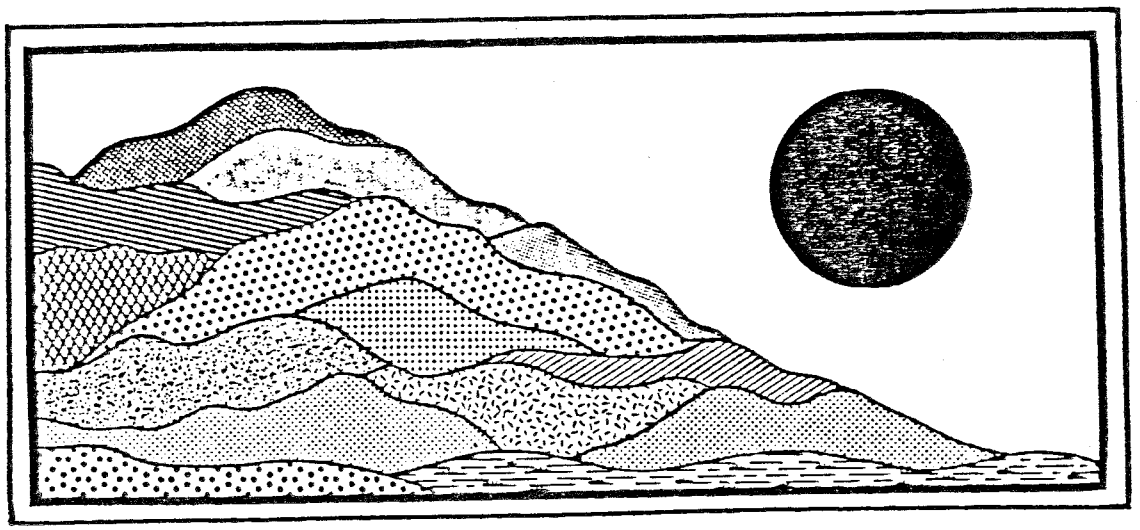
Colonial Woods

Coventry, Connecticut

November 1987



ENVIRONMENTAL REVIEW TEAM REPORT

EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

Colonial Woods

Coventry, Connecticut

Review Date: OCTOBER 15, 1987

Report Date: NOVEMBER 1987

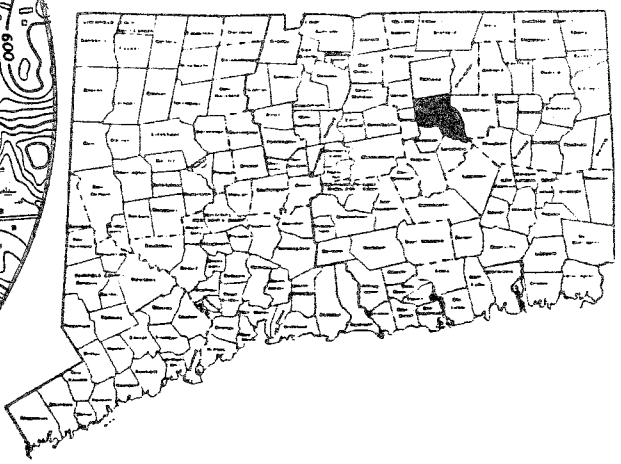
RC&D

ENVIRONMENTAL REVIEW TEAM
PO BOX 198
BROOKLYN, CONNECTICUT 06234

Site Location

COLONIAL WOODS CONDOMINIUMS

COVENTRY, CONNECTICUT



EASTERN CONNECTICUT

RESOURCE CONSERVATION

& DEVELOPMENT AREA

Suffield
Enfield
Somers
Stafford
Union
Woodstock
Thompson
Granby
East Granby
Windsor Locks
Ellington
Putnam
East Windsor
Eastford
Simsbury
Windsor
Tolland
Willington
Ashford
Pomfret
Canton
South Windsor
Vernon
Killingly
Bloomfield
Chaplin
Avon
West Hartford
Hartford
East Hartford
Manchester
Bolton
Coventry
Mansfield
Hampton
Brooklyn
Farmington
Andover
Windham
Scotland
Canterbury
Plainfield
Sterling
Newington
Wethers-field
Glastonbury
Hebron
Columbia
Rocky-hill
Mari-borough
Lebanon
Sprague
Voluntown
Cromwell
Portland
Franklin
Lisbon
Griswold
East Hampton
Colchester
Middletown
Bozrah
Norwich
Preston
Middle-field
North Stonington
Durham
Haddam
East Haddam
Salem
Montville
Ledyard
Chester
Lyme
Waterford
Killing-worth
Deep River
East Lyme
Groton
Stonington
Essex
Old Lyme
Clinton
West-brook
Old Saybrook
New London

ENVIRONMENTAL REVIEW TEAM REPORT
ON
COLONIAL WOODS CONDOMINIUMS
COVENTRY, CONNECTICUT

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

The ERT met and field checked the site on Thursday, October 15, 1987. Team members participating on this review included:

Brian Murphy	--Fisheries Biologist DEP - Eastern District Headquarters
Joe Neafsey	--District Conservationist USDA - Soil Conservation Service
Jim Parda	--Forester DEP - Eastern District Headquarters
Meg Reich	--Planning Director Windham Regional Planning Agency
Harry Siebert	--Transportation Planner ConnDOT - Bureau of Planning
Elaine Sych	--ERT Coordinator Eastern CT 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, topographic and soil maps as well as a 1975 ERT report for the same parcel of property. During the field review the team members were given plans and a traffic study. The Team met with, and were accompanied by the Town Planner, the project construction manager and the landscape architect. 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 enviornmental 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 proposed condominium 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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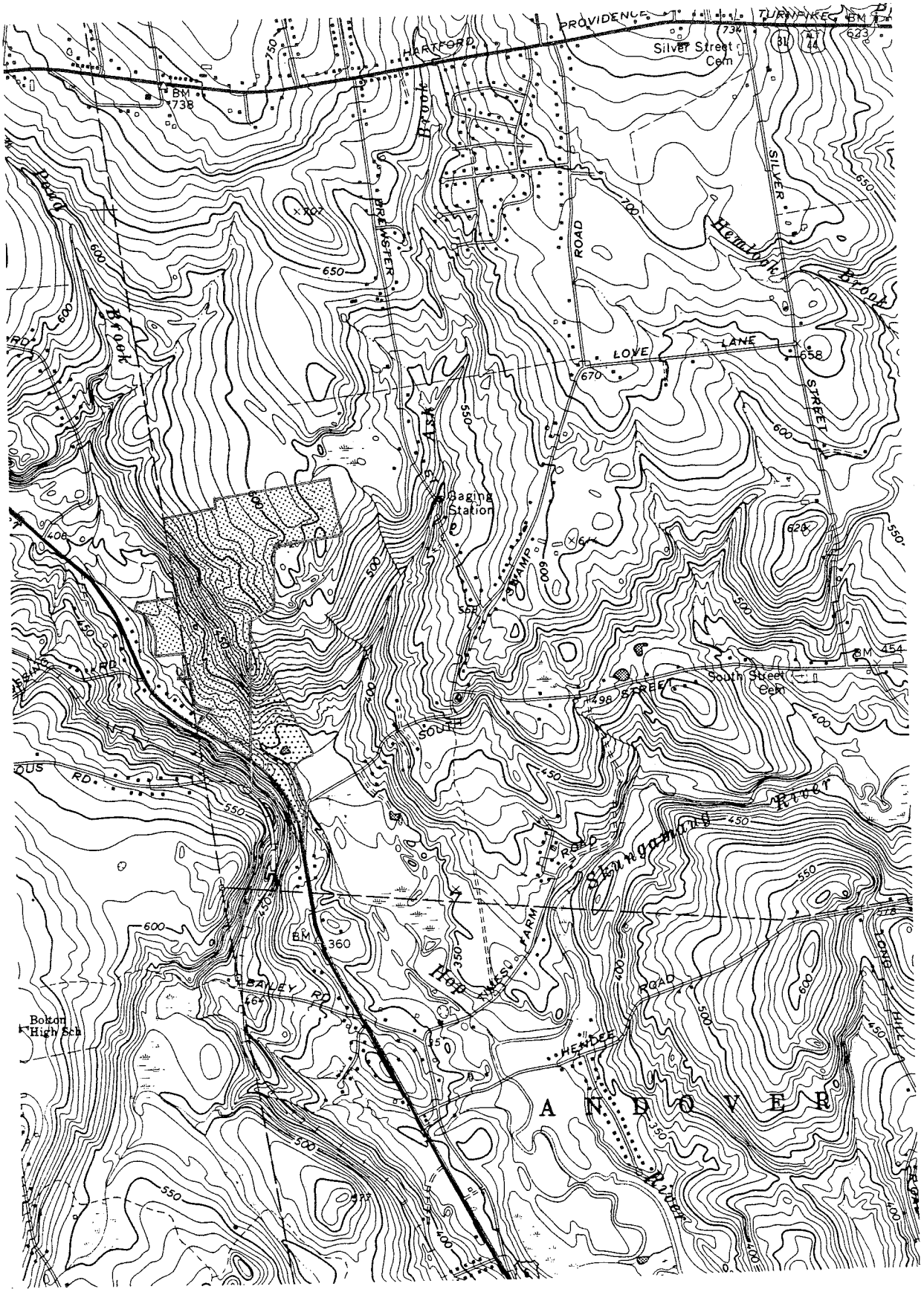
TABLE OF MAPS AND CHARTS

LOCATION

Site

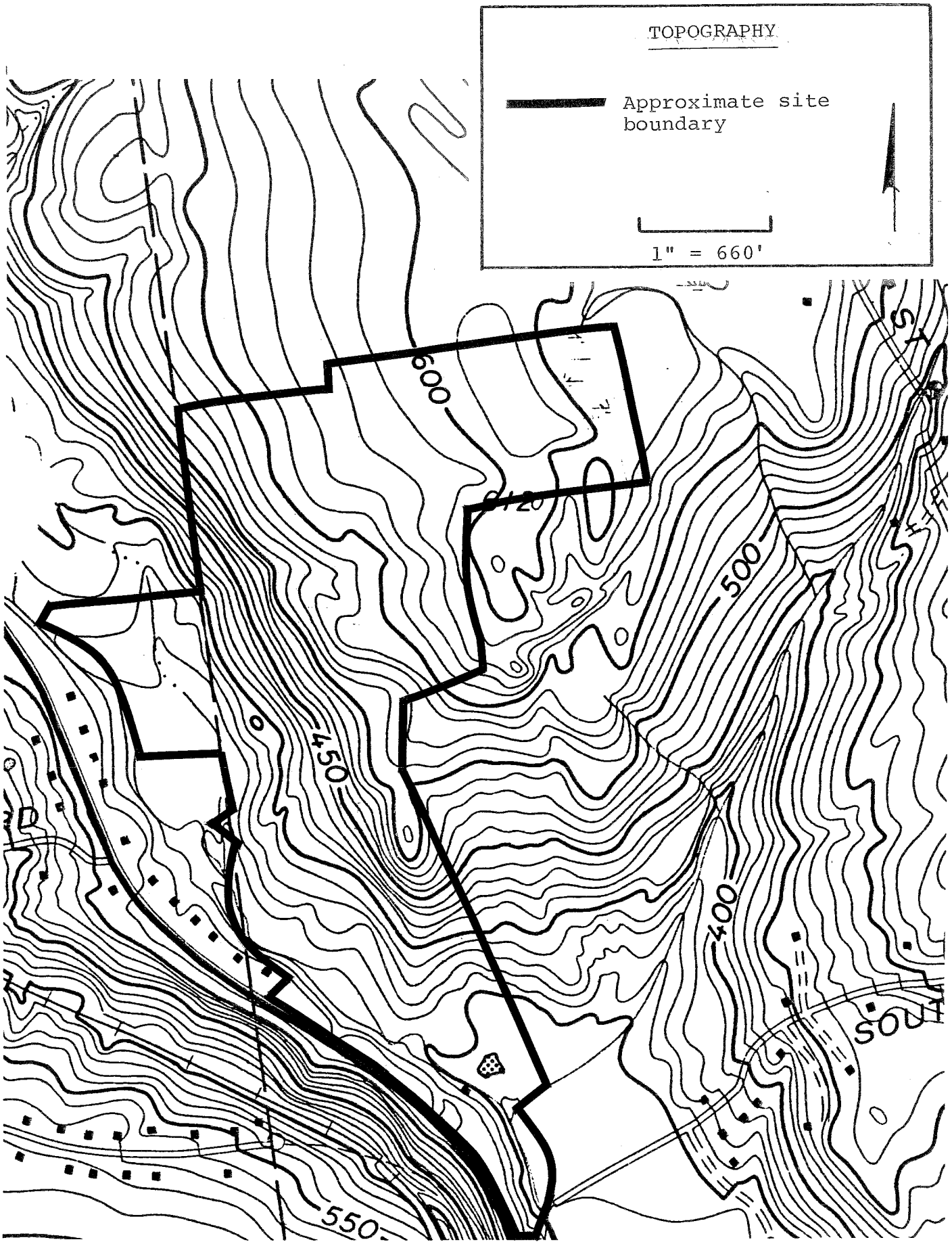
Scale 1" = 2000'



1. INTRODUCTION

The Town of Coventry has asked for Environmental Review Team assistance in evaluating a special permit application allowing a condominium development. In 1975 the Team prepared a report entitled "Arrowhead Ridge - Coventry, Connecticut" for a proposed 340 residential units on approximately 115 acres. The report presented a resource inventory of the property and discusses geology, hydrology, soils and general suitability of the site for development as well as other environmental topics. The new proposal now named "Colonial Woods" includes the previous 115 acres plus an additional 60 acres located in the southern part of the site. It is bounded on the southeast by Ash Brook and on the southwest by Route 6. The new plans propose 330 two bedroom units. A copy of the 1975 ERT report is included in the Appendix of this report.

This report evaluates the new proposal and discusses the additional 60 acre acquisition. Also included is information on the permitting processes applicable to the development.


TOPOGRAPHY
Approximate site boundary
1" = 660'
600
500
450
400
550
SOUT

2. GEOLOGY

The geology and land-use of the original 115 acres has not changed dramatically since the 1975 ERT so the Team's Geologist has chosen not to repeat the information contained in that report, instead this report will focus on data and analysis for the newly acquired land, hydrologic conditions for the entire site and review of the newest development proposal the from a hydrogeologic standpoint. The Team's Geologist concurs with the topography and geology sections of the 1975 ERT report.

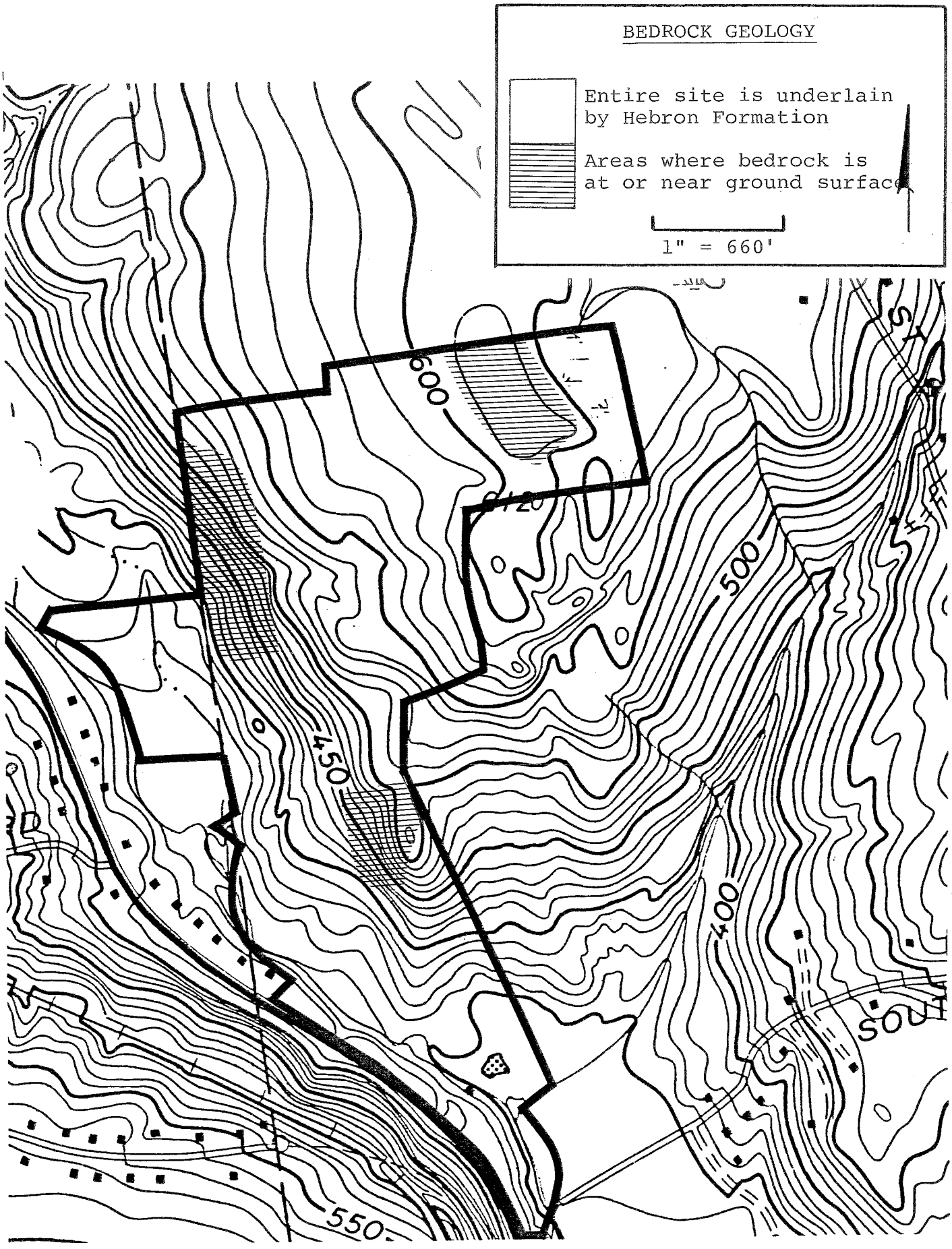
The newly acquired 60 acres consists of land that slopes moderately to steeply from the proposed water company facility southeastward toward the confluence of Ash Brook and the Hop River. Many of the proposed active recreational facilities for the development such as horse stables, riding ring, pool, tennis courts, etc., are located in the lower parts of the newly acquired land.

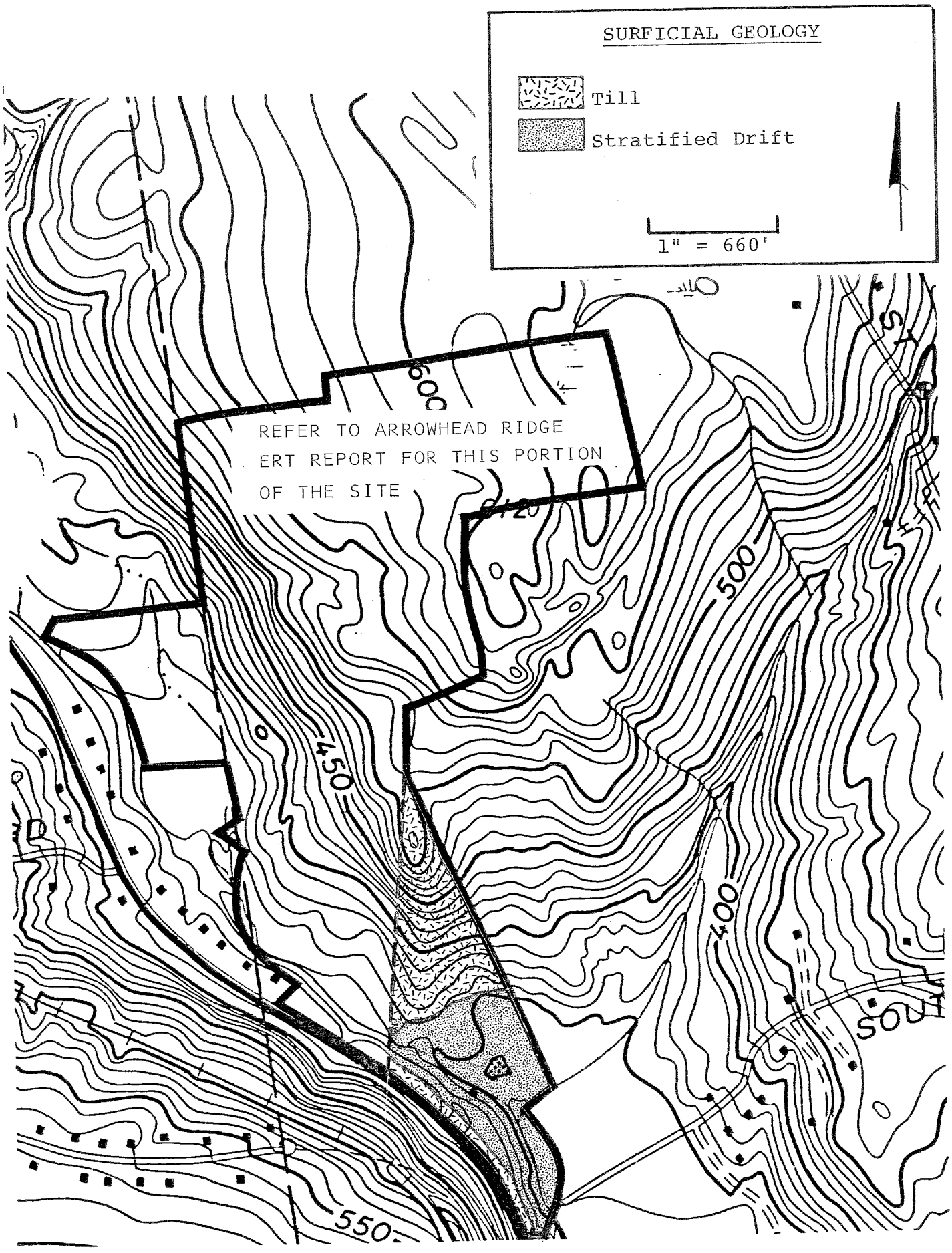
The ± 60 acre piece is covered mainly by two types of glacial sediments; till and stratified drift. Till covers the upland portions of the parcel. It consists of glacial sediment that was deposited directly from glaciers. The sediment is made up of varying proportions of sand, silt, gravel, clay and boulders. Particles of different sizes are generally mixed together in a complex fashion. The texture of the till on the parcel is sandy, stony and loose or moderately loose.

The remainder of the land, which is in the southern limits, is covered by stratified gravelly sands, which were deposited by streams of glacial meltwater in the Hop River Valley. Several tens of feet of sand and gravel may cover this area.

Bedrock underlying the ± 60 acre parcel is comprised of the Hebron Formation, the same type of bedrock underlying the original piece. {Rockville Quadrangle Bedrock Map, QR-6, J. Aiken}. The bedrock has been well described in the 1975 ERT report and should be referenced by interested persons.

The underlying bedrock is a source of water to most homes in Coventry. It is understood that the stratified sand and gravel deposits overlying bedrock near the confluence of Ash Brook and the Hop River would be drawn upon for the water supply well servicing the proposed development. {See Water Supply Section}.


BEDROCK GEOLOGY
Entire site is underlain by Hebron Formation
Areas where bedrock is at or near ground surface
1" = 660'
600
500
450
400
550


SURFICIAL GEOLOGY
Till
Stratified Drift
1" = 660'
REFER TO ARROWHEAD RIDGE
ERT REPORT FOR THIS PORTION
OF THE SITE
600
500
450
400
550
SOUTH

3. GENERAL SOILS INFORMATION

The soil map contained in the ERT report "Arrowhead Ridge, Coventry, Connecticut" dated November 1975 was reviewed and appears to be adequate for general planning purposes. This supercedes the information contained in the Soil Survey of Tolland County, Connecticut, 1961. An updated interpretation table for the soils that appear in the 1975 report is included here. The table was updated to reflect 1987 interpretations and concepts. If the Commission requires additional information it is suggested that the applicant retain the services of a qualified private soil scientist to review the information contained in the Soil Survey of Tolland County, CT., and the 1975 ERT report and then examine conditions in the field and provide the Commission with a verified map and up-to-date interpretive information for the site.

The Tolland County Soil and Water Conservation District can on request review the submitted information for adequacy.

PROPORTIONAL EXTENT OF SOILS AND THEIR LIMITATIONS FOR CERTAIN LAND USES

Soil Series	Natural Soil Group	Soil Symbol	Slope (percent)	Approx. Acres	Percent of Acres	Urban Use Limitations*			
						On-site Sewage	Buildings with Basements	Streets and Parking	Land-scaping
Hinkley	A-1b	HkC	3-15%	5.4	5%	3	2	2	3
Walpole#	A-3a	Wd		7.5	6%	3	3	3	3
Charlton	B-1a	CaB	3-8%	2.2	2%	1	1	1	1
Charlton	B-1a	ChB	3-8%	4.8	4%	1	1	1	1
Leicester#	B-3a	Le		3.1	3%	3	3	3	3
Leicester#	B-3b	Lg		4.6	4%	3	3	3	3
Woodbridge	C-2a	Woodbridge		37.0	32%	3	3	3	2
Ridgebury#	C-3b	Lg		5.0	4%	3	3	3	3
Whitman#	C-3b	Wp		1.9	2%	3	3	3	3
Montauk	C-1e	BSMD	15-35%	26.5	22%	3	3	3	3
Charlton/Hollis	D-1	ClB	3-15%	14.5	12%	variable	variable	variable	variable
Alluvial#	E-3a	Am		4.3	4%	3	3	3	3
Total				116.8	100%				

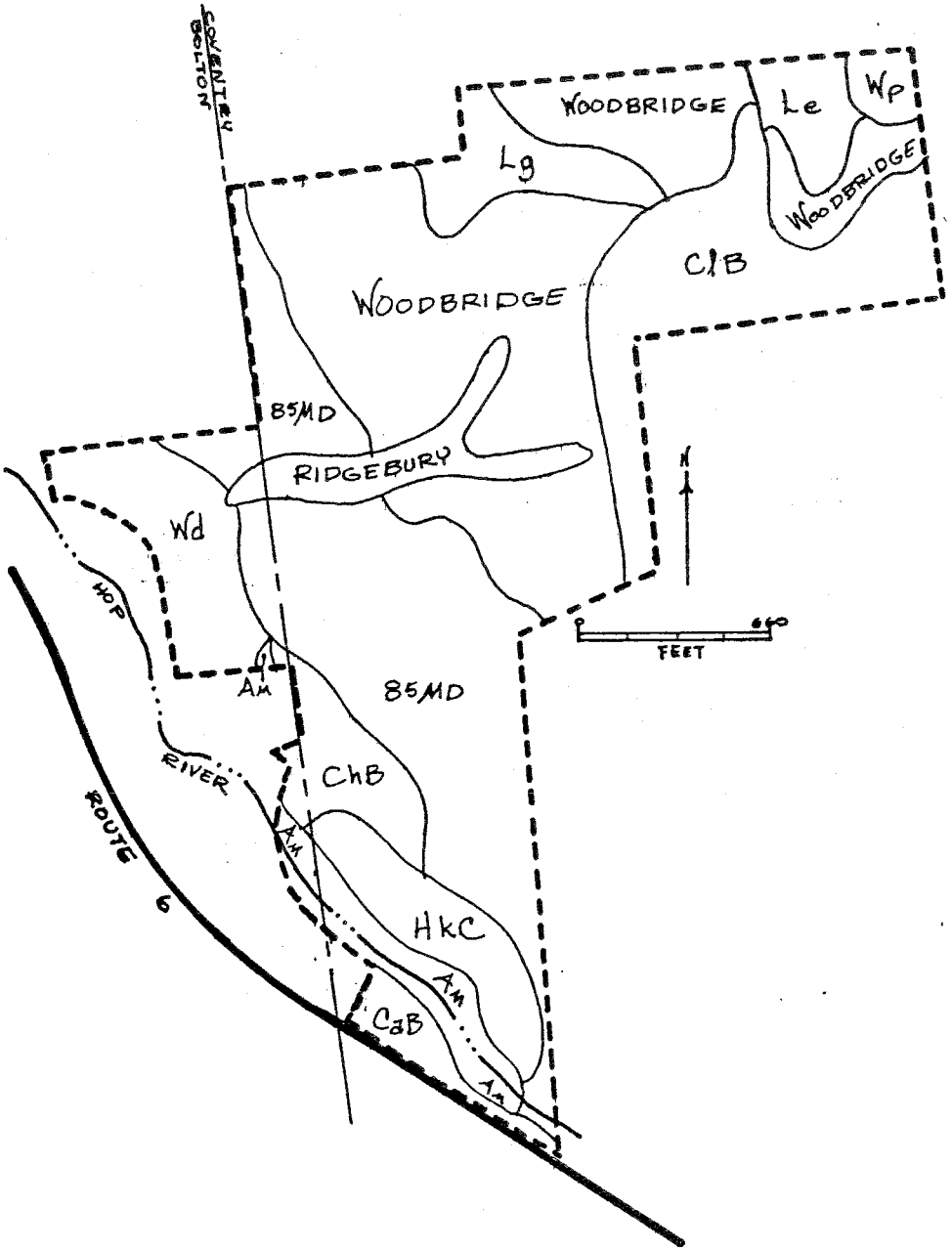
*1 = slight; 2 = moderate; 3 = severe
#Regulated Inland Wetland Soils

United States Department of Agriculture

Soil Conservation Service

Tolland County USDA-SCS
24 Hyde Avenue
Rockville, CT 06066
875-3881

COVENTRY, CONNECTICUT



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

ADVANCE COPY, SUBJECT TO CHANGE.

OCTOBER, 1975

4. WETLAND BOUNDARY INFORMATION

Wetlands on this site have not been identified in the field. It is suggested that the Commission require that the applicant have a qualified private soil scientist delineate wetland boundaries and watercourses in the field. The boundaries should be flagged and numbered sequentially. This information should then be surveyed onto the plan map. The soil scientist should then review and sign a statement on the map(s) certifying that the information is substantially correct. The certification statement should be similar to the following: "The wetland soils on this site were identified in the field using the criteria required by Connecticut P.A. 72-155 as amended by Conn. P. A. 73-571, Conn. P. A. 87-338 and P. A. 87-533. The boundaries of these soils and of identified watercourses are accurately represented on the plot plan." This statement should be signed by the soil scientist who performed the field work.

If this procedure is followed and discrepancies are found, the Tolland County Soil and Water Conservation District can on request review the submitted information for adequacy.

5. SOIL EROSION AND SEDIMENT CONTROL PLAN

A detailed soil erosion and sediment control plan is required and should be developed and implemented for this site. The plan should be developed using the criteria contained in the Connecticut Guidelines for Soil Erosion and Sediment Control (1985). The Tolland County Soil and Water Conservation District would appreciate the opportunity to review this plan prior to final approval. The major concerns of the proposal with respect to soil erosion and sediment control are: the detention/sediment basin, the proposed wetland crossings, the storm drainage system outlets, protection of the storm drainage system from siltation, the Hop River crossings (permanent and temporary), construction of roads on steep grades, and the large areas disturbed by construction activities.

6. GEOLOGIC DEVELOPMENT CONCERNS

No subsurface data, i.e., deep test holes, percolation tests, etc., either new or from the 1975 ERT were made available to Team members on the reivew day. However, numerous deep test holes were recently excavated in the proposed leaching field area. This area is located in a former pasture adjacent to the Hop River. Since these holes had not been backfilled, Team members were able to examine several of them.

Except for holes excavated near the treeline, which appear to have encountered till soils and bedrock, most of the proposed leaching field area consisted of sand and gravel in the upper portions but graded into fine-grained sediments (silty sand or sandy silt) to the bottom of the pit. The texture of the material below the fine grained sediments is unknown.

The zone of finer grained soils commonly tend to have lower permeabilities than the overlying coarser grained sand and gravels. As a result, groundwater or effluent that encounters this layer will tend to move laterally on the top of the finer-grained materials towards discharge points such as the Hop River or move slowly through the material enroute to discharge points. Groundwater was observed in at least one test hole near the Hop River. The water level appeared to be coincident with the water level in the river.

Because public sewers are not available in this part of Coventry, Team members were informed on the review day that the septic effluent generated by the proposed development would need to be disposed of on-site.

The development as a whole (not subdivided) would discharge 5,000 gallons per day or more of septic effluent, so a permit from DEP's Water Compliance Unit will be required.

A cursory review of open deep test pits in the septic field area indicates that sandy/gravelly soils on the site may be favorable for construction of on-site sewage disposal system. However, these sandy/gravelly soils are also known for having rapid seepage and in turn may not have the ability to provide the good filtration and renovation of septic effluent or other types of pollutants. On the other hand, natural dilution by infiltration precipitation will be increased.

The presence of fine-grained sediments at depth may also limit the potential of this area for on-site sewage disposal. Further testing of this soil zone will be imperative in order to determine the area's ability to handle the projected sewage flows.

In view of the foregoing discussion, the presence of rapidly permeable soils, and the need for on-site sewage disposal systems, all these make the site an area of special concern. Without good planning and design, subsurface sewage disposal in this area could deteriorate the quality of the Hop River aquifer and possibly cause groundwater pollution problems. This raises a special concern since the proposed development and existing land use in the area rely on on-site wells.

Since the proposed development will discharge sewage in excess of 5,000 gallons per day, the Department of Environmental Protection's Water Compliance Unit must issue a permit. Assuming a discharge rate of 150 gallons of sewage per bedroom per day, it is estimated that approximately 99,000 gallons of sewage effluent will be discharged to the site from the proposed 330 two-bedroom units. (See Appendix B)

Before the DEP could act on a permit application, the applicant's engineer would have to provide detailed technical information on the hydrogeologic conditions in the disposal area, the design of each sewage disposal system; a thorough hydraulic analysis of the disposal areas; and analysis of the probable impact on any nearby water resources and the underlying aquifer from a drinking water quality standpoint. This last requirement should include an analysis of bacterial travel, virus removal and nitrate and phosphate transport. The "burden of proof" is clearly upon the developer to show that the proposed sewage disposal system(s) will function properly and not pose a threat to the environment or public health. Prior to acting on a permit application, the applicant should be required to make arrangements for ownership, operation and maintenance of the sewage disposal system. It seems likely that the Coventry Health Department, in conjunction with the DEP will also play an important role in the permit application, review of the plans and inspection of the sewage disposal system(s) during installation.

Development of the site should proceed only within the limits of acceptable density as to the capacity of the soil and particularly not to overload the Hop River aquifer with too great a volume of sewage waste water discharge. Groundwater in the area is classified by the DEP as GA, which means that it is suitable for private drinking water supplies without treatment.

The moderate steep slopes that characterize the central part of the site can be an obstacle in terms of road construction. The presence of very large boulders and possible shallow bedrock in this area may require blasting in order to construct roads. Blasting should be conducted under the strict supervision of persons familiar with the most recent blasting technology. It is strongly recommended that a sound erosion and sediment control plan be formulated and followed very closely for the project, particularly where slopes are moderately steep or where there is running water. A closely followed erosion sediment control plans is necessary to avoid environmental damage and complaints from downstream neighbors.

The geology and topographic conditions found in the northern part should not pose any major problems in terms of the construction of residental units. The presence of interspersed regulated wetland soils and areas where bedrock is at or near ground surface may be a hindrance.

7. HYDROLOGY

The entire site lies within the Hop River watershed. At its point of outflow into the Willimantic River, the Hop River drains an area of 80.2 square miles or 51,320 acres. Except for the northern most part of the site and parts of the newly acquired ± 60 acres, surface runoff flows downslope to the Hop River. Groundwater flow mimics surface flow to a large degree on the site. Precipitation falling on the sandy/gravely soils along the Hop River are quickly absorbed into the ground. Water then percolates downward through the soil components until it reaches the groundwater table or the fine-grained material. Once it reaches the water table, it is pulled by the force of gravity toward the River or moves laterally on top of the less permeable fine sands and silts.

The northernmost section of the site and the newly acquired land drains downslope to tributaries to Ash Brook. Ash Brook is a tributary to Hop River.

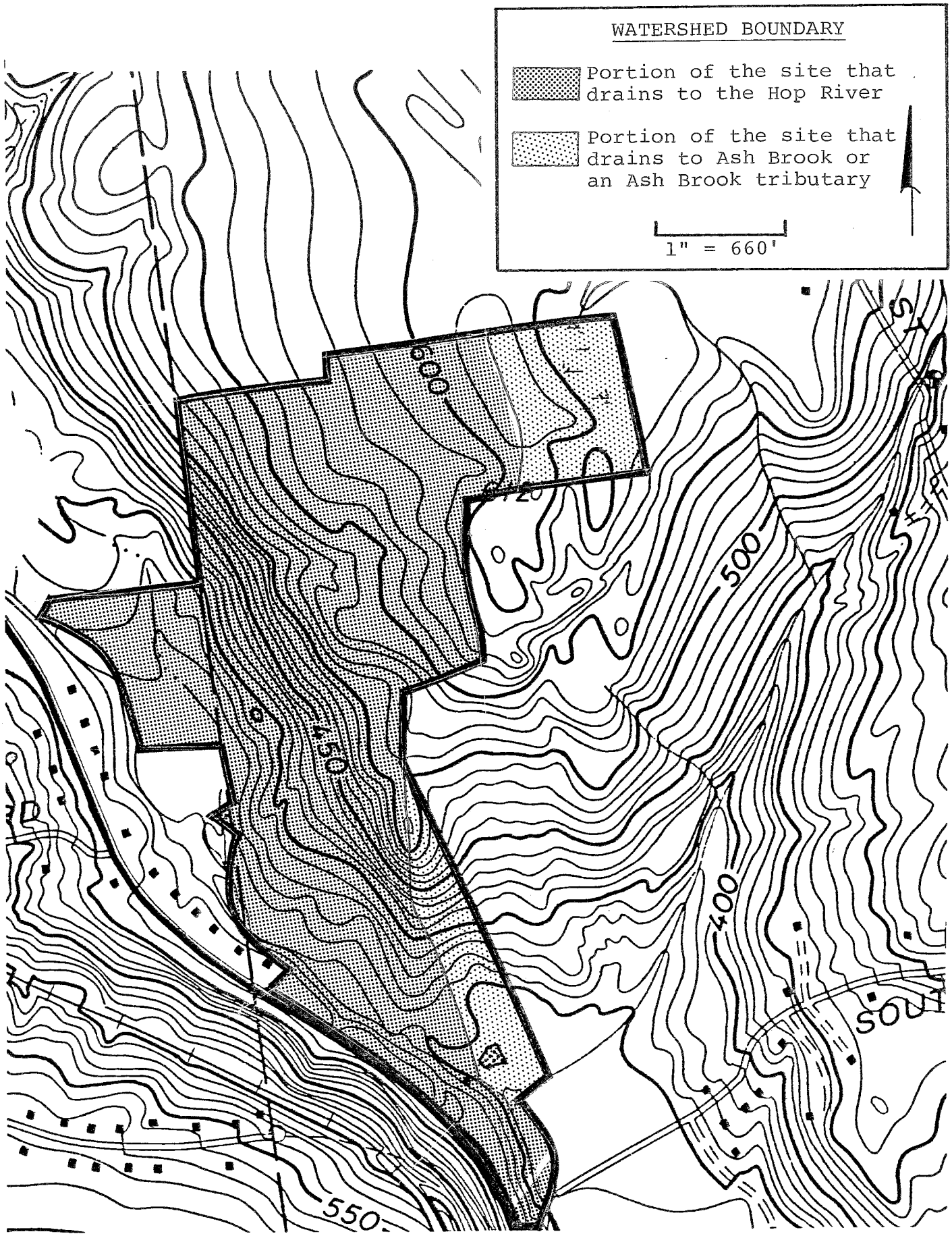
Because of the high density of units presently proposed, development of the site would be expected to significantly increase the amount of runoff during periods of rainfall. These increases would result from soil compaction, removal of vegetation and placement of impervious surfaces (roof tops, parking area, etc.) over otherwise pervious soils. As a result, it is strongly suggested that the Town require the applicant to submit a stormwater management plan, which includes pre and post development runoff calculations. The plan and calculations should be carefully reviewed by the Town engineer and appropriate town officials.

Considering the site's close proximity to the Hop River, on-site detention may not be necessary, but this can only be determined once drainage calculations have been prepared.

The protection of watercourses on the site from silt, sand and parking lot debris is a major concern. In this regard, it is recommended that a comprehensive erosion and sediment control plan be submitted for the proposed development, particularly in view of the moderately steep slopes. The applicant's engineer should show in the stormwater management plans where road and parking lot runoff will be outletted to. Ideally, it should be outletted to a sediment basin on the site rather than directly to watercourses. Consideration for the maintenance of catch basins on a regular basis is also recommended.

Based on present plans, the Hop River and its accompanying floodplain will need to be bridged in order to gain access to the site. the Only other wetland area that may be affected would be the wetland pocket in the northeast corner. This wetland pocket forms the headwater region for a small Ash Brook tributary.

Both of the above areas are considered "regulated areas" under Chapter 440 of the Connecticut General Statutes. Any proposed activity that impacts regulated areas must be approved by the Coventry Inland-Wetlands Commission. In reviewing a proposal, the Commission will need to determine the impact that the proposed activity will have on the wetland. If the commission feels that the regulated area is serving an important hydrologic or ecologic function and that the impact of the proposed activity will have on the wetland. If the commission feels that the regulated area is serving an important hydrologic or ecologic function and that the impact of the proposed activity will be severe, they may deny the activity altogether or, at least, require measures that would minimize the impact. The U. S. Army Corps of Engineers should be contacted to determine if a permit is required for crossing the Hop River. All wetland crossings should be accompanied by an erosion and sediment control plan. If approved, wetland crossings should be constructed during the dry time of the year.


WATERSHED BOUNDARY
Portion of the site that drains to the Hop River
Portion of the site that drains to Ash Brook or an Ash Brook tributary
1" = 660'
600
500
400
550

8. FLOOD ZONE BOUNDARY

The applicant should obtain the services of a consulting hydrologist to verify the location of the 100 and 500 year flood elevations along the Hop River. The maps and profiles prepared by USDA - SCS dated June 1975, HUD Flood Insurance Rate maps dated June 1980 and information from the State of Connecticut DEP can be used as reference material.

An updated analysis of the flow characteristics of the Hop River should be developed or existing information verified in conjunction with the design of any proposed stormwater detention facilities. The purpose of this information is to ensure that construction and operation of a detention basin does not aggravate flooding conditions downstream due to coincidental discharge peaks for the Hop River and the basin. It is recommended that the rationale and design for the basin be developed using the methods, criteria and standards found in the Connecticut Guidelines for Soil Erosion and Sediment Control (1985) as amended.

9. WATER SUPPLY

Since public water supply lines are not available to this site, the developer(s) will need to rely on the water bearing geologic formations found within the site for a water supply source. The two principal geologic formations found below the site capable of supplying water to the proposed development includes the underlying bedrock and the stratified sands and gravels along Hop River.

Bedrock wells are commonly capable of providing small but reliable yields of groundwater to individual wells. A survey of bedrock wells in the Shetucket River basin (see Connecticut Water Resources Bulletin No. 11) indicates that 90 percent of these wells yielded 3 gallons per minute or more. This yield is equivalent to 3240 gallons per day (18-hour pumping period). It seems likely that a well or wells capable of producing between 73 and 92 gallons per minute would be required for the proposed project. These figures assume 4 persons per unit and consumption rates ranging between 60 and 75 gallons per day per person, respectively. Because the chances of obtaining a yield which ranges between 73 and 92 gallons per minute or more from a bedrock well is slight, it seems likely that many bedrock wells (24 to 31, respectively) would be required or the density of the proposed project would need to be significantly reduced.

The other potential aquifer within the site is the sand and gravel deposits along Hop River. Saturated, coarse grained sands and gravels, particularly when located near a major stream, may have potential for yielding moderate to very large amounts of water (greater than 50 gallons per minute). Hydrogeologic data such as thickness of saturated zones, texture, etc., are presently not known for the site and verification would require testing. As mentioned earlier, excavated pits on the site revealed coarse grained-deposits overlying fine-grained deposits. It should be pointed out that the latter type of deposit is a difficult material in which to finish wells and also has a relatively slowly permeable medium.

The plans distributed to Team members on the review day showed that the proposed well site is about 50 feet from the Hop River. The project engineer indicated that it would be a gravel packed well or wells. Because of its close proximity to the river, the well or wells would be hydrologically connected to the river. During pumping periods, the well may lower the water table below the level of the river, drawing water from the river into the well. This phenomenon is known as induced filtration. Obviously, this could have an adverse impact on aquatic habitats in the River, particularly during low flow periods. Therefore, it is strongly recommended that the developer be required to conduct a detailed hydrogeologic study in the area of the proposed well or wells, which would discuss all potential concerns regarding the water supply well and its effect on the river, nearby private wells, etc.

It should be pointed out that according to DEP Water Compliance, the surface water quality of the section of the river which traverses the site is classified as B/A. This means that it currently does not have potential for drinking water supply. This is a result of a past chemical (solvents and waste oils) spill upstream from the site. DEP's ultimate goal is to upgrade the river to an A classification. Designated uses for a Class A surface water body includes potential drinking water supply; fish and wildlife habitat; recreational use; agricultural/industrial supply and other legitimate uses, including navigation. Class B waters would have the same designated uses as Class A waters, except as a potential drinking water supply source.

Also, if the proposed well or wells pump in excess of 50,000 gallons per day or more, it will require a diversion permit. Since it seems likely that the 50,000 gallons per day or more would be surpasses, the applicant should contact Robert Gilmore of DEP's Water Resources Unit at 566-7220 to discuss the diversion permit.

Finally, because the proposed well site is located within the 100 year flood boundary of the river, it will be subjected to flooding and possible contamination during certain storm events. As a result, the well will need to be properly protected from flood waters or relocated to an area which would not be subjected to flooding.

The proposed well or wells will first require approval by the State Department of Health Services (Public Water Supply Section) and the Department of Public Utilities Control.

Information on projected needs of the development in terms of water quantity, water quality testing and plans for pumpage, storage, treatment, if necessary, and the distribution system would also be necessary for a community water supply. Consideration should be given in advance to providing for proper operation and maintenance of the community water supply system (i.e., establishment of a homeowner's association or takeover by a private or municipal water supply company).

Except for the chemical spill eluded to earlier, which has degraded surface water quality to a section of Hop River, groundwater beneath the site is classified as GA. This means that it is suitable for private drinking water supplies without treatment. As a result, the quality of the groundwater would be expected to be generally good.

There is always a chance for elevated iron and manganesse levels in the water supply wells, particularly if they tap the underlying bedrock. Iron removal filters are available on the market to combat this potential problem.

10. AGRICULTURAL WASTE MANAGEMENT PLAN

If the construction of horse stables are to be part of the proposal, then it is recommended that an agricultural waste management plan be developed so that the proper treatment facilities for animal wastes can be constructed and disposal methods and required management systems outlined. The major concerns are the storage and disposal of manure and bedding, runoff from loafing areas (paddocks), and proper management of pastures to prevent contaminated runoff from reaching the Hop River. The magnitude of the potential problems is obviously related to the number of horses to be housed on the premises. The applicant should note that if the number of horses exceed 150 then a discharge permit from DEP is required.

11. FISH RESOURCES

A. Site Description

The proposed Colonial Woods Condominium development will border approximately 4,290 feet of the Hop River. The Hop River is currently classified by the Department of Environmental Protection (DEP) as "Class B/A". Designated uses for this classification are: fish and wildlife habitat, recreational use, agricultural and industry supply, and other legitimate uses including navigation. Future goals are to upgrade the water quality classification of the Hop River to "Class A", where it could be utilized for a potential drinking water source.

The portion of the Hop River adjacent to the proposed development varies from 10 to 25 feet in width. Average water depth is approximately one foot. Water deepens in large "pool" type habitat up to a maximum of 4 feet. Dominant streambed substrate is comprised of fine sands and "cobble" (2-12" diameter) type rocks. This stretch of river contains large expansive pools and well defined riffles.

The Hop River contains excellent instream habitat for trout and other resident fishes. Undercut streambanks and fallen trees are common. These structures provide beneficial cover "hiding and resting areas" for stream fishes. Sufficient overhead shading is provided by streamside trees. Shading benefits aquatic resources by cooling stream waters. Water clarity is excellent. The lack of filamentous algae and nuisance aquatic vegetation is evidence of healthy, clean waters.

Numerous small low-lying dams comprised of small rocks have been strategically placed (probably by anglers) in this stretch in order to create large deep pools. A larger dam constructed and maintained by beavers also was observed. Additionally, a breached dam exists on the extreme southern portion of this property.

The Hop River is prone to flooding along this stretch. Streambed material has been deposited along the western side of the floodplain. A "choke" point or narrow river constriction exists above the breached dam. Trees and other materials have accumulated in this area due to past flood events.

One seasonal watercourse flowing into the Hop River was observed. This stream averages 2 feet in width and is comprised of a mud/silt bottom. Stream flows were minimal at the time of the field review.

B. Fish Population

The Hop River is a highly prized and productive trout stream. Its habitat is considered excellent for both juvenile (young) and adult stages of trout. The Hop River is annually stocked by the DEP Bureau of Fisheries with over 4,000 rainbow, brook, and brown trout in the towns of Coventry and Bolton. The river also supports a native (wild) brown trout fishery.

In addition to trout, the Hop River supports a diversity of other fish species such as: white sucker, fallfish, common shiner, blacknose dace, longnose dace, and tesselated darter. Warmwater fish such as largemouth bass, brown bullheads, bluegill sunfish, and pumpkinseed sunfish that reside in upstream areas (Bolton Lakes) may also disperse to this reach; although, cooler stream water temeperatures will restrict their growth and survival. The seasonal watercourse does not support a permanent fish population.

Angler access is good along this stretch. Most anglers walk within the river to reach their favorite locations since heavy underbrush discourages walking along streambanks. This reach also supports a wide variety of aquatic insects which serve as the primary food source for fishes.

C. Impacts

The following impacts on the Hop River can be expected if proper mitigative measures are not implemented:

1. Percolation of septic effluent into the Hop River -- The proposed community septic system will be constructed in close proximity to the river. A failure of this community system to operate properly would be potentially dangerous to the river ecosystem. Nutrients and assorted household chemicals that condominium residents may place in this septic system could enter the waters of the Hop River in the event of a failure. The introduction of septic effluent could result in a major threat to fish, public health, and overall water quality conditions. Effluent will also stimulate the growth of nuisance aquatic vegetation and algae.

2. Reduced streamflow in the Hop River due to diversion of water from the community well system -- proposed well placement in locations close to the river could potentially withdraw waters from the Hop River (see Water Supply Section). This situation would be most critical during normal summer low flow periods. Further reduction of Hop River flows due to well operation would adversely affect river ecology. Expected impacts would be increased water temperatures, decreased dissolved oxygen levels and reduction of overall usable habitat for fishes and aquatic insects. These impacts would ultimately result in reduced aquatic resource populations.

3. Condominium site construction soil erosion and sedimentation of the Hop River through increased surface runoff from unvegetated zones -- erosion and sedimentation due to construction activities has long been regarded as a major cause of stream degradation. If realized, excessive silt deposition can result in the reduction of:

* Stream pool depth -- pools provide cover, shelter, and resting areas for fish. They are a very improtant habitat variable.

* Fish egg survival -- sufficient water flow, free of sediment particles is a basic requirement of egg respiration (biological process of extracting oxygen from water) and successful hatching.

* Aquatic insect production -- sediment free water is also a basic need for successful aquatic insect egg respiration and hatching. Aquatic insects are the primary foods consumed by stream fishes. Decreased amounts of insects will adversely effect fish growth and survival since excessive energy demands are required to locate preferred aquatic insects when population levels are low.

* Streamwater oxygen levels -- organic matter associated with soil particles is decomposed by micro organisms. Decomposition will contribute to the depletion of oxygen in waters overlying deposited sediments.

Another major impact caused by silt deposition is the accelerated growth of rooted aquatic weeds and algae. Eroded soils contain plant nutrients such as nitrates and phosphates. Although algae and aquatic weeds require these nutrients for growth, most aquatic stream ecosystems contain very small amounts. Consequently, these nutrients act as fertilizers once they are introduced into streams. This process results in increased plant growth.

4. Stream sedimentation due to bridge construction over the Hop River -- the developer plans to construct one bridge crossing. Negative impacts of silt deposition were previously discussed.

5. The developer is considering refurbishment of the breached dam to create a pond -- long range impacts of stream impoundment would be increased deposition of sediments in the area behind the dam and increased decomposition of bottom materials resulting in decreased dissolved oxygen levels. Conversion of local stream habitat to pond habitat would make this area less suitable for resident stream fishes such as trout.

6. Transport of condominium lawn fertilizers and chemicals to the Hop River -- runoff and leaching of nutrients from fertilizers will stimulate nuisance aquatic weed growth. Introduction of lawn chemicals may result in "fish kills" and water quality degradation.

7. Introduction of road salts to the Hop River -- surface drainage from the proposed road network may introduce salts and other pollutants into the Hop River. This scenario will result in water quality and stream habitat degradation. Any water quality problems that develop along this property will ultimately be passed on to downstream regions and enter the Willimantic River which is one of the finest trout streams in the State of Connecticut.

D. Recommendations

The impact of residential development along the Hop River can be minimized by implementing the following precautionary measures:

1. Properly design and locate the community septic system (refer to Geologic Development Concerns Section -- the addition of septic effluent to the Hop River can be one of the greatest threats to river ecology.

2. Properly place community wells in locations that will not severely reduce Hop River streamflows.

3. Maintain at the minimum a 100 foot open space buffer zone along the river's edge -- no construction or alteration of riparian habitat shall take place in this zone.

4. Install and maintain proper erosion and sedimentation controls during condominium and bridge crossing construction -- this includes such mitigative measures as silt fences, hay bales, and catch basins. The developer must direct all runoff away from the Hop River and regularly maintain catch basins.

5. Discourage pond development on the Hop River -- since this area floods periodically, an elaborate and expensive engineering design will be required to prevent seasonal damage to the dam. State permits are required if the developer decides to build a dam. Contact the Water Resources Unit of the DEP for further details.

6. Limit liming, fertilization, and the introduction of chemicals to condominium lawns close to the Hop River -- this restriction will abate the amount of additional nutrients to the river.

7. Stress the use of low phosphate laundry detergents -- laundry detergents loaded with phosphates could enter the river in the event of a septic system failure.

8. Clear miscellaneous debris within the Hop River that has accumulated at the "choke" point -- this natural river constriction will probably require future maintenance.

9. Encourage condominium residents to create a Colonial Woods Environmental Association in order to educate all residents concerning responsible land management practices near the Hop River -- technical assistance regarding these matters can be obtained from DEP and Soil Conservation Service (SCS) professionals.

E. Summary

As proposed, the Colonial Woods condominium development has the potential to negatively impact the aquatic resources of the Hop River. Careful and conscientious planning must be implemented by the developer and the town to mitigate all potential impacts. If implemented, proper mitigation measures will assist in the preservation of existing water quality and fish habitat. If the condominium development is approved by the town of Coventry, the Team's fisheries biologist would like to be notified when site construction is initiated.

12. VEGETATION COMMENTS

Healthy forest land provides a protective influence on soil stability and water quality. Approximately one-half (1/2) of the acreage on this tract is 15% slope or higher, with some areas of 25%--30% slope. The forested land reduces the impact of precipitation and runoff, moderates the effects of adverse weather conditions and stabilizes soils. The woodlands reduce erosion, sedimentation, siltation and flooding. Research has shown that forest soils protected by tree roots, humus, and a litter layer contribute little or no sediment to streams.

A. Aesthetic Considerations

Trees are very sensitive to the condition of the soil within the entire area under their crowns. Development practices near trees such as excavation, filling and grading for road building and structures and compaction from equipment usage disturbs the balance between soil aeration, soil moisture level, and soil composision. Disturbances to soil near trees causes a decline in tree health and vigor resulting in mortality within three to five years. Older trees and/or larger trees are more readily affected by the negative impact of construction and related activities. Mechanical injury to trees from equipment can also cause mortality. Dead trees reduce the aesthetic quality of an area and may become hazardous and expensive to remove if near roads, buildings or utility lines.

Research has shown that trees on a houselot may enhance the value of that houselot. However, lots should be cleared completely and the trees that are left for aesthetics should be well away from the house, not disturbed during the clearing and have the roots and branches left intact to provide the highest aesthetic effect with the lowest potential for mortality. In general favor healthy, high vigor trees. The practice of retaining trees in small groups or "islands" lowers the possibility of soil disturbance and mechanical injury. The "islands" or individual trees left for retention should be clearly marked so as to be avoided during construction.

B. Limiting Conditions and Potential Hazards

Windthrow and tree breakage is a potential hazard after development. Trees which have grown in a forested condition rely on each other for stability and side support. Openings which allow wind to pass through, rather than over, the trees will result in uprooting and crown breakage of trees recently exposed to the effects of high winds before the trees have had 5--10 ybars to adapt to the change in their environment. This potential hazard can be minimized by openings less than one acre in size and oriented away from potentially high winds.

Alterations in wetland areas which permanently raise or lower the water table can eventually have a negative effect on tree growth. Raising the water table due to increased overland flow as a result of having less forest

acreage in houselots may drown roots of larger trees as well as lower shrubby vegetation. Draining wetlands or lowering watertables can also result in vegetation mortality. Construction through wetlands would have minimal effects provided that culverts are properly sized and spaced

By disturbing higly absorptive forest soils on slopes greater than 10% (which includes about 1/2 of the acreage on this property) to create houselots, roads and driveways, overland flow will increase. Roads and driveways present a permanent problem because they are not vegetated. Their construction removes all important forest litter. The resulting compaction and loss of protective, absorbent litter prevents rain from soaking into the soil surface rapidly as it falls. This causes water to collect and run over the road surface or exposed soils of a gravel driveway. The runoff moves faster on step slopes rapidly building erosive power, tearing soil loose and rutting driveways and leaving mud on town roads. Avoid driveways that go straight up slopes in excess of 10%. Install waterbar diversions at least every 40 to 75 feet on 10%--20% slopes. The steeper the slope, the closer the waterbars.

C. Management Considerations

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

The Forestry Unit of the Department of Environmental Protection encourages all woodland owners to manage their forest lands. When properly prescribed and executed, forest management practices will increase the production of forest woodland with minimum negative environmental impact.

To reach a healthy and productive state, individual forest stands should be periodically evaluated to determine present and future management needs. A public service forester from the Department of Environmental Protection may be contacted at 295-9523 to provide basic advice and technical assistance in woodland management. These services are provided free of charge. Services of a more intensive nature are available from private consulting foresters.

13. PLANNING COMMENTS

State Plan of Conservation & Development

The state's Policies Plan for the conservation & Development of Connecticut (Revision for 1987-1992) recommends the proposed site for "Rural Land' uses.

The strategy for development in this area is as follows:

Avoid support of structural development forms and intensities which exceed on-site carrying capacity for water supply and sewage disposal on a permanent basis, which are inconsistent with open rural character or conservation values of adjacent areas or which are more appropriately located in Rural Community Centers.

The guidelines for development in "Rural Lands" are recommended as follows:

RURAL LANDS GUIDELINES

A. Economic and Human Resource Development

Limit State support and promotion of the development to those uses and densities that ensure indefinite functioning of on-lot water supply and waste disposal systems and that are consistent with a generally open, rural environment.

1. Respond to housing needs through financial assistance to individual households. Where new large-scale developments are required, these projects should be encouraged in Rural Community Centers.

2. Expand the scientific management of forest lands and support forest product industries.

B. Environmental Quality

Encourage the protection of natural resource characteristics and the consideration of environmental quality in State actions.

1. Encourage and assist municipalities in the use of soils, geologic surveys and other natural resource information, basin and streambelt planning techniques in developing community plans.

2. Maintain GAA and GA groundwater designated areas at a drinking water quality which does not need to be treated.

C. Public Service and Infrastructure

Minimize the need for costly urban infrastructure facilities.

1. Encourage development regulations which will preclude the need for sewer, water and other urban infrastructure and facilities and which promote intertown or regional approaches where appropriate when needed. Promote sewer avoidance program management.

2. Establish guidelines for the control of the number and location of access points along rural State highways to maintain traffic volume capacity and safety standards.

3. Undertake traffic flow improvements to existing highways where feasible as a preferred alternative to the construction of new highways.

4. In general, locate interstate highway interchanges in urban rather than rural areas to support the concentration of urban growth in those areas.

5. When there is a demonstrated environmental, economic, social or general welfare concern, State support for the introduction or expansion of public facilities or services should be directed to the scale of improvement which responds to the existing need without serving as an attraction to major intensive development. An exception may be made to assist municipalities in the provision of infrastructure to service a particular site when:

   a. There is a definite commitment from a large industrial firm to relocate to the site in the immediate future,

   b. Substantial employment will result from the relocation,

   c. A feasible site is not available within an urban area, and

   d. A project plan is prepared which sets forth the costs and the anticipated economic, social and environmental impacts.

Regional Plan

The Windham Regions "Regional Growth & Preservation Guide Plan" recommends the area in the vicinity of the proposed site for "Low Density Rural" land uses which can be permanently accommodated with on-site water supply & sewage disposal rather than uses & densities requiring public investment in sewer & water service.

Policies recommended in such areas are as follows:

5. Low-Density Rural District

The low-density rural district contributes the bulk of the aesthetic appeal of the region and offers most of the low density recreational opportunities. Emphasis in planning and land regulation should be on minimizing the development of existing road frontages. People living in this district must be automobile oriented and, due to the high utility and energy costs associated with low-density development, they must be willing to pay significantly more to maintain this way of life.

(Policy for Low-Density Rural District)

. Development incentives should be provided to encourage residential development on internal parcels of land rather than along existing road frontages. Not only will the rural appearance of the region be maintained but traffic flow will be enhanced and traffic accidents reduced through having two or more residences on a single driveway instead of each individual residence having a driveway entering a state highway or town road.

. Preservation of agricultural lands and operations should be encouraged.

. Two-acre building lots should be the minimum and the prevailing lot size.

. Public services such as sewer, water and trash collection should not be available in the district.

. Large residential development projects should be discouraged in the low-density rural district. However, if such development occurs, subdivision standards for such developments should be designed to place all possible burdens for serving the residents of the proposed development on the developer (e.g., roads which at least meet town road specifications, drainage, dedication of land for recreation and perhaps additional school facilities or payment in lieu of dedication, etc.). Provision should be made for allowing small developments (e.g., through zoning incentives) to encourage the development of interior parcels.

. Where opportunities to develop recreational facilities or nature preserves of regional or statewide significance exist they should be exploited.

. Very light density development and open space preservation techniques should be used to protect areas along streams, watersheds which drain to public water supply sources and scenic and historic areas.

. The development of limited access highway interchanges should be discouraged.

Town Plan

Coventry's Plan of Development map indicates areas along the Hop River and other streams in the vicinity of this site for "open space" uses, and other portions of the proposed parcel for "Rural Density Residential" Development.

Residential Policy Goals & Objectives stated in the plan as follows:

- To regulate the density and location of new residential development based on physical resource information in order to protect environmentally sensitive areas and ensure adequate provision of sanitary services.

- To regulate new residential development in order to protect town facilities and neighboring properties and to prevent or minimize problems associated with drainage, sanitary waste disposal, water supply, flooding and traffic hazard. Due to the fact that many town roads are unsuitable in their current condition for providing proper sightlines and access, applicant/developer financed road and drainage improvements shall, to the degree necessary, be required to protect the health, welfare and safety of the town and its residents.

- To encourage a range of housing types in order that all ages and income groups have an opportunity to live in Coventry. Coventry recognizes that it has a regional as well as an individualized role.

- To encourage innovative designs and concepts which enable a maximum conservation of natural and cultural resources valued by the Town while providing attractive alternative places to reside. Cluster subdivisions and planned residential developments, with mixtures of single family, duplex and multi-family dwellings, should be encouraged.

- To encourage a revitalization and rehabilitation of the village area through a mixture of higher density commercial and residential opportunities.

- To encourage programs and policies promoting the rehabilitation of existing structures, roads and storm drainage systems in the Wangumbaug Lake drainage basin.

- To encourage and promote the integrity of historically significant areas and structures.

- To encourage the development of internal roads and common driveways to minimize drainage and traffic problems while enhancing Coventry's scenic character.

Other parts of the plan relevant to the proposed development include the discussion of the Physical Capabilities Approach to development (page 8) and Planned Residential Developments (page 13 & 14) as follows:

Physical Capabilities Approach

Cognizant of the need to protect the Town's environment while at the same time providing housing opportunities, the Planning and Zoning Commission has analyzed the specific nature and distribution of its natural resources with respect to implementing a solid and consistent residential policy. Recognizing that the Town's physical limitations are extensive but distributed fairly evenly throughout its borders, the Commission has concluded that its residential policies should direct future growth so that resultant densities are lower in areas of physical limitations. Due to specific problems, goals or environmental sensitivity, certain areas of town, such as the Wangumbaug Lake drainage basin, the village area drainage basin, the floodplain and aquifer areas of the Town's major watercourses and possibly the Eagleville and Bolton Lake watersheds require special attention, while the remaining areas of town require uniformly sound environmental regulation.

The utilization of a physical capabilities approach to land use will minimize or prevent a future overcrowding and potential destruction of important environmentally sensitive areas. These areas will then be able to serve their natural functions such as purifying and recharging groundwater, preventing flooding and supporting plant and animal life and recreational opportunities. Additional municipal problems associated with sanitary and drainage facilities would be minimized and, in general, the rural character and beauty of Coventry would be preserved for the benefit of all residents. It is the Commission's opinion that a physical capabilities approach is necessary because of the public character of many of our environmental resources and because the private real estate market often fails to adequately consider all costs and benefits associated with protecting these resources. This concept is intended to shift a developer's attention back to the capability of a specific site to support development. The gross number of acres in a parcel will not longer be the major determinant of potential residential density.

Planned Residential Developments

Many of the desired goals of the residential plan can be achieved through the construction of clustered single family homes with individual lots and common open space areas, clustered multi-family developments and innovative planned residential developments with a variety of housing types and layouts. The use of these approaches can provide unique and varied living environments which will provide housing types for all ranges of income and simulataneously protect environmentally sensitive areas. Furthermore, reduced roadway and drainage costs due to clustering can make these projects attractive alternatives to conventional subdivision development. Although these concepts often require sewer and water systems to provide ecnomically feasible densities, carefully drafted regulations, with appropriate density and sanitary standards, could encourage their construction in most areas of Town. However, due to the aforementioned environmental considerations, the Commission does not support the development of high density projects in the Wangumbaug Lake drainage basin and river/aquifer areas.

Regulatory controls, especially for multi-family units, must ensure that potential septic, water supply, drainage and access problems are properly handled and that the project will complement existing neighborhoods. Buffer areas and limited driveways off existing town roads should be encouraged and open space areas must be suitably preserved. Carefully drafted bylaws and rules for community association governance and maintenance are considered essential for a successful planned residential development. Regulations could also provide for common driveways, reduced roadway widths, swale/detention pond storm drainage systems and private recreational facilities. Enabling regulations for planned residential developments should provide flexibility for internal design, housing size and housing mix.

Due to the Town's natural resource limitations and the current reliance on on-site septic systems, the Commission shall limit multi-family developments to a maximum density of two units per acre and, through an established regulatory formula, shall require a lower overall density in areas with significant physical limitations. Developments of single family structures shall be limited to one unit per acre with provisions for a lower overall density in areas with significant environmental limitations. Similar density provisions shall be established for planned residential developments with mixtures of single family and multi-family units. In all cases, the density guidelines must be clearly worded in the regulations to prevent discretionary density determinations. If sewers are approved, a higher density guideline should be adopted for serviced areas and the density policy in non-serviced areas should be reanalyzed.

Planning Concerns

Coventry's zoning regulations allow for planned residential developments of the type proposed if the project meets the standards of the regulations. A development of this type was proposed as Arrowhead Ridge in 1975 and subsequently approved by the town. An Environmental Review Team Report was produced at that time on the 340 one and two bedroom multi-family project. Refer to that report and the Town's records on that development for comparison & guidance. Since that time a number of rules & regulations concerning approval of developments of this type have changed and the new application takes these into account.

Water Supply

The proposal for a small water company to supply water to the development now requires state approval. The developer indicates this application process has begun. Strict state standards for new small water companies should ensure an adequate drinking water supply. Utilization of this system is also planned for fire protection and should be reviewed by the town's fire department.

Waste Disposal

The community septic system proposed to serve the development located in the flood plain of the Hop River must be approved by the state, and according to state statutes (C.G.S. Section 7-246) the municipality's Water Pollution Control Authority must agree to accept responsibility for the functioning of that system, should it fail to be maintained by its owners, or provide for the installation of public sewers to the site if the on-site community system fails.

Coventry's W.P.C.A. should take special care to put in place the legal mechanisms necessary to avoid the financial burden of such an eventuality, in this, seemingly the first community system in the town.

The horse stable and complex planned for the development is a unique concept, perhaps the first of its kind in the region. Plans for the disposal of the animal waste should be considered in reviewing the plan.

Traffic Issues

Location of the proposed Rt. 6 expressway in relation to this development should be indicated on a location map as part of the plan submission, if only for information purposes for potential residents of the complex.

The proposed loop road through the wetlands at the northern edge of the development might be reconsidered to avoid the extensive wetland crossing. While proposed to provide adequate emergency vehicle access and turning connection to the cul-de-sac below the wetland could still provide the traffic loop without the wetland disturbance.

Sidewalks, pedestrian paths and school bus stops or turn arounds should be provided in a development of this size.

For other traffic concerns refer to Section 14 Traffic Concerns.

In general the traffic and roadway analysis for the project appears correct, although the Planner believes the number of vehicle trips projected for condominium unit will approach the upper limits of the estimate since the project is far from any public transit and residents will be dependent on their automobiles for mobility.

General

In general the development is a well thought out plan and should provide a pleasant residential environment. The questions to be resolved are whether the land is capable of supporting 330 residential units on 175 (+/-) acres (1/2 acre per dwelling) with on-site water supply & sewage disposal. This must be carefully evaluated by the state and local authorities.

14. TRAFFIC CONCERNS

The traffic study provided by the project developer appears adequate and the conclusion that a by-pass lane be provided in the project design is reasonable.

The average daily traffic (ADT) at the Andover/Coventry town line was: 1981 -- 8700 ADT, 1983 -- 9400 ADT and 1986 -- 9900 ADT which indicates stable growth for this area. Land use is controlled by the lack of public water and sewer. Traffic should increase at a normal rate even after the construction of I-384. Reconsideration of the by-pass design should be made as the length and width are to a minimal standard, such as the 32 foot width from the centerline of Route 6 and the 75 foot return. The radii of the subdivision road and Route 6 should take into account the site topographic conditions and Route 6 operations. The long length of the development roadway will require additional drainage at the proposed Route 6 intersection. The intersection must include an appropriate by-pass lane, drainage and radii.

The town must review their land use to insure that safe traffic operations are provided by their land use modification. The Windham Regional Planning Agency should coordinate similar planning and zoning actions by both Andover and Bolton. A proliferation of individual hillside roadways intersecting Route 6 or any other major arterial will affect safe traffic operations.

Additional Concerns

The developer is required to obtain a State Traffic Commission certificate since the number of proposed units are sufficient to exceed the 200 parking spaces requirement.

The on-site sewage disposal should carefully be considered. The reserve area must be fully explored to insure the reserve area has sufficient natural soil to be utilized when required.

Environmental controls should be at least equal to those...designed for I-384 to minimize the impact to the Hop River.

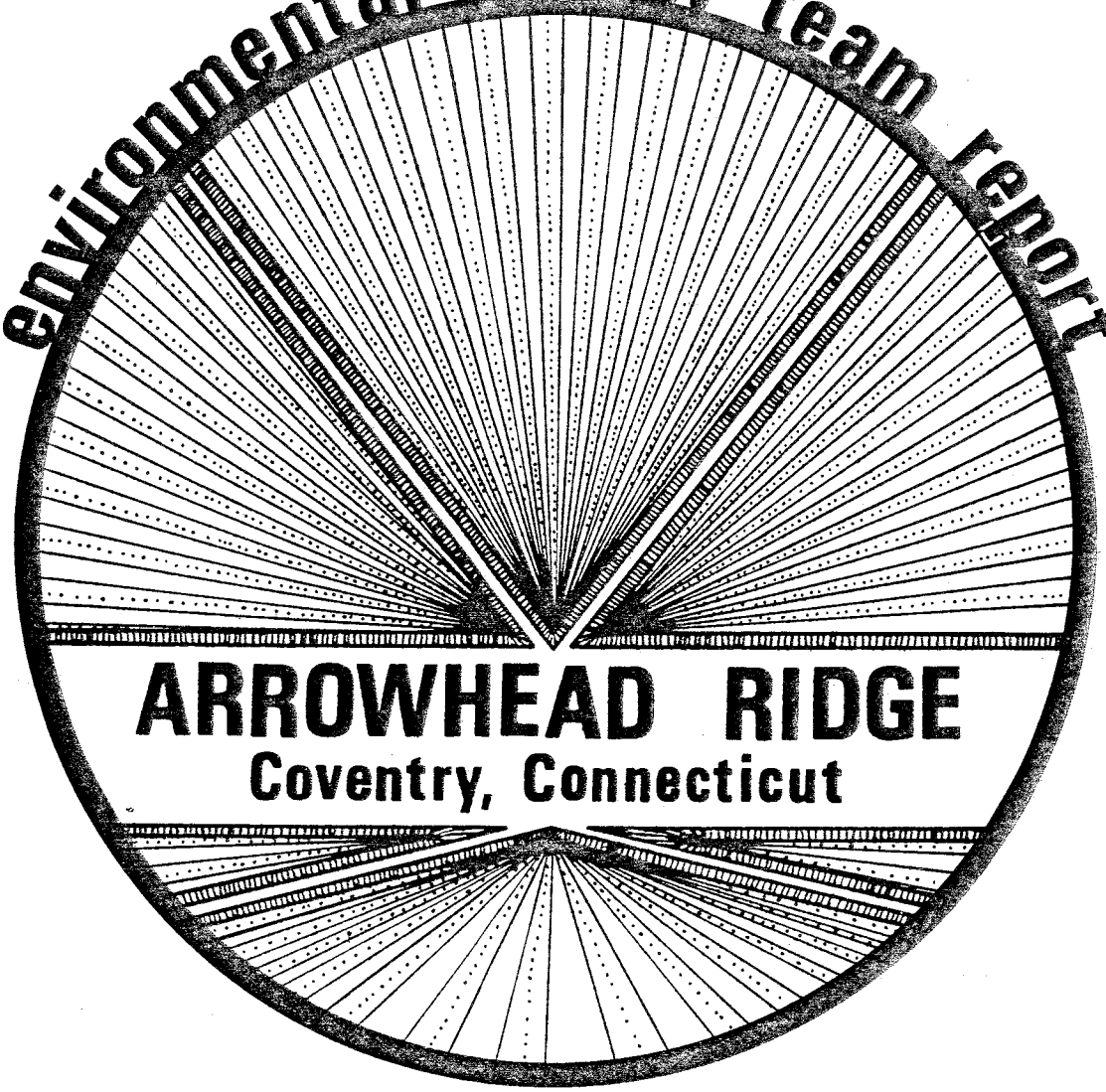
The Hop River crossing should be designed to insure that the river can be crossed in an emergency situation. The long access road will be the only means of ingress and egress for residents and access is critical.

15. APPENDIX

a. Arrowhead Ridge ERT Report

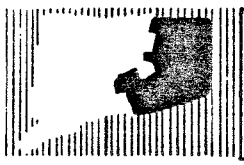
b. Letter regarding sewage disposal

environmental review team report



ARROWHEAD RIDGE

Coventry, Connecticut



RC&D

EASTERN CONNECTICUT
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

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

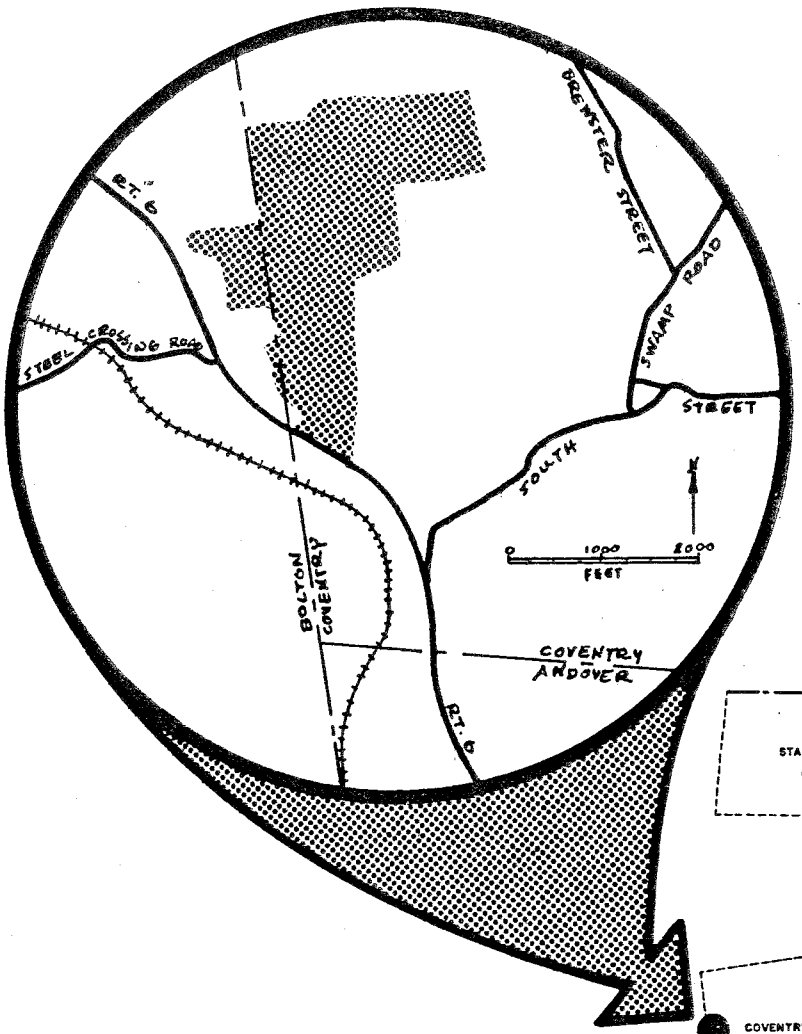
ENVIRONMENTAL REVIEW TEAM REPORT
ON
ARROWHEAD RIDGE
COVENTRY, CONNECTICUT
NOVEMBER, 1975

Project CPA-CT-01-00-1037

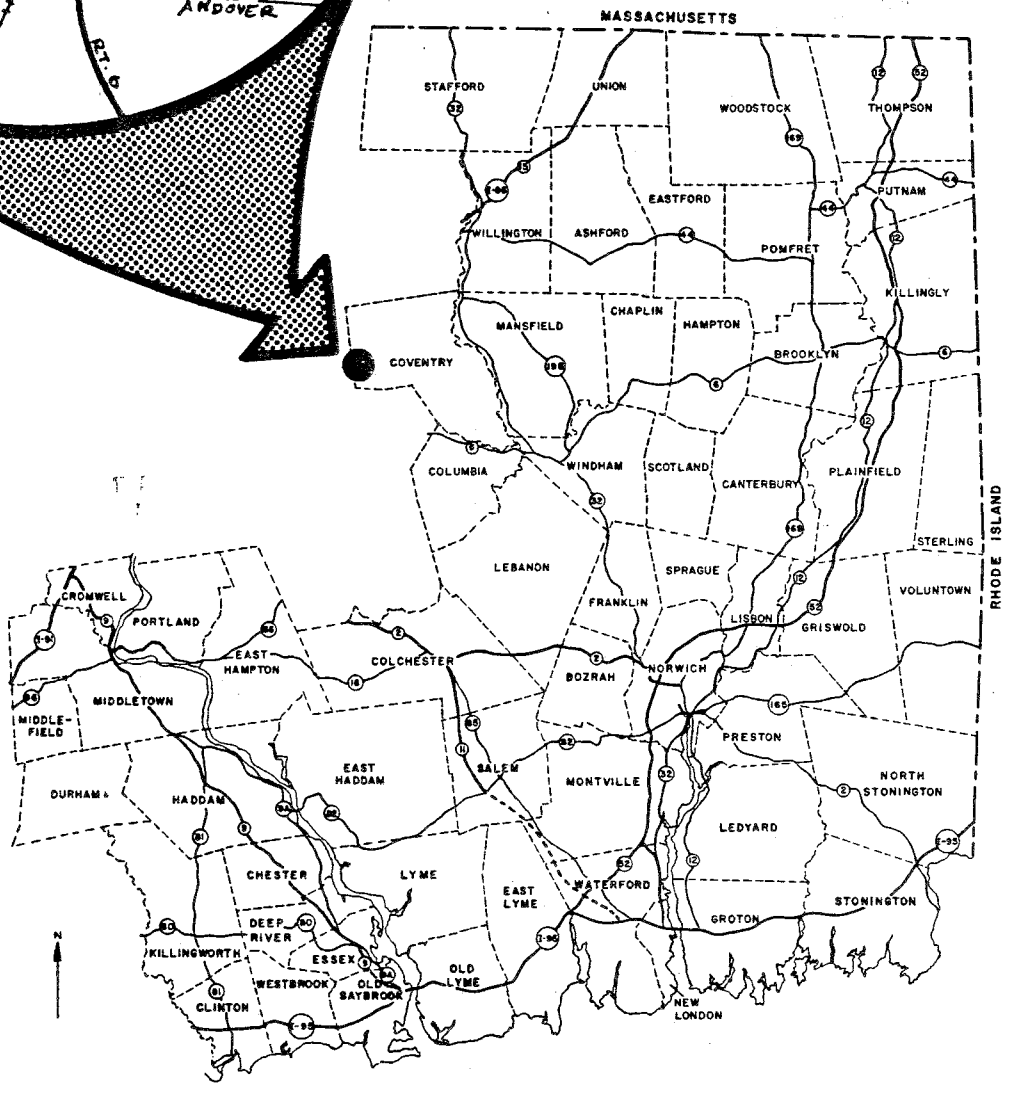
The preparation of this report was financed in part through an urban planning grant from the Department of Housing and Urban Development, under the provisions of Section 701 of the Housing Act of 1974, as amended, through a regional planning assistance grant from the Connecticut Department of Planning and Energy Policy and through contributions from the member communities of 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



ARROWHEAD RIDGE
COVENTRY, CONNECTICUT



EASTERN CONNECTICUT
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

ENVIRONMENTAL REVIEW TEAM REPORT
ON
ARROWHEAD RIDGE
COVENTRY, CONNECTICUT

This report is an outgrowth of a request from the Coventry Planning and Zoning Commission, with the approval of the landowner, to the Tolland County Soil and Water Conservation District (S&WCD). The S&WCD regerred this request to the Eastern Connecticut Resource Conservation and Development (RC&D) Project Committee for their consideration and approval as a project measure. The request was approved and the measure reviewed by the 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, a table of soils limitations for certain land uses, and a topographic map showing the Arrowhead Ridge property boundaries were forwarded to all members of the Team prior to their review of the site.

The Team that field-checked the property consisted of the following personnel: Donald Summers, District Conservationist, SCS; Dean Rector, Soil Scientist, SCS; Edwin Minnick, Civil Engineer, SCS; Richard Hyde, Geologist, Connecticut Department of Environmental Protection (DEP); Huber Hurlock, Forester, DEP; Charles Phillips, Fisheries Biologist, DEP; David Miller, Climatologist, University of Connecticut Extension Service; Paul Schur, Sanitarian, Connecticut Department of Health; Lester Barber, Regional Planner, Windham Regional Planning Agency; and Linda Simkanin, ERT Coordinator, Eastern Connecticut RC&D Project.

The Team met and field-reviewed the site on Thursday, August 7, 1975. Reports from each Team member were sent to the ERT 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 the developer and the Town of Coventry. 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 Project Committee hopes you will find this report of value and assistance in making your decisions on this particular site.

If you require any additional information, please contact: Miss Linda M. Simkanin, Environmental Review Team Coordinator, Eastern Connecticut RC&D Project, 139 Boswell Avenue, Norwich, Connecticut 06360, 889-2324.

INTRODUCTION

The Arrowhead Ridge development is proposed for a 115 acre tract of land located near the southwest corner of the Town of Coventry. Approximately 14 acres of the tract is in the Town of Bolton with the remainder of land in Coventry. The southernmost portion of the property fronts along U.S. Route 6. Undeveloped woodlands surround the site, with some single-family homes located along Route 6 near the western boundaries of the site in the Town of Bolton.

The Environmental Review Team field-reviewed the site relative to the proposal to construct 340 one and two bedroom residential units. The plans for the site indicated that the units be clustered in the northeastern corner of the property, that access be provided by a single road entering from Route 6, that 40%, or 136 units are planned to have two bedrooms, and that water retrieval and sewage disposal are to be developed on-site.

Some of the aspects of the development discussed by the Team are the location of on-site septic systems and the adequacy of the soils to accommodate the proposed systems, the potential soil erosion hazard during and after construction on the steep slopes which dominate a large portion of the site, the damming of the Hop River in order to provide a fire protection water supply pond, and the overall question of establishing an urban density development in a predominantly rural area where basic urban facilities such as public water and sewers do not presently exist, nor are they planned.

This report will also describe the natural characteristics of the site including topography, geology, and soils. Consideration will be given to the compatibility and suitability of the development 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.

NATURAL CHARACTERISTICS

TOPOGRAPHY AND GEOLOGY

The Arrowhead Ridge property includes approximately 115 acres of land situated on the western valley wall and on top of an irregularly shaped hill, adjacent to the Hop River. A topography map of the site and surrounding area is shown on the next page. This particular hill is part of the southern and lowest step of a larger hill system to the north which covers most of northwestern Coventry. It was formed by the piling up of glacial till on and against the underlying bedrock surface. With time the natural drainage patterns developed and segmented the area into the various hill and river systems. Typically, such processes exposed the bedrock along the southern flanks of most till hills in this section of Connecticut. As Arrowhead Ridge falls close to the northern flank, much bedrock is exposed south of the site, and to a certain extent within the property lines.

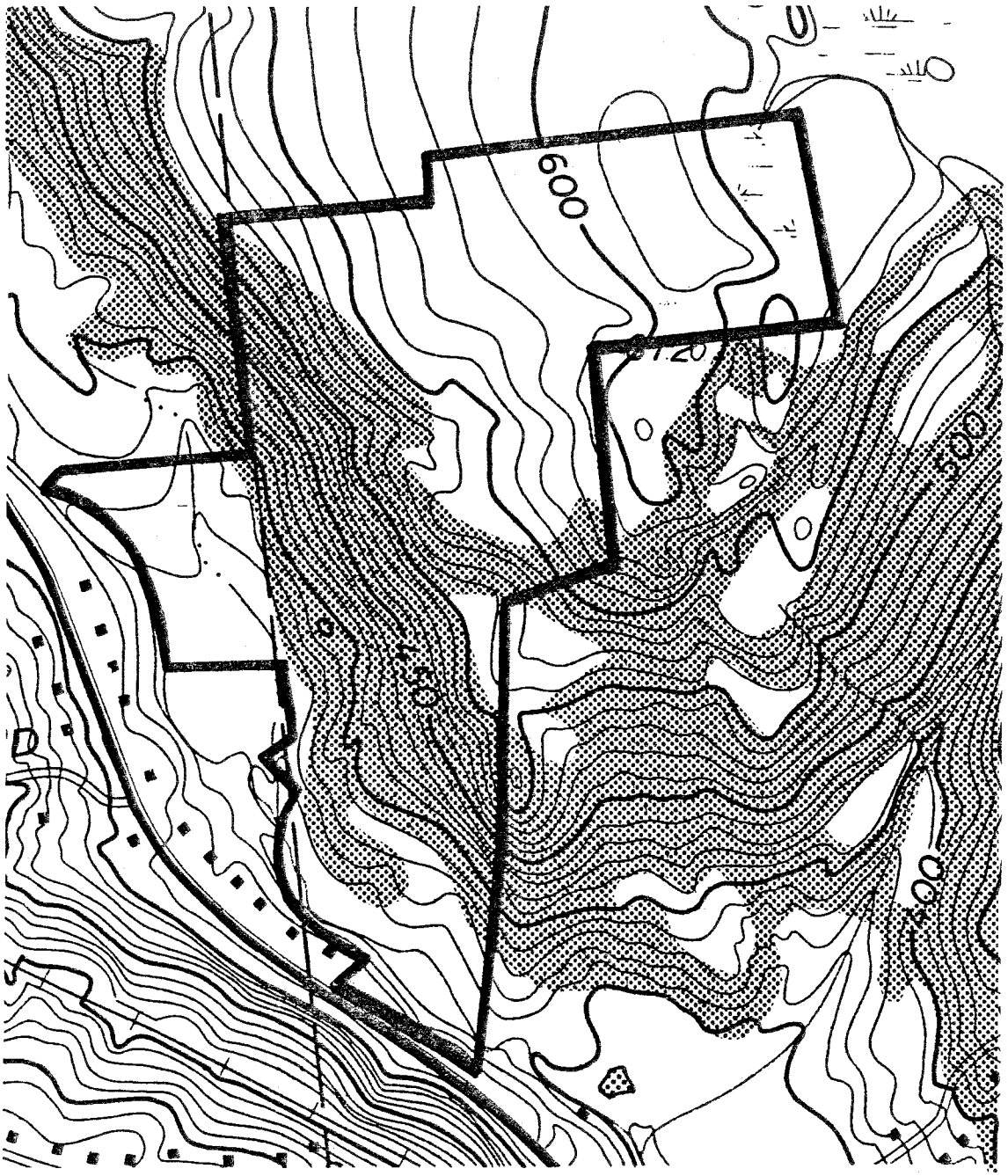
The bedrock underlying this site has been placed in the Hebron Formation by Janet Aiken in her Rockville Quadrangle Bedrock Map, Quadrangle Report #6 of the Connecticut Geological and Natural History Survey. Dr. Aiken feels that these Hebron gneisses may represent metamorphosed remnants of deep quiet water clay size sediments with interspersed lenses of sandy sediments. By metamorphosed we mean the originally deposited sediments were buried quite deeply in the earth where they were subjected to very high temperatures and pressures causing them to be altered to their present form. By gneiss we mean a relatively coarse-grained metamorphic rock in which fairly wide bands, sometimes several feet in thickness, and rich in granular materials, alternate with narrow bands, usually only inches thick, and rich in flat and elongate minerals.

Local drainage and late stages of glacial activity within the Hop River Valley resulted in the development of two distinct categories of unconsolidated earth materials on the site, that is, the stratified and non-stratified deposits.

Adjacent to the river a natural floodplain has formed which is typically low-lying, very flat and as a result, accommodates the Hop River overflow during times of flood. Materials found here are quite recent and usually consists of thinly stratified fine sands and silt sized particles. Such a floodplain is located in the extreme western edge of the site. Characteristically, the seasonal high water table is very close to the land surface, probably at or within several inches at some time each year. The frequency of flooding of these areas can probably best be determined by canvassing the owners of the 15 or so houses on the river's western bank. It can be said, however, that as upstream development intensifies in the future, flood frequency and intensity will increase to cause greater flood hazards.

The land slope of the Arrowhead Ridge property is also shown on the topography map. Using the 1/24,000 scale topographic map and applying a simple slope formula, it is possible to delineate those areas where land surface slope exceeds 15%, or for any other value desired. The figure 15% was chosen because this appears to be one of the critical points for engineering design requirements and construction activities. In this case 15% or greater means there is a 15 foot or greater vertical change in land elevation over a 100 foot horizontal distance.

TOPOGRAPHY



The topography map illustration indicates the approximate area of the site which falls within the 15% or greater slope regime. The development plans for Arrowhead Ridge indicate that the leaching field galleries are proposed for the same approximate area.

Within the southern portion of the property, in the approximate location of the proposed reserve leach field, is a remnant of a valley terrace or ancient floodplain. Topographically this feature is at a higher elevation than the floodplain, is fairly steeply sloped (10% to 15%) and is made up of stratified sand, silt, and gravel. From viewing several of the old test pits in this area, it appears the underlying materials are waterlain stratified sands and gravels, all of which lie below a one foot or two foot surface layer of rusty brown silt, possibly a windblown deposit.

Moving eastward from this point, the stratified deposits give way to the second type of earth material till. Till is the geologist's term for "hardpan" or "boulder clay" which are the more commonly used terms. More precisely till may be defined as 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 particle grain sizes, as in the case with the previously described waterlain or windblown deposits.

The thickness of all types of unconsolidated materials lying on top of the solid bedrock varies from place to place with the thickest deposits being found on the very top of the hill and along the valley bottom. The more steeply sloping areas tend to be very thinly covered or not at all. A depth to bedrock map, prepared for the Connecticut Valley Urban Area Project depicts areas of overburden thickness (depth to bedrock). The map was developed from logs of domestic wells, highway borings, and the location of actual bedrock outcrops. In general, the greatest concentration of bedrock outcroppings, and the areas having a shallow overburden thickness ranging from 0 feet to 10 feet, coincided with the area having a land slope of 15% or greater (refer again to the topography map).

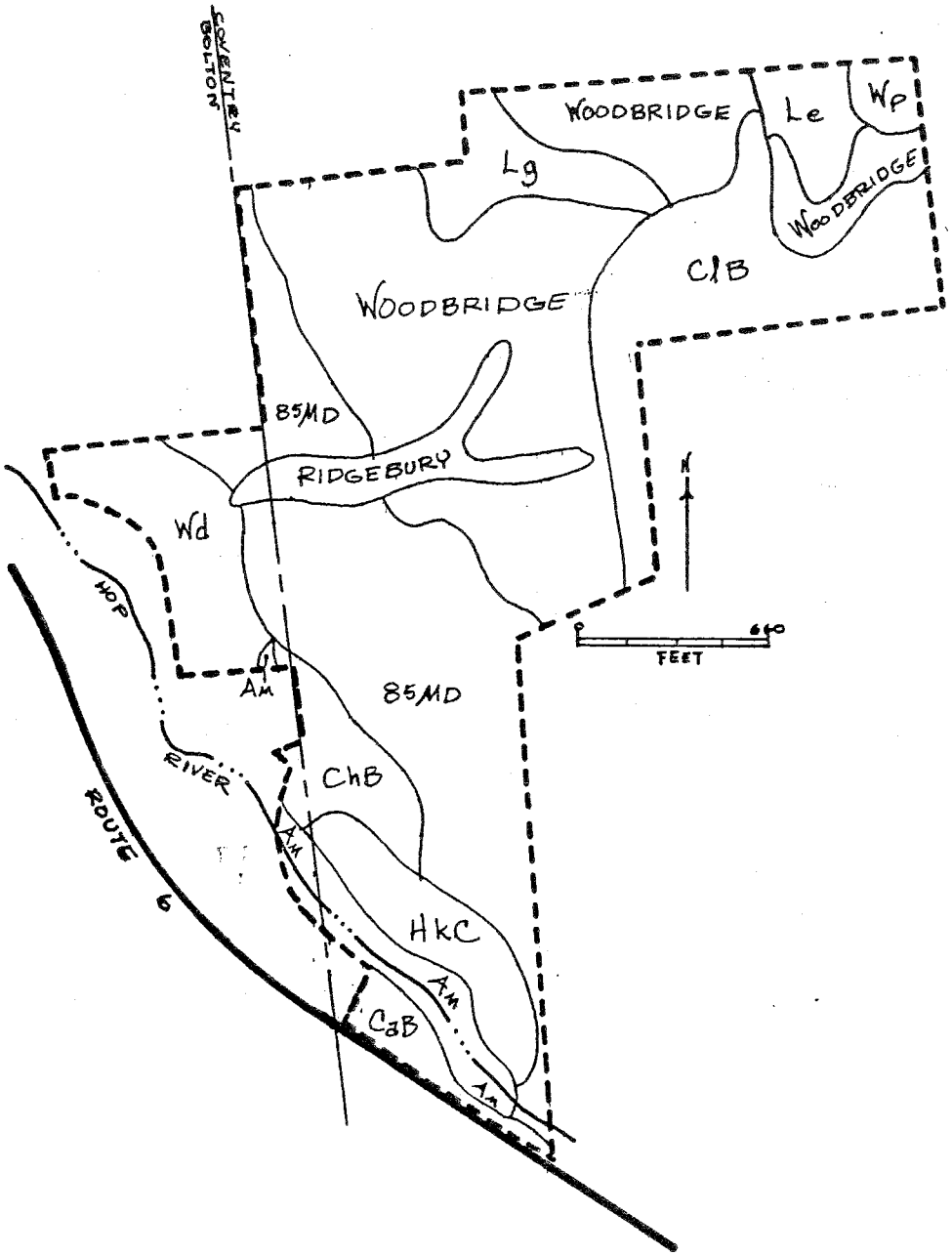
SOILS

A detailed soils map of the site and a soils limitations chart are presented in the following pages of this report. Although the original soil map was prepared at a scale of one inch = 1,320', since the time of the field review of the Arrowhead Ridge property, a more detailed mapping on a larger scale map (one inch = 660') was prepared by the soil scientist. His on-site investigations showed areas of inclusions which are reflected in the soil map shown here on the following pages. All of this soils information was distributed to the Team members after the time of the review for their consideration.

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, streets and parking, and on-site sewage disposal. However severe, the natural limitations imposed do not always preclude the use of land for development. If economics permit greater expenditures for land development and the intended use is consistent with the objectives of local and

SOIL MAP

ARROWHEAD RIDGE
COVENTRY, CONNECTICUT



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

ADVANCE COPY, SUBJECT TO CHANGE. *OCTOBER, 1975*

PROPORTIONAL EXTENT OF SOILS AND THEIR LIMITATIONS FOR CERTAIN LAND USES

Soil Series	Natural Soil Group	Soil Symbol	Slope (percent)	Approx. Acres	Percent of Acres	Urban Use Limitations*			
						On-Site Sewage	Buildings with Basements	Streets & Parking	Land-scaping
Hinckley	A-1b	HkC	3-15%	5.4	5%	1	2	2	2
Walpole	A-3a	Wd		7.5	6%	3	3	3	3
Charlton	B-1a	CaB	3-8%	2.2	2%	1	1	2	1
Charlton	B-1a	ChB	3-8%	4.8	4%	1	1	2	1
Leicester	B-3a	Le		3.1	3%	3	3	3	3
Leicester	B-3b	Lg		4.6	4%	4	4	4	4
Woodbridge	C-2a			37	32%	4	4	4	2
Ridgebury	C-3b			5	4%	4	4	4	4
Whitman	C-3b	Wp		1.9	2%	4	4	4	4
Montauk	C-3e	85MD	15-35%	26.5	22%	variable	variable	4	4
Charlton/Hollis	D-1	ClB	3-15%	14.5	12%	variable	variable	variable	variable
Alluvial	E-3a	Am		4.3	4%	3	3	3	3
TOTAL:				116.8	100%				

* 1 = slight; 2 = moderate; 3 = severe; 4 = very severe.

regional development, many soils and sites imposing difficult problems can be used. The soils map, along with the report, Soil Survey, Tolland County, Connecticut (USDA, SCS, 1966), can serve as an educational tool regarding the identification and interpretation of soils.

A large portion of the site contains a deep to hardpan layer which may be restrictive to water (or waste) movement. Referred to as a Montauk 85MD soil type on the soil map, this area possesses steep slopes ranging from 15-35%. An extremely stony, fine sandy loam, this soil has a hardpan (compact layer) located about 40" below the surface which may cause water to move rapidly downslope over the surface of the hardpan especially during the wet season.

Permiability above the hardpan is moderate but the pan drastically reduces percolation. Sewage disposal problems may arise during the wet season when the pan restricts the downward movement of excess water in the soil. In those times, excess rain water, that from spring thaws, or septage effluent from the leach fields may move rapidly downslope over the surface of the pan. Since the leach field galleries for the development complex are planned over this soil area, it will be important to locate the leaching galleries in sufficient soil or fill depths so that the effluents can be successfully eliminated without an environmental or health hazard.

In general, the site does appear to have soils suitable for sewage disposal in the area proposed for the leaching field galleries. However, the steep slopes and length of transmission lines leading to this area may create installation and operational problems. The steep slopes may create serious erosion and sediment problems both during and after construction. Detailed plans for controlling water runoff and soil erosion should be prepared and followed. The Erosion and Sediment Control Handbook for Connecticut is useful in preparing this plan, and the District Conservationist of Tolland County is available to assist the developer in the plan preparation as well.

A considerable ledgy, or shallow to bedrock soil area exists in the northeast corner of the site, underlaying an area where some of the residential units are planned. This soil, the Charlton-Hollis complex ClB, is a rocky, fine sandy loan with slopes ranging from 3-15%. The soil is underlain by bedrock usually less than 20 inches below the soil surface. Bedrock outcrops, in addition to the generally shallow and rocky soil condition, may cause severe problems and considerable expense when excavating for construction. As noted in the soils limitations chart, limitations for urban development in this soil type will vary from slight to severe as within this soil type, there can be pockets of deep soil, which, if located using a means such as a backhoe, can provide acceptable locations for residential units and on-site waste disposal systems.

The Woodbridge soils cover a large portion of the site, and are moderately well drained and have a slowly permeable compact layer at a depth of roughly 30 inches below the surface. Slopes can range from 0 to 15%, and so the limitations imposed can be slight to moderate. On slopes greater than 3%, Woodbridge soils are likely to erode, and should be stabilized. Removal of stones is generally necessary before a lawn can be established, and cloth or mulch may be needed to help establish lawns. All topsoil should be stockpiled when grading and saved for final grading of lawns. A minimum of clearing should be done at any one time. Disturbed areas should be revegetated as soon as possible. The Arrowhead Ridge development plans indicate considerable residential construction is planned over Woodbridge soils.

Excavation is moderately difficult. Bedrock outcrops or large surface boulders occur in some places. Excessive seepage in foundation holes and trenches may hinder building operations. Internal drainage problems are caused by the compact layer. Seepage is common in excavations that intersect with the compact layer; basements are frequently wet.

These soils have severe limitations for septic tank leach fields. The compact layer is slowly permeable, and lateral movement of water over it is slow. A high water table, which develops late in fall and persists through spring or early summer, hinders normal septic tank operation. Surface seepage and backups are common during these periods.

The Ridgebury series consists of poorly drained to somewhat poorly drained soils formed on a hard layer in glacial till. The 4-8" surface layer is very dark grayish-brown to black, friable fine sandy loam. The subsoil is olive or olive gray mottled with various shades of yellow, brown, and olive. It is generally friable to very friable fine sandy loam but may be sandy loam in the lower part. Both the surface soil and subsoil contain some small, angular fragments of rock. At a depth of 18 to 20 inches, the lower subsoil is underlain by a gray or olive-gray, hard, compact layer. The depth to the hard layer generally range from 18 to 24 inches but is deeper in places.

Generally, runoff is slow to very slow, and internal drainage is slow because of the very slowly permeable hard layer at 18 to 24 inches. The water table is 0 to 12 inches from the surface during spring and lasts until early summer. It severely limits these soils as sites for septic tank systems and leach fields as a considerable depth of fill is required if these soils are used in developed areas. If the fill settles unevenly, the septic tank and distribution box may tilt, or the tile lines of the leach field may lose the proper gradient. Insufficient fill depth can result in leach field flooding.

There are a variety of soil types along the south and east boundaries of the property. Along the Hop River in the southern portion is a band of alluvial soil following the floodplain (Am). Alluvial soils have a wide range of texture and drainage. Their use as building sites is limited as they are subject to flooding.

North of the floodplain soil is a band of Hinckley (HKC) gravelly sandy loam, with slopes ranging from 3-15%. This soil presents few limitations for urban development. Septic tank performance in this soil is generally very good; basements are generally dry; percolation rates are moderate to rapid; and failures of septic systems are rare and usually not related to soil properties.

Two Charlton soils occur on the property (ChB and CaB) and deep, friable, well-drained soils that formed in glacial till. In some areas these soils have a compact layer that is below a depth of 30 inches. The percolation rates of substratum materials are generally favorable for septic tank disposal fields. Where there is no compact layer, internal drainage is rapid. Excavation limitations are slight; outcrops of bedrock are not common, but they occur in places; the depth to bedrock varies but generally is more than 10 feet.

A considerable area of Walpole sandy loam (Wd) exists at the westernmost portion of the site. This soil consists of poorly drained soils formed in glacial

till and in stratified, water-laid deposits. The Walpole soil has no compact layer and is more easily drained with tile than the other poorly drained soils, but a suitable outlet is required. Excavation difficulties are compounded by a high water table, and by large surface boulders.

FORESTRY

Because of excessive slopes this property could not be a commercial forest. Erosion in the shallow to bedrock soils coupled with the steep slopes would also prohibit most commercial forestry. Steep slopes in the western portion of the property, the streams and swampy areas, and the current long distance to a road to the east (Brewster Street), makes the removal of timber impractical unless a development road were constructed. With the advent of a road, approximately 4,700 board feet/acre of timber could be taken from land cleared for roads and parking lots, septic tanks and leach fields, and actual residential units. The logs could yield $45.00 per thousand board feet.

When clearing land for development, trees should be left in clumps of 1/4 acre or more as winds would tend to break or uproot individual trees. In addition, the aesthetics of the area may be changed as the cleared upper slope becomes a part of the Route 6 vista.

CLIMATOLOGY

The climatic and microclimatic effect of the proposed development will probably be minimal. Since the building site is located on the crest of a ridge there may be some noise from I-84 when the highway is finally completed. Also, winter winds exposure and therefore heating requirements will be high unless wind barriers of tall vegetation are left across the ridge on the north edge of the property and east to west along the southern boundary.

The tall vegetation on the steep hillside should be left undisturbed to avoid intensifying the frost pocket at the bottom of the hill. Also, the proposed access road should be along the contours of the hill as much as possible to avoid affecting the cold air drainage down the hill.

WATER SUPPLY AND WASTE DISPOSAL

At present, the Arrowhead Ridge property lies outside any area identified to be serviced by public water or sewer service. While the provision of public water supply is probably not of major importance in assessing this particular site for the proposed development, the eventual availability of public sewer facilities may be of great importance for a high density residential development for which on-site disposal means are proposed. Extension of public sewers can be expected to be the mandated solution to a major on-site failure of sanitary facilities.

The State Plan of Conservation and Development identifies areas "Suitable for Urban Development," defined in large measure as those areas which can be economically serviced by public water and sewer and therefore accommodate high density development. Areas outside the SUD areas are planned to remain open or developed at low densities with all urban uses served by on-site disposal techniques permanently. The site under question lies four miles beyond the outer limit of the SUB area both as defined in this region and in the capitol region. The adopted water and sewer plan of the Windham Regional Planning Agency, published in 1972, defines a very similar area to be sewered in the region in stages through the year 2000. Any federal or state assistance sought in the provision of sewers in Coventry would be weighed in view of these recommendations. A suggested sewer program for the Town of Coventry was developed at the request of the Town by Griswold and Fuss. In that report, published in 1972, large areas of the northern part of Coventry along Route 44A were suggested for sewering after 1995 but even with that ultimate extension of sewer service the present proposal would lie almost two miles away and require the pumping of the effluent up to the proposed service area.

Waste Disposal

As mentioned earlier in the section on soils, the site does possess soils which are presently suitable for sewage disposal in some areas. While the areas investigated with observation pits are satisfactory for sewage disposal, the amount of sewage which can be disposed of and its method of disposal have not been established. The preliminary plan does not provide enough information to approve the site for the sewage disposal system which was proposed or the anticipated flows. The amount of flow, depth and design of the system will be critical due to the possibility of groundwater. Since there may be a question as to where maximum high groundwater is located, tests for maximum groundwater should be made at a time of year when groundwater is at its maximum level (spring of the year). While groundwater may not eliminate sections of the site for sewage disposal, its presence will effect the type of installation and possibly the use of sections of this site for sewage disposal.

The area which is proposed for sewage disposal would have to be cleared to install the system. This would be necessary in order to get equipment through the area and allow space for casting soil from the trenches dug for the leaching area. The clearing may create an erosion and sedimentation condition which must be considered in advance of actual groundbreaking in order to protect wells and streams from pollution. The steep slopes in the area proposed for the installation of the sewage disposal system, and those uphill of the actual leaching galleries, which lead to the actual disposal area, may create additional stress on such a large-scale sewage-disposal system.

Water Supply

The water supply for a development of this size (340 units) should be assured prior to any final approvals. This would require at least the installation of test wells to assure adequacy of supply and a suitable water quality. The location of such a supply in relation to sewage disposal and surface water drainage

will be very important. Wells developed adjacent to the apartment site would probably be drilled wells and may not provide (in one well) the quantity of water a developed well would provide. As a result, several wells with adequate separating distance between them and any sources of pollution would be needed.

Bedrock wells situated in any of the upland areas of Connecticut generally will yield on the average less than 5 gallons of water per minute to the user. The reason for this is water only can enter the well shaft from cracks, joints, and fissures intersecting the well below the natural water table. The more numerous and larger the size of these rock seams the more water than can enter the well in the shortest period of time. In general, however, these openings tend to decrease dramatically in size and number with depth below the rock surface. From a statistical analysis of water wells drilled to a depth of 200 feet, it appears they produce proportionately more water per foot drilled than do wells drilled to 400 feet. In other words, the cost, on the average, from putting additional well footage, below the 200 foot level, far exceeds the return in usable water. From the many well records in eastern Connecticut, it has been calculated 9 out of 10 bedrock wells yield at least 3 gallons of water per minute but only through exploratory drilling can a more accurate figure be determined on the quantity and quality available in this region of Coventry. One method to get an approximate number on well yields would be to question the owners of nearby homes and just see what their wells yield. One other factor to consider in choosing water supplies is the quality. The water produced from the rocks of the Hebron Formation tends to be of a less desirable quality than that of other bedrock formations found in Connecticut. If wells are drilled, water samples could be taken, analyzed and if needed a treatment system incorporated.

Gravel packed wells in the vicinity of the Hop River may be contemplated, but would have to be located so as to be protected from flooding and contamination. Such wells would also be 250-300 feet below the proposed apartments and would require large lift pumps to get water to the apartment complex.

Fire Protection Water Supply

The public water supply (drinking water) would have to be completely separate and protected from any nonpotable supply (fire-fighting water from proposed pond). The water for fire fighting, as proposed, is 250-300 feet below the apartments and would require a large pump to lift the water--in any quantity--to the apartment site.

The development plans call for the creation of a fire pond by damming the Hop River. If the Hop River is to be dammed for a fire pond, it is important to contact the Department of Environmental Protection for a design structure permit. This consists of a review by the Department to ensure the dam will meet the state's safety requirements.

The proposed impoundment for a water supply for fire protection should be designed to meet all safety standards. It is to serve as an access road crossing the Hop River. An area of 8.2 square miles drains to this point and this impoundment and associated water control devices must safely handle the storm runoff from this area. Complex investigation and design will be needed to determine the

feasibility of this structure. To provide adequate fire protection, an extensive pumping and storage system will be needed for maintaining sufficient water for the development area. The elevation head differential is in excess of 260 feet.

Concerning the creation of a fire pond, the Hop River is nearly dry during the average summer at the point where the developer wishes to build the impoundment. When investigated on September 5, the river was about 3 feet deep and 4 1/2 feet wide. Construction of an impoundment in this area would likely interfere with the Stream Low Flow requirements set forth by DEP Water and Related Resources Division. From the developer's viewpoint, the pond created would have limited value as a firefighting tool as fire equipment would be required to pump water up nearly 300 vertical feet.

Investigation of the upland vegetation in the northeast corner of the property to determine if this might be made a fire pond revealed that unfortunately, the water table in this wetland area is at least 8 to 10 feet below the ground surface at this time of the year as evidenced by a dried-up watering hole pond on adjacent property in the immediate area of the wetland. There appears to be no springs in the immediate area of the wetland which could facilitate pond construction. For these reasons it appears that a fire pond in conjunction with this development is not feasible.

ROADS AND UTILITIES

Route 6 will provide the only access to the proposed development. As a major arterial road in the area, the highway will certainly be capable of accommodating the additional traffic load. And, as the road's function is to carry and distribute large volumes of traffic through the region and off of local roads, the location of a high density development of this type would appear an appropriate use to be served by the highway. While increasing traffic will undoubtedly cause harm over time to the scattered low density residential development currently along the road, it is more appropriate to accommodate the increased vehicle traffic that growth in the region will entail here rather than on secondary roads. Coming from the east on Route 6, visibility is quite limited in the vicinity of the site due to a large continuous curve in the road. The high speed, high volume nature of the highway may indicate some safety problems with access onto the site, especially along the eastern edge of the property.

The proposed access road into the site will have to be on the order of 3,000 feet in length to reach the proposed location of the apartment complex. That single length of road will provide the only access through the site for most of its length. Such a length is more than three times the standard recommended length for dead end, cul-de-sac roads. The Urban Land Institute in the the Community Builder's Handbook suggests that such streets should be on the order of 1,200 feet for single family developments, but only 400 to 500 feet for multi-family developments. A more recent publication of ULI in cooperation with the American Association of Civil Engineers called Residential Streets indicated that the usual length of cul-de-sac is 400 to 600 feet with a 1,200 foot street considered a long one. The Coventry subdivision regulations, which would not technically apply in this situation, only permit dead-end streets of 400 feet. While such standards are not inflexible, the proposed road length is so much more extensive than ordinarily recommended, critical evaluation of the wisdom and possible

dangers of such a road providing the only link for 700 or more people off of the property must be carefully assessed.

AESTHETICS AND PRESERVATION

The proposed site design does present certain commendable features. With the exception of the one access road, no construction is occurring along the highway frontage, reducing to a considerable degree the visual impact of large numbers of dense residential development. Construction near or over the river is limited to that one road crossover necessary to reach the bulk of the property. As a result, the essential natural character of the road frontage and the valley of the Hop River need not be severely altered. The clustering of the urban development in one portion of the site would permit the retention of much of the tract, including that portion most visible to the general public, in a natural or developed open space.

SERVICES TO SUPPORT DEVELOPMENT

Supporting commercial development now exists in Andover and Bolton Notch within a moderate distance. It can be expected that as the population of the general area grows Route 6 will be the location of much of the additional commercial services likely to develop to serve the needs of new residents. However, a closer association of such a high density development with supporting commercial services would be more desirable to reduced vehicular traffic activity.

A commuter bus between Willimantic and Hartford is proposed along Route 6. As proposed, the bus will make no stops along this portion of Route 6, but, nevertheless, the proposal is undoubtedly indicative of future public transportation activity along this commuting route.

The development will be served by either the Coventry fire departments or those of Bolton or Andover. The Coventry company lies four miles away. Both Andover and Bolton lie about three miles away. All fire companies lie at the extremity or beyond the recommended safe service radius for fire protection. With the long, single access road to the summit of the property where the apartments are proposed to be located, the adequacy of fire protection should be carefully investigated before approval is granted for the proposal.

COMPATIBILITY OF SURROUNDING LAND USES

With careful siting of the apartment units on the site, there need not be any conflict with surrounding land uses. Traffic generated by the complex will be occurring directly on a major arterial highway without serious interruption of existing adjacent residential or rural neighborhoods. The concentration of apartment construction on one section of the site provides the opportunity to well buffer, visually, the impact of the structures from adjacent detached home

areas. The limits on height found in the zoning regulations should insure, with careful site review, that the buildings are not excessively overpowering in the environment.

As a specific, isolated proposal, the apartment complex can easily and unobtrusively be integrated into the larger predominantly suburban and exurban landscape. If, however, it is a precursor to similar more widespread development in the general area, its compatibility must be called into question.

Both the State Plan of Conservation and Development and WRPA's Guide Plan suggest this area remain rural or developed at low densities and permanently unsewered. Where environmentally safe, the clustering of the low density development potential of the area into nodes of moderate density of the type proposed in this review would be consistent with that State and regional policy and go a long way toward protecting and maintaining the area's rural quality. However, encouraging or permitting development at an overall density of 5 units/acre would inevitably transform the area into a more intensive suburban area, almost inevitably requiring public water and sewer service.

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Mr. John M. Leahy
P.O. Box 409
South Glastonbury, CT 06073

October 1, 1987

RE: Coventry - Colonial Woods

Dear Mr. Leahy:

Thank-you for the letter received on September 10, 1987 regarding design flow rates. In your letter you expressed concerns and doubts over this Department's use of 150 gallons per day per bedroom as a tool for determining design flows for multifamily housing. While this design parameter was established by my predecessors, I support its continued use for the following reasons:

1) Design Life of Project

Systems approved by this Department have a design life of fifty years. Changes in population and unit densities over this timespan need to be accumulated for. It has recently come to my attention that the occupancy rate of newly permitted multi-family projects has changed shortly after construction due to conversions of basements into bedrooms.

2) Published Documentation

Good engineering texts have published data consistant with our design standards. Wastewater Engineering, authored by Metcalf & Eddy, has found average residential wastewater flow rates of between 70-100 gallons per day per capitia.

3) Existing Facilities

Review of existing permitted facilitis has shown flow rates of 100 gallons per day per bedroom. Best engineering practice would account for variables by using a 1.5 peaking factor, thereby setting design at 150 gallons per day per bedroom.

In addition to your objections to our design flow rate, your letter raised concerns over a 50% hydraulic reserve. The primary reason for this saftey factor is that it is very common to have a wide range of values when establishing the premeability used in hydraulic calculations. If you can clearly establish site hydraulic capacity by three different models, and detail what methods would be used to correct a hydraulic failure, consideration will be given to modifying the 50% reserve requirement.

Phone:
165 Capitol Avenue • Hartford, Connecticut 06106

Another issue raised by previous letters was wether or not this Department would issue a conceptual approval letter for the local planning and zoning. If you can demonstrated that this site has the hydraulic capacity for your proposal project, and it is shown that there will be no pollution to the waters of the state, I will gladly write such a letter.

You noted in your most recent letter your obligation to protect the best interests of your client. I too, consistant with good engineering practice, must protect the best interests of the people of Connecticut who want and demand clean, fishable/swimmable waters and safe potable water supplies.

Very truly yours,

David Cherico
Senior Sanitary Engineer
Water Compliance Unit

DC:jdc

cc: Bruce Morton
Dom Bommarito, Coventry Town Engineer

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.