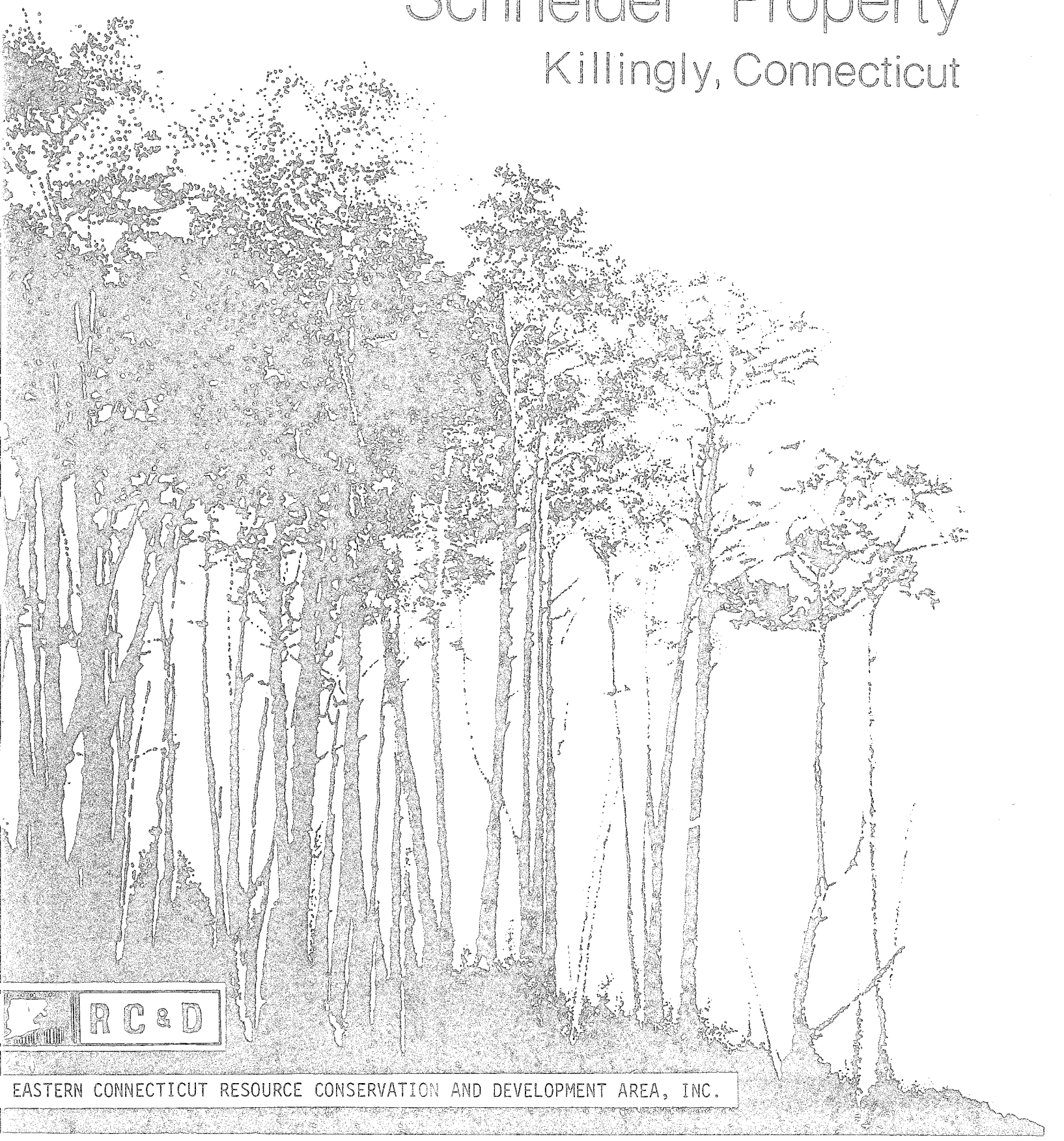
Environmental Review Team Report

Schneider Property

Killingly, Connecticut

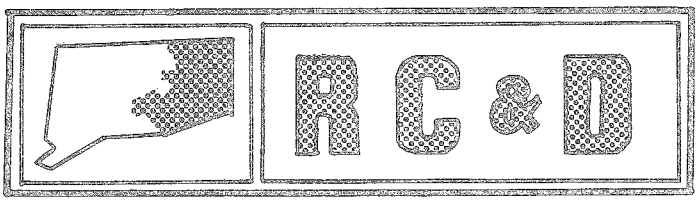


R C & D

EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

Environmental Review Team Report on Schneider Property Killingly, Connecticut

April 1981

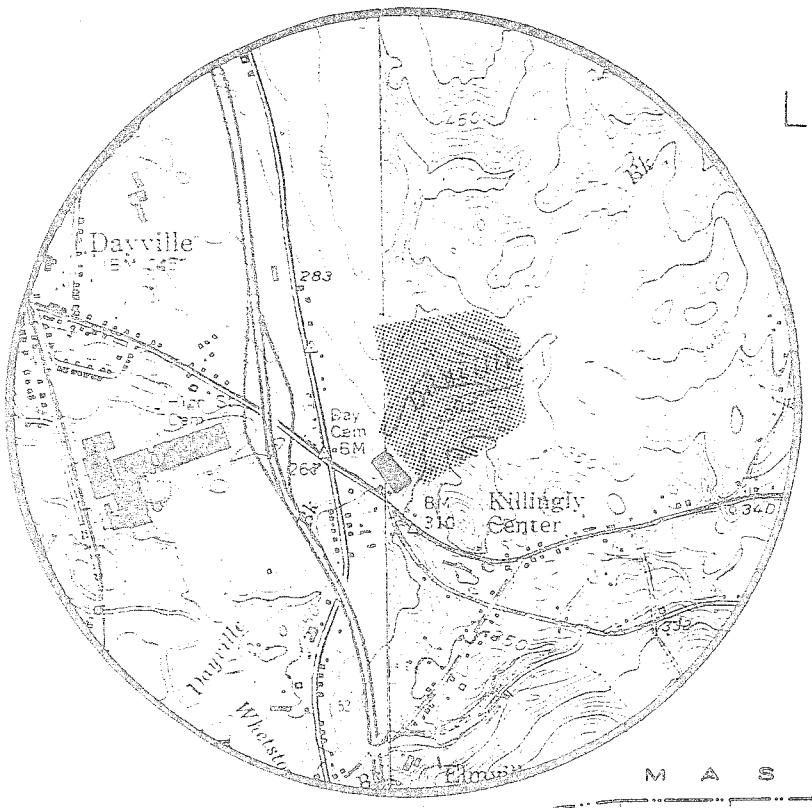


eastern connecticut resource conservation & development area

environmental review team
139 boswell avenue
norwich, connecticut 06360

Location of Study Site

SCHNEIDER PROPERTY
KILLINGLY, CONNECTICUT



EASTERN CONNECTICUT
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

ENVIRONMENTAL REVIEW TEAM REPORT
ON
SCHNEIDER PROPERTY
KILLINGLY, CONNECTICUT

This report is an outgrowth of a request from the Killingly Conservation Commission to the Windham 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 by the RC&D Executive Committee and the measure was reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The soils of the site were mapped by a soil scientist from the United States Department of Agriculture, Soil Conservation Service (SCS). Reproductions of the soil survey map, a table of soils limitations for certain land uses and a topographic map showing property boundaries were distributed to all Team members prior to their review of the site.

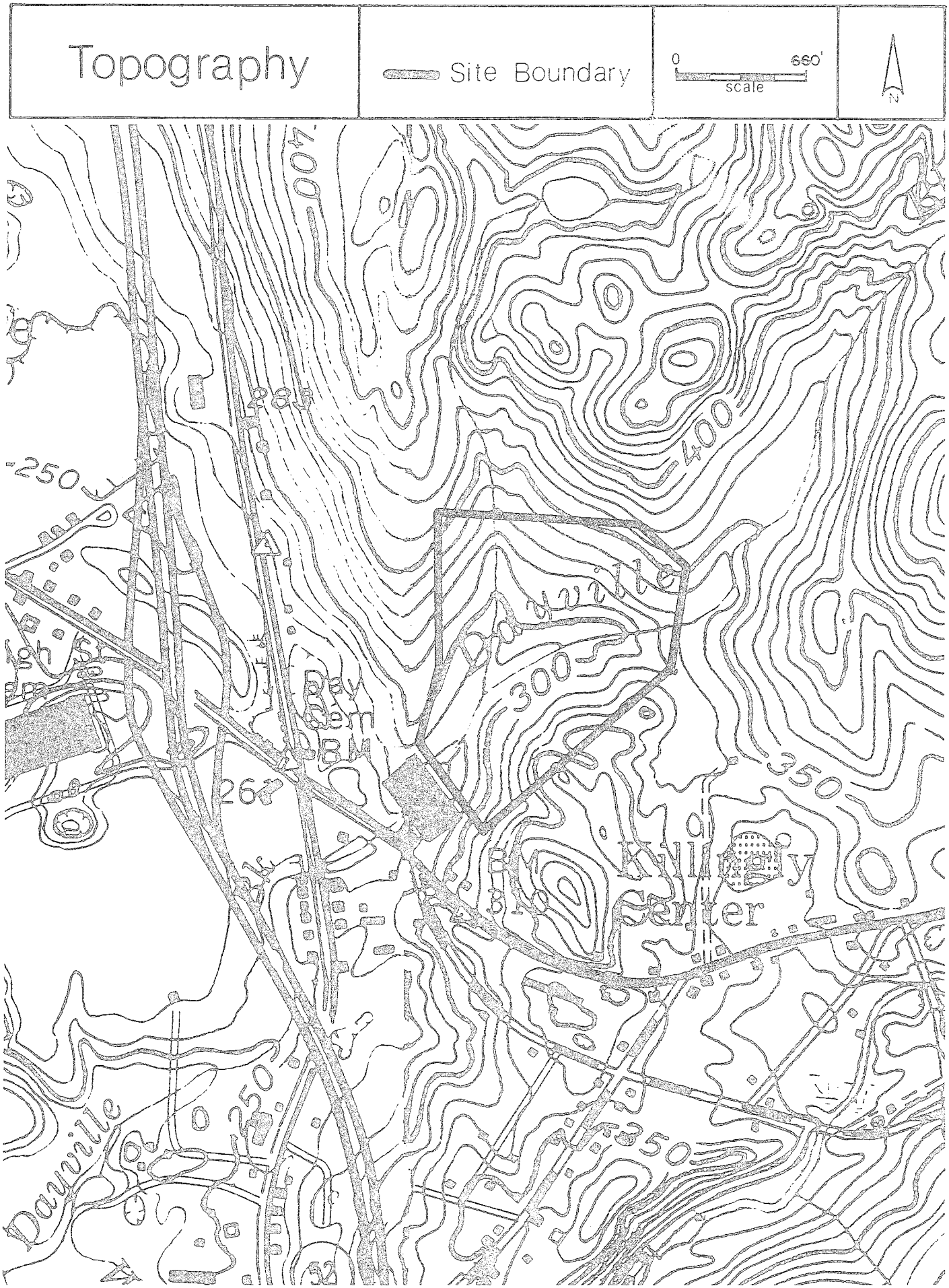
The ERT that field-checked the site consisted of the following personnel: Howard Denslow, District Conservationist, Soil Conservation Service (SCS); Tim Dodge, Resource Conservationist (SCS); Michael Zizka, Geologist, Connecticut Department of Environmental Protection (DEP); Rob Rocks, Forester, (DEP); John Cimochowski and Terrence Chambers, Regional Planners, Northeastern Connecticut Regional Planning Agency; Dwight Southwick, Engineer, (SCS); and Jeanne Shelburn, ERT Coordinator, Eastern Connecticut RC&D Area.

The Team met and field checked the site on Tuesday, March 24, 1981. Reports from each contributing Team member were sent to the ERT Coordinator for review and summarization for the final report.

This report is not meant to compete with private consultants by supplying site designs or detailed solutions to development problems. This report identifies the existing resource base and evaluates its significance to the proposed development and also suggests considerations that should be of concern to the developer and the Town of Killingly. The results of this Team action are oriented toward the development of a better environmental quality and the long-term economics of the land use.

The Eastern Connecticut RC&D Area Committee hopes that this report will be of value and assistance in making any decisions regarding this particular site.

If you require any additional information, please contact: Ms. Jeanne Shelburn, Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, 139 Boswell Avenue, Norwich, Connecticut 06360, 889-2324.


Topography
Site Boundary
0
660'
scale
N
400
250
300
350
Danville
Bay
Term
BM
Valley
Center

INTRODUCTION

The Eastern Connecticut Environmental Review Team was asked to prepare an environmental assessment for a proposed shopping center in the town of Killingly. The site consists of approximately 20 acres near the intersection of Routes 101 and 12 in Dayville. The property is owned by Raymond Schneider, a Willimantic attorney, and is being handled by Roslyn Realty. There is presently a shopping center located on this property fronting on Route 101, which consists of a Kings Department Store and various satellite commercial concerns. The project site does not border either highway (Routes 12 or 101), but is situated north of the existing shopping center. Mr. Schneider has proposed construction of three indoor cinemas with 175 person capacity each, a home supply/plumbing and heating retail store and a professional building for this site.

The parcel is drained by the Dayville Brook, the two branches of which have their confluence on the property. A substantial portion of the property consists of regulated inland wetland soils associated with the flood plain of the Dayville Brook. The total watershed area of this brook at Route 101 is about 340 acres. The brook is piped from the north side of the existing commercial development via a 36-inch reinforced concrete pipe (RCP) to Route 101 where it enters a 30-inch RCP. This latter conduit drains to a culvert under Route 52. This last culvert appears to be a 72-inch corrugated metal pipe.

The topography of the site consists of moderate to severe slopes and the terrain can be characterized as wooded with numerous ledge outcrops and boulders with many small streamlets. Soils on the site are predominantly Charlton-Hollis, which are characterized as being shallow to bedrock, and Ridgebury, Leicester and Whitman, which are regulated wetlands soils under Public Act 155.

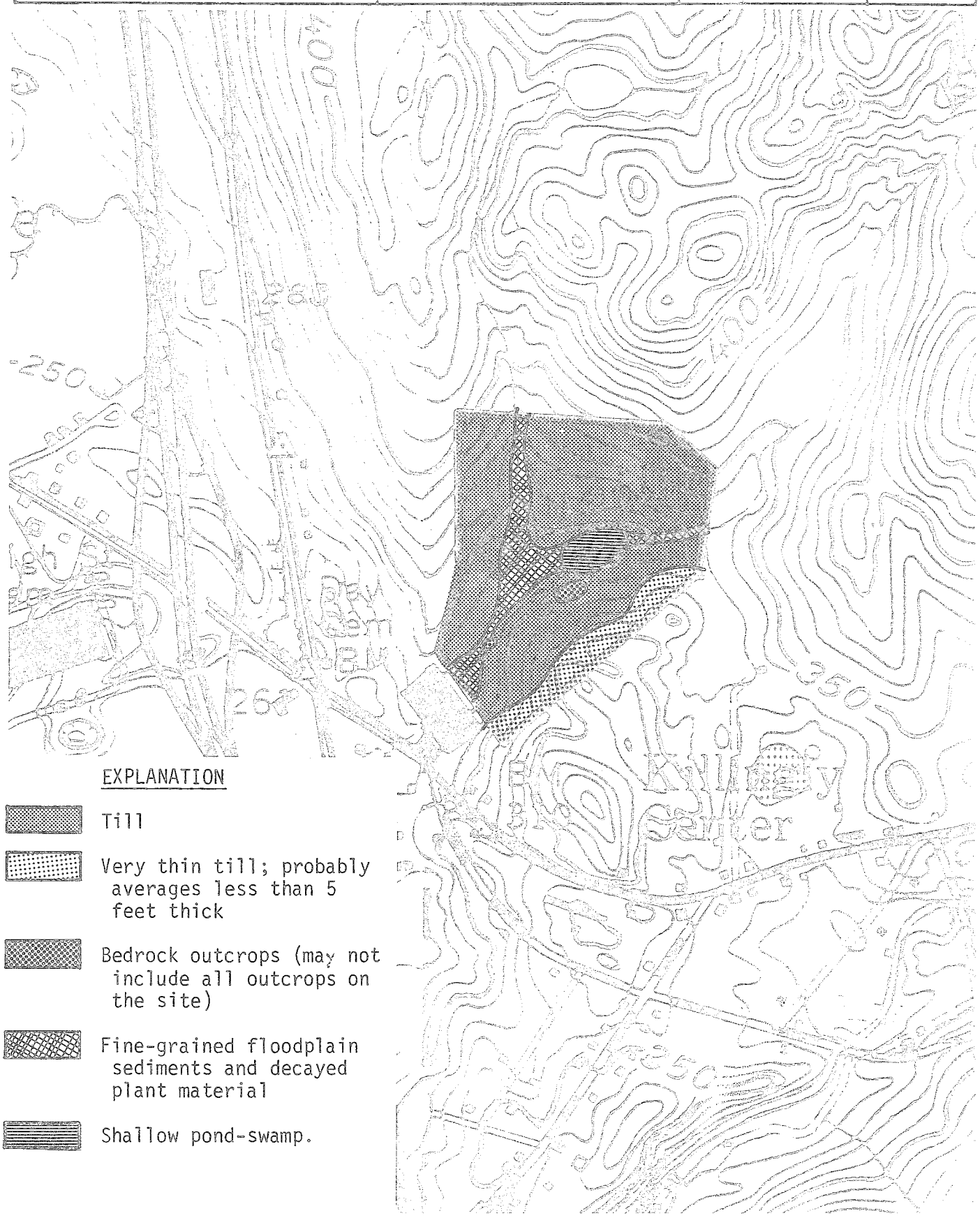
The Team is concerned with the effect of this proposal on the natural resource base of this site. Although severe limitations to development can often be overcome with proper engineering techniques, these measures can become costly, making a project financially unfeasible for a developer. The proposed project appears to be very costly considering the amount of engineering work which will be required for site preparation. The proposed piping of the brook and resultant filling of the surrounding wetland area will adversely impact the various functions of the brook and wetland. Although not underlain by stratified drift material, the stream and surrounding wetlands do absorb rainfall and provide subsurface water storage. Filling and piping of the stream will reduce the subsurface water storage and increase runoff.

In addition to subsurface water storage, the stream and surrounding wetlands provide flood storage during periods of high rainfall and runoff. Upstream of the existing shopping center the brook and adjacent wetland soil tend to decrease in slope and expand or spread out. Because of this, peak flows are reduced significantly. If removed by filling and piping, however, the flood storage capacity will be negligible. Inland wetlands serve as natural sediment traps which may prevent sediment from eroded land surfaces from adversely affecting streams. When removed or filled, care should be taken throughout all construction activity to control erosion and sedimentation. A more detailed discussion of hydrologic problems which may be encountered, can be found in the Hydrology and Engineering Concerns sections of this report.

Surficial Geology

Site Boundary

0 660'
scale



EXPLANATION

- Till
- Very thin till; probably averages less than 5 feet thick
- Bedrock outcrops (may not include all outcrops on the site)
- Fine-grained floodplain sediments and decayed plant material
- Shallow pond-swamp.

The Team also is concerned with the amount of traffic which may be generated by this proposal and feels that the Commission should consult a traffic engineer for detailed data on this aspect of the proposal.

ENVIRONMENTAL ASSESSMENT

GEOLOGY

A thin blanket of glacial sediment overlies bedrock on most of the site. Only a few bedrock outcrops were observed during the field review, but there may be smaller outcrops scattered throughout the parcel. Gneisses are the predominant bedrock type. These rocks contain parallel, alternating bands of granular mineral grains and platy, flaky, or elongate mineral grains. The minerals that make up gneisses on the site are mostly quartz, oligoclase, microcline, and biotite; muscovite, sphene, magnetite, apatite, and allanite are among the less common mineral constituents. No commercially economic value is evident in the bedrock.

Till comprises the bulk of the local glacial sediment. Till was deposited directly from a pre-existing ice sheet without undergoing substantial water-working or transport. Consequently, the till may contain clay, silt, sand, gravel, and boulders in highly variable proportions. Most of the till on the parcel appears to be sandy, stony, and friable, but compact, silty till may also be present. The bedrock surface over which the till was deposited is irregular; the result of the deposition of the till was to smooth out those irregularities in many places. Consequently, one may expect to find deep pockets of till in proximity to bedrock outcrops in some areas. The average thickness of the over-burden on the parcel probably is less than ten feet. It may be anticipated that blasting will be required in some areas in order to achieve the desired cutting and filling.

In the flat central portions of the site, till or bedrock may be overlain by up to several feet of fine-grained, organic-rich deposits. These deposits represent accumulations of decayed vegetation and floodplain sediment (mostly sand and silt).

HYDROLOGY

The property is trisected by Dayville Brook and a tributary stream. The two streams merge near the center of the site, in a flat wetland area, and then flow south toward the existing shopping complex. At the northern border of the complex, the brook passes into a 36-inch culvert and disappears underground, re-emerging east of Route 12 near the McDonald's Restaurant. The outlet culvert has only a 30-inch diameter. The present development plans call for installing a substantial new length of 36-inch pipe upstream from the inlet culvert, with fill being placed over the pipe and the adjacent wetlands. The new pipe would fork into two directions at the point where the two existing streams merge, with each half of the fork receiving inflow from a separate stream.

Watershed of Dayville Brook at inlet culvert to existing shopping center.

It is possible to estimate the peak flow rates at the inlet culvert for storms of infrequent occurrence and large magnitude. Several methods of calculation may be used; the Team has chosen the SCS runoff-curve number method. Peak flows were estimated for the 25-year, 50-year, and 100-year frequency storms, which have a 4-percent, 2-percent, and 1-percent probability, respectively, of occurring any year. The estimates are as follows: 25-year peak flow, 300 cubic feet per second (cfs); 50-year peak flow, 400 cfs; 100-year peak flow, 600 cfs. It should be noted that these estimates are all substantially higher than the town engineer's estimate of maximum storm flows at the inlet (his estimate was 200 cfs). Part of the difference in estimates may be attributable to differences in the methods used to calculate the anticipated flows.

The development of the site will cause runoff to increase. This, in turn, will lead to higher peak flow rates at the inlet culvert. An examination of the culvert indicated that it is not capable of passing the estimated peak flows from the large-magnitude storms discussed above; the rear portion of the present shopping complex would be flooded during such storms. Hence, development of the proposed commercial complex could be expected to aggravate the flooding problem to some extent unless adequate controls are used. Most of the peak flow increases from the development would be the result of filling the wetlands and piping the present streamflows. The flat areas bordering the streams provide a substantial area for floodwater storage, and they slow down the movement of surface water. Consequently, the loss of wetland space would increase the rate at which surface waters traverse the site. It is difficult to estimate the overall effect of the wetland activity, but it seems reasonable to assume that peak flows would increase by about 10 percent. This presumes, however, that the new pipe would be large enough to carry the entire flow to the inlet culvert. A 36-inch pipe would not carry the full flow. Rather, water would accumulate at the upstream ends of the pipe. If there is a headwall or dike in that area, artificial impoundment will occur; otherwise, the streams would disperse southward over the commercial area, flooding it.

Since the commercial complex would be constructed on fill with final elevations that are above the existing stream levels, some impoundment of water will occur. Part of the storage would occur along Dayville Brook in the pond in the northeastern section of the property. No specific storage area has been planned for the tributary stream, but since one branch of the forked pipe will extend up that channel, a storage site should be addressed for that area. From a hydrologic standpoint, then, the major considerations under the present development proposal will be whether sufficient flood-storage capacity can be provided at the upstream ends of the proposed new pipe to prevent flooding in both the existing and the new commercial areas. Any final plans for the new complex should indicate the volume of storage that would be required for major storm events, whether such storage volume would be available, and most importantly, where that storage would occur. It should be kept in mind that further development of other portions of the Dayville Brook watershed could increase the amount of storage that would be required on site. It should also be noted that this section of the report does not address the possible loss of biological values in the wetland if filling should occur; rather, it deals solely with hydrological functions.

SOILS

A detailed soils map of this site is included in the Appendix to this report accompanied by a chart which indicates soil limitations for various urban uses. As the soil map is an enlargement from the original 1320 feet/inch scale to 660 feet/inch, the soil boundary lines should not be viewed as absolute boundaries, but as guidelines to the distribution of soil types on the site. The soil limitation chart indicates the probable limitations for each of the soils for on-site sewerage, buildings with basements, buildings without basements, streets and parking, and landscaping. However, limitations, even though severe, do not preclude the use of the land for development. If economics permit large expenditures for land development and the intended objective is consistent with the objectives of local and regional development, many soils and sites with difficult problems can be used. The soils map, with the publication Soil Survey, Windham County, Connecticut, can aid in the identification and interpretation of soils and their uses on this site. Know Your Land: Natural Soil Groups for Connecticut can also give insight to the development potentials of the soils and their relationship to the surficial geology of the site.

Soils series typical of the site include the following types:

17LC Charlton-Hollis fine sandy loams, very rocky, 3 to 15 percent slopes. This complex consists of gently sloping to sloping, somewhat excessively drained and well drained soils on hills and ridges of glacial till uplands. Areas of this complex are mostly irregular in shape and range from 5 to 200 acres. Slopes are mostly complex and 100 to 200 feet long. The areas have rough surfaces with bedrock outcrops and a few narrow intermittent drainageways and small wet depressions. Stones cover 1 to 8 percent of the surface. This complex is about 55 percent Charlton soils, 20 percent Hollis soils, and 25 percent other soils and rock outcrops. Rock outcrops make up to 10 percent of this unit. The soils are in such a complex pattern that they could not be separated at the scale mapped. The water table is commonly below a depth of 6 feet in the Charlton soils. The available water capacity is moderate. Permeability is moderate or moderately rapid. Runoff is medium to rapid. The soil is very strongly acid to medium acid. The Hollis soils have a low available water capacity. Permeability is moderate or moderately rapid above the bedrock. Runoff is medium to rapid. The soil is very strongly acid to medium acid. The Charlton soils are well suited to woodland wildlife habitat, but the Hollis soils are poorly suited because they are droughty. These soils are poorly suited to openland wildlife habitat because stoniness hinders the use of equipment. They are too dry for wetland wildlife habitat. This complex is fairly suited to community development. It is limited mainly by rock outcrops and the shallow depth to bedrock in the Hollis soils. Large lots are commonly needed to locate a suitable site for an on-site septic system, and the shallow depth to bedrock hinders excavations in many places. Stones and boulders need to be removed for landscaping. Establishing quick plant cover, mulching, and using siltation basins are suitable management practices to control runoff and erosion during construction.

17LD Charlton-Hollis fine sandy loams, very rocky, 15 to 35 percent slopes. This complex consists of moderately steep to steep, somewhat excessively drained and well drained soils on hills and ridges of glacial till uplands. Areas of this unit are mostly long and narrow or oval and range from 5 to 100 acres. Slopes

are mostly convex and 100 to 500 feet long. Stones and boulders cover 1 to 8 percent of the surface. This complex is about 55 percent Charlton soils, 20 percent Hollis soils, and 25 percent other soils and rock outcrops. Rock outcrops make up to 10 percent of this unit. These soils are in such a complex pattern that they could not be separated at the scale mapped. The water is the same as 17LC except runoff in the Charlton soil is rapid. Charlton soils are well suited to woodland wildlife habitat, but Hollis soils are poorly suited because they are droughty. These soils are poorly suited to openland wildlife habitat because stoniness hinders the use of equipment. They are too dry for wetland wildlife habitat. This complex is poorly suited to community development because of steep slopes, bedrock outcrops, and the shallow depth to bedrock in many places. Large lots are commonly needed to locate a suitable site for on-site septic systems and care is needed to prevent effluent from seeping to the surface downslope. Excavations commonly require blasting. Steep slopes, stoniness, and rock outcrops hinder landscaping. Establishing quick plant cover and using mulch and siltation basins are suitable management practices to control erosion during construction.

17MD Hollis-Charlton-Rock outcrop complex, 15 to 35 percent slopes. This complex consists of moderately steep to steep, somewhat excessively drained soils on hills and ridges of glacial till uplands. Areas are long and narrow or irregular in shape, and range from 5 to 40 acres. Slopes are mostly convex and 100 to 400 feet long. The areas have rough surfaces with bedrock outcrops and a few small intermittent drainageways. Stones cover 8 to 25 percent of the surface. This complex is about 35 percent Hollis soils, 30 percent Charlton soils, 15 percent rock outcrops, and 20 percent other soils. The soils and rock outcrops are in such a complex pattern that they could not be separated in mapping. Stones cover 8 to 25 percent of the surface. Hollis soils have low available water capacity. They have moderate or moderately rapid permeability above the bedrock. Runoff is rapid. Hollis soils are very strongly acid to medium acid. The water table is commonly below a depth of 6 feet in the Charlton soils. The available water capacity is moderate. Runoff is medium to rapid. This soil is very strongly acid to medium acid. Hollis soils are poorly suited to woodland wildlife habitat because they are droughty, but Charlton soils are fairly suited to wildlife habitat. These soils are poorly suited for openland wildlife habitat because the steep slopes and stoniness make the use of equipment impractical. These soils are too dry for wetland wildlife habitat. This complex is poorly suited to community development because of the steep slopes, the shallow depth to bedrock in many places, and rock outcrops. Suitable sites for on-site septic systems commonly require unusually large lot sizes and require specially designed systems. Excavations commonly require blasting. Stoniness, rock outcrops, and steep slopes severely hinder landscaping. Establishing quick plant cover, and the use of mulch and siltation basins are suitable management practices to control runoff and erosion during construction.

*43M Ridgebury, Leicester and Whitman extremely stony fine sandy loams. This unit consists of nearly level, poorly drained and very poorly drained soils in depressions and drainageways of glacial till uplands. Areas are mostly long and narrow or irregular in shape and range from 5 to 150 acres. Slopes range from 0 to 5 percent. Stones cover 8 to 25 percent of the surface. About 40 percent of the mapped acreage of this unit is Ridgebury soils, 35 percent is Leicester soils, 15 percent is Whitman soils, and 10 percent is other soils. Some areas of this unit consist of one of these soils and were mapped together because they have no significant differences in use and management. The Ridgebury and Leicester soils have a seasonal water table at a depth of about 10 inches from fall through spring. It has a moderate available water capacity. This soil has moderate or moderately rapid permeability. Runoff is slow. The soil is

* Designated wetland soil by P.A. 155.

very strongly acid to medium acid. Whitman soils have a water table at or near the surface from fall through spring. It has a moderate available water capacity. This soil has moderate or moderately rapid permeability in the surface layer and upper part of the substratum, and slow to very slow permeability in the lower part of the substratum. Runoff is slow. The soil is very strongly acid to slightly acid. Ridgebury and Leicester soils are fairly suited to woodland wildlife habitat, but Whitman soils are poorly suited. These soils are poorly suited to openland wildlife habitat because stoniness hinders the use of equipment. These soils are well suited to wetland wildlife habitat where slopes are less than 1 percent. The soils of this unit are poorly suited to community development. Wetness and the slow to very slow permeability are the major limitations. Steep slopes of excavations slump when saturated. Areas used for on-site septic systems require extensive filling. Surface stones need to be removed for landscaping. Lawns are wet and soggy most of the year.

The site consists of 20.5 acres located behind the Kings shopping center in Dayville. If a zone change allows commercial development, it is understood only 12 of the 20 acres, or 60 percent, can be developed. This would be the southernmost portion of the property immediately behind Kings. At least half of this, 5 acres, is wetland - the lower reaches - a red maple swamp with a poorly drained extremely stony fine sandy loam (soil type 43M, in descriptions). A sizable perennial stream flows through the area entering a 36-inch diameter culvert which runs beneath Kings and existing commercial development beyond.

The relatively level land behind the 5 acres wetland area, which might be later considered for additional commercial expansion, is a large open water wetland swamp. It is also designated 43M on the soils map. Two streams, one from the north and the other from the east converge in this wetland area - to form the main stream.

The remainder of the 20.5 acres is a complex of fine sandy loam soils, very rocky, with slopes between 3 and 35 percent. It is designated as 17LC and 17LD on the soils map. There are numerous bedrock outcroppings. The steepest slopes are in the eastern side of the site. These soils are difficult to excavate, make poor fill, and are also difficult to stabilize since ledge and boulders tend to break and slide if a slope is left too steep.

VEGETATION

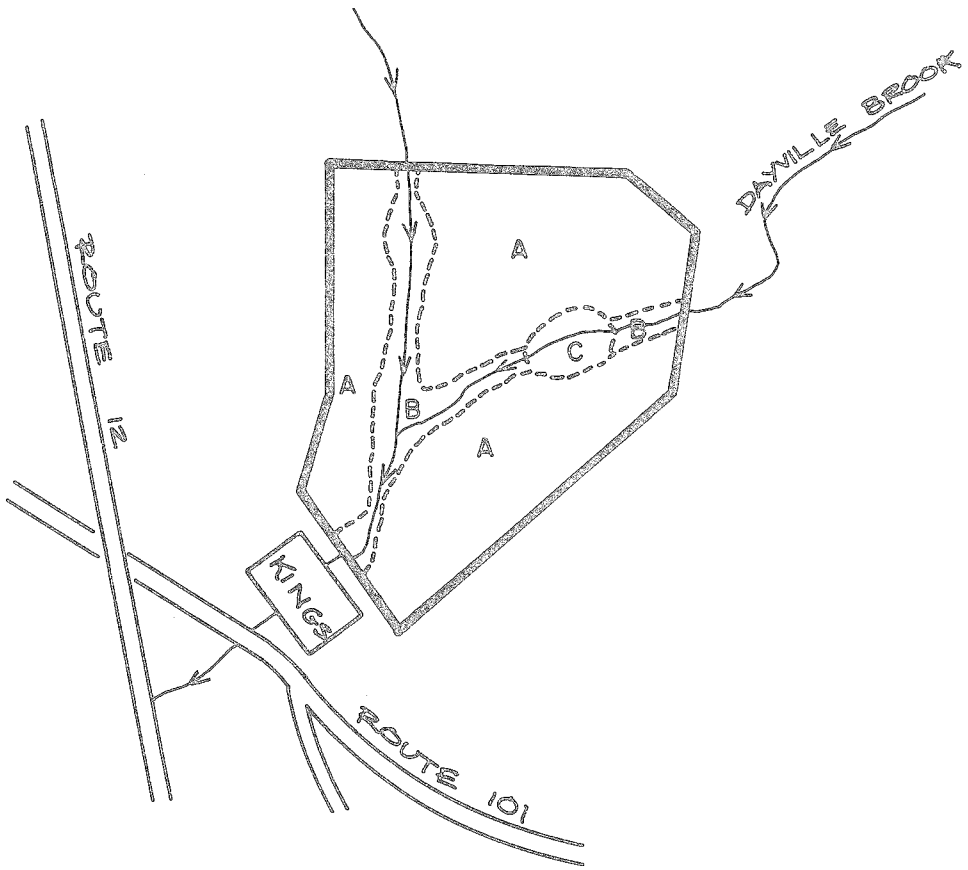
The 20± acre parcel proposed for development into a shopping complex is completely forested. Three vegetation types are present; these include: Mixed Hardwoods, 16± acres; Hardwood swamp/stream belt, 3± acres, and Open swamp, 1± acre. (See Vegetation type map and Vegetation type descriptions.)

Type A. (Mixed Hardwoods) This 16± acre over-stocked stand is made up of medium quality pole with occasional sawtimber size white oak, black oak, shagbark hickory, eastern white pine, black birch and red maple. The total volume in this stand ranges between sixteen and twenty-one cords per acre. Eastern white pine seedlings, hardwood tree seedlings, witch-hazel, mountain laurel, blue-beech, withe-rod, hazelnut, hophornbeam, and azalea are present in the understory. Sweet pepperbush and high bush blueberry are present where this stand borders the hardwood swamp/stream belt areas. Ground cover consists of grasses, partridge berry, striped pipsissewa, Canada mayflower, club moss, bracken fern and patches of huckleberry.

Vegetation

0 660
scale

N



LEGEND

- Road
- Property Boundary
- Vegetation Type Boundary
- Stream

VEGETATION TYPE DESCRIPTIONS*

TYPE A. Mixed hardwoods, 16± acres, over-stocked, pole to sawtimber-size.

TYPE B. Hardwood swamp/streambelt, 3± acres, over-stocked, pole-size.

TYPE C. Open swamp, 1± acre, wetland shrub species.

* Seedling-size = Trees less than 1 inch in diameter at 4 1/2 feet above the ground (d.b.h.)
Sapling-size = Trees 1 to 5 inches in d.b.h.
Pole-size = Trees 5 to 11 inches in d.b.h.
Sawtimber-size = Trees 11 inches and greater in d.b.h.

Type B. (Hardwood swamp/stream belt) The majority of this 3± acre area is over-stocked with pole size white ash and red maple. Occasional eastern white pine, yellow birch and swamp white oak are also present. A dense understory of sweet pepperbush, spice bush, greenbrier, high bush blueberry, swamp azalea, and scattered ironwood is present. Skunk cabbage, false hellebore, poison ivy, sphagnum moss, Christmas fern, cinnamon fern, evergreen woodfern, and sensitive fern form the ground cover in this area. The total volume which is present in this stand ranges between thirteen and sixteen cords per acre.

Type C. (Open swamp) This open swamp area which totals approximately 1 acre is vegetated with the following shrub species: high bush blueberry, swamp azalea, pussy willow, leather-leaf and swamp loose-strife. Red maple seedlings and spice bush are present around the perimeter of this area, along with marsh fern, sensitive fern and sphagnum moss.

Complete clearing of the vegetation from five or six acres of this tract will be necessary for development of the proposed complex. Approximately eighty cords of wood will be produced by this clearing operation. Utilization of the trees that are to be removed for fuelwood would be desirable. Removal of this vegetation may cause an increase in runoff.

Filling the wetland after the vegetation has been removed will reduce the flood water storage area which is now present. Provisions which allow for this loss could be made to help reduce the chances of flooding downstream during peak flows.

The construction of a dyke which would hold back and gradually release flood waters in the open swamp area should be considered. The open swamp area need not be altered in any way to function as a temporary holding pond during times of peak flow. Under these circumstances, flood waters ponded up at a time when vegetation is dormant or for short intervals should have little or no negative impact on the health or composition of the vegetation in this area.

Suggested Management Techniques

Both the mixed hardwood stand (Vegetation Type A) and hardwood swamp (Vegetation Type B) are over-stocked. The trees present are crowded and declining in health and vigor. A fuelwood harvest, following the "Crop Tree Selection Method," that removes approximately one-third of the total volume from areas which are not to be developed would help to reduce the crowded condition. This thinning would lower competition between residual trees for space, sunlight, nutrients and water, over time resulting in improved tree health, vigor and stability.

Under the "Crop Tree Selection Method," one hundred of the highest quality trees in each acre should be identified (trees spaced about 20' by 20' will equal one hundred trees per acre), and one, two, or three trees that are in direct competition with each of those identified should be removed. The one hundred trees per acre that are selected as crop trees should be healthy, large crowned, and show little or no signs of damage. Trees which are not competing with the one hundred selected trees should not be removed, unless they are severely damaged. This thinning, if implemented, will provide between four and seven cords of fuelwood per acre.

WILDLIFE HABITAT

The main stem of the stream, from the existing building (Kings) north to where it divides into an east and west branch, can be characterized as follows:

The streambed is mostly large angular rock, twelve inches or greater in size. The streambed width averages six to eight feet; however, the width of flow was something less than that on March 24, 1981. Direction of stream-flow, although north to south, changes abruptly within the stream as the water moves around large boulder size stones. The stream gradient is steep enough to maintain the water in a riffle or cascading condition. There are no large pool areas. Quiet water exists only for short distances between large stones. Visual water quality appears excellent. The flow is clear, with no evidence of sediment. Moss growth on the rocks, an indicator of high quality water, is abundant. There does not appear to be any fishery resource in this area of the stream. The west branch of the stream has similar conditions, but has a narrower stream width and depth of flow.

The east branch is also similar, but has a wetland of approximately two acres where ponded conditions exist. Water depths average three feet or less, depending on the season of the year. Visual water quality in the wetland is excellent. The water is clear, and the bottom shows no evidence of sedimentation. Vegetation in the wetland includes leather-leaf in standing water. High-bush blueberry, red maple, sweet pepperbush, as well as pussy willow and an occasional pine tree exist on drier, more hummocky areas. The wetland perimeter and uplands are vegetated with oak and pine, having an understory of pepperbush and witch hazel.

This is an excellent quality shrub swamp. The water table was at the surface on March 24, 1981, but probably drops during the drier summer months. A red maple wetland about one and one-half acres in size and somewhat triangular in shape is located in the area where the streams divide. Vegetation is mainly red maple and hornbeam, with an understory of sweet pepperbush and spice bush. The soil is extremely rocky, with a subsurface flow between the rocks evident.

These wetlands appear valuable in providing streamflow regulation and runoff retardation, as well as providing habitat to wildlife. Amphibians, including seasonals such as the spring peeper and reptiles such as the box turtle, should find ideal habitat in the shrub wetland. Larger animals, such as the black duck and woodduck, may also find the ponded area useful. Woodland wildlife, including the white tailed deer, raccoon, fox, and seasonal songbirds, use the wetlands and surrounding woodlands as habitat. The value of these areas as habitat will be reduced through development.

ENGINEERING CONCERNS

The preliminary plan for development proposes filling over the wetlands within the five acre area immediately behind Kings. Presumably the higher ground on either side would be excavated back away from the brook. Final grading elevations after cutting and filling have yet to be determined. The brook would be piped.

There are some critical engineering determinations that are necessary to keep this project from imposing further problems on the downstream property owners. The existing 36-inch RCP is inadequate to handle a 10-year frequency storm. As the Town Engineer has reported, it is essential that the existing and proposed 36-inch pipe be properly evaluated with the restrictions on head, friction loss, and smaller 30-inch pipe downstream adjacent to McDonalds restaurant considered.

To install a pipe on a uniform grade upstream from the existing 36-inch RC pipe would require blasting through bedrock and large boulders presently in the stream. Even if the construction was done in a dry season, the silt and sand that could get into the stream would be considerable and could cause failure of the existing drainage system by clogging. The existing pipe needs to be protected from sediment to avoid later problems with cleaning. There may be an opportunity for constructing a filtering or sediment basin to allow suspended sediment from construction time to settle out before the water enters the existing 36-inch pipe. Laying the proposed pipe over rocks and boulders that are at varying depths would cause unequal settlement, and could cause joint failure in the pipes.

Bedrock is exposed on both sides of the stream and in the stream. Grading both sides into the stream area would leave bedrock and boulders that would have to be hauled from the site. Probably more fill than is available would be required to bury them adequately to build up on.

On the east tributary, there is a small pond that could be used to store runoff from part of the watershed. If the ponded area is to be considered for stream flow detention, it appears a dike could be constructed immediately downstream of the outlet. Neither the wetland bottom nor its vegetation should be disturbed. Excavation would not provide additional stormflow storage, as the water surface is already at the surface. If the dike had a metered outlet, it could be self-draining in a short time period and would probably have a minimal effect on the existing vegetation. Visually, it appears three to four feet of storage could be possible over an area of about two acres. To be able to store enough to keep the drainage system from being over-taxed for a 50-year frequency storm is questionable. However, The Team agrees with the Town Engineer that a retention basin or pond is a must and further that it be designed to reduce the stormflow so that the existing pipe will handle a 50-year storm.

Protecting the stream from sedimentation should be a very high priority. It might be reasonable to try another layout with only a small bridge over the stream to one or more buildings and parking on each side of the stream. Another alternative would be to develop buildings and parking only on the easterly side of the stream. The stream could flow essentially untouched. The buildings and parking could be kept back far enough to stop silt and sand from entering the stream.

In addition to measures needed to offset the increase in runoff from development with pavement and buildings, specifically an upstream storm water retention area, and prevention of sediment clogging of the existing pipe beneath Kings, other specific drainage and erosion control measures must be implemented during development. Measures to consider would be: capping the storm drainage inlets,

using hay bale check dams or other means to filter runoff heading toward the stream, establishing temporary and/or permanent seedings on sloping earth areas where excavated, etc. A detailed erosion prevention plan should be developed.

Presently the 300± acre - watershed including the five acres presently proposed for development is in a very stable state. There is no erosion; the water emitting from the area is visually clean. The wetland has been performing a valuable function of storm water reduction. Even so, it is surprising the existing shopping center has not experienced more flooding than was reported since the existing 36-inch pipe is really too small. It will be imperative to keep this pipe clean if development is allowed. Maintenance of control measures used will be critical.

PLANNING CONCERNS

The proposed commercial development appears to conform with the Town of Killingly Plan of Development, which pinpoints this area as a suitable location for commercial uses. The plan provides for minor expansion of the existing shopping center but cautions against strip development along Route 12 or 101. The plan does emphasize that the Borough of Danielson remain as the major commercial center of Killingly, with small convenience commercial facility growth to service existing and planned neighborhood centers. Thus, in order to adhere to the Plan, care must be taken to ensure that this shopping center does not expand to a size which competes with downtown Danielson.

The site which is currently occupied by the King's shopping center is zoned commercial; however, the proposed site is zoned rural development. Development of this proposed site would require a zone change to commercial.

The preliminary site layout as prepared by George Valentino, Architect, proposed approximately five acres of commercial development including a three-screen cinema, hardward store, bank and professional building with associated parking spaces. This development is currently planned for the western section of the property directly behind King's Department Store. The plan proposes piping about 800 feet of Dayville Brook under the new parking lot.

The proper development of this parcel will necessitate rather complex analysis and design in two areas of engineering: these are storm drainage and traffic.

Approximation of the peak flow of the Dayville Brook at Route 101 by the rational method yields 190 cubic feet per second (cfs) for a 25-year return storm. This flow far exceeds the capacity of a 36-inch or 30-inch RCP at any slope. It appears then that an on-site retention basin is necessary to limit the flow from the site to that which can be adequately handled by the smallest downstream structure, i.e., the 30-inch RCP. The analysis and design of this should be undertaken by a Professional Engineer with experience in this area. The analysis should include the development of storm hydrographs and the routing of these hydrographs through the detention basin. The method developed by the USDA, Soil Conservation Service, is probably the simplest and does not require computer assistance. The design of this facility should include an emergency spillway

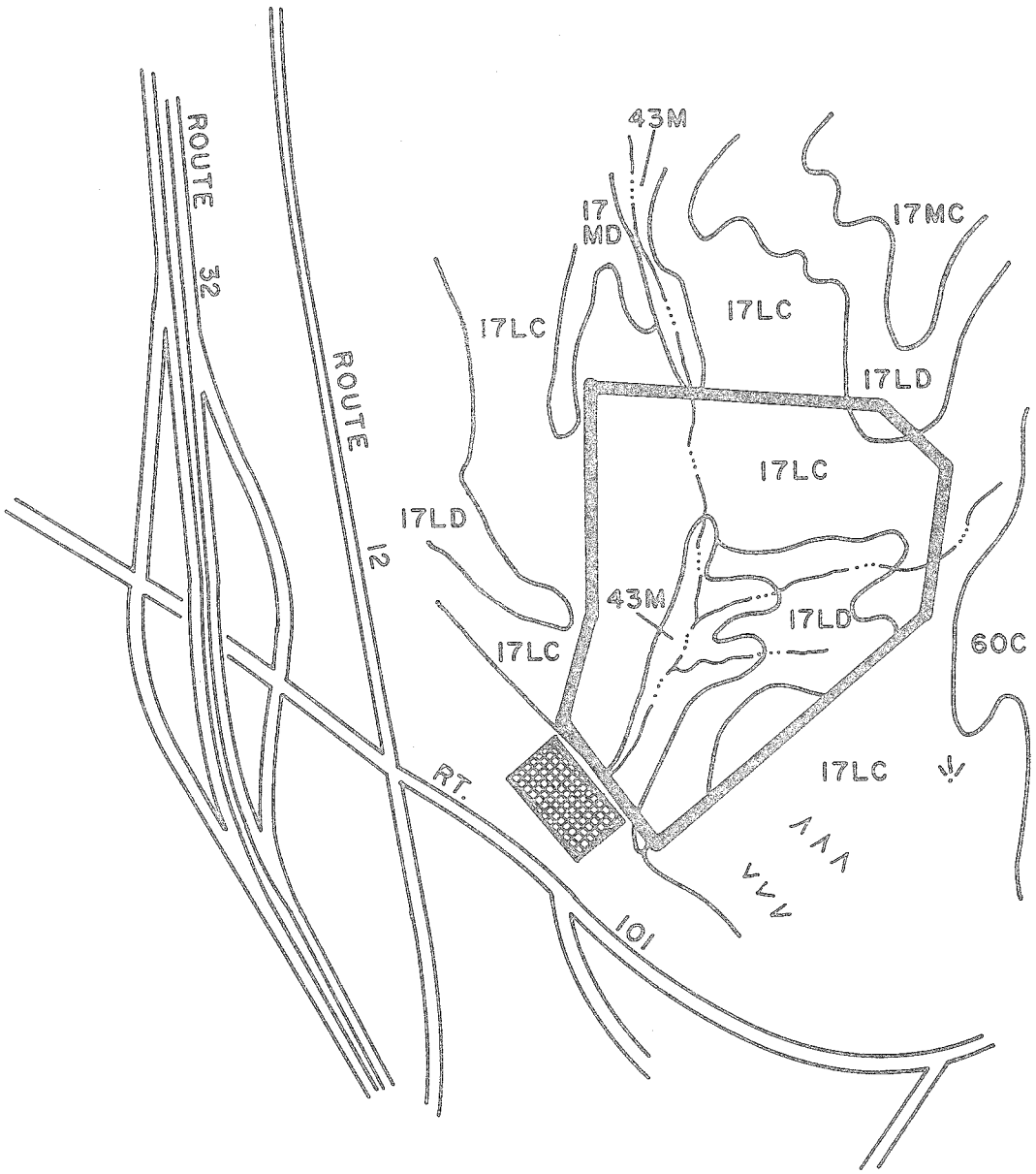
capable of passing the discharge from a 100-year storm frequency and controlled outlet designed for a 25-year frequency. It is possible to design this basin as a temporary sedimentation pond to limit erosion during construction and the Team recommends this procedure.

The second area of concern which should be thoroughly addressed by a qualified professional is the impact of new traffic generation on the existing road network. The adequacy of sight lines and the necessity of turning lanes and signalization should be fully reviewed.

Since proper treatment of these areas requires rather specialized expertise and experience, normally outside the realm of the Commission members, the Team recommends that the reviewing body contract with a Consultant Engineer to provide detailed review services of the technical aspects of this applications. By following this procedure, the Commission can assure themselves that the development of this parcel will be undertaken in a manner sensitive to the environment and in harmony with the existing character of the area.

Appendix

Soils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RT. 101

Ray Schneider

Route 101

Dayville, Connecticut

Principle Limitations and Ratings of Soils For

Map Symbol and Soil Name	WATER MANAGEMENT: Pond Reservoir Areas	WATER MANAGEMENT: Embankments, Dikes and Levees	WATER MANAGEMENT: Drainage	WILDLIFE HABITAT SUITABILITY: Openland Wildlife	WILDLIFE HABITAT SUITABILITY: Woodland Wildlife	WILDLIFE HABITAT SUITABILITY: Wetland Wildlife
17LC Charlton	Severe,slope, seepage	Moderate,piping, seepage	Deep to water	Poor	Good	Very poor
Hollis	Severe,depth to rock,slope	Severe,thin layer,piping	Deep to water	Poor	Poor	Very poor
17LD Charlton	Severe,slope, seepage	Moderate,seep-age,piping	Deep to water	Poor	Good	Very poor
Hollis	Severe,slope, depth to rock	Severe,thin layer,piping	Deep to water	Poor	Poor	Very poor
17MD Hollis	Severe,slope, depth to rock	Severe,thin layer,piping	Deep to water	Poor	Poor	Very poor
Charlton	Severe,slope, seepage	Moderate,seep-age,piping	Deep to water	Poor	Good	Very poor
*43M Ridgebury	Slight	Severe,piping, wetness	Percs.slowly, frost action	Poor	Fair	Fair
Leicester	Severe,seepage	Severe,wetness	Frost action	Poor	Fair	Fair
Whitman	Slight	Severe,piping, ponding	Percs. slowly, Frost action	Very Poor	Poor	Fair

* Designated wetland soil by P.A. 155

Ray Schneider

Route 101

Dayville, Connecticut

Principle Limitations and Ratings of Soils For

SITE DEVELOPMENT

Map Symbol and Soil Name	Shallow Excavations	Dwellings without Basements	Dwellings with Basements	Small Commercial Buildings	Local Roads and Streets	Lawns and Landscaping
17LC Charlton	Moderate,slope	Moderate,slope	Moderate,slope	Severe,slope	Moderate,slope	Moderate,slope, large stones
Hollis	Severe,depth to rock	Severe, depth to rock	Severe, depth to rock	Severe,slope, depth to rock	Severe,slope, depth to rock	Severe,depth to rock,thin layer
17LD Charlton	Severe,slope	Severe,slope	Severe,slope	Severe,slope	Severe,slope	Severe,slope
Hollis	Severe,slope, depth to rock	Severe,slope, depth to rock	Severe,slope, depth to rock	Severe,slope, depth to rock	Severe,slope, depth to rock	Severe,slope, depth to rock, thin layer
17MD Hollis	Severe,slope, depth to rock	Severe,slope, depth to rock	Severe,slope, depth to rock	Severe,slope, depth to rock	Severe,slope, depth to rock	Severe,slope, depth to rock, thin layer
Charlton	Severe,slope	Severe,slope	Severe,slope	Severe,slope	Severe,slope	Severe,slope
*43M Ridgebury	Severe,wetness	Severe,wetness	Severe,wetness	Severe,wetness	Severe,wetness, frost action	Severe,wetness
Leicester	Severe,wetness	Severe,wetness	Severe,wetness	Severe,wetness	Severe,wetness, frost action	Severe,wetness
Whitman	Severe,ponding	Severe,ponding	Severe,ponding	Severe,ponding	Severe,frost action,ponding	Severe,ponding

* Designated wetland soil by P.A. 155

SOIL INTERPRETATIONS FOR URBAN USES

The ratings of the soils for elements of community and recreational development uses consist of three degrees of "limitations:" slight or no limitations; moderate limitations; and severe limitations. In the interpretive scheme various physical properties are weighed before judging their relative severity of limitations.

The user is cautioned that the suitability ratings, degree of limitations and other interpretations are based on the typical soil in each mapping unit. At any given point the actual conditions may differ from the information presented here because of the inclusion of other soils which were impractical to map separately at the scale of mapping used. On-site investigations are suggested where the proposed soil use involves heavy loads, deep excavations, or high cost. Limitations, even though severe, do not always preclude the use of land for development. If economics permit greater expenditures for land development and the intended land use is consistent with the objectives of local or regional development, many soils and sites with difficult problems can be used.

Slight Limitations

Areas rated as slight have relatively few limitations in terms of soil suitability for a particular use. The degree of suitability is such that a minimum of time or cost would be needed to overcome relatively minor soil limitations.

Moderate Limitations

In areas rated moderate, it is relatively more difficult and more costly to correct the natural limitations of the soil for certain uses than for soils rated as having slight limitations.

Severe Limitations

Areas designated as having severe limitations would require more extensive and more costly measures than soils rated with moderate limitations in order to overcome natural soil limitations. The soil may have more than one limiting characteristic causing it to be rated severe.

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.

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, and a statement identifying the specific areas of concern the Team should address. 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 Jeanne Shelburn (889-2324), Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, 139 Boswell Avenue, Norwich, Connecticut 06360.