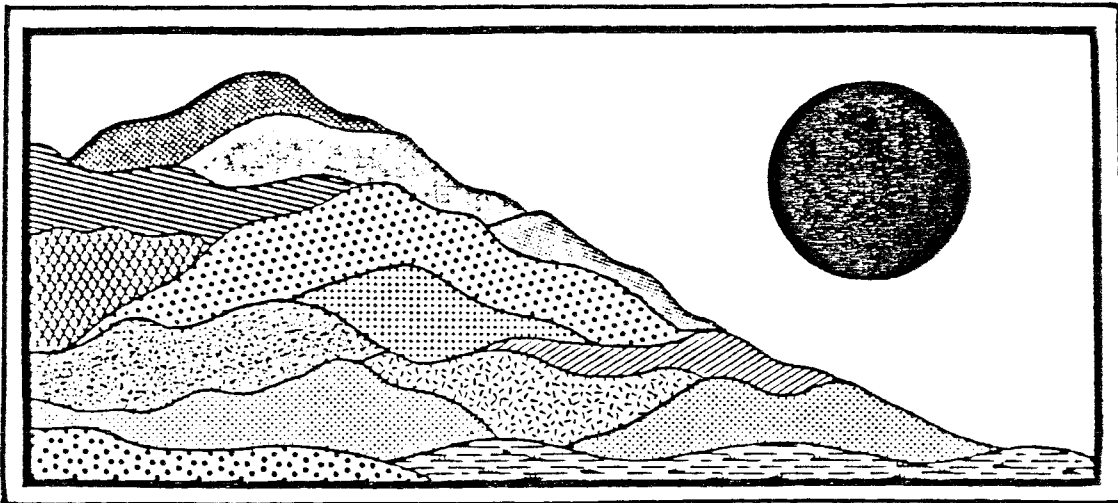


NORTH COVENTRY FARMS

Coventry, Connecticut

April 1988



ENVIRONMENTAL

REVIEW TEAM

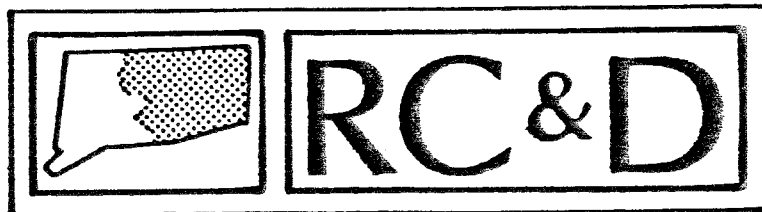
REPORT

NORTH COVENTRY FARMS

Coventry, Connecticut

Review Date: FEBRAURY 25, 1988

Report Date: APRIL 1988



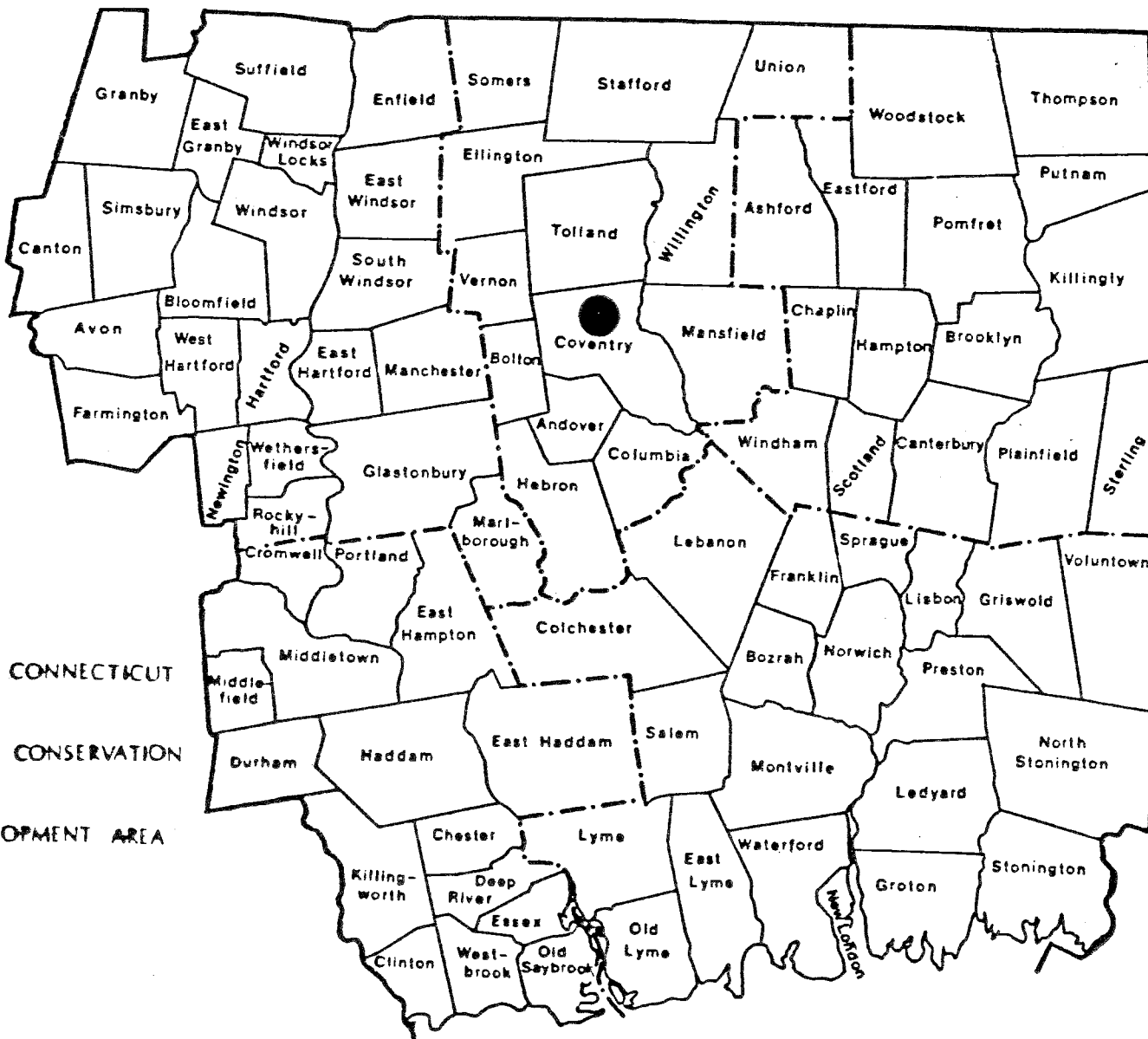
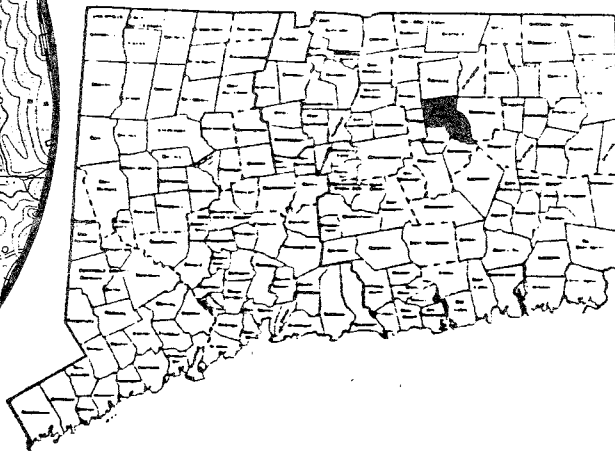
ENVIRONMENTAL REVIEW TEAM

PO BOX 198

BROOKLYN, CONNECTICUT 06234

Site Location

NORTH COVENTRY FARMS SUBDIVISION
COVENTRY, CONNECTICUT



EASTERN CONNECTICUT
RESOURCE CONSERVATION
& DEVELOPMENT AREA

ENVIRONMENTAL REVIEW TEAM REPORT
ON
NORTH COVENTRY FARMS 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, February 25, 1988. 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 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, a location map, a topographic map and a soils map. During the field review the team members were given subdivision plans, and a summary of drainage. The Team met with, and were accompanied by the Town Planner, the landowner, counsel to the landowner, the engineer and surveyor. Following the review, reports from each team member were submitted to the ERT Coordinator for compilation and editing into this final report.

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

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

If you require any additional information, please contact:

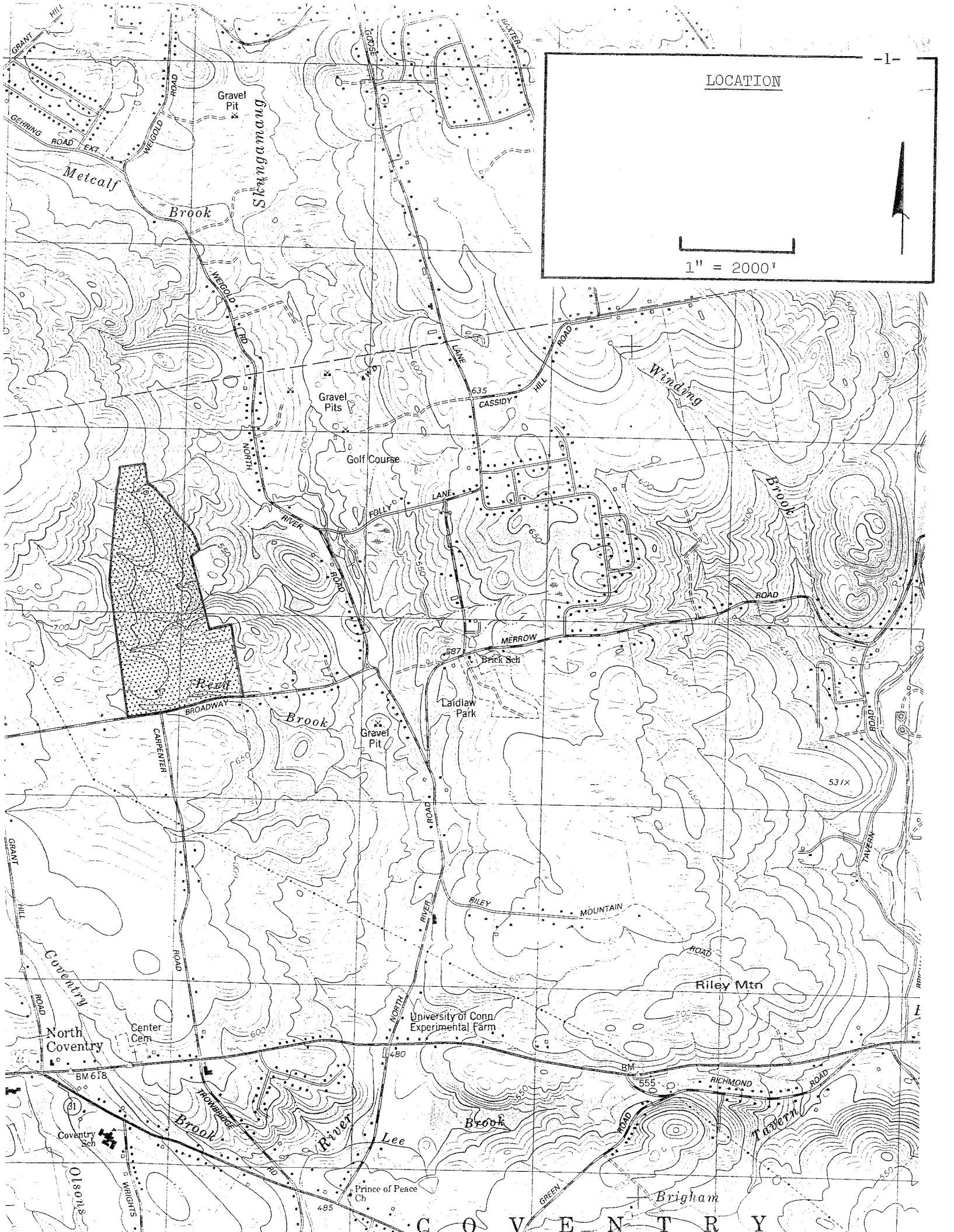
Elaine A. Sych
ERT Coordinator
Eastern Connecticut RC&D Area
P. O. Box 198
Brooklyn, CT 06234
(203) 774-1253

TABLE OF CONTENTS


	<u>Page</u>
1. INTRODUCTION.....	2
2. TOPOGRAPHY AND SETTING.....	2
3. GEOLOGY.....	4
4. SOIL RESOURCES.....	7
4.1 General Soils Information.....	7
4.2 Wetland Boundary Information.....	7
4.3 Soil Erosion and Sediment Control Plan.....	7
4.4 Other.....	9
5. GEOLOGIC DEVELOPMENT CONCERNS.....	9
5.1 Sewage Disposal.....	10
5.2 Building Footing Drains.....	11
5.3 Blasting.....	11
5.4 Wetland Crossings.....	11
5.5 Parcel "A".....	12
6. HYDROLOGY.....	12
7. WATER SUPPLY.....	14
8. VEGETATION.....	15
8.1 Vegetation Type Description.....	15
8.2 Aesthetic Considerations.....	17
8.3 Limiting Conditions and Potential Hazards.....	17
8.4 Management Considerations.....	18
0. FISH RESOURCES.....	18
9.1 Site Description.....	18
9.2 Fish Population.....	19
9.3 Impacts.....	20
9.4 Recommendations.....	21
9.5 Bibliography.....	23
10. PLANNING CONCERNS.....	24
10.1 Traffic Impacts.....	24
10.2 Plan Compliance.....	27
10.3 Open Space.....	27

TABLE OF MAPS

	<u>Page</u>
LOCATION.....	1
TOPOGRAPHY.....	3
BEDROCK GEOLOGY.....	5
SURFICIAL GEOLOGY.....	6
SOILS.....	8
WATERSHED BOUNDARY.....	13
VEGETATION.....	16
TRAFFIC COUNTS	26



LOCATION



1" = 2000'

COVENTRY

1. INTRODUCTION

The Eastern Connecticut Environmental Review Team has been asked to provide assistance to the Coventry Planning and Zoning Commission in reviewing the North Coventry Farms Subdiviison.

The following sections of this report contain natural resource information about the site, and detail areas of concern. Recommendations and suggested mitigation measures may also be found under individual sections.

2. TOPOGRAPHY AND SETTING

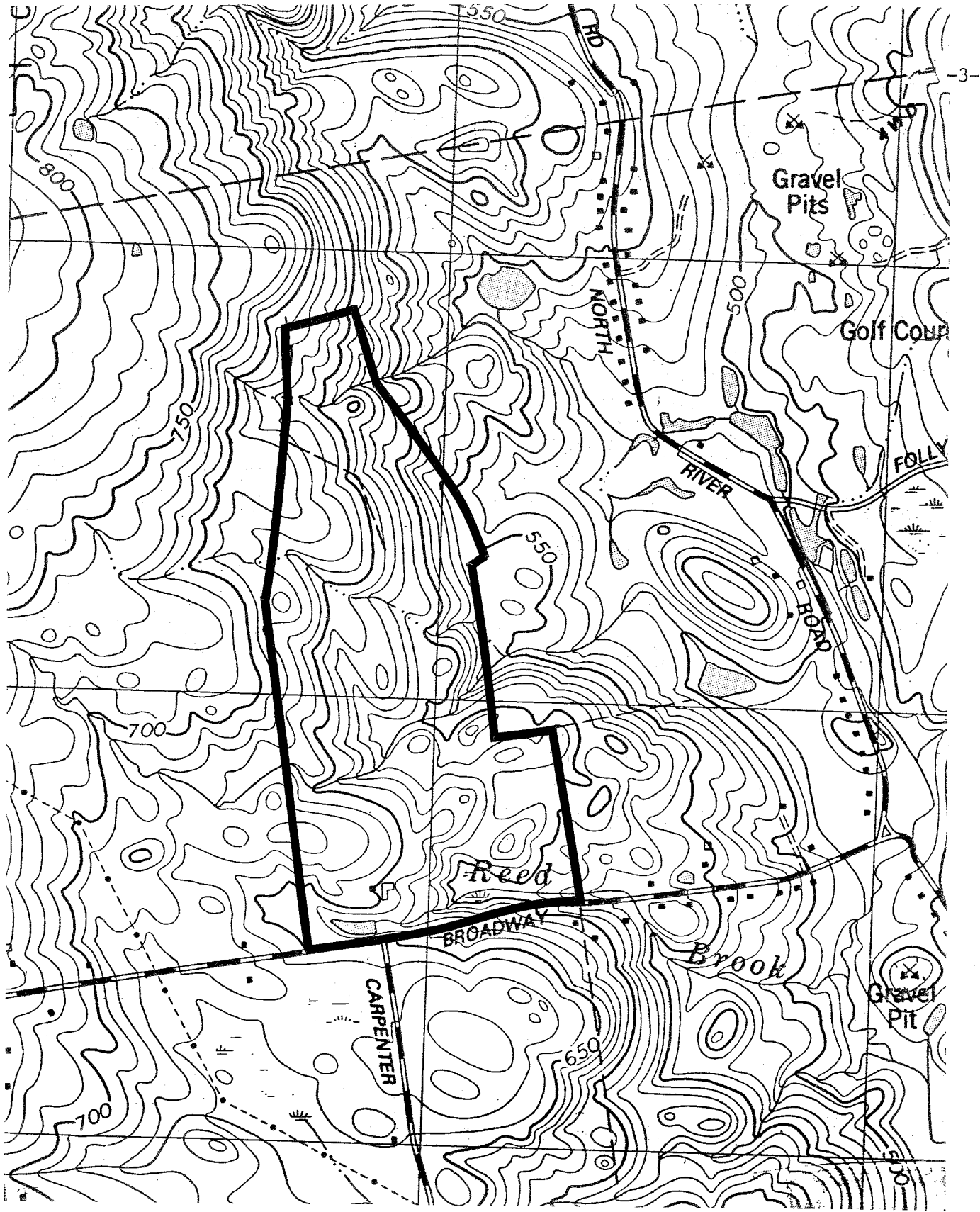
The proposed subdivision site consists of about 144 acres in North Coventry. The northern property boundary for the site lies approximately 1,250 feet south of the Tolland Town line. It abuts Broadway on the south and several private, undeveloped lands on the north, east and west.

The site is located in a RU-40 zone. A permitted use for the RU-40 zone includes residential development with a minimum lot size of 40,000 square feet (about 1 acre in size). All of the proposed residential lots exceed the minimum 40,000 square foot area.

The proposed subdivision site has historically been used for agricultural purposes. The presence of several stone walls which were constructed as boundaries for fields and pastures confirms this. The southern limits and north central parts are currently open farm lands, some of which are actively being farmed at the present time. It is estimated that about 33 percent of the site, or 47 acres is open or active farmland. The remainder consists of forested acreage.

The land surface on the site generally slopes gently to moderately eastward. Areas of steep slopes are concentrated along the streamcourses on the site. Site elevations range from about 690 feet above mean sea level at the highest point to about 580 feet above mean sea level at the lowest point.

Four streamcourses, all of which are tributaries to Skungamaug River, flow through the site in an easterly direction. All are unnamed, except Reed Brook which flows easterly through the southern part of the site enroute to the river. Reed Brook originates in the ±5 acre man-made pond located in front of the existing farmhouse on the site. All of the above mentioned streamcourses are paralleled by regulated inland-wetland soils. According to present plans, the North Farms Road will need to cross the wetland streamcourse system in at least five locations. This does not account for potential wetland crossings by driveways. The latter will depend largely on the ultimate house location of each lot. It is understood that Coventry has no prescribed setback (buffer zone) regulations from wetlands, ponds and streams, but each application is reviewed on a case by case basis.



TOPOGRAPHY

█ Approximate Site Boundary

Scale 1" = 1000'



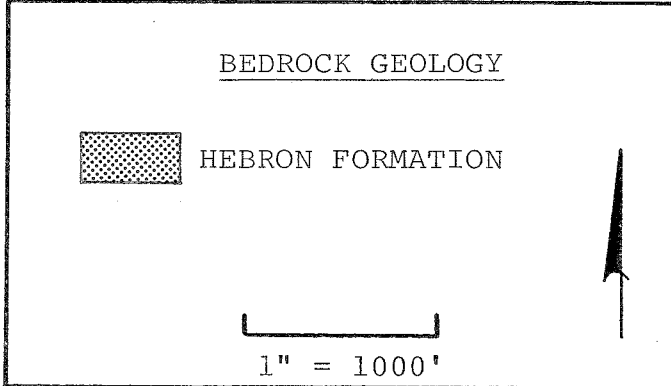
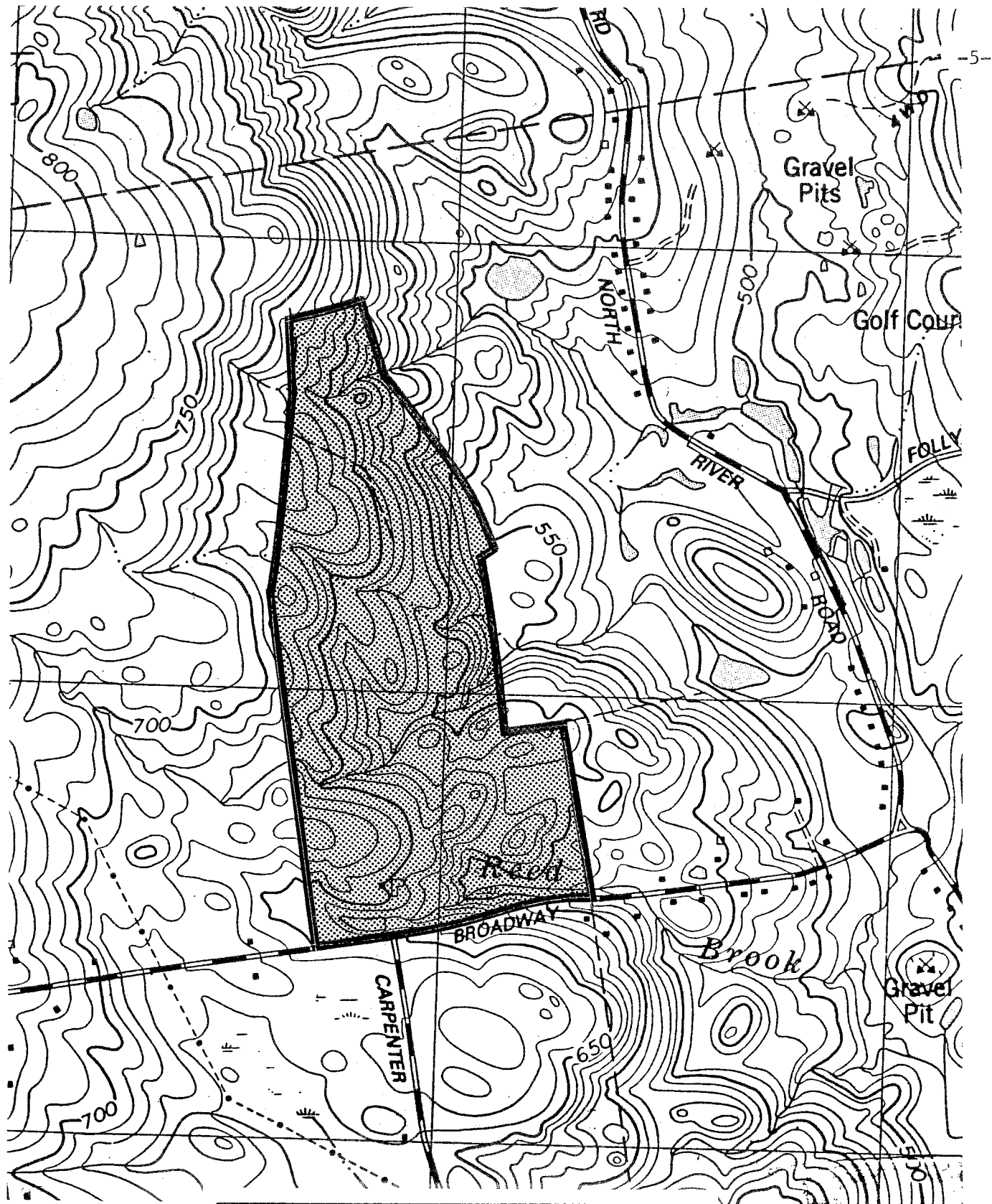
3. GEOLOGY

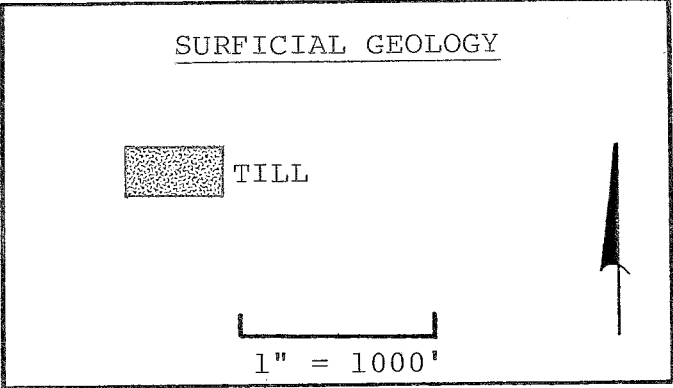
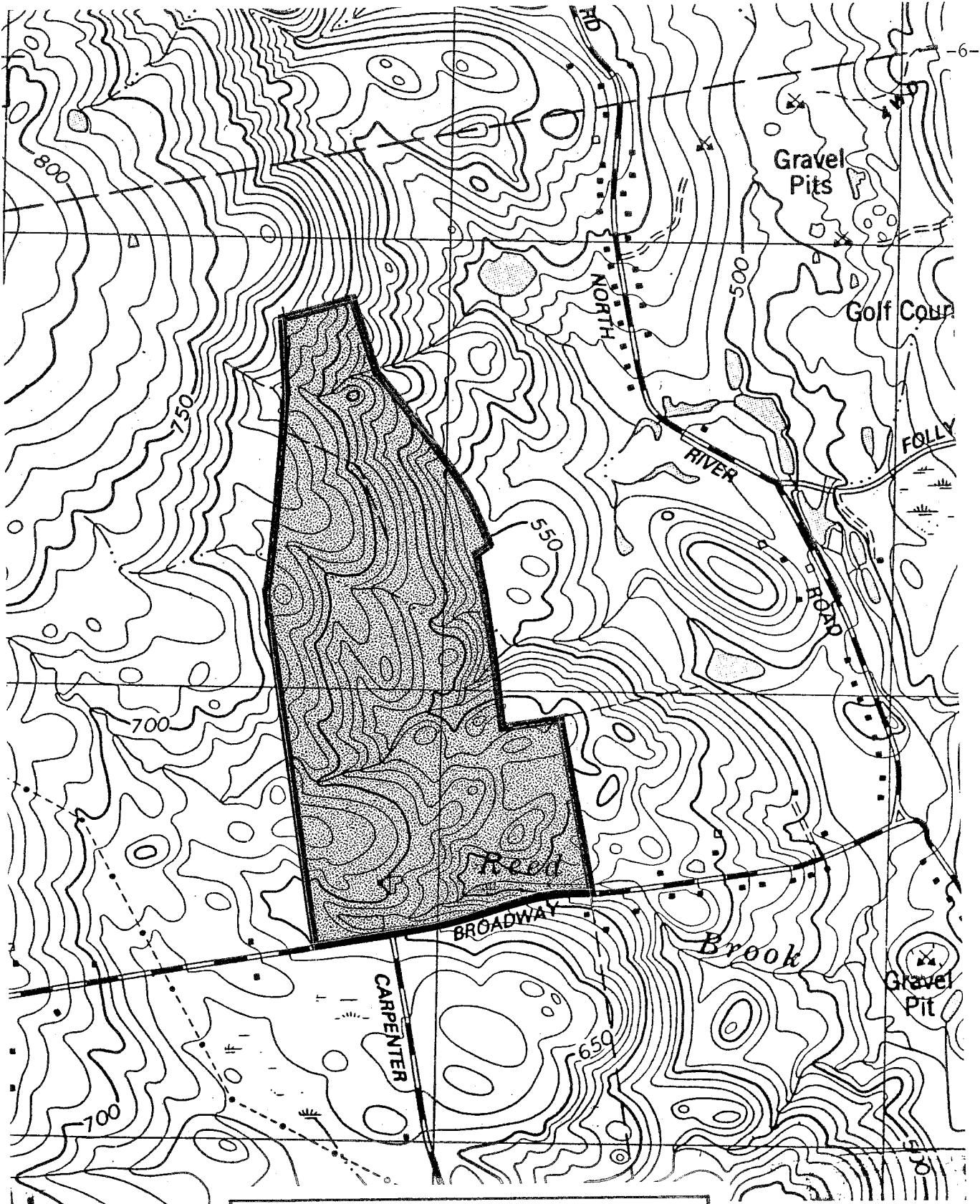
The subdivision site is located entirely within the Coventry topographic quadrangle. No bedrock or surficial geologic map has been published for the quadrangle to date. For the purpose of this section of the report, the Team's geologist referenced John Rodgers' Bedrock Geological Map of Connecticut, and Soil Survey for Tolland County, Surficial Materials Map of Connecticut by Stone, Schafer, London & Thompson (1985) and soils and deep test pit information submitted by the applicant's soil scientist and engineer, respectively.

A relatively thin blanket of glacial sediment called till covers bedrock on the site. It consists generally of a non-sorted mixture of sand, silt, clay, gravel and boulder. These materials were collected, transported and redeposited by an ice sheet as it moved through the region about 10,000 to 12,000 years ago. Subsurface exploration for sewage disposal has been conducted on the site. A total of one hundred thirty-three (133) deep test pits were excavated on the site and witnessed by the Town Sanitarian. Soils mapping information supplied to Team members suggests that the till is generally shallow probably less than 10 feet throughout the site. It also suggests that the texture of the till soils is mostly sandy, stony and loose. Although deep test hole information generally confirms these conditions, some holes encountered a denser and siltier variety of till with depth. The presence of soil mottling at or near the beginning of this compact zone indicates that it has a slowly permeable medium which tends to impede the downward movement of water.

The post glacial sediments occurring on the site are mainly swamp deposits (inland-wetlands soils). Based on the site plan distributed to Team members, inland-wetland soils, which are regulated under Chapter 440 of the Connecticut General Statutes, occur as relatively narrow bands along the easterly flowing streamcourses on the site. These sediments, which have a higher mineral content and minor traces of organic materials, are seasonally wet. It should be noted that some of the inland-wetland soils paralleling Reed Brook have a high organic content.

The bedrock underlying the site is metamorphic; that is, it has been geologically altered by great heat and pressure within the earth's crust. According to John Rodger's map, the entire site is underlain by the Hebron Formation. It is described as an interlayered dark gray schist and greenish gray fine to medium grained calc-silicate gneiss. The terms gneiss and schist used in the preceding paragraphs refer to the texture of the rock. "Gneisses" are generally coarse-grained, foliated rock characterized by alternating bands of light and dark minerals. "Schists" are generally cleavable rocks with layers defined by the parallel arrangement of platy, flaky or elongated materials.





The bedrock surface was encountered in several deep test pits at depths ranging between 3 feet and 6 feet. The underlying bedrock is a source of water to many homes in the region and will be the likely source of domestic water to houses in the proposed subdivision.

4. SOIL RESOURCES

4.1 General Soils Information

The information contained in the Soil Survey of Tolland County, CT appears to be adequate for general planning purposes. 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, examine conditions in the field and provide the Commission with a verified map and up to date interpretive information for the site.

4.2 Wetland Boundary Information

Wetlands on this site were identified in the field by a soil scientist and located on the plot plan during 1987. Because most of the boundary flags were missing it was not possible to verify the information. On future submittals it is suggested that the Commission require that the applicant have a qualified private soil scientist delineate wetland boundaries 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.

4.3 Soil Erosion and Sediment Control Plan

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 plan should include specific measures for each proposed lot with special emphasis placed on those lots where driveways are proposed across

wetlands. The plans developed for the road crossing of wetlands should be very specific and be carefully implemented. Frequent and thorough inspection by the Town will be needed. The Tolland County Soil and Water Conservation District would appreciate the opportunity to review this plan prior to final approval. A specific concern with respect to soil erosion and sediment control is the design of the so called "sediment pools" at the storm drainage system discharge points. These structures as designed do not meet the criteria and standard for sediment basins found in the Connecticut Guidelines for Soil Erosion and Sediment Control and therefore cannot be considered adequate.

4.4 Other

1. Alternatives to crossing the stream system three times with driveways to serve lots 43, 44 and 45 should be examined. These crossings will involve placing large volumes of fill within the streambelt and negative impacts on the wetlands associated with encroachments and erosion of steep fill banks can be anticipated.

2. The plans to use Parcel "A" for a boarding stable and pasture for horses should be carefully evaluated. The site has severe limitations for the proposed uses. At least 32% of this area is wetland and the remainder has soils with steep slopes. Problems such as overgrazing and destruction of vegetative cover, trampling of the wetland, soil erosion, siltation and pollution of the wetland with silt and manure will need to be addressed as well as storage and utilization of manure. As an alternative the developer may want to consider a site on the property with less limitations and use Parcel "A" for an open space buffer. A secondary concern is where these horses will be exercised and ridden. Parcel "A" does not seem to have the capability to support this type of land use. (See additional concerns in Section 5.5)

3. If the project will have phases, phase lines should be indicated on the plan map and the soil erosion and sediment control plan should reflect phase limits.

4. In order to evaluate the adequacy of stormwater control plans, peak discharges from the 2-year and 10-year frequency, 24-hour duration, Type III distribution storm should be analyzed for the present and future (developed) conditions. The analysis should use one of the methods described in the Connecticut Guidelines for Soil Erosion and Sediment Control, Chapter 9. (Also refer to Section 6)

5. GEOLOGIC DEVELOPMENT CONCERNS

In terms of the proposed subdivision development, the principal geological limitations found on the site include: (1) the presence of till soils, some of which have the potential for seasonally high groundwater levels and moderately slow percolation rates; (NOTE: It appears percolation tests have not been

conducted on the proposed lots to date (2/25/88).) (2) areas of seasonal and permanent wetness; (3) the presence of shallow bedrock; and (4) presence of moderate slopes.

5.1 Sewage Disposal

It is understood that the proposed 54 building lots would be served by on-site sewage disposal systems. The geologic limitations mentioned above will be a hindrance in terms of providing adequate subsurface sewage disposal systems to the proposed homes. It seems likely that good planning and engineering will be needed in order to surmount the geologic limitations.

Deep test hole information supplied to Team members confirms that many lots would be classified as areas of special concern and warrant detailed site investigation and engineering plans in order to assure each subsurface sewage disposal system is properly constructed. The major items of concern include the potential for seasonally high groundwater due to the relatively shallow depth to soil mottling noted in many deep test pits and the limited areas where bedrock was observed at depths of less than seven feet below existing grade. With regard to the latter, several deep test holes are warranted on lots which have shallow to bedrock conditions, in order to establish a good profile of the bedrock surface.

As mentioned above, the limiting factor on many lots is the presence of shallow soil mottling which would be indicative of seasonal high water tables. Every effort should be made to determine if these lots are suited for installation of groundwater intercepting drains (curtain drains). There is a possibility that curtain drains could be installed in conjunction with the building footing drains. It is likely that select fill material will need to be placed on these lots to elevate trench bottoms sufficiently above the compact soil zones and seasonally high water table. These engineering measures should help to protect the leaching system from groundwater interference.

Because most lots are greater than one acre in size, the design engineer will be afforded greater flexibility for locating septic systems.

Due to the various geologic limitations noted on several lots, it is suggested that detailed plans be prepared by a professional engineer prior to issuance of building permits. Where there is concern with respect to the varying seasonally high groundwater elevations, provisions should be made for installation of groundwater monitoring pipes to facilitate water level monitoring during this forthcoming spring period. It should be noted that deep test holes were observed during the dry time of the year.

5.2 Building Footing Drains

Because of the potential for wet soils conditions (at least, seasonally) on the site, it is strongly recommended that building footing drains be installed around foundations. This will help to prevent wet basements. Building footing and curtain drains will need to be outletted at points which will not present problems in terms of septic systems and on-site wells. Ideally, they should be outletted into the road drainage system.

5.3 Blasting

Interior roads, utility lines, and house foundations constructed in shallow bedrock areas may require blasting. Any blasting which takes place in the study area should be done under the supervision of personnel familiar with the latest technology in blasting. This will hopefully reduce the chance for damage from undue seismic shock. A pre-blast survey of the area would also be wise so as to minimize the chance for damage claims.

5.4 Wetland Crossings

Based on the subdivision plan submitted to Team members, the present interior road system will cross wetland areas in at least five (5) locations. Also it appears that driveways serving several lots will also need to cross wetlands.

Wetland crossings are generally feasible provided they are properly designed (e.g. culverts are properly sized and installed and permeable road base fill material is used). The roads should be constructed at least 1.5 feet and preferably 2 feet above the surface elevation of the wetlands. This will allow better drainage of the roads and decrease the frost heaving potential of the road. The best time for road construction through wetland areas is during the dry time of the year with adequate provisions for effective erosion and sediment control. Detailed plans for all road and driveway crossing through wetlands should be shown on the subdivision plan and carefully reviewed by Town officials.

Because the soils in the preceding paragraphs are classified as inland-wetland soils in Connecticut, they are regulated under Chapter 440 of the General Statutes. 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 that the proposed activity will be significant, they may deny the activity altogether or, at least, require measures that would minimize the impact.

5.5 Parcel "A"

Team members are informed that the applicant wishes to use Parcel "A" in the southern part as a 10 stall horse farmette for property owners in the subdivision. Approximately 32 percent of Parcel "A" is comprised of regulated wetland soils. The north facing slopes on Parcel "A" are moderately steep. Also, Reed Brook, a class 'A' stream flows through the middle of the parcel in an easterly direction. Class 'A' means that the surface water body (Reed Brook) may be suitable for drinking water supply; may be suitable for all other water uses including bathing; and whose character is uniformly excellent. As a result, it may be subject to absolute restriction on the discharge of pollutants.

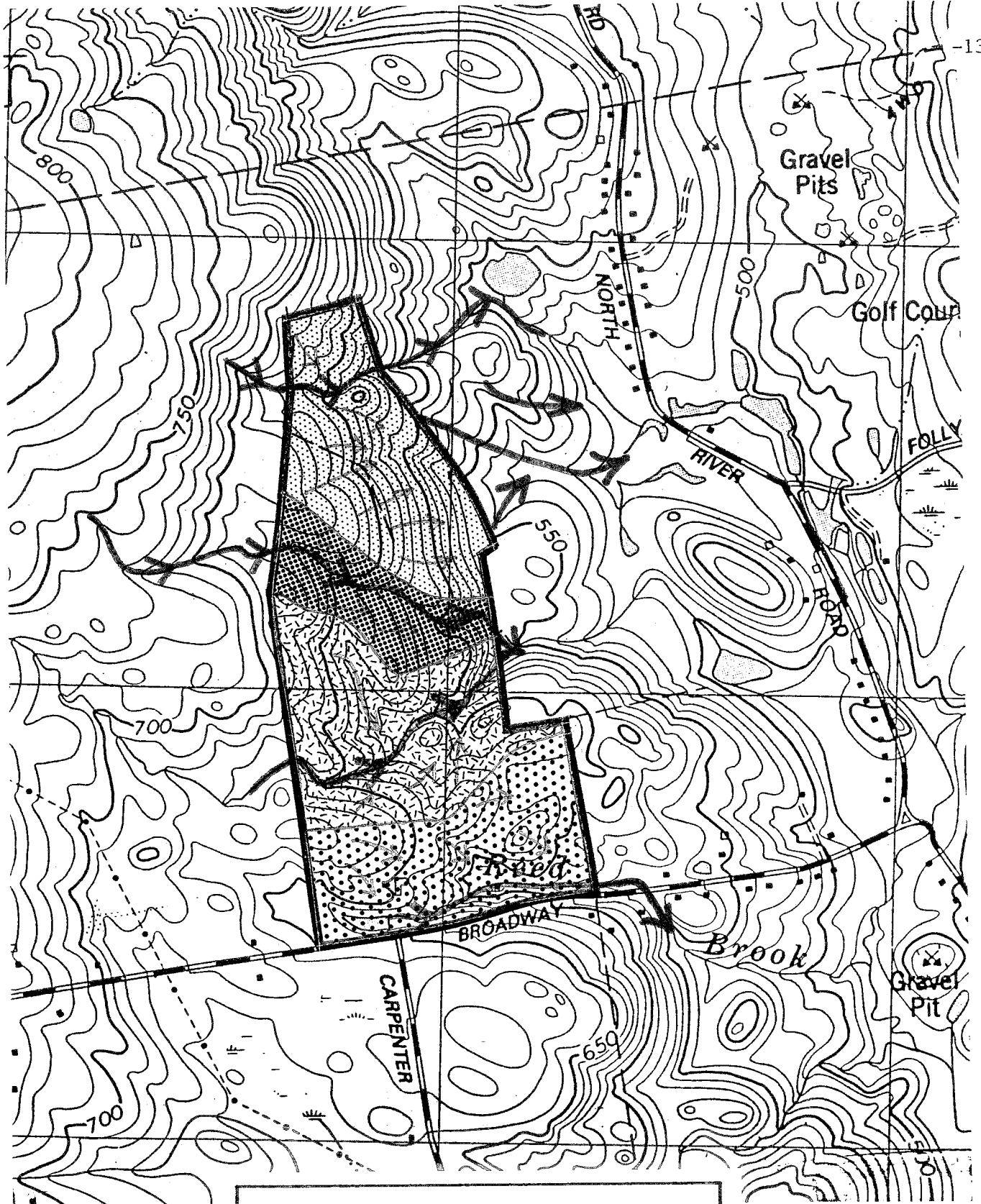
In view of the current surface water quality, moderately high percentages of wetland soils present, moderately steep slopes and limited area for horseback riding and pasture for horses, it appears Parcel "A" would not be favorable for the desired horse farmette. It appears to be more suited for passive-type recreational uses.

6. HYDROLOGY

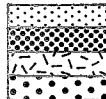
Reed Brook, as well as the other three unnamed easterly flowing streamcourses are tributary to Skungamaug River. Surface water on the site, which includes the four streamcourses mentioned above is classified as Class 'A'. (See Section 5 for definition) It should be pointed out that there are several man-made ponds east of the site. Some of the ponds are fed directly by the unnamed streamcourses in the upper part of the subject site, but some were created by excavation and intercepting the groundwater table near the streamcourses. It is understood that some of these ponds are being created for commercial purposes, e.g., trout fishing ponds.


Converting the wooded land on the site to a residential subdivision would be expected to increase the amount of runoff shed from the site. On the other hand, establishing lawns on the active cornfields (no cover crop) in the northern part may actually result in a net decrease in the amount of runoff shed from these areas. Areas of increased runoff would result from soil compaction, removal of vegetation and placement of impervious surfaces (roof tops, roads, and driveways, etc.) over otherwise impervious soils.


Present plans indicate that road drainage from North Farms Road and Joshua Lane will be artificially collected in catch basins and routed at various points to the easterly flowing streamcourses on the site. Because plans are preliminary, it is not known how storm drainage will be handled from individual lots or what the hydrologic impacts will be once they are developed. Obviously, the latter will depend upon the ultimate density of the subdivision and the amount of impervious surfaces created.



WATERSHED BOUNDARY

 Watershed boundaries for the four streamcourses within the site.

 Watercourses

 Direction of surface flow

1" = 1000'

It is suggested that the Town's engineer carefully review the final stormwater management plan. Efforts should be made to protect all streamcourses from silt and road sand, especially since they may ultimately feed the potential commercial fish ponds to the east. Also, wetlands and surface water bodies should also be protected. Discharge points for drainage pipes should have energy dissipators to slow down water flows and which will allow fine grained materials to settle out. Also a check of all downstream culverts is warranted to ensure they can handle post-development flows.

Present plans indicate that two permanent sediment basins are proposed for the subdivision. It is understood that the ponds would be designed to alleviate accelerated downstream channel erosion and sediment retention functions. The latter will hopefully help to maintain water quality to the streamcourses and ultimately the fish ponds to the east. If the ponds are designed to handle sediment, then provisions for maintenance should be paramount. The sediment basins should be designed in accordance with Guidelines for Soil Erosion and Sediment Control. There should be a determination made as to who will maintain the sediment basins. This means that an access road to the sediment basins for cleaning and maintenance equipment must be shown on the subdivision plan. Because the primary purpose of the sediment basins is to minimize erosion and sedimentation, the peak discharge from the two year and ten year frequency storms should be analyzed. It appears that the applicant's engineer analyzed only the ten year storm event.

7. WATER SUPPLY

Since there are no public water supply lines accessible to the parcel, it seems likely the proposed subdivision would be served by individual on-site wells. It appears that wells will need to tap the underlying bedrock aquifer. Wells drilled in bedrock generally supply small but reliable yields of groundwater. However, since the yield of a given well depends upon the number and size of water bearing fractures that it intersects, and since the distribution of fractures in bedrock is irregular, there is no practical way, outside of expensive geophysical testing, of predicting the yield of a well drilled in a specific location. Because fractures in the rock generally occur within the first 100 to 150 feet below the surface, it has been shown that the probability of increasing the yield of a well decreases with depth below this level.

Ideally, each well should be located on a relatively high portion of the lot, properly separated from the sewage disposal system and any other potential pollutant (e.g., fuel oil storage tank, manure storage pits, etc.) and in a direction opposite the expected direction of groundwater movement. They should all be cased with steel pipe into the underlying bedrock. In order to provide adequate protection of the quality of the bedrock water, all wells will need to be properly installed in accordance with applicable State Public Health Code and Connecticut Well Drilling Board regulations. In addition,

the Town Sanitarian will need to inspect and approve well locations.

In the Shetucket River Basin, wells tapping crystalline bedrock (i.e., gneisses, schists, etc.) were surveyed in Connecticut Water Resources Bulletin No. 11. approximately 90 percent or 9 out of 10 wells surveyed were able to yield 3 gallons per minute or more of water. A well yield of three (3) gallons is generally satisfactory for most households.

The natural quality of groundwater should be satisfactory. The schists and gneisses beneath the site may have elevated amounts of iron and/or manganese minerals which would lower the overall quality. If elevated iron and/or manganese levels are present in the water, it may be necessary to provide suitable treatment filters.

8. VEGETATION

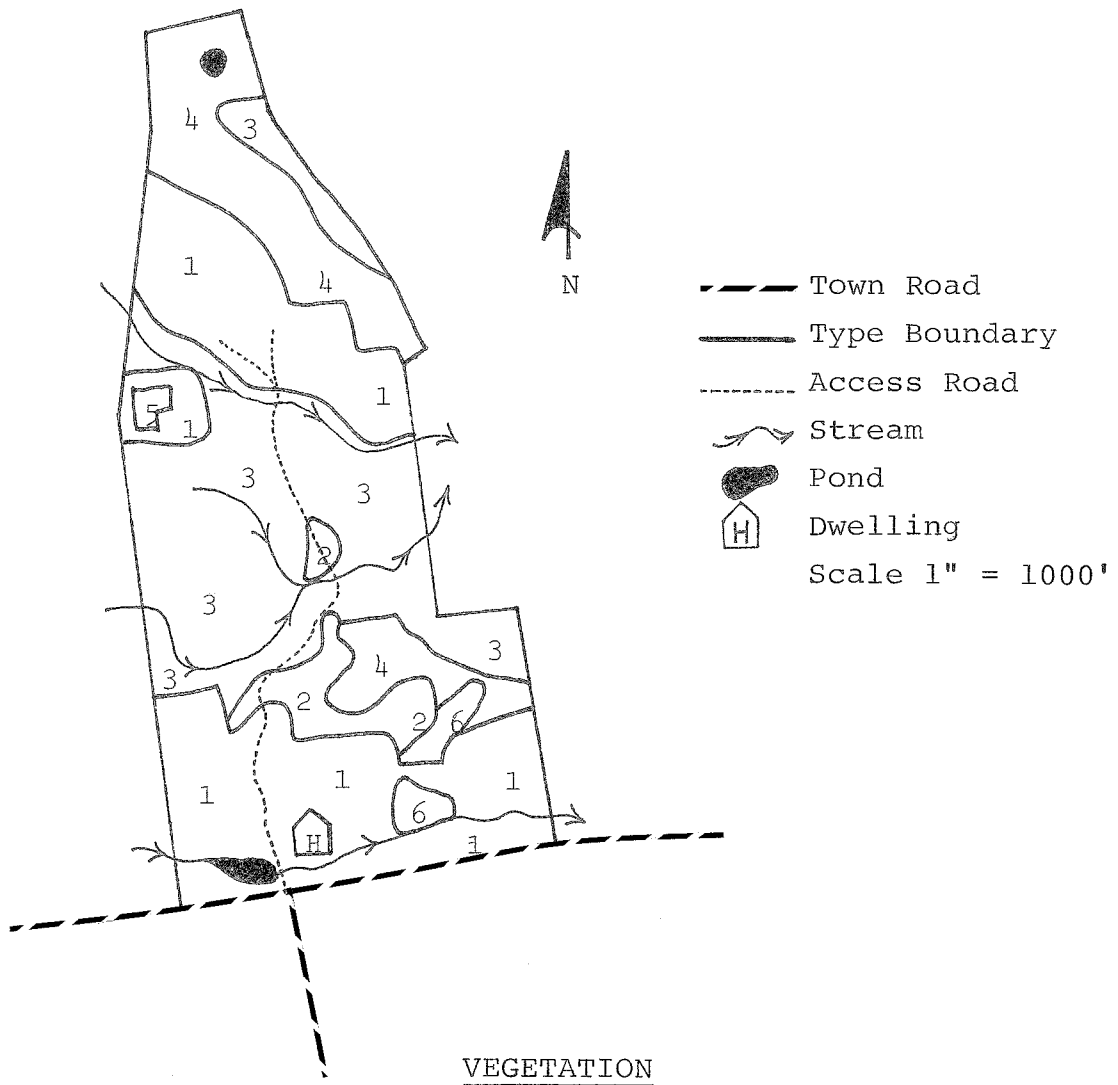
The tract proposed for subdivision is composed of six vegetative types. These include open agricultural fields, early succession old field, mixed hardwood forest and hardwood swamp. The tract is approximately 50% forested. The forest ranges in age from 10 years to nearly 100 years old.

8.1 Vegetation Type Description

Type 1: Agricultural Field, 60 acres. Hay and corn.

Type 2: Old field, 10 acres. This type is typical of recently abandoned agricultural fields or pastures. The early succession vegetation consists of red cedar, juniper, autumn olive, blackberry, grey and black birch, aspen, black cherry, sapling oaks, white ash, red maple, sweet fern, grasses. In this type and along the hedgerows of the agricultural fields are occasional overmature, large diameter, open grown oak trees which have been growing since early to mid nineteenth century.

Type 3: Mixed hardwood forest, 45 acres. This forested area is composed of black oak, red oak, white oak, hickory, red maple, American beech, paper birch, black and yellow birch, sugar maple and white ash along streams. The trees range in size from poletimber to sawtimber (6"--11") - poletimber, 12" and larger - sawtimber). Understory vegetation is predominantly young hardwood growth as a result of a harvest of sawlogs 10-15 years ago. Typical understory shrubs on upland sites in this forest type would include blueberry, viburnum, witch hazel. Lowland areas along streams would support spicebush and fern.



- TYPE 1 : Agricultural Field 60 acres
- TYPE 2 : Old Field 10 acres
- TYPE 3 : Mixed Hardwood Forest - Poletimber/Sawtimber 45 acres
- TYPE 4 : Mixed Hardwood Forest - Sapling 25 acres
- TYPE 5 : Softwood Plantation 1 acre
- TYPE 6 : Hardwood Swamp 3 acres

- Type 4: Mixed hardwood forest, 25 acres. This acreage is composed of the same species of trees as type 3, but the trees are sapling size (2"-5" diameter) and 10-20 years old.
- Type 5: Softwood plantation, 1 acre. White pine, white spruce and Douglas fir.
- Type 6: Hardwood swamp, 3 acres. These are low lying wet areas of red maple, white ash, yellow birch and elm with a spice bush, fern, skunk cabbage, poison ivy understory.

8.2 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 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.

Many large, healthy trees along the hedgerows between the fields have high aesthetic and/or shade value. The large 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 in wooded areas 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" or individual trees left for retention should be clearly marked so as to be avoided during construction.

8.3 Limiting Conditions and Potential Hazards

Windthrow and tree breakage is a potential hazard in type 3. 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. 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 are susceptible. 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 3. 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 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%.

8.4 Management Considerations

There is approximately 70 acres of forested land that will be taken out of wood production as a result of development. No one housing development will deplete future wood product supplies significantly. However, the forest acreage that will be converted to homes would have been usable as forest products beginning about 2030-2050. Fortunately our forests are capable of producing more than they already do.

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.

9. FISH RESOURCES

9.1 Site Description

Four watercourses (3 intermittent; 1 perennial) bisect this property flowing in an easterly fashion before emptying into the Skungamaug River.

Several ponds have been built on or near the lower reaches of the northernmost intermittent stream and the unnamed perennial stream that drains through the Therien property. A bypass pond on the Therien property has been granted a water diversion permit by the Department of Environmental Protection to withdraw water from the perennial stream to supplement the pond's water supply.

A physical habitat survey was conducted on the perennial stream. This stream averaged approximately 10 feet in width and contained a well developed overhead vegetative canopy that provides essential shading and cooling of stream waters. Stream gradient on this property was 6%. Stream substrate consisted of large rocks and boulders on top of gravel and cobble (2-12" diameter). A 1:1 pool-riffle ration was observed which is considered optimum for survival of sportfish. Pools are used by fish as resting and hiding places whereas upper reaches of riffles are primarily used as feeding areas. Some deep pools were observed up to 2 feet in depth.

All watercourses on this property are classified as "Class A" surface waters. Designated uses for this classification are: potential drinking water supply; fish and wildlife habitat; recreational use; agricultural, industrial supply; and other legitimate uses. Waters of the Skungamaug River are classified as "B/A". Designated uses are similar to Class A except that water quality has been degraded to a point where it is not usable as a potential drinking water supply.

9.2 Fish Population

The three intermittent streams on this property do not support permanent year-round fish populations. The unnamed perennial stream would be expected to support: native (naturally reproduced) brook trout, longnose dace, and blacknose dace. This stream supports a wide variety of aquatic and terrestrial insects which serve as the primary food source for resident fishes. The bypass pond on the lower stretch of this stream has been designated as "private waters". This designation authorizes the owner of private waters to take fish and allow guests to take fish without a license at any season of the year.

The Skungamaug River is stocked by the DEP Bureau of Fisheries with more than 4,300 adult (9-12") brook, brown, and rainbow trout in the Towns of Andover, Tolland, and Coventry. Other species of fish that could be expected to inhabit the river would be: longnose dace, blacknose dace, tessellated darter, white sucker, and fallfish. Due to heavy private pond construction within the Skungamaug watershed, several species of warmwater fish such as largemouth bass, pumpkinseed sunfish, bluegill sunfish, common shiner, and brown bullhead have likely been introduced into the mainstem of the Skungamaug River. The Skungamaug River is a very popular stream with Connecticut anglers, receiving fishing pressure in the spring and fall.

9.3 Impacts

The following impacts on the streams that lie on this property can be expected if proper mitigation measures are not implemented:

1. Construction site soil erosion and sedimentation of streams through increased runoff from unvegetated areas -- during construction topsoil within the proposed 54 building lots will be exposed and susceptible to runoff. 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 (biological process of extracting oxygen from water) 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 for growth, most aquatic ecosystems contain very limited amounts. Consequently, 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.

2. Stream sedimentation due to road crossing construction activities - all streams will be crossed and culverted (60" circular pipe) except for the northernmost intermittent stream. The detrimental effects of sedimentation were previously discussed.

3. Percolation of septic effluent into streams - a failure of individual septic systems to operate properly would be potentially dangerous to stream environments. Nutrients and assorted chemicals that may be placed in septic systems could enter streamwaters in the event of a failure or infiltrate the groundwater during the spring when water tables are close to the surface.

The introduction of septic effluent could result in a major threat to fish habitat, public health, and overall water quality conditions. Effluent will also stimulate the growth of nuisance aquatic vegetation and algae.

4. Loss of streambelt or riparian vegetation along streams due to building lot development and road crossings - well developed riparian zones protect stream environments by filtering-out various types of surface and subsurface runoff, maintaining stream hydrology, and stabilizing stream banks. Additionally, overhead vegetative canopy provides invaluable shading and cooling of stream waters. Without a suitable amount of riparian habitat, streams become extremely susceptible to any type of runoff. Fish survival can be reduced in streams with poorly vegetated or disturbed riparian zones.

5. Aquatic habitat degradation due to the influx of stormwater drainage - surface drainage from roads may allow salt, sand, nutrient-enriched sediment, gasoline and oil to enter streams. The developer intends to construct three drainage systems which will outlet stormwater runoff to three streams. All systems will contain sediment catch basins. Sediment catch basins if designed properly can trap most of the heavy particulate matter, however, fine particles cannot be effectively removed from stormwaters. Stormwater runoff will eventually fertilize stream waters and result in water quality problems.

6. Transport of lawn fertilizers and chemicals to streams - runoff and leaching of nutrients from fertilizers on lawns will stimulate filamentous algae growth in streams and degrade water quality. Introduction of lawn herbicides may result in "fish kills" and water quality degradation.

7. Transport of agricultural wastes into streams - uncontrolled runoff from the proposed horse stable and manure storage areas will also stimulate filamentous algae growth. Large quantities of animal waste can rapidly rob stream waters of dissolved oxygen resulting in complete fish kills.

8. Impacts to downstream environments - any water quality problems and habitat degradation that directly occurs within these streams will eventually be observed in downstream areas of the Skungamaug River. Increased pond aging will result in the creation of dense algae blooms, sediment accumulation, nuisance amounts of aquatic vegetation, and increased production of micro-organisms that cause fish diseases. The probability of partial or complete fish kills will increase.

9.4 Recommendations

The wide ranging impacts on these streams and the Skungamaug River may be somewhat minimized by implementing the following suggested recommendations:

1. Install and maintain proper erosion and sedimentation controls during both road crossing and site construction activities - this includes such mitigative measures as silt fences, hay bales, and catch basins. The Town of Coventry should have an appointed official that would be responsible for checking this development to ensure that contractors have complied with all stipulated mitigation devices. Past stream siltation disturbances in Connecticut associated with residential housing developments have occurred when individual contractors either improperly deployed mitigation devices or failed to maintain these devices on a regular basis. Since all local watersheds on this property are draining into the Skungamaug River, the slightest siltation occurrence will be observed in downstream areas.

2. Road crossings and all associated instream work should take place during the summer - this will help minimize the impact to the aquatic resources in all streams. Reduced streamflows and rainfall during the summer provide the least hazardous conditions in which to work near sensitive aquatic environments. All culverts should be installed at least 9" below the existing streambed elevation so that fish passage will not be prevented.

3. Properly design and locate individual septic systems (refer to Sewage Disposal section) - the addition of septic effluent to these streams can be one of the greatest threats to stream ecology. Septic systems should be maintained on a regular basis. Prevent the disposal of harmful chemicals into septic systems which may negatively effect operation and possibly result in system failure.

4. Maintain at the minimum a 100 foot open space buffer zone along the edges of all streams - no construction and alteration of riparian habitat shall take place in this zone. Research has shown that 100 foot buffer zones will help prevent surface runoff and other pollutants from entering streams and protect aquatic resources (USFWS 1984; USFWS 1986; ODFW 1985).

5. Properly design, locate, and maintain catch basins to ensure the proper management of stormwaters - maintenance is very critical. The Town of Coventry should regularly maintain all catch basins to minimize adverse impacts to streams. Catch basins should trap most sediments reducing the likelihood of stream sedimentation; however, waters that contain pollutants such as salts and even small amounts of fine enriched sediments will eventually cause water quality and aquatic habitat degradation. This impact cannot be prevented.

6. Limit liming, fertilization, and the introduction of chemicals to subdivision building lots - this will help abate the amount of additional nutrients to the streams. Non-phosphorus lawn fertilizers are currently available from various lawn care distribution centers.

7. The developer should prepare an agricultural waste management plant - this plan should address such items as manue storage, disposal, and proper measures to prevent agricultural runoff to streams.

9.5 Bibliography

- ODFW (Oregon Department of Fish and Wildlife) 1985. The Effects of Stream Alterations on Salmon and Trout Habitat in Oregon. Oregon Department of Fish and Wildlife, Portland, Oregon. 70 pp.
- USFWS (United States Fish and Wildlife Service) 1984. Habitat Suitability Information: Rainbow Trout. United States Fish and Wildlife Servie, Biological Report FWS/OBS-82(10.124). 64 pp.
- USFWS (United States Fish and Wildlife Service) 1986. Habitat Suitability Index Models and Instream Flow Suitability Curves: Brown Trout. United States Fish and Wildlife Service, Biological Report FWS/OBS-82/(10.60). 65 pp.

10. PLANNING CONCERNS

10.1 Traffic Impacts

Access to the development site will be via Broadway and one of several other roads connecting to Broadway. (North River Road, Carpenter Road, Grant Hill Road or North School Road)

Broadway is classified in Coventry's Plan of Development (1978) as a "collector street" designed for speeds of 35 to 45 mph and average daily traffic volume of over 1,000, which serves to connect various parts of the community and provide continuous routes to and from high traffic generation points and arterial roads. Three of the roads leading to Broadway are also classified as collectors, North River Road, Grant Hill Road and North School Road, while Carpenter Road is classified as a 'local street', which carries lower, yet significant volumes of traffic between minor local streets and arterial and collector roadways. Local streets should be designed for speeds of 30 to 40 mph and average daily traffic volumes of 200 to 1,000.

The attached vehicle count data for March 9, 10, and 11, 1988 indicates Broadway is currently carrying the traffic volume of a 'local street' (200-1,000 vehicles per day) while it is classified as a 'collector street' with a capacity for over 1,000 vehicles per day.

The proposed 54 new residential building lots of North Coventry Farms, when fully occupied by single family homes can be expected to generate ten vehicle trips per household per day or a total of 540 additional vehicle trips per day using Broadway. (One round trip to school, work, shopping, etc. and back is equivalent to two vehicle trips)

Approximately 8% of these trips can be expected to occur during peak morning traffic hours (43 vehicle trips) and 10% during evening peak hours (54 vehicle trips).

How many vehicles use the other connecting roads depends primarily on where those residents work and choose to shop. As an example, a resident who works in Hartford might take Carpenter or Grant Hill Roads to reach RT 44 and 384 to drive to work. If that same resident took the commuter bus from the RT 31/I-84 park-and-ride lot in Vernon, they might instead take North School Road to RT 31.

The Town's Plan of Development and Windham Region Regional Transportation Plan lists the following needed improvements in the vicinity of this development:

Needed Improvements on State Roads

- An upgrading of the intersection of Routes 31, 44 and Grant Hill Road (This would allow a discontinuation of Windham Turnpike).

- An upgrading of Route 31 from Route 44 to the Tolland town line and continuing to I-84 (The Northern most .19 miles of this highway within the town of Coventry will be rebuilt as part of a 2.5 mile reconstruction in Coventry, Tolland, and Vernon.) Engineering for this project is expected to take place in FY 88 and 89 with rights of way acquisition in FY 90 and construction scheduled for FY 91 - 98 according to the 1988 Connecticut Master Transportation Plan)

The Town Plan of Development lists the following:

Needed Improvements on Town Roads

- Overall improvements along the North River Road, Goose Lane and Merrow Road triangle including a realignment and widening of Goose Lane and a reconstruction of Merrow Road.
- Major improvements to North School Rd.....

The Regional Transportation Plan also lists:

Widening/upgrading of Broadway and the new Broadway/Goose Lane intersection which is currently under construction.

The proposed cul-de-sac road into the subdivision - North Coventry Farms Road - is more than 4,200 feet in length.

Coventry's subdivision regulations state cul-de-sac streets shall generally not exceed 650 feet in length.

While two future connections to the adjacent Therion property are proposed to be reserved for future use the town should be concerned for the safety and adequacy of access to the lots in the development which can be reached only from this sole road, even temporarily. Cul-de-sac streets are recommended to be designed for a maximum of 200 vehicles per day or 20 homes according to ConnDOT's "Guidelines for Subdivision Streets" 1987 and Institute of Transportation Engineers publications. Fifty-four homes will be accessed by the proposed North Coventry Farms Road.

Due to the possibility that an emergency may occur and the road may be blocked, the use of more than 20 homes on a cul-de-sac is not recommended.

Coventry's fire and police officials should review this matter for their comments on this important safety issue.

If future road connections provide alternate additional access, a temporary cul-de-sac of such length might be acceptable.

Technology Transfer Center
 HOURLY, 2 CHANNEL VEHICLE COUNT
 CORRECTION FACTOR: 1.00

REFERENCE: 1
 LOCATION: Broadway, Coventry
 WEATHER: mixed
 OPERATOR: WRPA, M.R.

FILENAME: COV0309V
 WEEK OF WEDNESDAY MARCH 9, 1988

HOUR BEGINS	MONDAY 7		TUESDAY 8		WEDNESDAY 9		THURSDAY 10		FRIDAY 11		SATURDAY 12		SUNDAY 13		WEEKDAY AVERAGE	
	e	w	e	w	e	w	e	w	e	w	e	w	e	w	e	w
12AM	1	1	1	1	1	1	1	2	3	1	0	0	0	0	2	2
1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1
2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1
3	1	1	1	1	1	1	0	0	1	0	0	0	0	0	1	1
4	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1
5	1	1	1	1	1	1	6	7	6	0	0	0	0	0	6	7
6	1	1	1	1	1	1	19	17	15	6	0	0	0	0	17	12
7	1	1	1	1	1	1	25	14	25	9	0	0	0	0	25	12
8	1	1	1	1	1	1	16	11	17	7	0	0	0	0	17	9
9	1	1	1	1	21	5	20	10	13	2	0	0	0	0	18	6
10	1	1	1	1	9	3	11	20	9	4	0	0	0	0	10	9
11	1	1	1	1	8	4	12	15	15	2	0	0	0	0	12	7
12PM	1	1	1	1	14	3	9	14	13	6	0	0	0	0	12	8
1	1	1	1	1	18	6	14	16	9	2	0	0	5	0	13	8
2	1	1	1	1	21	5	20	19	13	0	0	0	0	18	12	
3	1	1	1	1	26	7	17	6	23	5	0	0	0	22	6	
4	1	1	1	1	22	18	18	9	18	14	0	0	0	0	19	14
5	1	1	1	1	23	29	23	16	25	14	0	0	0	0	24	20
6	1	1	1	1	19	26	14	21	18	12	0	0	0	0	17	20
7	1	1	1	1	8	13	10	7	0	0	0	0	0	9	10	
8	1	1	1	1	4	4	7	3	0	0	0	0	0	6	4	
9	1	1	1	1	5	10	3	0	0	0	0	0	0	4	10	
10	1	1	1	1	3	9	6	0	0	0	0	0	0	5	9	
11	1	1	1	1	2	5	2	0	0	0	0	0	0	2	5	
TOTALS	0	0	0	0	203	147	255	209	223	85	0	0	5	0	261	192

COMBINED TOTALS

12	1	1	1	3	4	0	0	4
1	1	1	1	2	0	0	0	2
2	1	1	1	0	0	0	0	1
3	1	1	1	0	1	0	0	0
4	1	1	1	2	2	0	0	2
5	1	1	1	13	6	0	0	13
6	1	1	1	36	21	0	0	29
7	1	1	1	39	34	0	0	37
8	1	1	1	27	24	0	0	26
9	1	1	26	30	15	0	0	24
10	1	1	12	31	13	0	0	19
11	1	1	12	27	17	0	0	19
12	1	1	17	23	19	0	0	20
1	1	1	24	30	10	0	5	21
2	1	1	26	39	13	0	0	30
3	1	1	33	23	28	0	0	28
4	1	1	40	27	32	0	0	33
5	1	1	52	39	39	0	0	44
6	1	1	45	35	30	0	0	37
7	1	1	21	17	0	0	0	19
8	1	1	6	10	0	0	0	10
9	1	1	15	3	0	0	0	14
10	1	1	12	6	0	0	0	14
11	1	1	7	2	0	0	0	7
TOTALS	0	0	350	464	308	0	5	453

10.2 Plan Compliance

The state, region, and town plans of development all recommend the area proposed as North Coventry Farms for rural density types of development, along with conservation of wetlands and watercourses which exist on the site.

While the state plan recommends only that density not exceed on-site carrying capacity for water supply and sewage disposal, the regional plan recommends two acre minimum lot size, not only to ensure such adequate on-site facilities, but also to preserve the rural character which historically has been at such low or lower densities. The town's plan also takes a physical capabilities approach, which via the town's zoning regulations permits 40,000 square foot lots as a minimum size. All lots proposed exceed this zoning minimum.

10.3 Open Space

The North Coventry Farms subdivision plan proposes no open space reserved for recreation , as may be required by Coventry's subdivision regulations. Parcel 'A' has been discussed as a possible ten acre area with a ten stall horse barn which could be made available to residents of the subdivision. This parcel is particularly appropriate ,however,for dedication to recreation & conservation purposes, since as one approaches the area from Carpenter Rd or Broad Way , the rural character of the area has long been established by this, the Shea farm.

As other of the ERT reviewers have commented, use of this parcel for more passive recreation would be more appropriate in order to avoid the erosion & sedimentation problems which will result from ten horses trampling the earth. Preservation of this parcel in an undeveloped or agricultural use is imperative to maintaining any of the neighborhood's existing character. Ownership of the parcel should be such that residents of the subdivision have access to the parcel, but the parcel could not be sold or developed without the town's prior approval.

Preservation of open space corridors along the wetlands and watercourses on the entire subdivision site are also important ,and could be accomplished by conservation easements.

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.