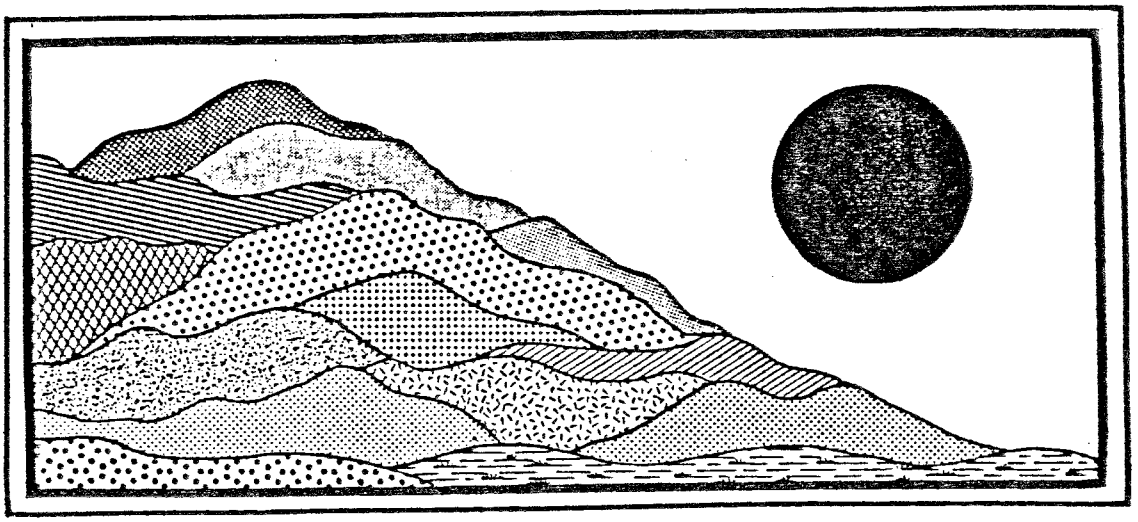
Mountain Ridge Estates

Coventry, Connecticut

October 1987



ENVIRONMENTAL REVIEW TEAM REPORT

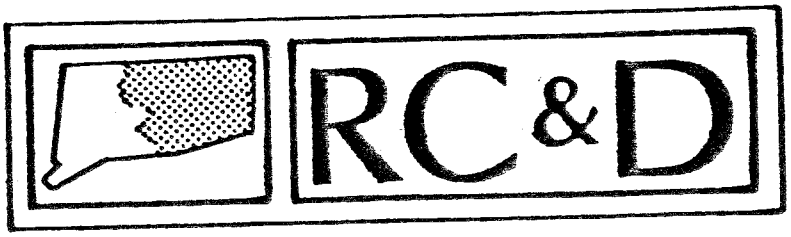
EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

Mountain Ridge Estates

Coventry, Connecticut

Review Date: *AUGUST 13, 1987*

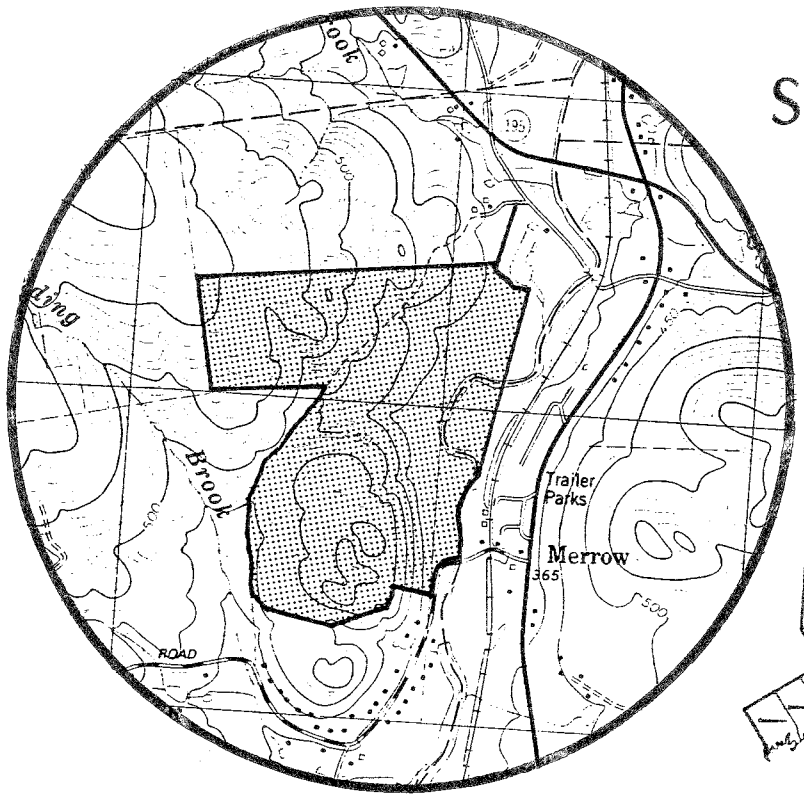
Report Date: *OCTOBER 1987*

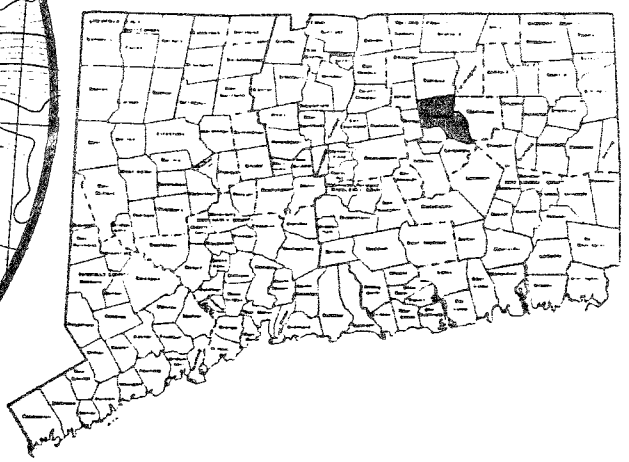


ENVIRONMENTAL REVIEW TEAM
PO BOX 198
BROOKLYN, CONNECTICUT 06234

Site Location

MOUNTAIN RIDGE ESTATES
COVENTRY, CONNECTICUT





EASTERN CONNECTICUT

RESOURCE CONSERVATION

& DEVELOPMENT AREA

ENVIRONMENTAL REVIEW TEAM REPORT
ON
MOUNTAIN RIDGE ESTATES SUBDIVISION
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, August 13, 1987. Team members participating on this review included:

Brian Murphy	--Fisheries Biologist DEP - Eastern District
Joe Neafsey	--District Conservationist U.S.D.A. - Soil Conservation Service
Jim Parda	--Forester DEP - Eastern District
Meg Reich	--Planning Director Windham Regional Planning Agency
Elaine Sych	--ERT Coordinator Eastern Connecticut RC&D Area
Bill Warzecha	--Geologist DEP - Natural Resources Center

Prior to the review day, each team member received a summary of the proposed project, a list of the Town's concerns, a location map, a topographic map and a soils map. During the field review the team members were given site plans, conceptual plans and test hole information. The Team met with, and were accompanied by the landowner, the engineer, the Town Planner and Wetlands Enforcement Officer. Following the review, reports from each team member were submitted to the ERT Coordinator for compilation and editing into this final report.

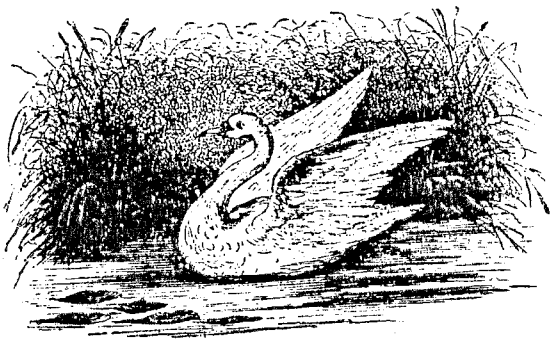
This report represents the Team's findings. It is not meant to compete with private consultants by providing site designs or detailed solutions to development problems. The Team does not recommend what final action should be taken on a proposed project -- all final decisions and conclusions rest with the Town and landowner. This report identifies the existing resource base and evaluates its significance to the proposed development, and also suggests considerations that should be of concern to the developer and the Town. The

results of this Team action are oriented toward the development of better environmental quality and the long-term economics of land use.

The Eastern Connecticut RC&D Exeuctive Committee hopes you will find this report of value and assistance in making your decisions on this proposed subdivision.

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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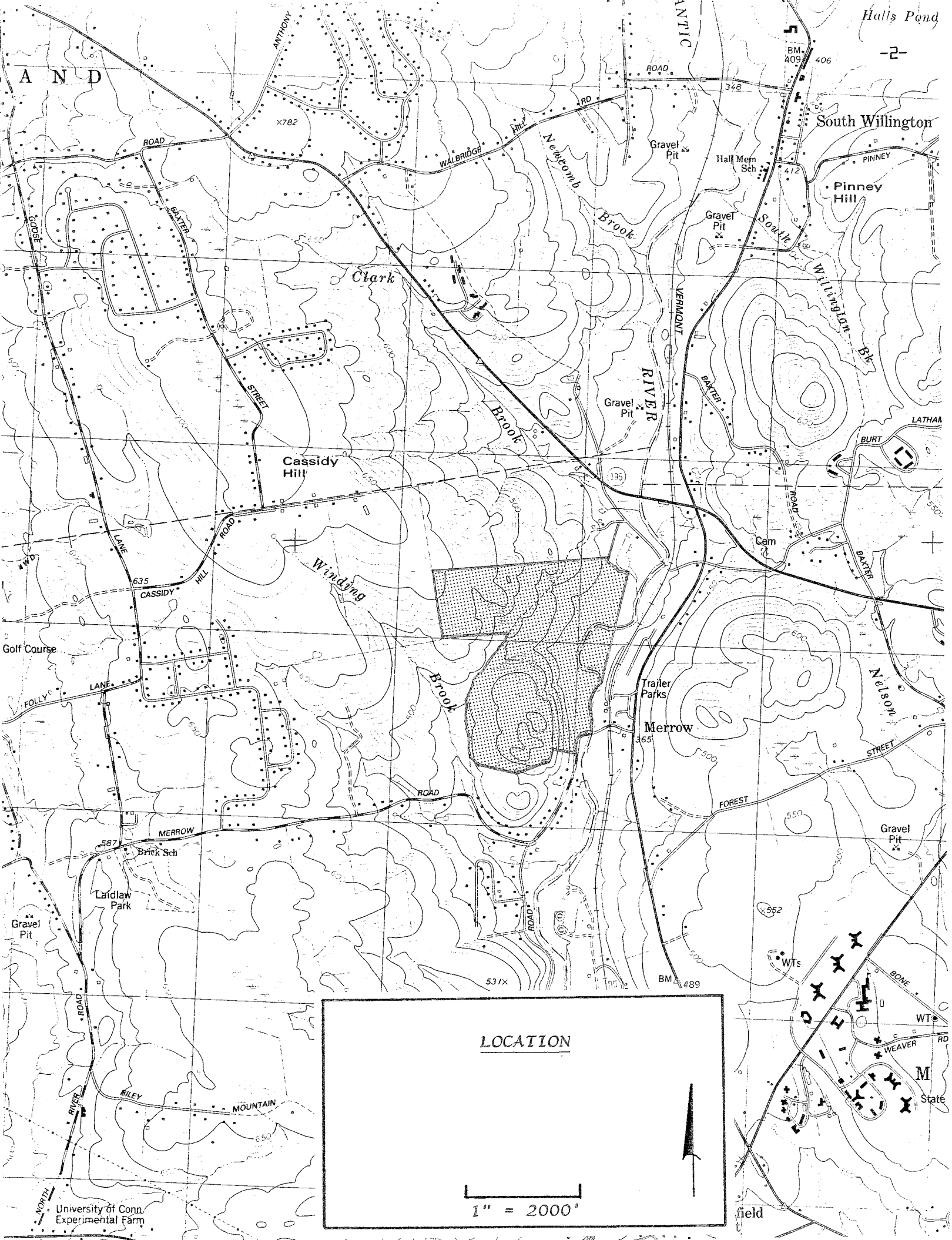
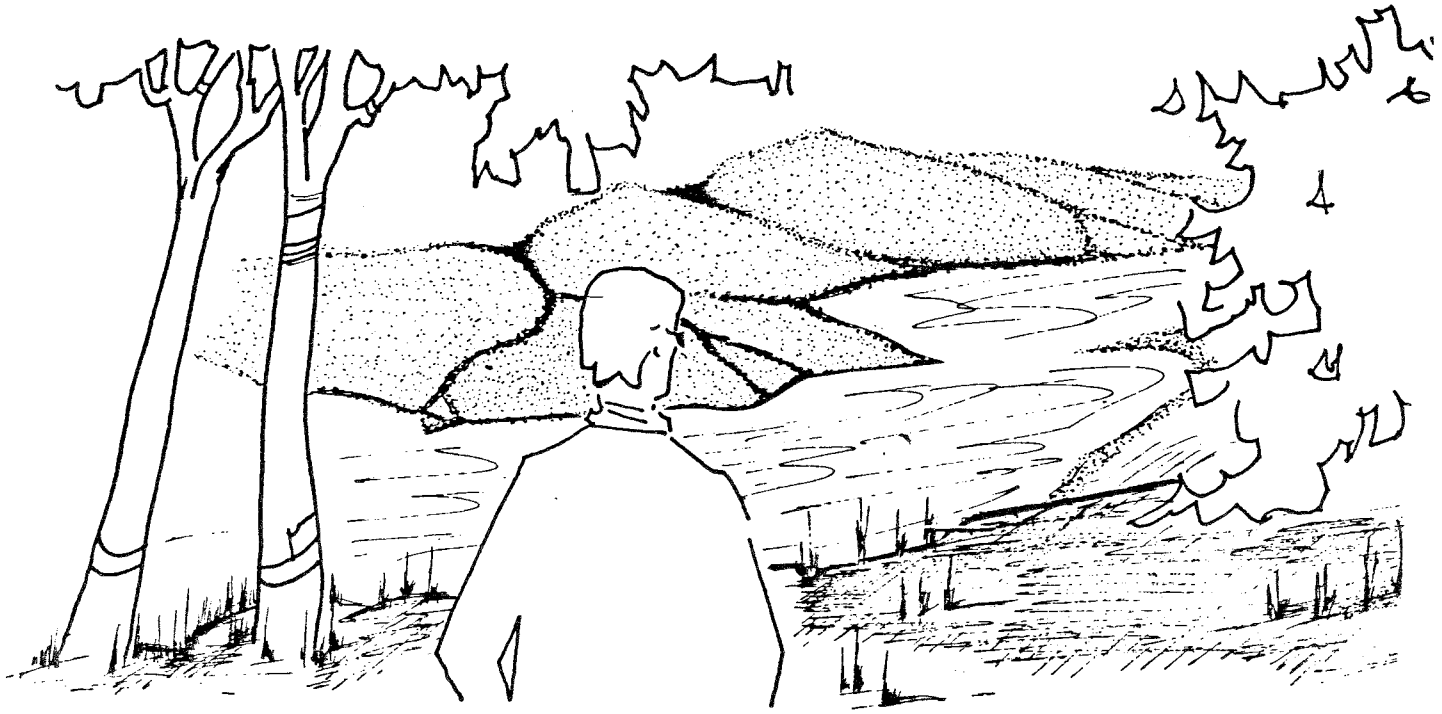

A N D
ANTHONY
ROAD
X782
WALBRIDGE
HILL
RD
Newcomb
Brook
Gravel Pit
Hall Mem Sch
South Willington
PINNEY
Pinney Hill
BM 409
406
348
412
GOOSE
BAXTER
Clark
South Willington Bk
VERMONT
RIVER
STREET
Brook
Gravel Pit
BAXTER
LATHAM
BURT
Cassidy Hill
135
ROAD
Cem
LANE
635
CASSIDY
HILL
Winding
Brook
Golf Course
FOLLY
LANE
Trailer Parks
Merrow
365
Nelson
STREET
FOREST
ROAD
MERROW
587
Brick Sch
Laidlaw Park
Gravel Pit
ROAD
552
WTs
531X
BM 489
BONE
WT
WEAVER
RD
M
State
ROAD
RILEY
MOUNTAIN
RIVER
LOCATION
1" = 2000'
NORTH
University of Conn
Experimental Farm
field

1

ONE: INTRODUCTION

The Eastern Connecticut Environmental Review Team has been asked by the Town of Coventry to review plans for a proposed subdivision to be known as Mountain Ridge Estates.

The Team reviewed plans for Phase I which included 15 lots on ± 33 acres. Team members also received a conceptual plan for the entire 200 acres encompassing five (5) phases for a total of 94 lots. The following sections of this report include natural resource information, comments, concerns and recommendations to mitigate any negative impacts for Phase I and also for the entire site. This report should be read in its entirety since a summary has not been included.



2

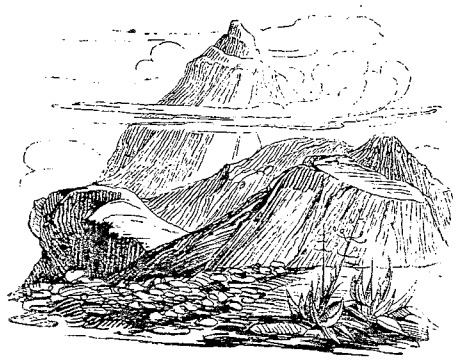
TWO: TOPOGRAPHY AND SETTING

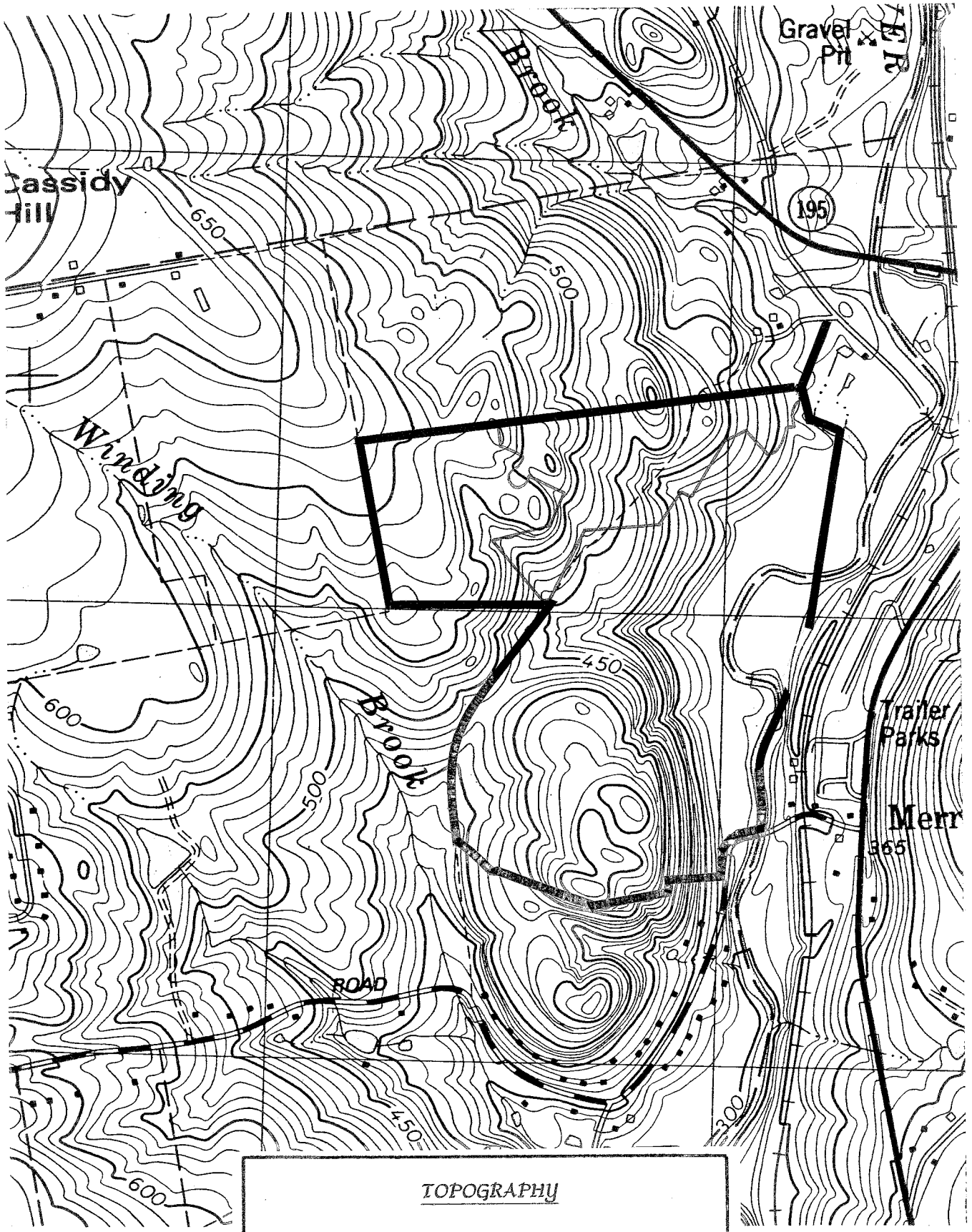
The proposed Mountain Ridge Estates consists of an irregularly shaped parcel of land about 200 acres in size. It is located east of the village of Merrow. The Willimantic River flows along the eastern border of the site. Access to the site is via Jones Crossing Road.

The site contains slopes that range from gentle to precipitous (cliffs). Gentle slopes are associated with the sand and gravel terraces along the valley sides of the Willimantic River in the eastern part. Steep slopes, which include rock cliffs, are found along the east central part and are clearly controlled by the underlying bedrock. The remainder of the site is comprised of moderate slopes also controlled by the underlying bedrock. The highest point on the site, about 510 above the mean sea level, is located on top of the rock cored hill in the southern limits. The lowest point on the site, about 310 above mean sea level, occurs along the Willimantic River.

The site contains numerous seasonal drainageways that ultimately transport the surface water to the Willimantic River. These drainageways generally flow in an easterly direction.

Based on the field walk and air photo interpretation, the site is mostly wooded except for the open fields in the eastern part. In the past sand and gravel has been mined in the eastern part mainly for fill and road base material. Some of the mined areas have not been reclaimed and consist of open faced gravel pits. In comparing a 1986 air photo and 1938 air photo of the site, there has been little or no change in the open and wooded areas. The 1936 air photo shows some small open areas surrounding an abandoned farmhouse and out buildings in the northern part.

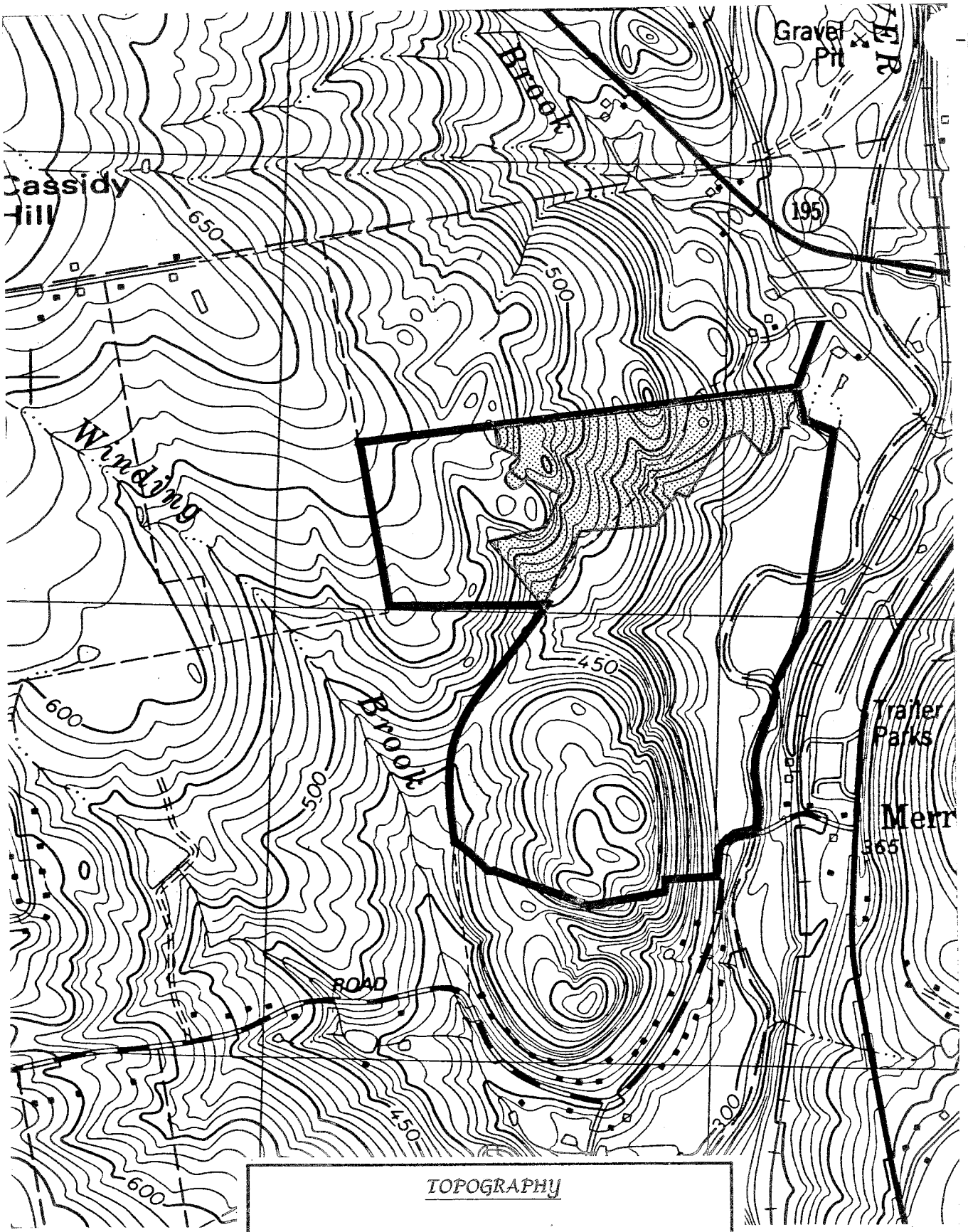




TOPOGRAPHY

Approximate Boundary

1" = 1000'



TOPOGRAPHY

Approxiamte Site Boundary

Section I

1" = 1000'

3

THREE: BEDROCK AND SURFICIAL GEOLOGY

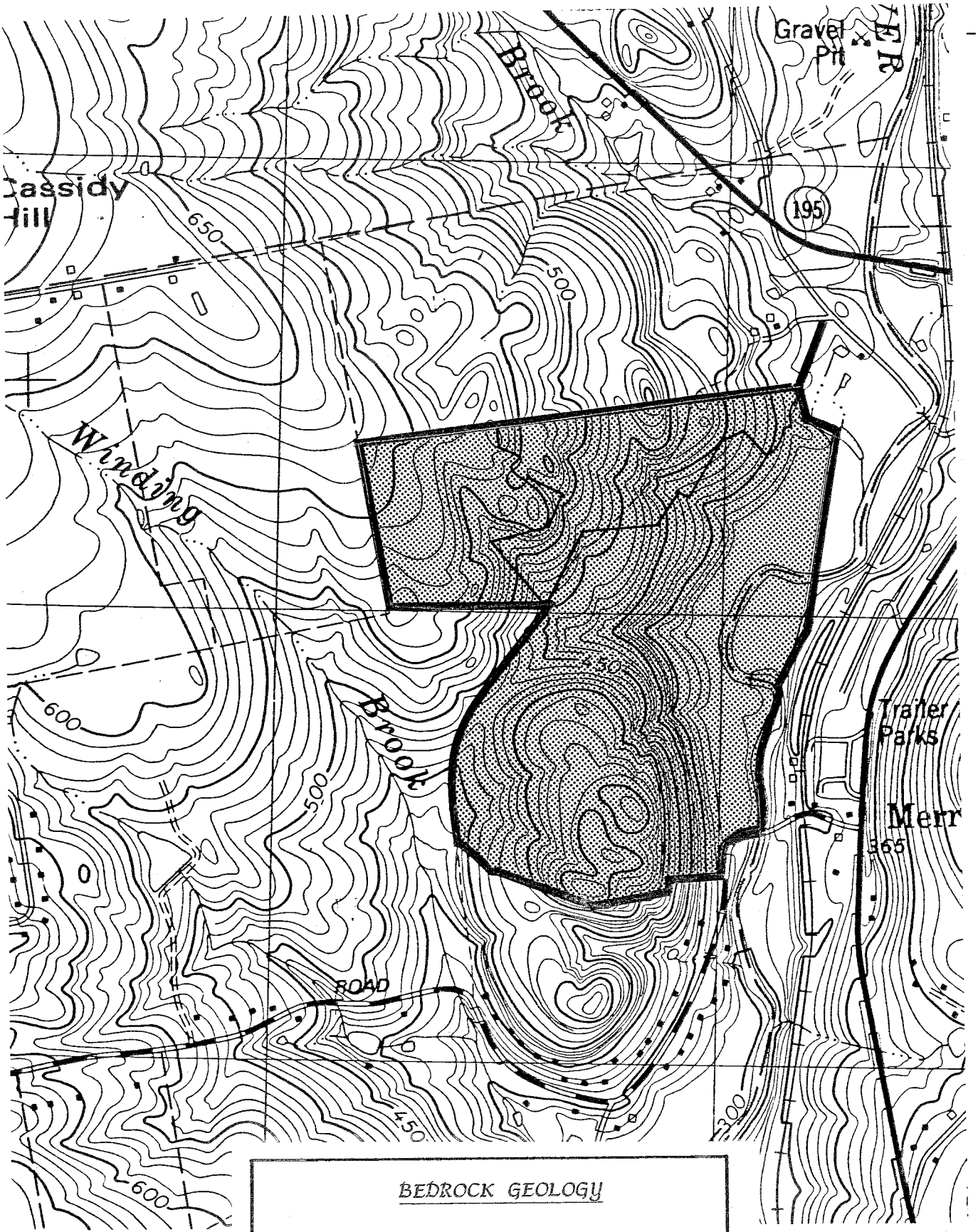
The site lies entirely within the Coventry topographic quadrangle. Neither a bedrock nor a surficial geologic map have been published to date for the quadrangle. However, there is preliminary data available for both maps, which can be reviewed at DEP's Natural Resources Center in Hartford. The Team's Geologist also referenced John Rodgers' Bedrock Geological Map of Connecticut (1985) and the Soil Survey for Tolland County for the purpose of this section.

Based on soil mapping data, deep test hole information from Phase I, and visual observations made during the field review, bedrock is at or near ground surface throughout the middle sections of the site. Rodgers' map has identified the bedrock underlying the site as Brimfield Formation. The rock is described as a gray, rusty-weathering, medium to coarse grained layered gneiss and schist. A "gneiss" is a banded or streaked crystalline rock. A "schist" is a structurally layered crystalline rock. Both rock types are metamorphic, that is they have been geologically altered by great heat and pressure. In a single outcrop a schist may grade into a gneiss and vice versa.

The water supply for each lot of the proposed subdivision would be derived from drilled wells, cased with steel pipe firmly into the Brimfield Formation. As such, the bedrock will have at least some impact on the quantity and quality of water withdrawn from fractures and seams in the bedrock (See Water Supply Section).

There is at least some chance that the bedrock surface will be encountered during road construction and/or the excavation of house cellars, especially moving from north to south on the site. If blasting is necessary it should be done only under the supervision of personnel experienced in blasting techniques. This will hopefully avoid potential damage claims and undue seismic shock. Because the shallow bedrock areas of the site are in close proximity to a medium density residential subdivision, it might be wise to conduct a pre-blast survey in order to minimize unwarranted damage claims. This of course depends upon how much blasting would be required.

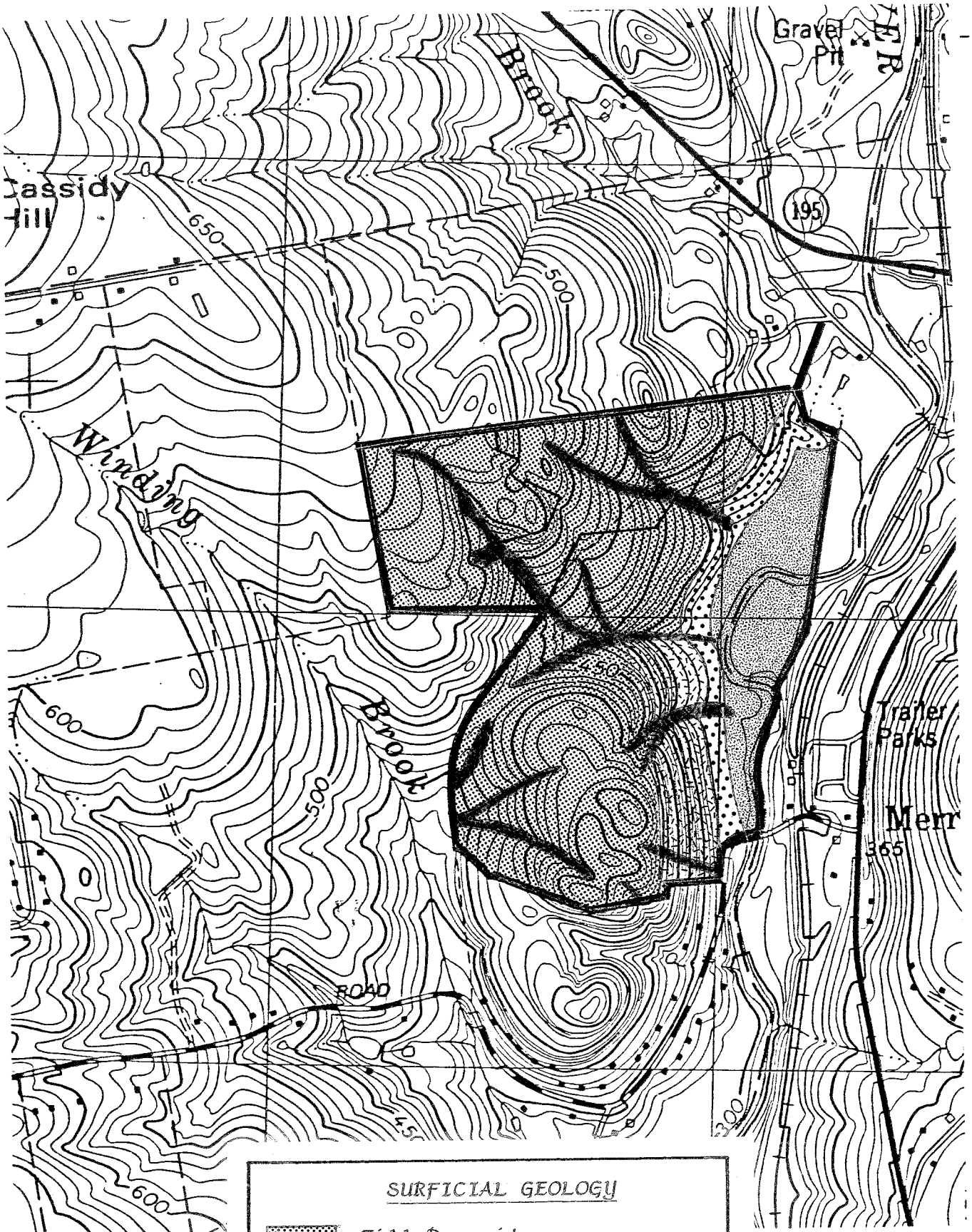
The two predominant types of surficial geologic deposits overlying bedrock on the site are stratified drift and till. Both have been deposited by glacier ice. The eastern limits of the site are covered by stratified while the remainder is covered by relatively thin till. As glacier ice moved through the region it collected and transported rock particles and pre-existing overburden. Much of this transported debris was redeposited directly from the ice,



BEDROCK GEOLOGY

Entire site underlain by Brimfield Schist

1" = 1000'


Gravel Pit
Brook
Cassidy Hill
650
500
195
Winding
600
450
Brook
Trailer Parks
Merr
365
500
ROAD
600
SURFICIAL GEOLOGY
Till Deposits
Alluvial Deposits
Stratified Drift Deposits
Rock Cliffs
Seasonal Drainageways
1" = 1000'

either by being plastered onto the land from beneath the ice mass or by being let down gently as the ice later wasted. The resulting deposit is till. Because of its mode of deposition, till contains a nonsorted mixture of particles ranging in size from clay to large boulders. The till may be sandy, stony and loose, or silty, less stony and tightly compact. Most of the till on the site is the sandy, stony and loose variety. The northwest corner of the site contains a siltier, more compact variety of till.

When the glacier ice began to melt in the Willimantic River Valley, it sent forth streams of meltwater, often with torrential flows. These streams were filled with rock debris from the ice, and they redeposited this debris in well-sorted to poorly sorted layers. Sand and gravel were commonly deposited near the ice, while silt and clay were washed further downstream to be deposited in lakes or in the sea. The resulting deposits are known as stratified drift. The sand and gravel in the eastern part has been mined for commercial use in the past.

Overlying sand and gravel deposits along the Willimantic River are post-glacial sediments called alluvium. Alluvium consist of light colored silts, sand and minor gravel and organic deposits which were deposited by the Willimantic River in recent times. Because these areas are subject to flooding during certain storm events, they hold low potential for development and should be avoided.

Several seasonal drainageways have developed on the till soils within the site. These post-glacial deposits, which are regulated under Chapter 440 of Connecticut's General Statute, have been mapped by certified soil scientist and their boundaries superimposed on the subdivision plan.

4

FOUR: GEOLOGIC DEVELOPMENT CONCERNS

It is understood that the proposed 200 acre subdivision would be constructed in five phases. The first phase, which is located in the northern part, is located on about 33 acres and would contain 15 building lots. Present plans indicate that the applicant would desire a total of 94 building lots on the 200 acres. All lots would require on-site septic systems and wells.

Based on visual observations, the most recent deep test hole information provided by the project engineer and available surficial, bedrock and soil mapping data, the major geologic limitation of Phase I includes; (1) the presence of till-based soils, which have moderately slow percolation rates and seasonally high groundwater condition due to the presence of a surface; (2) the presence of shallow bedrock in some areas; and (3) the presence of moderate slopes, particularly in view of the Town's maximum grade of 12% on roads. Also, the regulated wetland areas in Phase I hold low potential for development and therefore, should be avoided when siting homes and septic systems.

The geologic limitations mentioned above will pose the greatest hindrance in the installation of on-site septic systems and construction of roads. Except for Lots 1 and 15, it appears that the remaining 13 lots will require specially designed (engineered) septic systems. With proper engineering and installation, the geologic limitations, e.g., seasonally high groundwater table and shallow ledgerock mentioned earlier can be surmounted. However, careful planning and testing is imperative on each lot so that potential septic system problems can be avoided. In order to overcome the seasonal high groundwater table and the shallow to bedrock areas, it seems likely that filled and raised systems will be required. Also, in some cases, properly located, installed and outletted curtain drains may also be effective in protecting septic systems from seasonally high groundwater table conditions. Curtain drains are installed to ensure that the seasonal water table does not rise up into the leaching system and interfere with its hydraulic capacity. Because percolation rates are typically slow in the till soils, septic systems will undoubtedly need to be relatively large. Since the lots are at least two acres in size, the project engineer will have some flexibility when searching for favorable leaching areas.

Another concern with seasonally high water tables is the chance for wet basements, especially during the spring months. It is suggested that all homes be provided with building footing drains where possible. This will hopefully prevent wet basements. It may be impossible to install footing drains

on lots with flat grades. The foundations on these lots should be elevated, particularly if high groundwater is present. Also, house lots located on the dry, sandy and gravelly soils in the eastern part may not need building footing drains.

In terms of road construction, shallow to bedrock areas and moderately sloping areas can be a major obstacle. Depending upon the depth to ledgerock, it may be necessary to blast in order to construct access roads. Since the steep slopes in Phase I are associated with these areas, it is recommended that a detailed erosion and sediment control plan be formulated and followed very closely with implementation of the project. Blasting should be conducted under the strict supervision of persons familiar with the most recent blasting technology.

Based on the site plan submitted to Team members on the review day, inland-wetland soils will need to be crossed in Phase I in order to construct the proposed interior road system and/or driveways. Although undesirable, wetland road crossings are feasible provided they are properly engineered. The road should be constructed adequately above the surface elevation of the wetlands. This will allow for better drainage of the road and also decrease the frost heaving potential of the road. Road construction through wetlands should preferable be done during the dry time of the year and should include provisions for effective erosion and sediment control. Any unstable organic or mucky material should be removed and replaced with a permeable road base material. Based on soils mapping data and causeway observations during the field reviews, the wetland soils on the site appear to have a mineral texture rather than a muchy one. Finally, culvert(s) should be properly sized and located so as not to alter the water levels in the wetland or cause flooding problems.

Because these soils are classified as inland-wetland soils in Connecticut they are regulated under Public Act 155. Any activity which involves modification, filling, removal of soils, etc., will require a permit and ultimate approval by the Town's Inland Wetland Commission. In reviewing a proposal, the Commission needs to determine the impact that the proposed activity will have on the wetlands. If the Commission determines that the wetland is serving an important hydrological or ecological function and that the impact of the proposed activity will be significant, they may deny the activity altogether or, at least, require measures that would minimize the impact.

Subsurface information for the remainder of the site has not been collected to date. Examination of available soils data and visual observations made on the review day, indicate that conditions become more hostile moving southward on the parcel. The presence of much more shallow to bedrock areas compared to Phase I, moderate to precipitous slopes, wetland soils and soils which are likely to have seasonally high water tables will be the major geologic limitations. Undoubtedly, the remainder of lots in Phases II--V will require engineered septic systems. Nevertheless, detailed lot-by-lot investigation of subsurface conditions will be required. It seems likely that much diffi-

culty will be encountered on the lots characterized by shallow to bedrock and steeply sloping areas (east central parts). These conditions will also present problems in terms of road construction. The need for blasting appears greater for this area than in Phase I. The presence of these hostile conditions will possibly require some realignment of the preliminary lot layout made available to Team members on the review day which may lead to a reduction of lots. This can only be determined once detailed soil testing has been conducted.

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FIVE: SOIL RESOURCES

General Soil Information:

The information contained in the Soils Report by Bruce Laskey of Northeast Soils, Cheshire, Connecticut was reviewed and appears to be adequate for planning purposes. The deficiencies found in the report were that it did not address the most important limitations on the site which are the steep slopes and the depth to bedrock. The descriptions provided in the report are general in nature and don't reveal details specific to the site and don't relate how the soils on the site are suited to the proposed use. Site specific information on slope, depth to water table, permeability, depth to bedrock (in soils other than Hollis) and other soil restricting layers would have made a much more useful and complete report. The mapped information appears to be accurate and adequate. Because this is a bedrock controlled landscape, deep test pits will be required on subsequent phases to determine suitability of the site for building locations and on site sewage disposal.

Wetland Boundary Information:

Wetlands on this site were identified in the field by Bruce Laskey of Northeast Soils and located on the plot plan. Because of time constraints it was not possible to verify this information completely, but it appears to be adequate. On future submittals it is suggested that the Commission require that the private soil scientist who performed the field work 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".

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.

The site has a high potential for serious soil erosion and off-site sedimentation. A detailed soil erosion and sediment control plan 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

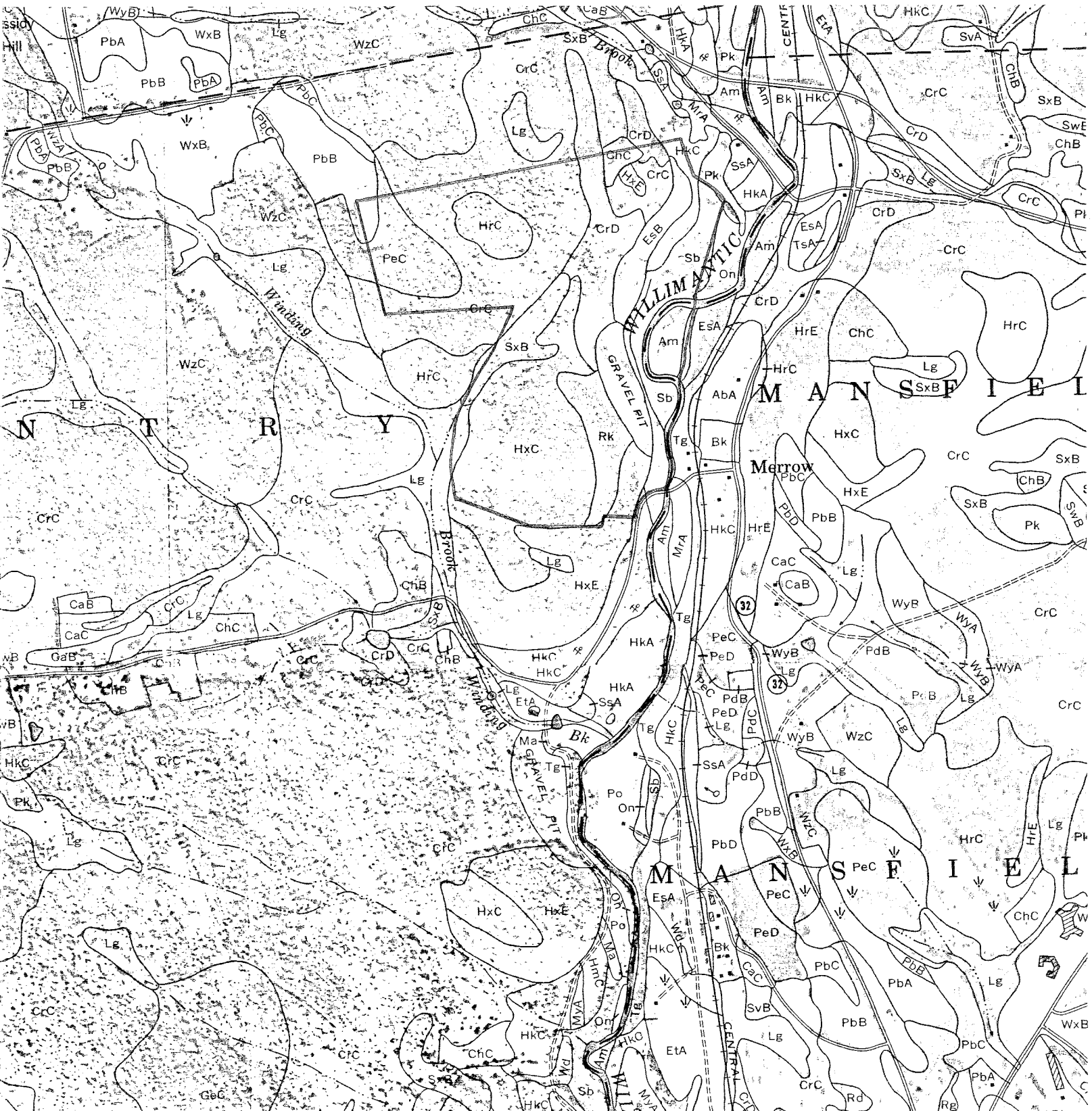
United States Department of Agriculture

Soil Conservation Service

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

Approximate Site Boundary

Scale 1"=1320



District would appreciate the opportunity to review this plan prior to final approval. Deficiencies in the preliminary soil erosion and sediment control plan include:

1. lack of adequate protection at storm drain outlets and downstream channels
2. extensive outs and fills will require specific measures to control erosion and sediment
3. the plan should address vegetative stabilization of outs and fills
4. catch basins will require individual protection especially on slopes, these measures should be shown on the plan
5. a note on the plan should indicate that individual lots will require soil erosion and sediment control plans prior to issuance of zoning permits
6. the narrative should be more specific, i.e., more detailed
7. a checklist listing planned measures and maintenance items should be developed

Other:

1. A sediment or debris basin may be advisable below the main storm drain outlets.
2. A detailed drainage study which includes information of the hydrology of the Willimantic River should be completed to determine if a storm-water detention basin is needed.

6

SIX: HYDROLOGY

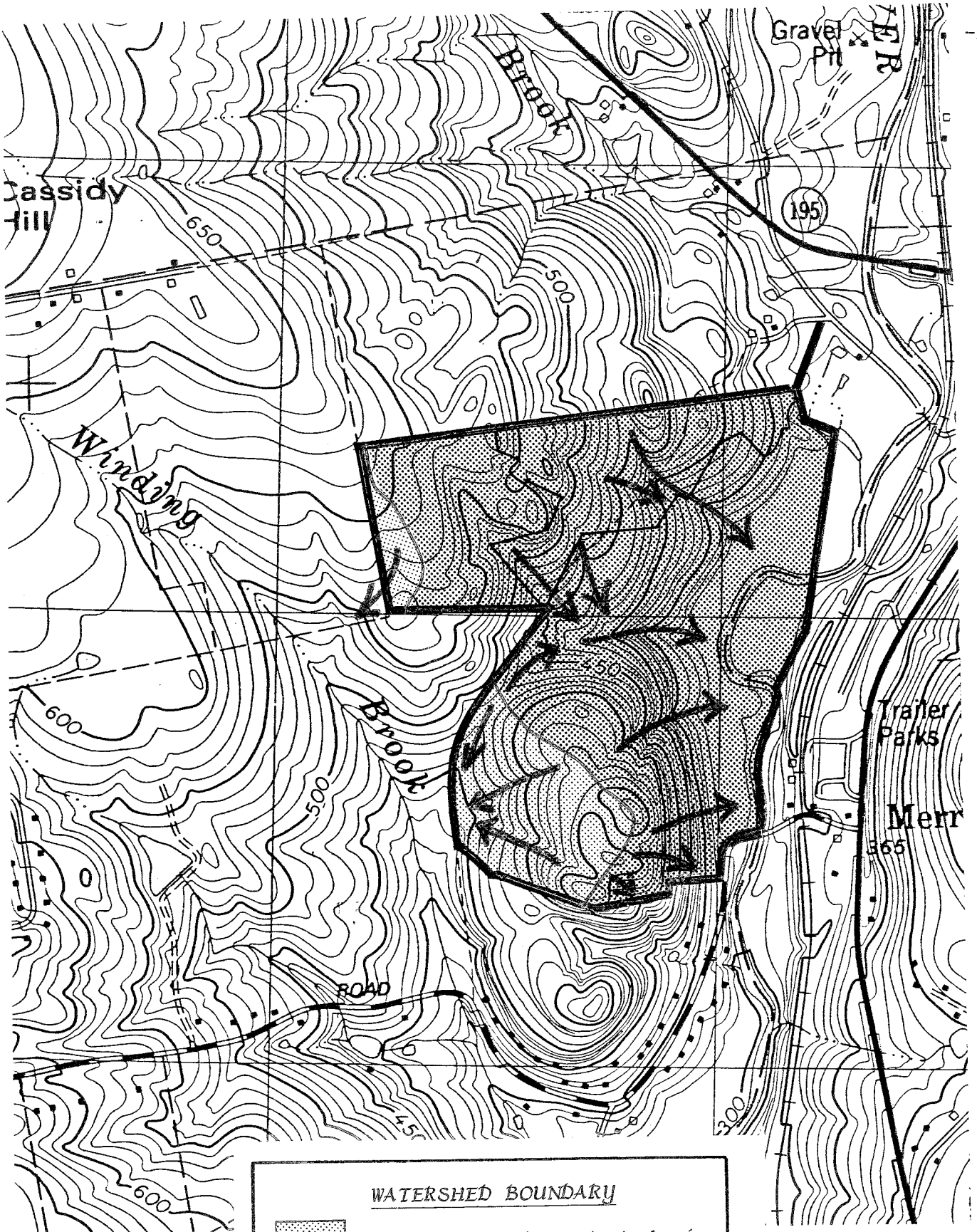
The entire site lies within the Willimantic River drainage basin. Most of the site drains directly to the Willimantic River via seasonal drainageways or it is absorbed by the permeable sands and gravels in the eastern part. Once it percolates down to the water table, it is pulled by the force of gravity to the Willimantic River. Surface drainage in the eastern part flows mainly downslope via seasonal drainageways or by sheetflow to Winding Brook, a Willimantic River tributary.

Development of the site for residential use would be expected to lead to increases in the amount of runoff shed from the parcel. The amount of increases will depend upon the extent of development, the impervious surfaces created, and the amount of vegetation removed or preserved. The project engineer has provided road drainage calculation only for Phase I. In order to adequately ensure that flooding problems do not occur, the applicant's engineer should submit for Town review, a complete stormwater management plan for the entire project that includes detailed drainage calculations. Because of the site's close proximity to the Willimantic River, it will probably be more desirable to get rid of runoff from the site quickly than to detain it in a detention basin on-site and release it later when the river is at its peak during a storm event. If a detention basin(s) is considered to minimize flooding conditions, the peak discharge from a 2-year, 10-year and 100-year frequency, 24-hour duration Type III distribution storm should be analyzed. In regard to the latter, the project engineer should reverence Connecticut's Guidelines for Soil Erosion and Sediment Control. Close examination of all downstream culverts, particularly under Merrow Road is warranted. Drainage pipes and culverts will need to be properly sized.

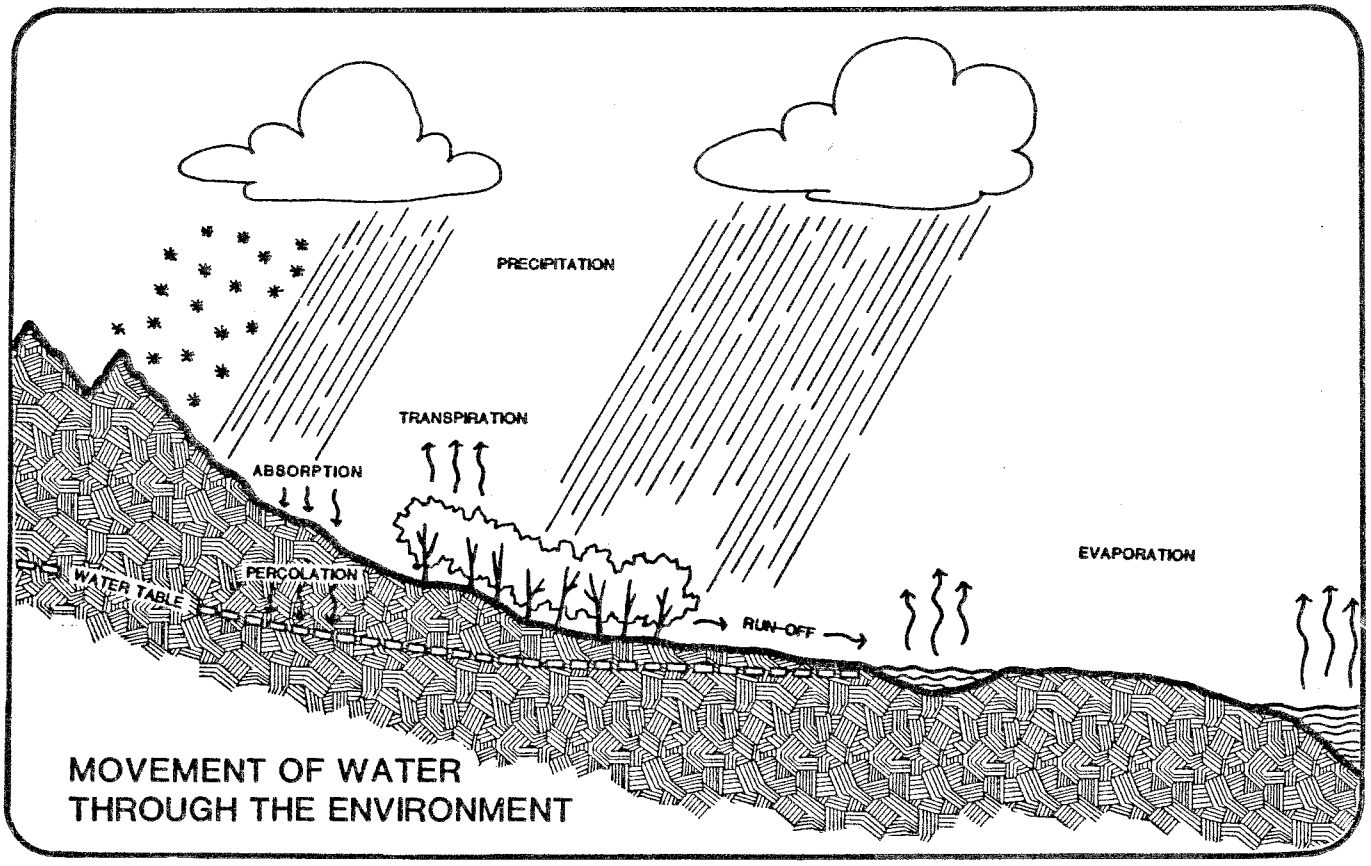
The other concern related to increases in runoff from the site is the potential for erosion. The presence of moderate to steep slopes on the site warrants the need for a sound erosion and sediment control paln. All erosion and sediment control measures should be shown on the subdivision site plan.

Once the control devices have been installed, Town officials or a designated person should inspect them for proper installation and effectiveness.

In order to protect the quality of water in the Willimantic River and in drainageways on the site, consideration should be given to the installation of a temporary sediment pool(s) during construction phases. If the sediment pool is constructed, it should be located on upland soils rather than wetland


Gravel Pit
Brook
Cassidy Hill
650
500
195
Winding
600
450
Brook
Trailer Parks
Merr
365
500
ROAD
450
300
600
WATERSHED BOUNDARY
Portion of site that drains to Winding Brook
Portion of site that flows to Willimantic R.
Direction of surface flow
1" = 1000'

soils. This will help to minimize wetland disturbances. If the primary purpose of a detention basin is to minimize erosion and sedimentation, the peak discharge from the 2-year and 10-year frequency, 24 hour duration, Type III distribution storms should be analyzed. A buffer strip would help to protect water quality in Willimantic River also. If adopted, the buffer strip boundary should be superimposed on the subdivision plan.



7

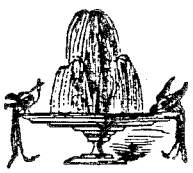
SEVEN: WATER SUPPLY

Since public water is not available to this site, individual on-site wells will need to be developed on each lot of the subdivision. Crystalline bedrock wells can generally yield quantities of water adequate for most domestic uses. The exact yield of a bedrock-based well is a function of many hydrogeologic factors including the number and size of fractures present in the bedrock. Because the fractures are unevenly spaced throughout the rock, there is no practical way, short of expensive geophysical tests, to assess the potential of any particular site for a satisfactory well.

According to statistics in Water Resource Bulletin No. 11 for the Shetucket River Basin (which the site lies within), 90% of the bedrock drilled wells surveyed in the report have yielded 3 gallons per minute or more. A well yielding 3 gallons per minute should adequately meet the demands of most domestic households.

According to DEP's Water Quality Classification map for the area, groundwater is suitable for private drinking water supplies without treatment. As such, the quality of the groundwater is expected to be good. However, there is a good chance that water produced from wells tapping the underlying bedrock will be naturally mineralized with elevated iron or manganese.

The federal recommended limit of iron and manganese in drinking water is 0.3 milligrams per liter and 0.05 milligrams per liter, respectively. These limits are based largely on aesthetic and taste considerations. Both are capable of imparting a metallic taste to water and can stain plumbing fixtures, laundry, etc., when the above levels are reached or exceeded. There are filters available on the market to deal with water quality problems arising from elevated iron and manganese.



8

EIGHT: VEGETATION

The tract proposed for subdivision is composed of five vegetative types. These include open fields of grass, hardwood swamp, softwood-hardwood forest, oak-hickory forest, and mixed hardwood forest. Woodlands cover 95% of the property, grasses cover the remainder of the tract. Healthy forest land provides a protective influence on soil stability and water quality. Approximately two-thirds (2/3) of the acreage on this tract is 15% slope or greater with some areas of 35%--40% 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.

Vegetation Type Description

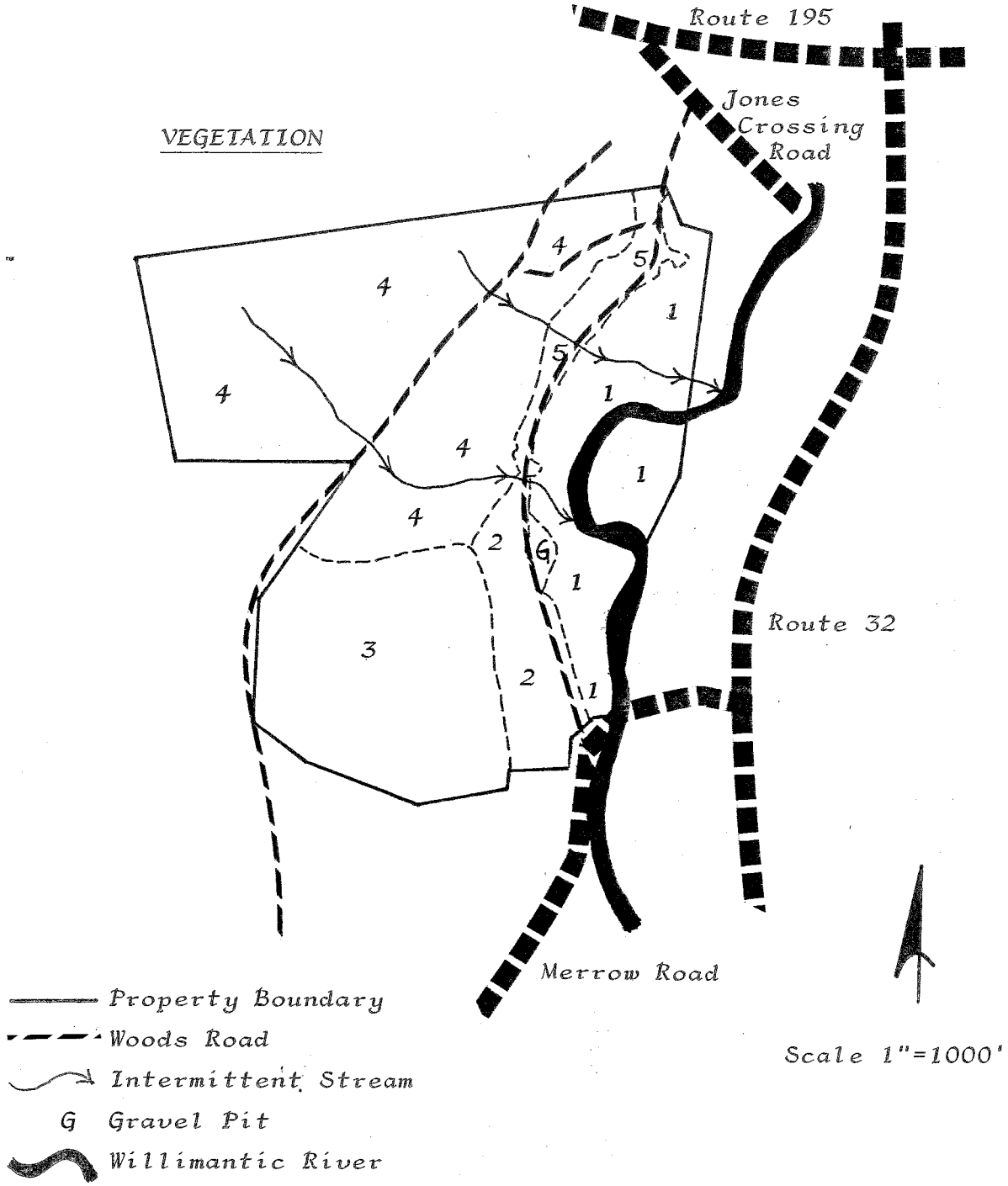
TYPE 1: Hardwood Swamp, 34 acres. This type is dominated by red maple located in the flood plain of the Willimantic River. Associated vegetation includes elm, swamp white oak, white ash, occasional sugar maple and oaks. Understory vegetation is composed of spice bush, skunk cabbage, sweet pepper bush, swamp azalea, highbush blueberry, fern, poison ivy, sedges and grasses.

TYPE 2: Softwood-Hardwood, 15 acres. This type is on an extremely steep, rocky, slope (35%--40%). It is composed of hemlock, sugar maple, red oak, black oak, white oak, shagbark hickory, and pignut hickory. The understory is relatively open, but occasional young hemlock and sugar maple occur.

TYPE 3: Oak-Hickory, 46 acres. This type, located on drier soils on the top of a hill is composed of 95% oaks including black oak, scarlet oak, white oak, hickories and occasional sapling red maple and black birch. The understory is predominantly huckleberry with mountain laurel and viburnum.

TYPE 4: Mixed Hardwoods, 95 acres. This is the largest type on the property composed of black oak, red oak, white oak, red maple, hickory, black and yellow birch, and sugar maple. Understory vegetation is composed of fern, blueberry, wafer ash, mountain laurel, witch hazel, viburnum and hophornbeam. There are also five areas of plantation softwoods such as white pine and spruces. These plantations total 4 to 5 acres and are scattered through type 4. The eastern half of this type has slopes ranging from 15% -- 22%.

VEGETATION



TYPE 1 : Hardwood Swamp 34 acres
TYPE 2 : Softwood-Hardwood 15 acres
TYPE 3 : Oak-Hickory 46 acres
TYPE 4 : Mixed Hardwoods 95 acres
TYPE 5 : Open Field 10 acres

TYPE 5: Open Field, 10 acres. This area is made up of grasses, wildflowers, seedling hardwoods encroaching on the old field, trembling aspen and gray birch. This type also includes a one (1) acre gravel pit.

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 composition. 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 or 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.

Many large, healthy trees throughout Type 4 (as well as the plantation pine and spruce) have high aesthetic and/or shade value. The large sugar maple, white pine, red maple, as well as some oaks and hickories should be selected for retention and worked into a final site plan for the proposed development. Research has shown that trees on a houselot may enhance the value of the 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. Several old, spreading sugar maple along the old road through the property and near the colonial cellar hole and old homestead site are prime candidate trees to be avoided and left undisturbed. A rough estimate puts the age of these trees between 150 and 200 years old.

In stand 2 the combination of hemlock and sugar maple provides attractive fall color and year round green (due to the hemlocks). These trees are also holding soil on a steep slope where all construction activity or any other disturbance should be avoided.

Limiting Conditions and Potential Hazards

Windthrow and tree breakage is a potential hazard in Type 3 and 4. Trees which have grown in a forested condition rely on each other for stability and side support. On these east and southeast facing slopes, 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 years 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 in Type 1. 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 highly absorptive forest soils on slopes greater than 10% (which includes about 2/3 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 steep 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.

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.

Trees present in Types 3 and 4 are declining in health and vigor. The oaks are especially susceptible at this time to shoestring root rot and two-line chestnut borer as well as ant damage. Trees that are already under stress (especially Type 3) are very susceptible to changes in soil conditions and mechanical injury which would rapidly lower their health and vigor.

In Types 3 and 4 a harvest prior to development would remove low vigor, dying, poor quality trees and retain the most stable vigorous trees for future growth. Up to half of the trees greater than 11 inches diameter at 4 1/2 feet above the ground could be removed in a properly executed timber harvest.

The Forestry Unit of the Department of Environmental Protection encourages all woodland owners to manage their forest lands. When properly described 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.

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NINE: FISH RESOURCES

Site Description

The proposed Mountain Ridge Estates development borders approximately 5,000 feet of the Willimantic River in Coventry, Connecticut. The Willimantic River is currently classified by the Department of Environmental Protection (DEP) as "Class B" surface water (swimmable-fishable water).

This section of the Willimantic River ranges from 40 to 60 feet in width and is characterized by very expansive pool and riffle areas. The pool to riffle ration in this stretch is 1:1 (equal amount of both habitats). This ratio is considered optimum for sportfish. Waters are slow moving in this low gradient reach of the river. Water depth ranges from 0.1 to 4.5 feet in depth. Stream bottom is comprised of small pebbles and cobble type rocks intermixed on fine sand and gravel. Overhanging vegetation provides beneficial shading and cooling of stream waters. Water clarity is excellent. The lack of filamentous algae in this portion of the Willimantic River is evidence of healthy water quality conditions.

Fish Population

The Willimantic River is a highly prized and productive trout stream. River habitat particularly along the proposed development is considered excellent for trout. The Willimantic River is annually stocked by the Department of Environmental Protection with over 8,000 rainbow, brook, and brown trout in the Towns of Tolland, Willington, Coventry, and Mansfield. The river also supports a native (wild) brown trout fishery. A designated Trout Management Area in which all angled fish are released unharmed exists approximately 3.8 river miles upstream from the proposed development.

In addition to trout, the Willimantic River supports diverse and healthy warmwater and coolwater fisheries. Recent fishery surveys have been conducted by DEP fisheries personnel in the Willimantic River from Merrow Road to Jones Crossing Road. Fish which inhabit this area are: smallmouth bass, largemouth bass, pumpkinseed sunfish, redbreast sunfish, redfin pickerel, chain pickerel, yellow perch, white sucker, fallfish, common shiner, blacknose dace, and long-nose dace. This reach also supports a wide variety of aquatic insects which serve as the primary food source for fishes. Angler access is good to excellent along this stretch.

Impacts

The following impacts on the Willimantic River can be expected if development is constructed as proposed:

1. Construction site soil erosion and sedimentation of the Willimantic River through increased runoff from unvegetated areas -- erosion and sedimentation due to construction has long been regarded as a major cause of stream degradation. In particular, silt deposition will:

   * Reduce fish egg survival - adequate water flow, free of sediment particles is required for egg respiration and successful hatching.

   * Reduce aquatic insect production - sediment free water is also required for successful aquatic insect egg respiration and hatching. Aquatic insects are important food items in fish diets. Reduced insect levels will adversely effect fish growth and survival since excessive energy demands are required to locate preferred aquatic insects when population levels are low.

   * Reduce stream pool depth - pools provide cover, shelter, and resting areas for fish.

   * Encourage the growth of rooted aquatic plants and promote filamentous algae growth in streams - eroded soils contain plant nutrients such as nitrates and phosphates. Although algae and aquatic plants require these nutrients act as fertilizers once they are introduced into aquatic habitats resulting in accelerated plant growth.

   * Contribute to the depletion of oxygen - organic matter associated with soil particles is decomposed by micro organisms contributing to the depletion of oxygen in waters overlying sediments.

The Willimantic River in this area has limited capacity to move fine streambed materials due to its low gradient. Consequently, any damage effected by silt deposition could be long lasting.

2. Percolation of septic system leachate into the Willimantic River -- any proposed riverfront septic systems could be potentially dangerous to the river ecosystem. Seasonally high water tables along with high permeable soils could allow easy transport of leachate into the river. The introduction of septic effluent could result in a major threat to fish and public health.

3. Transport of lawn fertilizer to the Willimantic River -- runoff and leaching of nutrients from fertilizers will stimulate nuisance aquatic weed growth.

4. Introduction of road salts to the Willimantic River - the proposed road network for this development is too close to the river. Surface drainage from paved roads may introduce salts and pollutants into the Willimantic River. This will result in water quality and stream habitat degradation. Any water quality problems that develop along this property will ultimately be passed onto downstream areas.

If realized, these impacts would have a severe, adverse effect upon the Willimantic River. Degradation of water quality and fish habitat could render this area less desirable for recreational activities.

Recommendations

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

1. Do not allow riverfront development - removal of riverfront building lots from proposed subdivision plans will reduce hazardous impacts and maintain river ecosystem integrity.

2. If riverfront development is allowed, maintain at the minimum a 150 foot open space buffer zone along the river edge -- no construction or alteration of habitat shall take place in this zone.

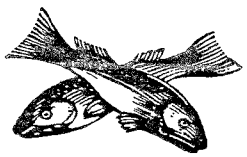
3. Install and maintain proper erosion and sedimentation controls during construction such as silt fences, hay bales, and catch basins -- direct all runoff away from the Willimantic River and regularly maintain catch basins.

4. Limit liming and fertilization of subdivision lawns close to the Willimantic River -- stress the use of low phosphate laundry detergents. These steps will partially mitigate the addition of nutrients to the river.

5. Encourage subdivision residents to create a local environmental association in order to educate all landowners concerning responsible land management practices near the Willimantic River -- technical assistance regarding these matters can be obtained from DEP professionals.

Summary

As proposed, this development has the potential to negatively impact the Willimantic River. Careful and conscientious planning must be exercised by the developer and the Town of Coventry to mitigate a myriad of potential impacts. All efforts should be expended to protect the Willimantic River. If implemented, proper mitigation measures will preserve existing water quality and fish habitat.



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TEN: PLANNING COMMENTS

1. State of Connecticut Conservation & Development Policies Plan 1982-85

   This current state plan indicates a green belt of "conservation area" along the Willimantic River which borders this property, undoutedly contiguous with the flood plain area and channel encroachment lines of the river, as well as wetland areas, and other natural and scenic areas abutting the river corridor.

   The remainder of the parcel seems to fall within the "rural area" which is recommended for development forms & intensities which can be supported on a permanent basis with on-site water & sewage disposal consistent with an open, rural character and adjacent areas of conservation value.

2. Regional Plan

   The Windham Regional Planning Agency's "Regional Growth & Preservation Guide Plan" recommends the area along the Willimantic River for a river corridor preservation district where river water quality is maintained or improved, recreational opportunities provided and visual enjoyment of these natural features be preserved.

   The plan suggests each community with such valuable areas:

   - vigorously enforce flood plain & inland wetlands regulations.
   - encourage state & local entities to acquire rights to land within river corridors to preserve them and provide public access.
   - ensure that development within river corridors be designed and sighted to minimize the visual impact on rivers and protect river water quality.

3. Town Plan of Development

   Coventry's Plan of Development recommends areas along the Willimantic River for open space uses. The plan recommends areas of high open space values be protected (page 40 & 42). These include the Willimantic River corridor and steep sloped areas, ridge tops and scenic vistas including those overlooking the Willimantic River Valley.

The plan points out the town's Planning & Zoning Commission's role in preserving open space by setting aside appropriate portions of proposed subdivisions (p.41). Open space is suggested to be preserved in a number of ways ranging from public ownership to private ownership with no public access, deed restrictions, land trust ownership, homeowner association ownership and private ownership with easement rights to allow activities such as fishing, hiking and cross country skiing.

Open space designations & other recommendations are included on pages 42 & 43 of the plan.

The remainder of the proposed Mountain Ridge subdivision property is recommended for rural density residential development.

4. Planning Considerations

There are a number of technical issues which should be studied before determining if the proposed subdivision complies with Coventry's zoning & subdivision regulations.

a. An overall development plan.
The subdivision plan submitted is for Section 1, 15 individual house lots on 33± acres out of a total parcel of 200 acres. An overall preliminary plan was shown to ERT team members indicating a 94 lot subdivision, although a condominium development was also seen as a possibility for the remaining land.

In order to properly evaluate the Section 1 proposal which has been filed as an application, an overall development plan is necessary. Even if there are alternative plans for the remaining property as varied as condos vs. single family house lots, a concept plan or plans for the remaining property is important to plan for road connections, drainage improvements and open space dedication.

As an example, the preliminary 94 lot plan shown to the ERT team members showed the main access road into the property from Jones Crossing Road to enter the property, two house lots being created on each side of the road, (lots 1 & 2 and 23 & 22), then at approximately 500 feet into the main parcel a road being created to the right (west) entering into section 1 subdivision of the subdivision at a 90° angle to the road parallel to the river.

The Mountain Ridge, Section 1, final subdivision plan this reviewer saw, however, has a different road alignment which instead creates "Timber Trail" & "Mountain Ridge Drive", the roads into section 1, with a "Y" shaped intersection with an as yet undefined "river road" alignment.

While this may seem a minor change, larger issues are created. Coventry's subdivision regulations (Chapter VI Section 2 Streets) requires all streets to join at right angles, for traffic safety. The "Y" intersection which would be created by the plan for any future road connections may not be appropriate for the level of development which occurs later.

Further, the driveway to lot #15 which is in the "Y" is proposed to enter the future river road only 40 or so feet from the intersection of the two roads, not a particularly advantageous location to provide safe turning movements.

No open space is indicated on this Section 1 plan. Open space in any development be it single family house lots, or condominiums, needs to be incorporated into the first sections of the development and the overall plan.

b. Open Space.
Coventry's subdivision regulations (Chapter VIII) provide for the dedication of open spaces and/or recreation land required to be a minimum of 10% of the property and up to 20%. This property contains flood plain, inland wetland, steep slopes, river frontage along the Willimantic River and scenic vistas, all of which are recommended by the town, region and state plans to be preserved in open space uses rather than developed.

Open spaces to be incorporated into the subdivision should be shown in any and all phases of the development and disposition of such space should be determined with the first phase of the development.

This reviewer recommends that the steep slopes on the property leading down to Merrow Road, and the entire flood plain & channel encroachment area along the Willimantic River, at minimum, be dedicated to meet the open space dedication requirement. In accordance with the disposition options listed in the regulations as acceptable to the town, this reviewer recommends perpetual dedication to Joshua's Trust, another land trust, State of Connecticut or Town of Coventry (Sec. 8.3), but recommends against private ownership or homeowner's association ownership since these properties should, most appropriately, be accessible to the public. The preliminary overall development plan shows the steep slopes incorporated into lots #74, 76, 78, 90 & 91. Such a plan would not preserve open space in any coordinated manner. These slopes rival those found in the Westford section of Ashford called Boston Hollow.

The Willimantic River in the area of this subdivision is already enjoyed by fishermen and canoeists. A popular canoe day trip starts below Stafford Springs and ends at Eagleville Lake, or with a portage, to Willimantic. Canoe & fishing access for the general public from the existing cart path which parellels the river, or from any new road which is built in conjunction with this development, would be appropriate.

c. Lot layout.
The "liveability" of some of the proposed lots could be improved with some minor changes.

For example, lots 1 & 14 are wedge shaped, limiting the use of these sections of the property which are narrowly constrained by the sharp angles of the lots and set back requirements. Privacy, yard & garden areas are also impeded by such irregularly shaped lots unless they are quite large in size.

Lot 4 would be better shaped and property ownership and yard maintenance issues eased, if a natural wetland boundary were used as a lot boundary rather than an artificial survey boundary. Since lots 5, 6 & 7 have better access to the dry land on lot 4 due west of the large wetland area, and lot 4 is already a relatively large lot, exceeding minimum lot size required by zoning, lots 5, 6 & 7's rear boundaries should simply coincide with the wetland boundary or intermittent stream channel.

Solar accessibility for the proposed house lots has not been demonstrated in this plan as required by section 1.10 of Coventry's subdivision regulations and state statutes.

While no one is required to build passive or active solar dwellings, all new subdivisions are supposed to indicate that if the lot purchaser chose to do so, the property had been evaluated for solar accessibility.

By designing a development with appropriate lot and road alignment, solar dwellings can be better accomodated. If a homebuilder then wishes to take advantage of such solar access, simple passive solar gain on a converted house can mean the difference between affordable utility bills and housing or being priced out of the housing market.

The plan should indicate appropriate house locations for solar access.

With the issues of open space dedication, solar access, steep slopes and other design constraints imposed by this very pretty property, a cluster development should have been considered as allowed by section 10.5 of Coventry's Zoning Regulations. Less investment in new roads, environmentally more sensitive lot & road layouts and preservation of larger areas of open space could be achieved through such a design. This would seem to be an appropriate property for a clustered development rather than a conventional single family house lot subdivision.

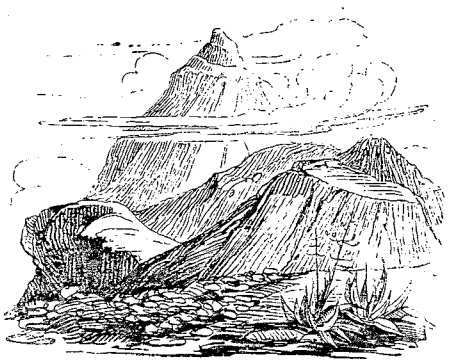
d. Road layout.
Maximum cul-de-sac length is limited to 650 feet by Coventry's subdivision regulations. The temporary Timber Trail cul-de-sac exceeds that length while the preliminary plan indicates future road connections through adjoining properties.

The Section 1 plan provides no indication of future development, again pointing out the need for overall development plans.

Maximum cul-de-sac length is recommended by the State of Connecticut, Department of Transportation, "Guidelines for Subdivision Streets" to be 1000 feet or no more than 20 house lots, providing for a maximum of 200 vehicle trips per day (assuming 10 trips per day per single unit dwelling).

Sections of the proposed road indicate grades as steep as 12%, which is permitted under Coventry's regulations.

State and national guidelines, however, recommend a maximum grade of 10%. Grades up to 12% are to be considered only on short sections of streets in hilly terrain.



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.