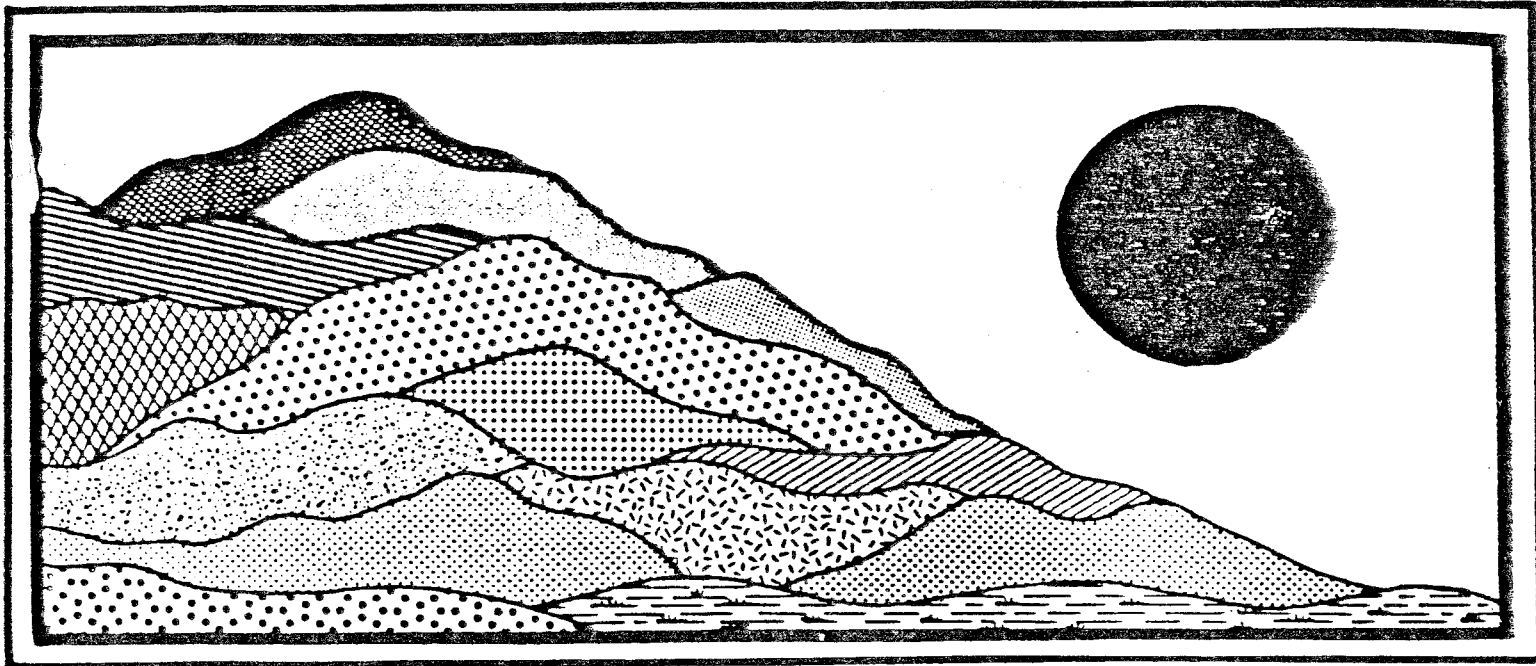


Ledgewood Commons

Groton, Connecticut

June 1986



ENVIRONMENTAL

REVIEW TEAM

REPORT

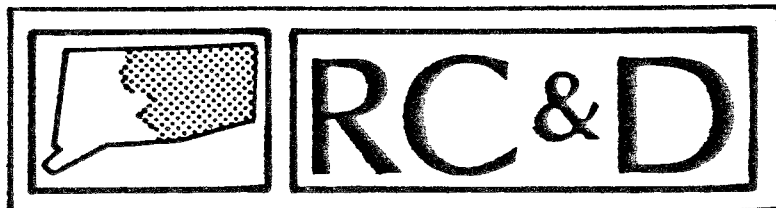
EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

Ledgewood Commons

Groton, Connecticut

Review Date: MAY 1, 1986

Report Date: JUNE 1986



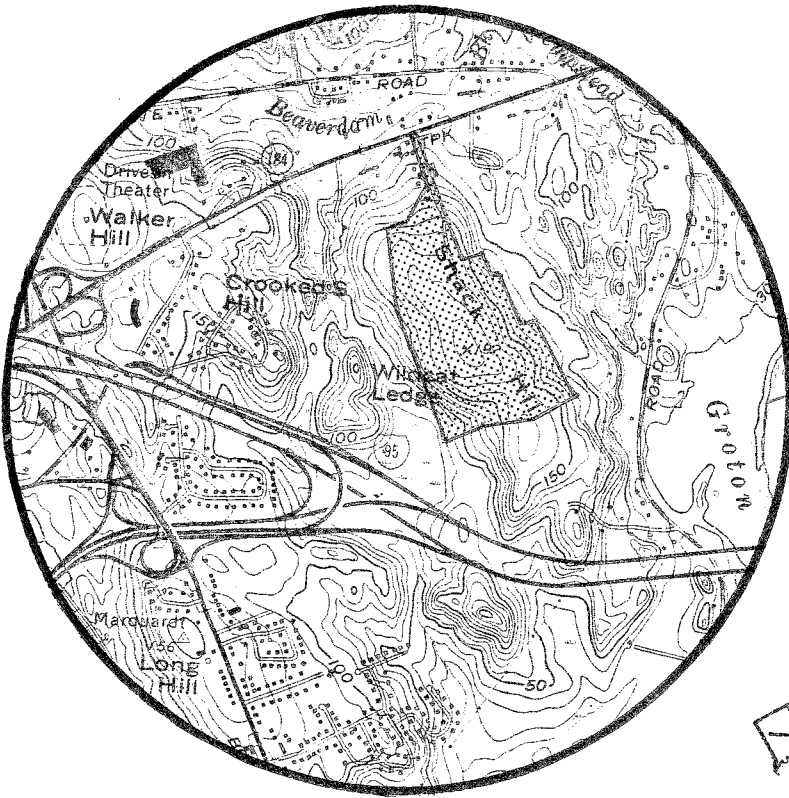
ENVIRONMENTAL REVIEW TEAM

PO BOX 198

BROOKLYN, CONNECTICUT 06234

Site Location

LEDGEWOOD COMMONS
GROTON, CONNECTICUT



EASTERN CONNECTICUT
RESOURCE CONSERVATION
& DEVELOPMENT AREA

ENVIRONMENTAL REVIEW TEAM REPORT

ON

LEDGEWOOD COMMONS

GROTON, CONNECTICUT

This is an outgrowth of a request from the Groton Planning Commission 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. The request was approved and the measure reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The ERT met and field checked the site on May 1, 1986. Team members participating on this review included:

Barry Cavanna	- District Conservationist	- U.S.D.A., Soil Conservation Service
Tom Seidel	- Planner	- Southeastern Connecticut Regional Planning Agency
Dwight Southwick	- Civil Engineer	- U.S.D.A., Soil Conservation Service
Elaine Sych	- ERT Coordinator	- Eastern Connecticut RC&D Area
Bill Warzecha	- Geologist	- DEP, Natural Resources Center

Prior to the review day, each team member received a summary of the proposed project, a list of the Town's concerns, location maps, a topographic map, a soils map and diagram of the project site showing adjoining properties. Specific team members also received drainage calculations. During the field review the team members were given site plans and later received a traffic study. The Team met with, and were accompanied by the Groton Environmental Planner, another member of the Groton Planning Department, the engineer and surveyor for the project, and the developer. Following the review, reports from each team member were submitted to the ERT Coordinator for compilation and editing into this final report.

This report represents the Team's findings. It is not meant to compete with private consultants by providing site designs or detailed solutions to development problems. The Team does not recommend what final action should be taken on a proposed project--all final decisions and conclusions rest with the Town and landowner. 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. The results of this Team action are oriented toward the development of better environmental quality and the long-term economics of land use.

The Eastern Connecticut RC&D Executive Committee hopes you will find this report of value and assistance in making your decisions on this town-house development.

If you require any additional information, please contact:

Elaine A. Sych
ERT Coordinator
Eastern Connecticut RC&D Area
P. O. Box 198
Brooklyn, CT 06234

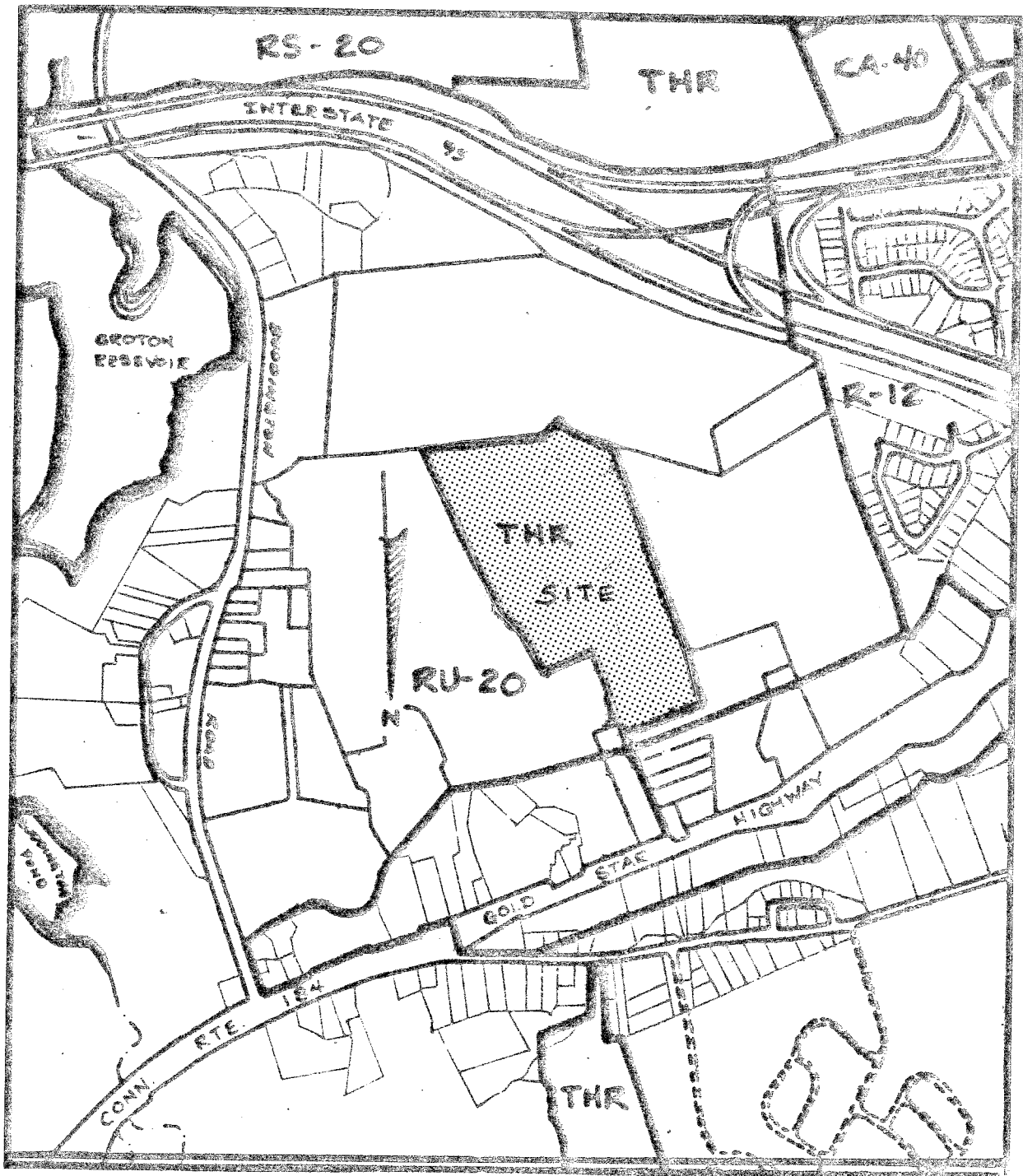
(203) 774-1253

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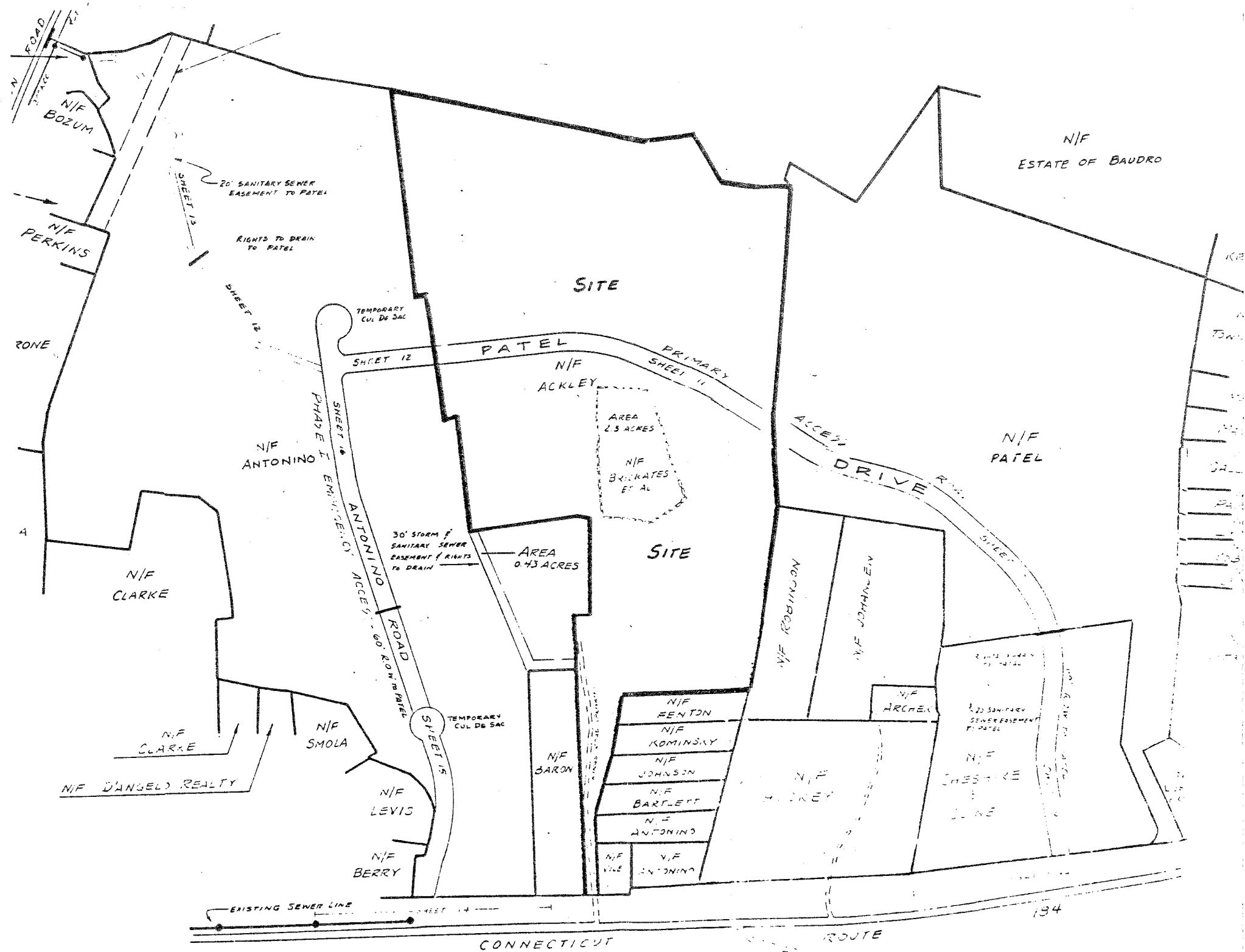
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LOCATION MAP
SCALE 1" = 1000'

0 100 250 500 1000 2000

NOT TO SCALE



1. INTRODUCTION

The Groton Planning Commission has requested Environmental Review Team assistance in reviewing a proposed multi-family development.

The + 44 acre parcel of land which is being considered for multi-family development is located between Route 184 and I-95 on top of Shack Hill. Present access to the site is by a private road referred to as Kings Road. Proposed access to the site will be from Route 184 via a proposed loop road system which will service Ledgewood Commons, the Cheshire and Kline Property, other lands of the applicant and the Antonio Property. Based on discussions with town officials on the review day, Patel Road would ultimately connect with Buddington Road. The 368 units would be serviced by city sewer and water.

This report contains information on the geology and hydrology of the site, and specific comments and recommendations on geologic development concerns, watershed protection, engineering design and land use and traffic analysis.

2. TOPOGRAPHY AND SETTING

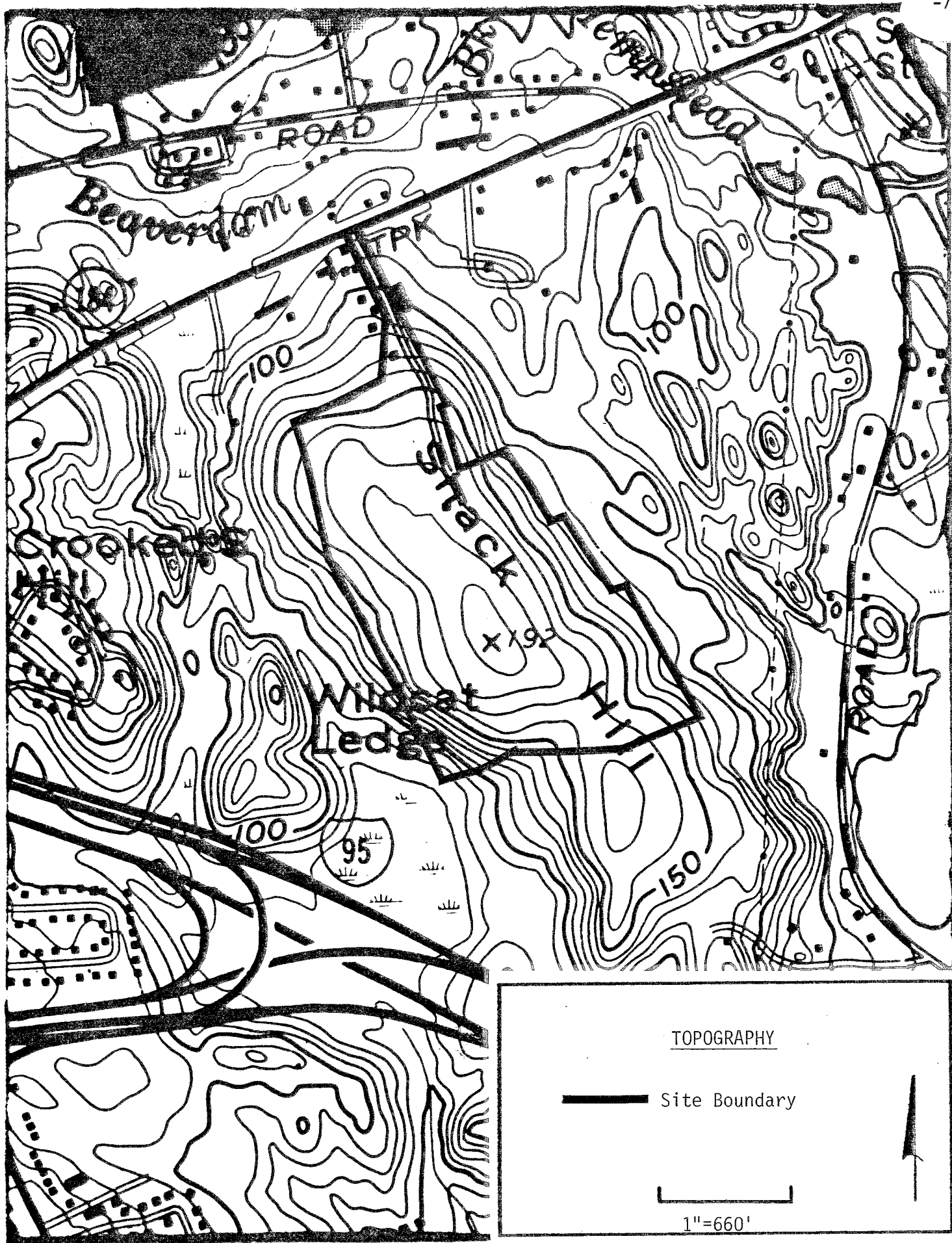
The + 44 acre parcel of land is located mainly on top of Shack Hill in west central Groton. The land is comprised largely of a mixture of woodlands and surface drainage swales. Based upon 1939 aerial photos, the old foundations visible in the center of the site are the remains of a farmhouse and its out-buildings which formerly occupied the property.

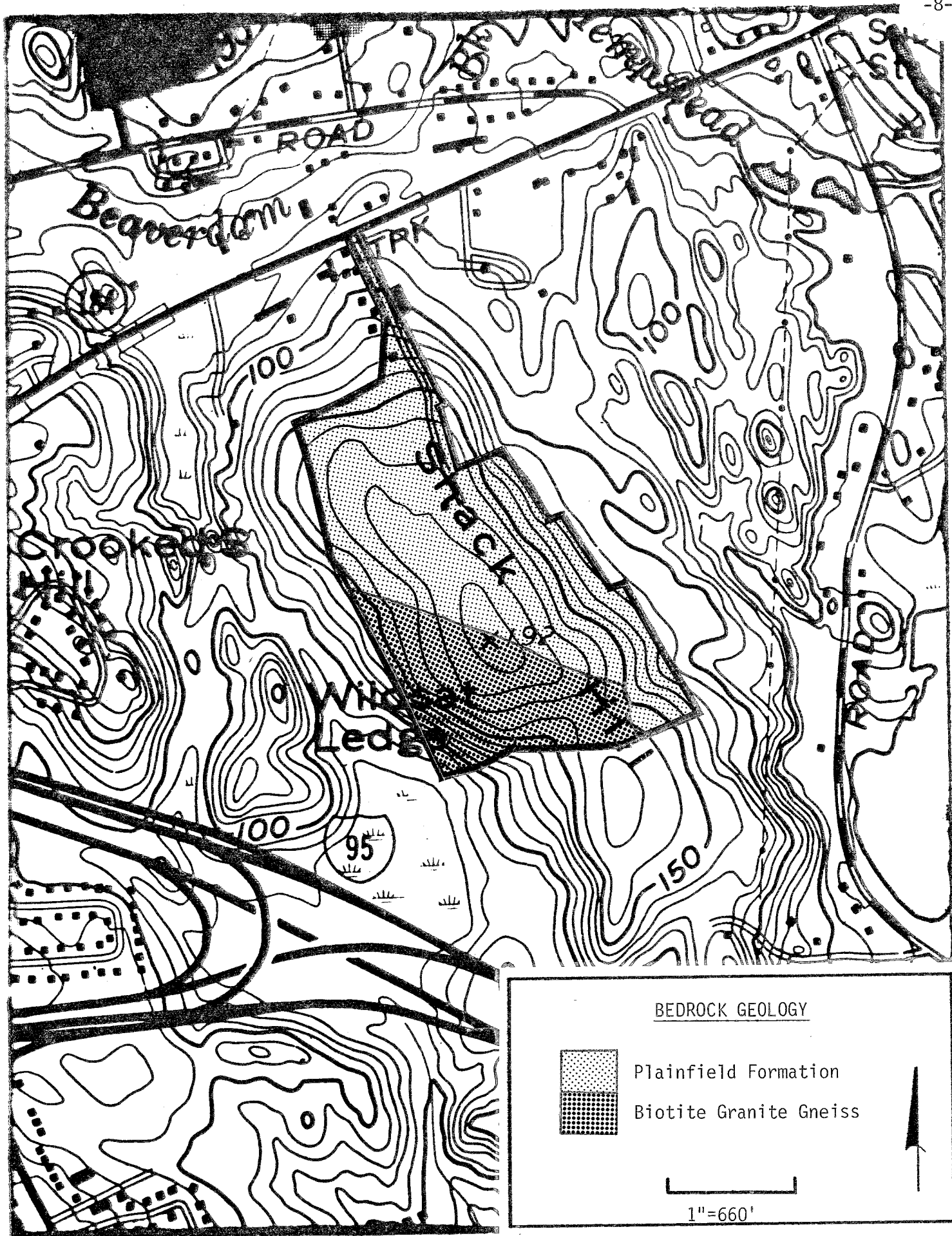
The site is characterized by slopes which range between gentle and moderate. The tableland of Shack Hill, where most of the actual development will take place, is dominated by flat and gentle slopes. The terrain which flanks the eastern and western limits of the site is dominated by moderate slopes. It appears that excessive slopes near the proposed recreation area, i.e., tennis courts, swimming pools, etc., will be a major hindrance to their construction.

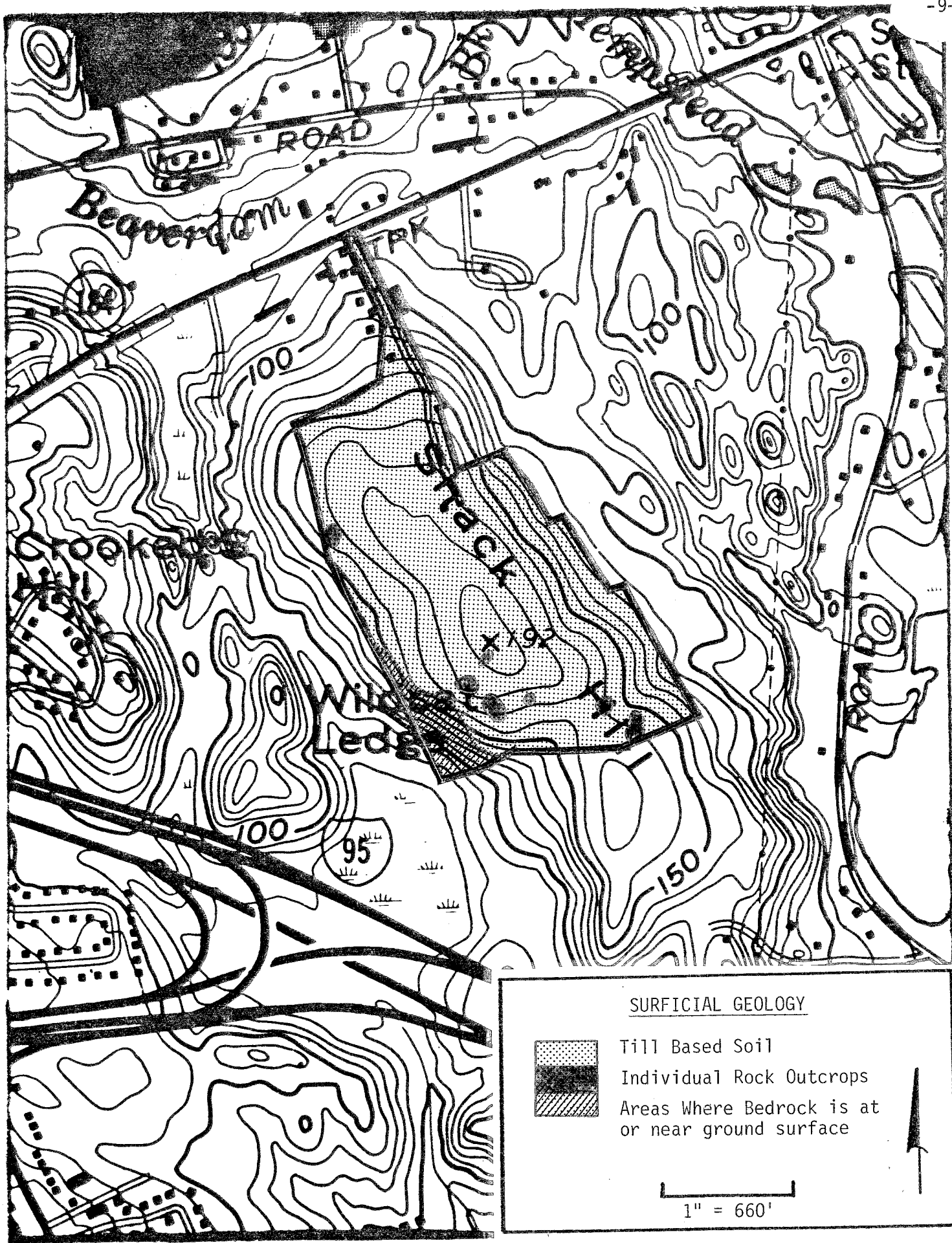
Maximum and minimum elevations on the site are about 192 feet and 80 feet above mean sea level, respectively, and produce an average overall slope of about 8 percent.

3. BEDROCK AND SURFICIAL GEOLOGY

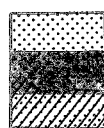
The site is located entirely within the New London topographic quadrangle. A bedrock geologic map (GQ-575) and a surficial geologic map (GQ-176) by Richard Goldsmith have been produced for quadrangle by the U. S. Geological Survey.







SURFICIAL GEOLOGY



Till Based Soil

Individual Rock Outcrops

Areas Where Bedrock is at
or near ground surface

1" = 660'



Shack Hill is a geologic feature known as an upland rock and till drumlin. It consists of a relatively large, elongated hill whose long axis parallels the direction of past ice movements. The axis of Shack Hill is pointed in a south-east direction.

A glacial sediment called till was plastered by moving glacial ice on a core of crystalline bedrock. Till consists of ground up rock material which may range in size from clay to boulders or any combination of these intermediate sizes. According to Goldsmith, the till covering the site is described as medium compacted, sandy and gravelly and includes a few thin masses of loose till and small lenses of stratified material. A deep test pit excavated on the site during the field review revealed basically the variety of till described above.

Thicknesses of the till varies throughout the site. Based on visual observations, soil mapping and geologic maps, it is thickest in the northern parts, probably not much more than ten feet. It becomes much thinner in the southern and western parts. The bedrock breaks ground surface in many areas throughout these parts.

The rock core of Shack Hill is identified mainly as Plainfield Formation by Goldsmith. The southwest corner is underlain by a biotite granite gneiss. The Plainfield Formation consists of interlayered, thinly bedded quartzite, mica schist and dark gray gneiss. Major minerals in these rocks include biotite, feldspar, quartz, garnet, calc-silicate minerals, and sillimanite. The biotite granite gneiss is described as light pink to gray, fine to medium grained and is well foliated (layered). Major minerals in this rock includes quartz, microcline, biotite and iron-oxides. Locally, it contains muscovite and garnet. The granite gneisses outcrop extensively in the southwest corner of the site. Continuous outcrops are visible west of the site.

All of the rock types mentioned above, gneisses, quartzite and schists are metamorphic rocks; that is, rocks which have been geologically altered due to great heat and pressure deep within the earth's crust.

The layering of platy or flaky minerals in both rock units dips moderately to the northeast. The bedrock surface has influenced the shape of the land and the drainage pattern on Shack Hill.

4. GEOLOGIC DEVELOPMENT CONCERNS

The proposed loop road system which will access Ledgewood Commons will need to pass over the granite gneiss outcroppings found in the southwest corner of the site and as a result, will require significant blasting. Bedrock may also need to be blasted in order to install sewer lines, water lines, foundations, etc., on the site particularly in the southern and western parts.

Because the site and proposed road system will require reshaping and re-grading, and because the bedrock surface is shallow in some areas, particularly the western limits, it certainly appears that bedrock will need to be blasted where encountered. As a result, if proper precautions are not taken, there is a chance that blasting could lead to (1) increased turbidity levels in groundwater, at least in the immediate vicinity; (2) increase the number of fractures or openings in the solid bedrock at least in the immediate vicinity, which may or may not impact nearby wells which rely on the underlying bedrock as a water source (it should be pointed out that water stored in fractures and openings in the underlying bedrock is the source of groundwater to wells which tap the bedrock); and (3) possibly cause damage to nearby structures and foundations. In regard to the last comment, a pre-blasting survey of surrounding properties should probably be considered to reduce unwarranted damage claims. It seems likely that most blasting will be far removed from existing structures. Any blasting activity which takes place on the site or along the proposed road route should be under the strict supervision of persons experienced with state-of-the-art blasting techniques. This will hopefully reduce the chance of unnecessary seismic shock or possible damage claims.

From a water quality standpoint, there is a chance that minor amounts of nitrate may be released from explosives into the surrounding soils, ultimately percolating into the groundwater or directly to surface water. This undoubtedly would be a short-term effect occurring mainly during initial blasting. However, since most of the site lies within the watershed of Groton's public water supply, every effort should be made to protect any streamcourses from potential nitrate contamination.

A final water quality concern associated with blasting on the site is the potential for the leaching of certain iron or manganese bearing minerals from freshly blasted bedrock surfaces when it comes in contact with water. Chemically active rock may also alter the pH of the water as well as its appearance. Based on Goldsmith's mineralogical description of the rock types underlying the site, there are a few minerals, i.e., biotite, garnet, iron-oxides, that may release some iron and/or manganese when in contact with water, but it should not pose a major problem. As a precaution, every effort should be made to keep blasted rock from coming in contact with surface water, particularly tributaries to the reservoir.

It appears that significant amounts of bedrock particularly along Patel Drive in the western parts will need to be blasted. If a vertical cut is made into the rock, creation of a buffer area to collect falling rocks will be important to prevent rocks from rolling or sliding onto the road. The layering and fracturing in the rock should also be determined, particularly where vertical cuts are made. This research should be done by an engineer or geologist familiar with road cuts and blasting. Once this information is compiled, the engineer/geologist should be able to determine such factors as: (1) how susceptible the rock unit is to sliding and (2) how steep or flat the cut into bedrock should be.

5. HYDROLOGY

Except for about 12 acres in the southwest corner of the site, surface water and to a large extent, groundwater within the property ultimately drains to Groton Reservoir. Groton Reservoir is an active public water supply reservoir serving the town/city of Groton and is operated by the Groton Water Department.

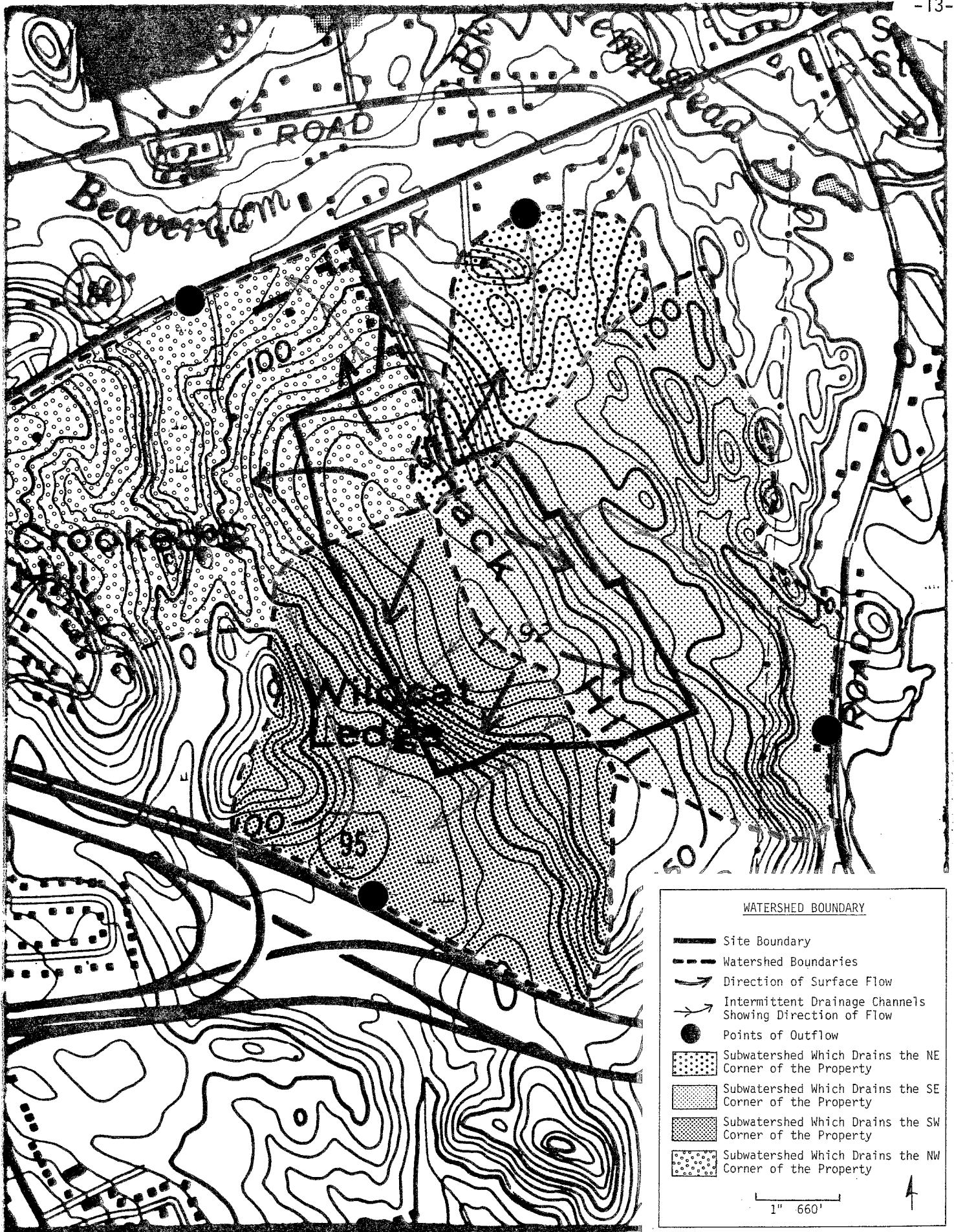
Runoff shed from the northwest corner of the site flows downslope via intermittent drainage channels or overland to a wetland situated between Crooked S Hill and Shack Hill. From this wetland area, which acts as a discharge point for the surface and groundwater, water passes under Route 184 in a northerly direction ultimately emptying into Beaverdam Brook. Beaverdam Brook flows in an easterly then northeasterly direction into Hempstead Brook, which feeds Groton Reservoir. Runoff from the northeast corner also flows into the Beaverdam/Hempstead Brook system. It is temporarily detained in a detention basin northeast of the property.

Surface runoff shed from the southeast corner of the site flows downslope to an intermittent drainage channel which routes the water under Buddington Road and ultimately into Groton Reservoir.

As mentioned earlier, runoff shed from the southwest corner of the site does not flow into Groton Reservoir. Surface runoff from this part of the site flows downslope to a seasonal topographic swale which transports the water to a permanently, wet, swampy area located just north of I-95. Water is temporarily detained in the wetland and is eventually piped under I-95. It ultimately flows into Baker Cove. Included in this report is a map depicting the watershed boundaries as described above.

Based on hydrologic information supplied to Team members by the applicant's engineer, the proposed multi-family development will cause moderately high increases in the volume of runoff for all of the watersheds mentioned earlier except for the one which drains the northwest section of the site (See Watershed Analysis Narrative for LedgeWood Commons, pg. 7, John Kopko, Jr. and Associates). According to the project engineer's hydrologic computations, which were based on the Soil Conservation Service's Technical Release #55 publication, there would be a decrease in the amount of runoff shed from the northwest section.

The increases in runoff would be caused mainly by removal of vegetation, compaction of soil, and creation of impervious surfaces. The major runoff increases would be expected from the paved access roads and parking areas, any roof tops, tennis courts, etc. The increases in additional runoff could lead to increases to peak flood flows of streams which drain the site, and may also cause increased overland erosion. The latter is a major concern especially for portions of the site which drain into the Groton Reservoir. Silt laden water reaching the reservoir will undoubtedly have an adverse impact on water quality.



A likely resolution for mitigating peak flows arising from increased runoff would be the installation of one or more detention basins. According to the project engineer's hydrology report, it was determined that only the northeast watershed will require stormwater detention. The project engineer indicated that peak flows from the remaining three watersheds would be attenuated by existing wetland areas. It does not appear that there are any permanently wet areas between the southeast parts of the property and Groton Reservoir.

The proposed detention basin will be constructed in a topographic swale which is adjacent to and northeast of the Patel Property. The project engineer has proposed to provide storage for all increased flows emanating from Ledgewood Commons, as well as other undeveloped land just above the proposed detention basin site. According to the detention basin report, it will also provide an average of 30% increase in available storage for any storms to 100 year frequency. Consideration should be given to combining this function (detention) with a sediment-retention function.

Based on present plans, some construction activity would occur on the moderate slopes flanking the east and west side of Shack Hill. The removal of vegetation and construction activities on these slopes, without careful planning, could lead to the deposition of road sand and silt into the site's storm drainage system and ultimately carried away by the receiving streams. Sediment trapping will be most important in order to protect Beaverdam Brook and ultimately Hempstead Brook from siltation. It is possible that unwanted debris emanating from the site could find its way into the above streams and ultimately be deposited in the Groton Reservoir. No sediment or detention basin is proposed for runoff from the southeast corner of the site. Since this part of the site is closest to Groton Reservoir and since there is little opportunity for natural sediment trapping enroute to the reservoir, consideration should be given to creating sediment retention basins for this part of the site. Also, based on the project engineer's hydrologic report, detention of stormwater will probably be necessary following the development, mainly to reduce the chance for streambank erosion.

If sediment does accumulate in any of the sediment detention basin(s) created for the development, provision should be made to remove it periodically in order to assure that the runoff storage capacity of the pond is not seriously diminished.

In order to minimize the impact of increased and/or concentrated runoff, a stormwater management plan which incorporates a sound erosion and sediment control plan should be submitted to the Town for review by all appropriate officials. The plan should include pre and post development hydrologic computations, sediment/detention basin designs, inland-wetland crossings for Patel Drive and any other engineering structures where needed, either before or during land grading.

The proposed project calls for four (4) wetland road crossings along Patel Drive/Antonio Drive of ± 50 feet, ± 25 feet, ± 150 feet and ± 25 feet.

Wetland road crossings are feasible, provided they are properly engineered. Provisions should be made for removing unstable material beneath the road bed, backfilling with a permeable road base fill material and installing culverts as necessary. When crossing any wetlands, the roads should be at least 1.5 feet and preferably be done during the dry time of the year and should include provisions for effective erosion and sediment control.

Groundwater within the site which drains to the Groton Reservoir is classified by the Department of Environmental Protection as GAA. This represents approximately 86 percent of the property. A GAA classification means that the groundwater is suitable for public and private drinking water supplies without treatment. Groundwater in remaining parts of the site, which represents about 12 acres in the southwest corner, is classified by the Department of Environmental Protection as GB. A GB classification means that groundwater may not be suitable for potable use unless treated because of existing or past land uses. The availability of public sewers should help reduce the chance of significant groundwater contamination on the site and reservoir. As a result, it seems likely that the applicant will need to focus mainly on controlling runoff from parking areas within the site which may contain road sand, road salt, automobile residue, hydrocarbons, etc., all of which can degrade the water quality of receiving streams and ultimately the reservoirs. Some of the contaminants mentioned above may be removed as they pass through the wetlands enroute to the reservoir although it is unlikely that they could completely remove them. (Note: A natural hydrologic function of wetlands is the purification of surface waters). Therefore, these contaminants do represent a potential threat to water quality and the wetlands and can reduce the effectiveness of the wetland as a natural buffer. In this regard, it is recommended that the applicant first contact the Department of Environmental Protection's Water Compliance Section at 566-7167, regarding the parking lot discharges on the site, which will eventually drain into the Groton Reservoir. The following recommendations may help to reduce potential parking lot contaminants from adversely impacting water quality to streams feeding the reservoir.

- (1) require gross particle separators to reduce sediment loading to receiving streams.
- (2) installation of sediment basins as discussed earlier in this section of the report.
- (3) properly installed and placed storm drain catch basins with bottoms.
- (4) evaluate the impact of potential parking lot pollutants on water quality, particularly for the portion of the property which drains to Groton Reservoir.
- (5) regular sweeping of streets and parking lots especially following winter months.

and,

- (6) if road salting is needed use calcium chloride variety instead of sodium chloride.

A final point on protecting land and watercourses tributary to a public water supply including both surface and groundwater is Section 19-13-B 32 a-i, inclusion, Sanitation of Watershed in the Connecticut Public Health Code. Following is a copy of Section 19-13-B32. Sanitation of Watershed. Applicable sections as they relate to the proposed project would be best enforced through the local director of health. For this reason, the site plans should be submitted to the director of health for his review and comments.

Sec. 19-13B32. Sanitation of watersheds. Unless specifically limited, the following regulations apply to land and watercourses tributary to a public water supply including both surface and ground water sources.

(a) As used in this section "sewage" shall have the meaning found in section 19-13-B20(a) of the public health code: "Toxic metals" shall be arsenic, barium, cadmium, chromium, lead, mercury and silver and the salts thereof; "high water mark" shall be the upper limit of any land area which water may cover, either standing or flowing, at any time during the year and "watershed" shall mean land which drains by natural or man-made causes to a public drinking water supply intake.

(b) No sewage disposal system, cesspool, privy or other place for the deposit or storage of sewage shall be located within one hundred feet of the high water mark of any reservoir or within fifty feet of the high water mark of any stream, brook, or watercourse, flowing into any reservoir used for drinking purposes.

(c) No sewage disposal system, cesspool, privy or other place for the deposit or storage of sewage shall be located on any watershed, unless such facility is so constructed that no portion of the contents can escape or be washed into the stream or reservoir.

(d) No sewage shall be discharged on the surface of the ground on any watershed.

(e) No stable, pigpen, chicken house or other structure where the excrement of animals or fowls is allowed to accumulate shall be located within one hundred feet of the high water mark of a reservoir or within fifty feet of the high water mark of any watercourse as above mentioned, and no such structure shall be located on any watershed unless provision is made in a manner acceptable to the commissioner of health services for preventing manure or other polluting materials from flowing or being washed into such waters.

(f) No toxic metals, gasoline, oil or any pesticide shall be disposed of as a waste into any watercourse tributary to a public drinking water supply or to any ground water identified as supplying a public water supply well.

(g) Where fertilizer is identified as a significant contributing factor to nitrate nitrogen occurring in excess of 8 mg/l in a public water supply, fertilizer application shall be made only under current guidelines established by the commissioner of health in cooperation with the state commissioner of agriculture, the college of agriculture of the University of Connecticut and the Connecticut agricultural experiment station in order to prevent exceeding the maximum allowable limit in public drinking water of 10.0 mg/l for nitrite plus nitrate nitrogen.

(h) Where sodium occurs in excess of 15 mg/l in a public drinking water supply, no sodium chloride shall be used for maintenance of roads, driveways, or parking areas draining to that water supply except under application rates approved by the commissioner of health, designed to prevent the sodium content of the public drinking water from exceeding 20 mg/l.

(i) The design of storm water drainage facilities shall be such as to minimize soil erosion and maximize absorption of pollutants by soil. Storm water drain pipes, except for crossing culverts, shall terminate at least one hundred feet from the edge of an established watercourse unless such termination is impractical, the discharge arrangement is so constructed as to dissipate the flow energy in a way that will minimize the possibility of soil erosion, and the commissioner of health finds that a discharge at a lesser distance is advantageous to stream quality. Special precautions shall be taken to protect stream quality during construction.

6. SOILS COMMENTS

1. The measures planned for sediment and erosion control appear adequate.
2. The construction sequence and narrative could be tightened to insure that the plans are implemented.

7. ENGINEERING CONCERNS AND COMMENTS

1. The detention basin area (on the northeast section) seems to have plenty of storage for the 2-Year--10-Year and 100 Year frequency -- 24 hour--Type III storms. The discharge of the 36" RCP needs to be coordinated with the stage storage as made available in the detention basin. Quick calculations show that

the basin area is large enough, but the discharge from the 36-inch pipe needs to be metered down more.

2. Swales or diversions on the uphill side of some of the buildings and the tennis courts would allow surface water to drain away instead of ponding near the building.

3. The storm outlet shown on Sheet 7 of the plans will cause some washing, but the silt will be contained in the detention basin, and will not get into the stream system. It is understood that this 24" accm/pipe will be connected to the road culvert under Antonio Road in the future.

4. The ERT engineer did not see the specifications on compacting fill. The foundations of some of the buildings will be on natural ground and fill material. This is an area where differential settlement could occur if the foundation is not thoroughly compacted before concrete is poured.

5. The plans do not show subsurface disposal of surface runoff from roofs, etc. This possibility was talked about during the field review of the ERT. In the Team engineer's thinking, this subsurface disposal of surface water would not be wise because of the shallow to bedrock soils nearby.

8. PLANNING AND TRAFFIC CONCERNS

The immediate surrounding area to the east, south, and west is undeveloped. Single-family homes are located between the proposed development and Route 184. Commercial uses are located east and west along Route 184 and single-family homes are located farther to the west in the area of Routes 12, 184 and I-95. To the east, single-family homes are located along Buddington Road and also the City of Groton reservoir system.

The area is zoned Townhouse Residence, which is intended to provide for infill housing along the Town's high density corridors. This Zone requires 6,500 square feet of lot area per unit with opportunities for a reduction in this figure if the applicant meets certain requirements such as providing recreation facilities as specified for the zone.

The 1985 Connecticut DOT traffic log indicated an average daily traffic count of 11,700 vehicles on Route 184 between Route 12 and Candlewood Road. Earlier Connecticut DOT data indicated a volume/capacity ratio of 0.5325 for Route 184 between King's Highway and Route 117. A ratio of 0.75 is considered congested and 1.25 is considered the intolerable threshold, so the road was below problem traffic levels. The peak hour capacity under this analysis is 820 vehicles per hour and the road has a capacity of 1,540 vehicles per hour.

The project will be built in two phases and will total 368 units. Data published by ConnDOT* indicate that an apartment complex can be expected to generate 6.8 weekday trips per unit. Of this number, 8.0% can be expected to occur during the morning peak hour, and 10.2% during the evening peak hour. On this basis, a 368 unit project could be expected to generate 2,503 trips of which 200 would take place during the morning peak hour and 255 during the evening peak hour.

Initially, all the proposed development's traffic will access Route 184 via Patel and Antonio Roads. The possibility exists for a longer-term connection of these new roads to Buddington Road to the east which would provide additional access to this project and other adjacent lands. As other rear lands off of Route 184 develop in the future, these new roads will provide a useful service road function for these adjoining properties and help reduce the number of exit and entrance points directly onto Route 184. The applicant has shown 525 feet sight lines at the intersections of both Patel and Antonio Roads with Route 184. No improvements are indicated for this section of Route 184 in the adopted Regional Transportation Plan. As development occurs off of Route 184 in the future, improvements such as turning lanes and traffic lights might have to be examined for these new road intersections with Route 184.

Currently there is no SEAT bus service along Route 184. If residential and commercial growth continues to occur in this area of Groton, then consideration should be given to extending local bus service east to Buddington Road along Route 184. This service could tie into the existing SEAT service in Groton along Route 1.

*Trip Generation Study of Various Land Uses, Supplement A, by Israel Zevin. Connecticut Department of Transportation, 1975.

9. SUMMARY

NOTE: This summary serves only to briefly highlight the major concerns, comments and recommendations of the Team. You are strongly urged to read the entire report, and to refer back to specific sections in order to obtain all the information about a certain topic.

GEOLOGIC DEVELOPMENT CONCERNS - Section 4

- Because of the need for significant blasting to construct roads and possibly sewer lines, water lines and foundations there is a chance that the blasting could lead to (1) increased turbidity levels in groundwater, (2) increase the number of fractures or openings in the bedrock and (3) possibly cause damage to nearby structures or foundations.
- A pre-blasting survey should probably be considered to reduce unwarranted damage claims.
- Any blasting activity should be under the strict supervision of persons experienced with state-of-the-art blasting techniques.
- There is a chance that minor amounts of nitrate may be released from explosives into the surrounding soils and ultimately into the ground or surface water. This would most likely be a short-term effect, but because the site lies within the watershed of Groton's public water supply, every effort should be made to protect any streamcourses from potential nitrate contamination.
- There is the potential for the leaching of certain iron or manganese bearing minerals from freshly blasted bedrock surfaces when it comes in contact with water. Chemically active rock may also alter the pH of the water as well as its appearance. Every effort should be made to keep blasted rock from coming in contact with surface water, especially tributaries to the reservoir.
- An engineer or geologist familiar with road cuts and blasting should research the rock types where vertical cuts will be made to determine (1) how susceptible the rock unit is to sliding and (2) how steep or flat the cut into bedrock should be.

HYDROLOGY - Section 5

- The proposed multi-family development will cause moderately high increases in the volume of runoff for all of the watersheds except for the one which drains the northwest section of the site, there would be a decrease of runoff in this section.

- Any increased overland erosion from the portions of the site that drain to the Groton Reservoir will undoubtedly have an adverse impact on water quality.
- A likely resolution for mitigating peak flows arising from increased runoff would be the installation of one or more detention basins.
- Consideration should be given to combining the detention function of the one proposed basin with a sediment-retention function.
- There is a need for careful planning of all activity (removal of vegetation and construction) on the slopes flanking the east and west side of Shack Hill. Sediment trapping will be important to protect Beaverdam Brook and Hempstead Brook from siltation.
- Consideration should be given to constructing a sediment retention basin for the southeast corner of the site, also detention of stormwater will probably be necessary following development to reduce the chance of streambank erosion.
- Provisions should be made to remove sediment periodically from any sediment detention basins created for the development.
- In order to minimize the impact of increased and/or concentrated runoff, a stormwater management plan should be submitted to the Town for review. The plan should include pre and post development hydrologic computations, sediment/detention basin designs, inland-wetland crossings and any other engineering structures either before or during land grading.
- Wetland crossings are feasible, provided they are properly engineered.
- In order to protect the groundwater the applicant will need to focus mainly on controlling runoff from parking areas within the site which may contain road sand, road salt, automobile residue, hydrocarbons, etc., these can all degrade the water quality.
- It is recommended that the applicant contact the Department of Environmental Protection's Water Compliance Section at 566-7167 regarding parking lot discharges on the site.
- Recommendations contained in the HYDROLOGY section of this report may help to reduce potential parking lot contaminants from adversely impacting water quality.
- The site plans should be submitted to the local director of health for his review and comments concerning a public water supply.

SOILS COMMENTS - Section 6

- See section in report.

ENGINEERING CONCERNS AND COMMENTS - Section 7

- See section in report.

PLANNING AND TRAFFIC CONCERNS - Section 8

- Currently Route 184 is below problem traffic levels. The road has a capacity of 1,540 vehicles per hour.
- A 368 unit project could be expected to generate 2,503 trips of which 200 would take place during the morning peak hour and 255 during the evening peak hour.
- As other rear lands off Route 184 develop in the future the proposed roads will provide a useful service road function and help to reduce the number of exits and entrances onto Route 184.
- As more development occurs on Route 184 in the future improvements such as turning lanes and traffic lights may have to be examined for the proposed roads.
- If residential and commercial growth continue along Route 184 consideration should be given to extending the local bus service to Buddington Road along Route 184.

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--an 86 town area.

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

PURPOSE OF THE TEAM

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

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

REQUESTING A REVIEW

Environmental reviews may be requested by the chief elected officials of a municipality or the chairman of town commissions such as planning and zoning, conservation, inland wetlands, parks and recreation or economic development. Requests should be directed to the Chairman of your local Soil and Water Conservation District. This request letter should include a summary of the proposed project, a location map of the project site, written permission from the landowner allowing the Team to enter the property for purposes of review, a statement identifying the specific areas of concern the Team should address, and the time available for completion of the ERT study. 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 Elaine A. Sych (774-1253), Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, P.O. Box 198, Brooklyn, Connecticut 06234.