVIEW TEAM REPORT  
ON THE  
BROWN PROPERTY  
SPRAGUE, CONNECTICUT

This report is an outgrowth of a request from the Sprague Planning and Zoning Commission, with the approval of the owner, George M. Brown, 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) Executive Council for their consideration and approval as a project measure. The request has been approved and the measure reviewed by the Environmental Review Team.

The soils of the site were mapped by a soil scientist of the USDA Soil Conservation Service. Reproductions of the soil survey and a table of limitations for urban development were forwarded to all members of the Team prior to their review of the site.

The Team that reviewed the proposed development consisted of the following personnel: Sherman C. Chase, District Conservationist, Soil Conservation Service (SCS); Dennis Hutchison, Soil Scientist, SCS; Edwin L. Minnick, Engineering Specialist, SCS; Richard Hyde, Geologist, Natural Resource Center, State of Connecticut Department of Environmental Protection (DEP); George F. Cloutier, Forester, DEP; Joseph Piza, Fisheries Biologist, DEP; T.E. Linkkila, Wildlife Biologist, DEP; Donald Capellaro, Principal Sanitarian, State of Connecticut Department of Health; Rudy Favretti, Landscape Architect, Connecticut Cooperative Extension Service; Thomas H. Seidel, Planner, Southeastern Connecticut Regional Planning Agency; Barbara A. Hermann, Team Coordinator, Eastern Connecticut RC&D Project.

The Team met and reviewed the site on April 18, 1974. Reports from each Team member were sent to the Team Coordinator for review and summarization.

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 both the Town of Sprague and the developer. 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 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 Barbara A. Hermann (889-2324), Environmental Review Team Coordinator, Eastern Connecticut RC&D Project, 139 Boswell Avenue, Norwich, Connecticut 06360.



## INTRODUCTION

The development proposed for the property of George M. Brown on Salt Rock Road, immediately west of the village of Hanover, consists of approximately 80 single bedroom condominiums on a parcel of land about 50 acres in size. Rather than utilizing the whole property for the buildings, the developer proposes to cluster the units to one side of the property, leaving the remainder for open space and recreation. Also shown on the preliminary plans is the creation of a second man-made pond in the wetlands, just north of an existing man-made pond.

The wetlands on the site extend in a north-south direction through the center of the property, thereby forming a natural separation between the upland areas to the east and west. The preliminary plans showed the development on the west and the open space area to the east. The plans were laid out in this manner because of the difficulty of establishing access to the eastern portion of the site. Since the original plans were drawn up, an additional property along Salt Rock Road has been purchased, from which access could be established onto the eastern side.

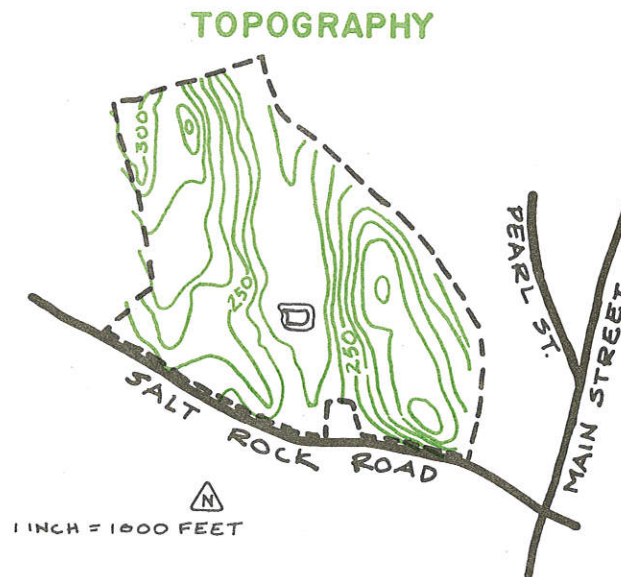
Therefore, in evaluating the proposed development of this site, the Team not only concerned itself with the various aspects of development, but also with the overall question of whether the plans should be reversed so that the eastern portion of the site would be developed and the western portion left as open space. The following report will start with a description of the physical resources of the site, followed by a phase-by-phase discussion of the proposed development. Recommendations or comments made within this report are presented for consideration by the developer and town in the preparation and review of the development plans and should not be viewed as mandatory or regulatory in nature.

## EVALUATION



## PHYSICAL RESOURCES OF THE SITE

Topographically, as can be seen on the map below, the property is relatively level with few steep slopes in its western and central thirds. The eastern third is a small elongated hill trending northwest by southeast which is approximately 40 to 50 feet above Salt Rock Road. The hilltop is broadly undulating and has been cleared for agricultural purposes. Steeper slopes, up to 15% or more in places, are mainly restricted to the hill margins. Large boulders are quite numerous over most portions of the site, particularly around the base of the hill and in the western and central sections.



Geologically, the eastern third of the site is a small but well developed drumlin shaped hill while the western third is a lower and rocky hill remnant. The central section is a low area which is the top of two very local drainage systems; one directing surface run-off to the north and the other to the south.

All unconsolidated overburden (material lying above bedrock) on the site is what is known to the geologist as till. This is the predominant form of overburden in Connecticut and is commonly called "hardpan" or "boulder clay." Till includes deposits which were remaining after all glacial ice had melted and which were relatively unaffected by water transport. More specifically, till 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 grain size, as is the case with waterlain deposits.

The thickness of the overburden varies on the site. Based on the presence of the numerous boulders, and more importantly, the exposure of bedrock in the property's northwestern corner and the extensive exposures due west of the site,

the overburden would appear to be fairly thin, probably less than ten feet, in the central and western thirds of the site. The hill on the eastern third, however, should maintain considerably greater thicknesses than ten feet. More specific information can only be determined through some subsurface exploratory drilling.

The bedrock underlying the site, as mapped on the Geologic Quadrangle Map GQ-392, Scotland Quadrangle, 1965, falls within the Fly Pond Member of the Tatnic Hill Formation. The Fly Pond Member is a gneiss, rich in the minerals of epidote-biotite-hornblende-quartz and andesine. A gneiss is a coarse-grained metamorphic rock in which fairly wide bands, sometimes several feet in thickness, rich in granular minerals alternate with narrow bands, usually only inches thick, rich in flat, elongate and platy minerals.

A detailed soils map on this site is given in the Appendix to this report along with a soils limitations chart. Due to the original scale at which the soils are mapped (1"=1,320') the lines shown on the soils map should not be viewed as precise boundaries, but rather as guidelines to the distribution of soil types on the property. The soils limitations chart indicates the probable limitations for each of the soils for basements, landscaping, and streets and parking. However, limitations, even though very severe, do not always preclude the use of the land for development. If economics permit greater 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 majority of the soils on the site, 64.6 percent, fall within natural soil group B-1, well drained upland soils over friable to firm glacial till (includes soils mapped as 32XB, 32C, 32MC, 32MD). These soils were formed in the looser, unconsolidated deposits of till usually occurring on hillocks and hillsides. Stones and large boulders are common in these glacial deposits and add difficulty in excavating and earth moving. These soils do not have a high water table during any part of the year, and permeability is moderate or rapid. With the exception of soil 32MD the slopes generally do not exceed 15 percent.

Similar in origin to the above soils, but only moderately drained, is soil 41MB, which falls within natural soil group B-2 and encompasses 12.8 percent of the site. The major difference from the B-1 soils is a high seasonal water table. During the wettest season, usually in spring, the ground water will remain within 15 to 20 inches of the soil surface.

Soil type 43M, falling within natural soil group B-3 and encompassing 19.6 percent of the site, is legally classified as an inland wetland under P.A. 155. These soils are very poorly drained with water ponding on the surface for significant periods in winter and spring. The water table usually remains within three feet of the surface throughout the year.

The remaining three percent of the site falls with natural soil group D-2, which is characterized by steep slopes and shallow depth to bedrock.

#### WATER SUPPLY

On-Site. From information gathered during the on-site visit and from the

Scotland Quadrangle Surficial Geology Map (GQ-392, 1965), it is evident the types of overburden materials and conditions necessary for large quantity water supplies do not seem to exist on this particular piece of property. Dug or screened wells placed in till overburden usually cannot produce the required yields necessary for municipal supplies, although they may be capable of meeting the needs of individual homes. Till tends to be found in rather thin deposits, as is the general case here, and this factor in combination with its rather poor water transmitting capacity, a result of the high silt and clay content and compactness, cause well water recovery times to be painfully long. Thus, a well without a large storage capacity might run dry if water withdrawal rates exceed the well's recovery capability in the short term.

The bedrock in this region of Connecticut is generally hard and dense with tightly interlocking mineral grains, making the passage of water through the intergranular openings extremely slow and difficult. For this reason most bedrock wells derive their water from fluids which flow through the cracks, joints and fissures of the rock. Therefore, bedrock wells are only as good as the number and size of the openings, below the water table, in which water can pass to reach the well. The more numerous and the larger the fractures and openings, the more water a well will be able to receive in the shortest possible period of time and thus be capable of yielding to the user.

Except for fault zones which may extend deep into the bedrock, the major amount of fracturing is primarily confined to that area of rock closest to the land surface. As a general rule then the capacity for rock to produce water declines with depth. From records of existing wells in the eastern Connecticut uplands, it is evident wells drilled to a 200 foot depth produce proportionately more water per foot drilled than a well drilled to 400 feet. In other words, the cost, on the average, from putting down additional well footage below 200 feet far exceeds the water benefit return.

From numerous well drilling records for eastern Connecticut, it has been calculated that 9 out of 10 bedrock wells yield at least 3 gallons of water per minute while "dry holes" and wells yielding up to 100 gallons per minute are extremely scarce. Logs from several well drillers' completion reports for this area of Sprague indicate water yields range from 3 to 20 gallons per minute from wells falling between 100 feet to 200 feet in depth. The average water yield for these completion reports is around 10 gallons per minute. However, reported well yields, more other than not, tend to be higher than the actual case. (Well log information was taken from the publication "Hydrogeologic Data for the Shetucket River Basin," Connecticut Water Resources Bulletin No. 12, 1967.)

Based on the proposed 82 single bedroom condominiums complex, it is estimated that there will be about 164 residents. If we assume each person requires 50 gallons of water to supply his needs per day, then the total daily need of the entire development will be 8,200 gallons of water. A 10 gallon per minute yielding well will supply approximately 14,400 gallons of water per day, which is nearly twice the calculated daily need. Unfortunately the results of this simple calculation are misleading because at any single minute the need can easily exceed the yield. Therefore, the design of the water system should include some method of storage to cope with the peak demand period. This storage could be a tank installed in each building or one or more tanks separate from the buildings to serve the entire development.

It is not within the scope of this report to engineer water supplies but merely to point out potential problem areas. A series of wells may be able to handle the immediate water demand, but the cost may exceed the cost of hooking into the municipal water supply.

Municipal. The Angus Park Woolen Company water supply, which now serves the Hanover area, is being taken over by the Sprague Water and Sewer Authority and being changed from a surface reservoir to ground water (wells) source. If the new wells have sufficient yield to supply the existing services as well as the proposed project, this should be investigated as a means for the water supply.

If the western portion of the site is developed, moderate difficulty can be expected with the installation of transmission lines due to the stoniness. The eastern portion offers only slight limitations for the installation of transmission lines.

#### WASTE DISPOSAL

Although the site presently does not have municipal sewers, the developer plans to extend the existing municipal sewers in order to service the project. With the availability of a public sewerage system there should be no particular problem with sewage disposal.

As stated earlier concerning the installation of water supply transmission lines, moderate difficulties can be expected on the western portion of the site and only slight difficulties on the eastern portion for the installation of sewers.

#### FOUNDATION DEVELOPMENT AND GRADED CONDITIONS

Substratum support will most likely not be a problem on the site, unless an extensive grading operation is planned. Placement of footings on semi-compacted till can result in differential settlement, a major cause of structural failure.

An important aspect of any development project is its storm drainage system. The outlets of these systems can be a point source of pollution. Road sand, salt, oil, and other deleterious material that enters the system usually has a direct route to some existing watercourse. Trapping or settling devices can be used to minimize the effect of this problem.

To develop the western portion of the property, extensive clearing would be required. It is very stony and covered with brush and trees.\* Clearing will leave a substantial area of soil unprotected from the elements and subject to erosion. The eastern portion would require only minimal clearing.

Concerning either portion of the site, the method of design and construction is important. The type of structure should conform to the topography

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\* It would cost an estimated \$600-1,000 per acre to clear this type of land.

rather than altering the topography to conform with the structure. This results in a minimum amount of earth being disturbed and, consequently, less erosion.

The seasonal weather pattern should be considered to determine the most favorable time of year to begin construction. The construction timetable should be planned so that the amount of area being left unprotected at any one time is minimal. Temporary seeding can be used to protect disturbed areas that will not be developed for a significant period of time. By limiting cut and fill slopes to nothing steeper than one vertical to three horizontal, the establishment and maintenance of a good vegetative cover will be facilitated. A buffer strip along the hillsides leading to the pond would provide added protection for the pond from siltation.

The Erosion and Sediment Control Handbook for Connecticut, published by the Soil Conservation Service, should be used as a guide to locate, design, and install the appropriate erosion control practices.

#### ROADS AND UTILITIES

Salt Rock Road will probably be able to handle the increased traffic expected from this development. Expansion of existing utilities is feasible to service the development.

Regarding the construction of roads on the site, slope would be the major limiting factor throughout the site. The soils in the western portion are stonier than in the eastern portion which would increase the difficulties there. Establishing an access road into the eastern side may be difficult, though it appears that with the second property purchased along Salt Rock Road it can be accomplished. Once established, an access road on the eastern side would involve much less overall preparation than on the western side.

#### HAZARDS

Although the existing pond will provide recreational and aesthetic value to the development, it does constitute an attractive hazard. There does not appear to be a large enough watershed to support swimming for a large group of people and the pond would probably not meet the State Health Department's standards for a public bathing facility. However, since the pond will still receive use for fishing and passive enjoyment, some water safety equipment should be installed alongside the pond.

Added fire protection for the development could be provided by installing a road and fire hydrant to the pond.

Erosion and possible siltation of the ponds, wetlands, and streams could be a hazard during development, but this can be controlled as discussed previously. The New London County Soil and Water Conservation District could assist with the preparation of an erosion control plan prior to development.

## AESTHETICS AND PRESERVATION

Aesthetics. The varied terrain coupled with water and rock features make this an interesting site from an aesthetic point of view. The portion of the site originally planned for development, however, would destroy many of these features. The eastern portion seems more desirable for development in that fewer scenic features would be removed. Also, inhabitants would enjoy a good view from this part of the site if the buildings are carefully placed. This last point would also affect how the buildings are seen from points off-site.

Forestry. Forest lands within the proposed development area are located primarily in the western and central portions and consist of Upland Central hardwoods, principally oak, hickory, maple, and birch, and old field red cedar. The mixed hardwoods are in the pole-small sawtimber size, approximately 41-60 years of age. Red cedar abounds on the abandoned pasture land with an age class of 21-40 years. Most of the wooded area serves as the primary watershed for the pond and swamp in the central portion of the site.

The red cedar provides a four season forest resource with outstanding aesthetic quality. In addition, red cedar is a preferred habitat for many forms of bird and animal life and is an excellent source of durable posts and fancy aromatic lumber. However, as a forest type it is very transitional and fragile, being very intolerant of shade. To maintain this desirable aesthetic forest type, it is absolutely necessary to control the encroachment of hardwoods. Control can be achieved by grazing, cutting, frilling, and/or herbicides.

Forest land such as the two types found on this proposed development site lends itself to open space management much more readily than open fields. Annual maintenance is much less demanding on manpower and low-key, passive recreation on wooded areas does not require highly developed, costly facilities. The forest land on this site is adjacent to a much larger area of forest land and because of this proximity could be considered suitable for management on a multiple use basis, as part of a large forest resource base.

A higher quality environment would be maintained on this site by developing the open, eastern portion of the site which is close to the presently developed Hanover village, leaving the woodland as a buffer to the more rural area west of the proposed development.

Wildlife. The westerly portion of the tract is more valuable to wildlife with its mixture of hardwoods, old pastures grown over with cedar and barberry, wetlands, and southerly aspect. The present state of succession is excellent for wildlife usage. Conversely, the easterly portion of the tract is very open, lacking much vegetation other than grass and some hardwoods on the northerly edge. If the westerly portion is left for open space, the area will provide year round habitat for many species of wildlife, such as songbirds, grouse, rabbits, deer, and waterfowl.

Fish. The existing man-made pond on the property was designed by the Soil Conservation Service for a fish pond and can continue to provide this recreational activity. It did not seem necessary or particularly desirable to construct a second man-made pond in the wetlands. However, if this were to be pursued, planting hemlocks and shade trees below the outflow of the second pond would help to reduce water temperatures.

A buffer strip along the hillsides above the pond (or ponds) would prevent silt from entering the water and would help in stabilizing a new pond, if and when dug.

#### SERVICES TO SUPPORT DEVELOPMENT

Residents of the proposed development would be within walking distance of the stores and churches in Hanover. Sewer and possibly water services are available within a reasonable distance, as well as the other utilities. Developing the eastern portion of the site would shorten the distance to these services and at the same time significantly lower the cost of installation.

#### COMPATIBILITY OF SURROUNDING LAND USES

Surrounding land uses are undeveloped and residential. The village of Hanover is located about 500 feet east and north of the proposed site. The village is primarily residential with churches, a post office, and the Angus Park Woolen Company. On a land use basis, residential development would be compatible with existing uses.

If the western portion of the property were developed, the eastern hill would become open space and could function as a buffer zone between the village of Hanover and the development. On the other hand, the western portion is better suited for wildlife preservation, a prime factor when evaluating open space. By developing the eastern portion, the wooded area would provide a transition from cluster development to the rural two-acre zone. This would also mean less extension of the public sewers and would avoid "leapfrog" development west along Salt Rock Road away from Hanover.

If approved for the zone change, an important consideration when deciding which portion of the site to develop should be the intended future land use of the presently rural real estate that surrounds the site.

#### ALTERNATIVE LAND USES FOR THE AREA

Alternative land uses appear to be undeveloped, residential, and recreational. The site was once used for agriculture, but now portions of it are reverting to woody plants. Because of the location, the site does not appear feasible for commercial or industrial uses.

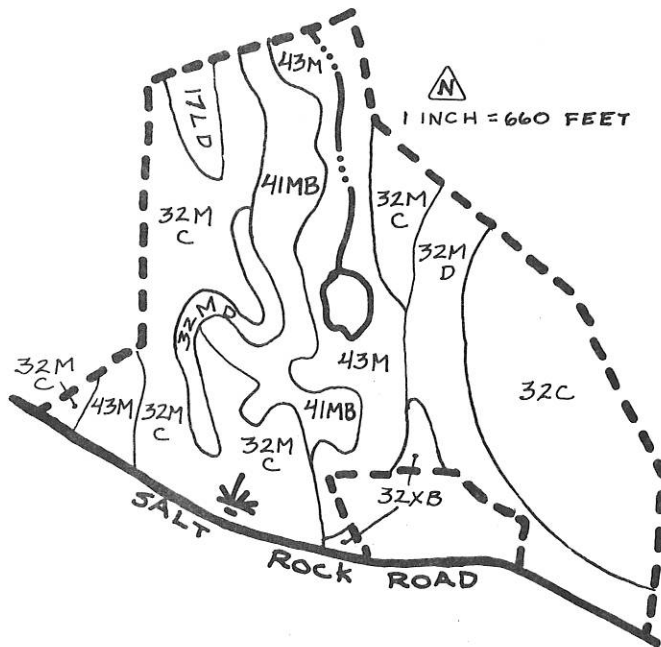
The area could be developed into a recreational park with fishing, hiking, and nature areas. The high ground on the east offers a favorable vista.

With the availability of sewers, a variety of residential development is possible, including both single-family and multi-family development. The proposed development would include single-bedroom condominiums constructed using the cluster concept, which will leave a major portion of the site undeveloped. With good site design covering items such as roads, parking areas, curbs, sidewalks, recreation areas, and landscaping, as well as close scrutiny by the Planning and Zoning Commission, the proposed development could be an attractive extension of the present village.

APPENDIX



SOIL MAP  
GEORGE M. BROWN PROPERTY  
SALT ROCK ROAD  
SPRAGUE, CONNECTICUT



Prepared by: UNITED STATES DEPARTMENT OF AGRICULTURE  
Soil Conservation Service

ADVANCE COPY, SUBJECT TO CHANGE

MARCH, 1974

## SOILS LIMITATIONS CHART

Natural Soil Group*	Mapping Symbols	Acres	Percent of Total Acres	Limitations for:**		Principal Limiting Factor
				Basements	Streets and Parking	
B-1a	32XB	.6	1.3	1	2	Slope 3-8%.
B-1b	32C	10.2	21.7	1	3	Slope 3-15%.
B-1c	32MC	12.2	25.9	2	3	Stoniness, slope 3-15%.
B-1e	32MD	7.4	15.7	3	4	Stoniness, slope over 15%.
B-2b	41MB	6.0	12.8	2	3	Seasonal high water table, stoniness, slope 3-8%.
B-3b	43M	9.2	19.6	4	4	High water table, stoniness.
D-2	17LD	1.4	3.0	3	4	Stoniness, shallow to bedrock, slope over 15%.
		47.0	100.0			

\* Refer to Know Your Land, Natural Soil Groups for Connecticut, Soil Conservation Service, USDA Connecticut Cooperative Extension Service, for further explanation of the natural soil groups.

\*\* Limitations: 1-slight; 2-moderate; 3-severe; 4-very severe.

ACREAGE SUMMARY OF SOILS LIMITATIONS

	<u>Slight</u> <u>Acres</u> <u>%</u>	<u>Moderate</u> <u>Acres</u> <u>%</u>	<u>Severe</u> <u>Acres</u> <u>%</u>	<u>Very Severe</u> <u>Acres</u> <u>%</u>
Basements	10.8    23.0	18.2    38.7	8.8    18.7	9.2    19.6
Landscaping	.6    1.3	10.2    21.7	18.2    38.7	18.0    38.3
Streets and Parking	-	.6    1.3	28.4    60.4	18.0    38.3