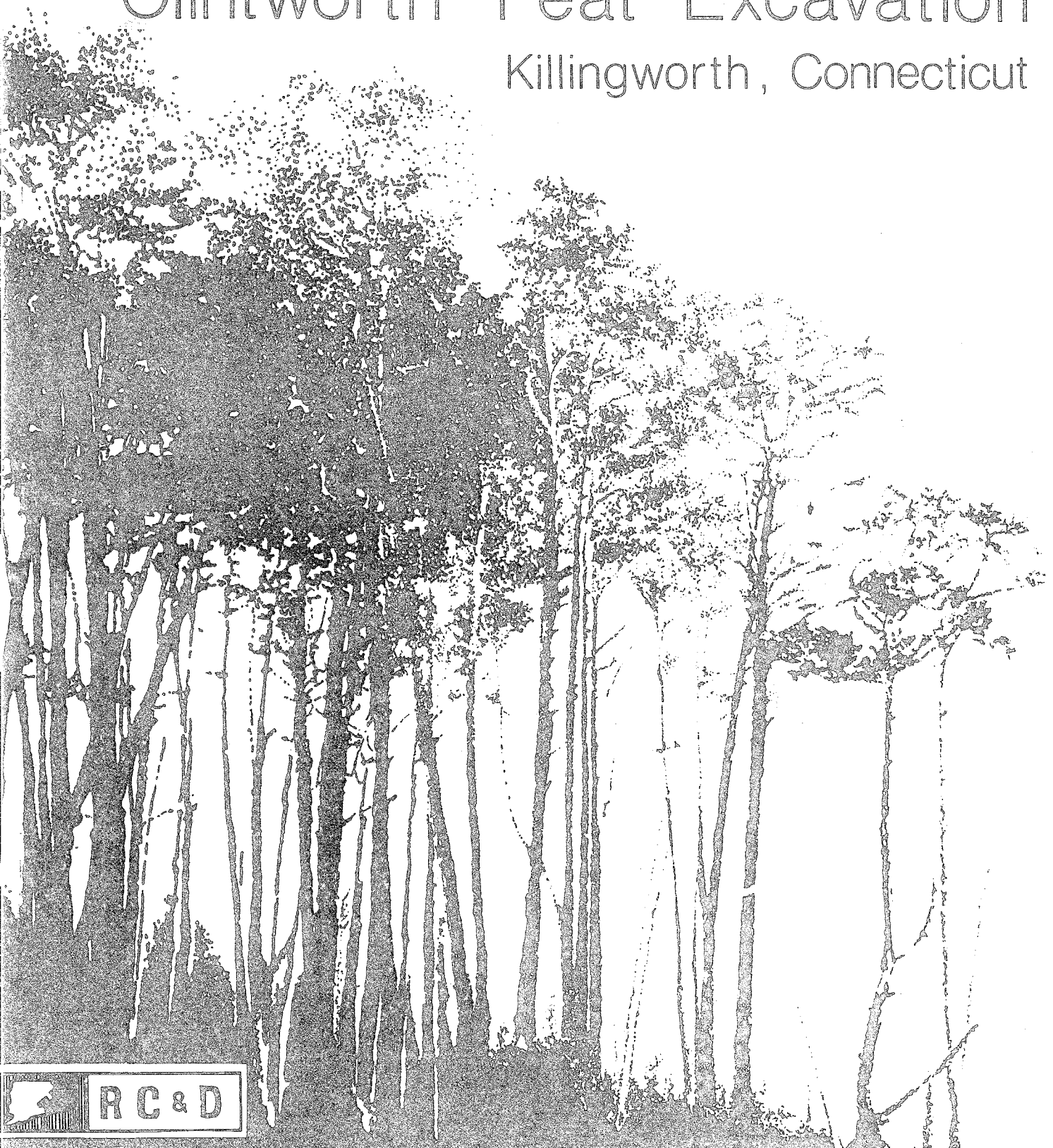
Environmental Review Team Report

Clintworth Peat Excavation

Killingworth, Connecticut



RC&D

EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

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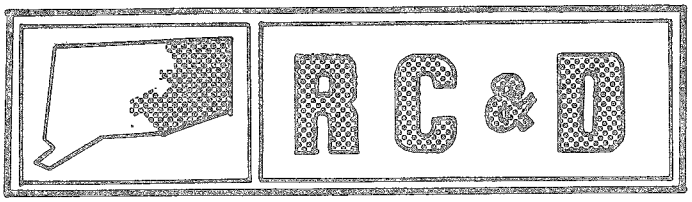
August 1980



eastern connecticut resource conservation & development area

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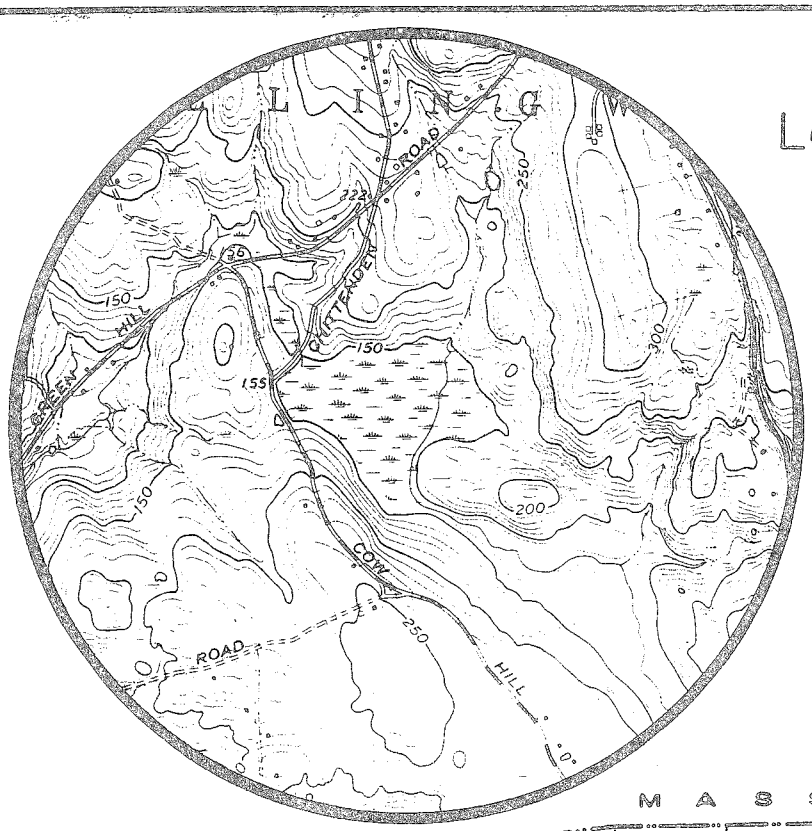


Location of Study Site

CLINTWORTH PEAT EXCAVATION
KILLINGWORTH, CONNECTICUT

ENVIRONMENTAL REVIEW TEAM REPORT
ON
CLINTWORTH PEAT EXCAVATION
KILLINGWORTH, CONNECTICUT

This report is an outgrowth of a request from the Killingworth Inland Wetlands Commission, to the Middlesex 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 as a project measure. The request was approved and the measure reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The soils of the site were mapped by a soil scientist of the United States Department of Agriculture (USDA), Soil Conservation Service (SCS). Reproductions of the soil survey map as well as a topographic map of the site were distributed to all ERT participants prior to their field review of the site.

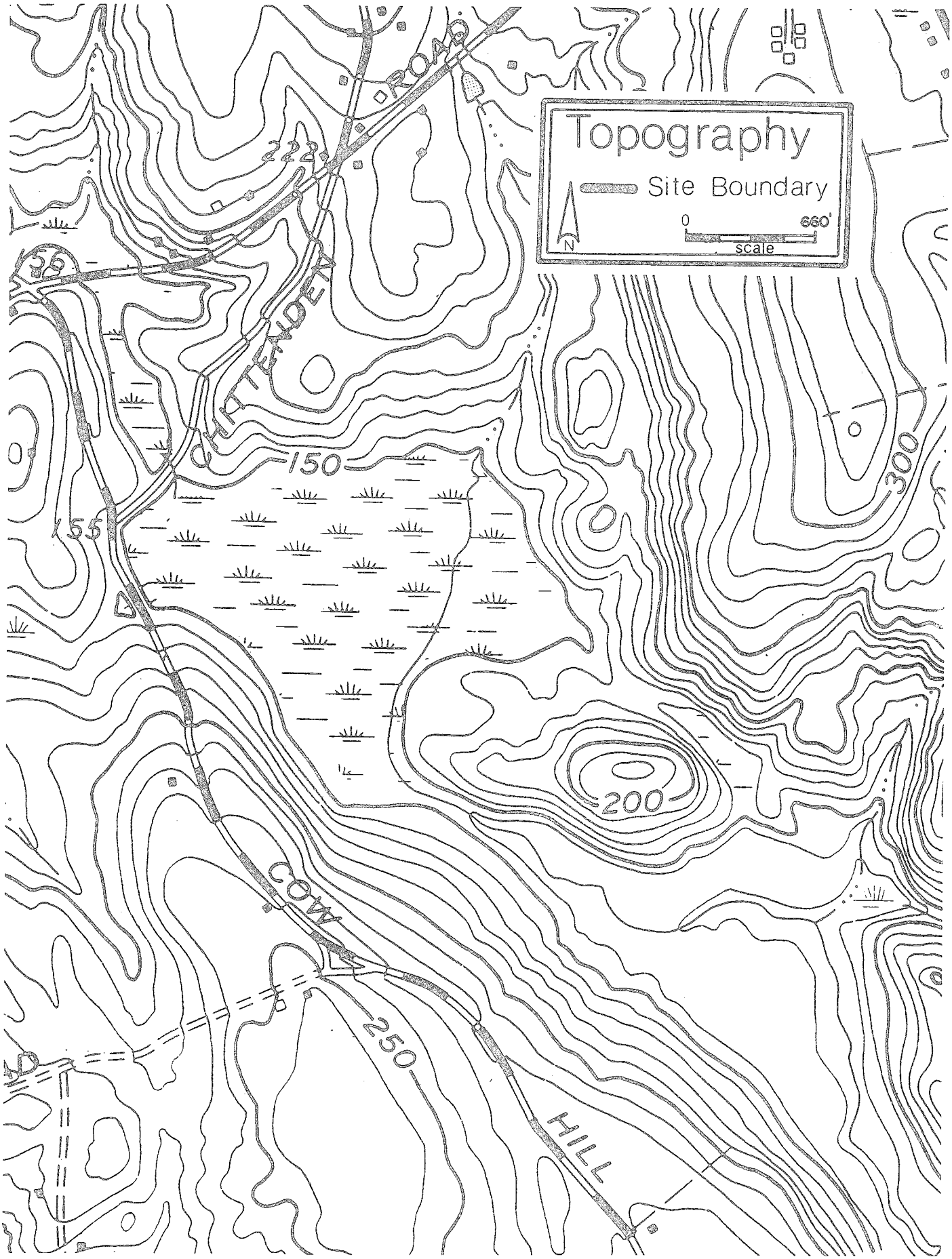
The ERT that field-checked the site consisted of the following personnel: Barry Cavanna, District Conservationist, SCS; Mike Zizka, Geologist, Connecticut Department of Environmental Protection (DEP); Charles Phillips, Fisheries Biologist, DEP; Les Mehrhoff, Biologist, Conn. Geologic and Natural History Survey; Ken Metzler, Wetland Ecologist, DEP; Ed Meehan, Regional Planner, Connecticut River Estuary Regional Planning Agency (CRERPA); Bob Knowlton, Engineer, DEP; and Jeanne Shelburn, ERT Coordinator, Eastern Connecticut RC&D Area.

The Team met and field-checked the site on Thursday, June 19, 1980. Reports from each 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 Killingworth. 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 you will find this report of value and assistance in making your decisions on this particular site.

If you require any additional information, please contact: 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
ROAD
CLIFFSIDE
150
155
300
200
COW
250
HILL

INTRODUCTION

The Eastern Connecticut Environmental Review Team was asked to evaluate a proposal for peat excavation in the town of Killingworth. The 55± acre site is located on Cow Hill Road and is owned by Clintworth Country Estates. This proposal was briefly reviewed by the Team in 1976 as a section of a larger subdivision/lake excavation proposal for 300+ acres owned by Clintworth Country Estates. That report dealt primarily with the subdivision proposal and its effect on the resource base of the site. The review which took place in July 1980 was limited to the peat removal proposal. Preliminary plans for a phased excavation of 48 of the 55 acres have been prepared by Angus McDonald and Associates, a Saybrook engineering firm. The final result of the removal project will be a 48 acre lake.

The actual excavation is proposed to take place in four phases by drag-line method, over a period of approximately five years. Phase I is at the eastern end of the existing wetland, entirely to the east of a stream which currently flows through the wetland. In conjunction with Phase I removal, a temporary berm will be constructed adjacent to the existing stream to isolate the Phase I excavation area from the stream flow. This dike is proposed to prevent sedimentation of the stream from Phase I excavation. Dewatering of the Phase I area will be accomplished by pumping the water into a filtration pool as shown in the engineering drawings.

The Phase II excavation will take place in the following manner. A berm is proposed to be constructed along the western side of the existing stream in order to isolate that stream from the Phase II excavation area in a fashion similar to that used for the Phase I excavation. To facilitate the removal of peat from the Phase II area to the drying area, an access road will need to be constructed across the stream with the installation of three 36" corrugated metal pipes. Again, dewatering would be accomplished by pumping to a filtration pool.

To isolate the Phase III excavation area from the stream flow, a diversion berm is to be installed near the point at which the existing stream flows into the peat bog to divert that stream into Phase I excavation. The berms installed during Phase I and Phase II excavation are to be connected and a break made in the southern end of the Phase I berm to allow flow to pass through the Phase I area back into the original streambed and from the site. Once again, dewatering would be accomplished by pumping to a filtration pool.

The Phase IV operation is simply an expansion of the Phase III excavation area. No further berming is required during the course of this excavation. Upon the completion of the Phase IV excavation, all temporary berms are to be removed from the excavation area as well as the temporary access road across the stream.

Access to the site during the peat removal operation will be accomplished by constructing a new haul road from the area of the existing peat bog in a southeasterly direction to Connecticut Route 81 as shown on the engineering drawings. It is proposed that existing town roads not be utilized for the purpose of removing peat from this site. Initially, it will be necessary to utilize Chittenden Road to deliver equipment to the site to begin the construction of the proposed haul road. This, however, should occur quite quickly and any future use of

Chittenden Road would be limited to passenger vehicles carrying workmen to and from the site. Once the haul road has been constructed, all heavy equipment in the form of trucks, trailers, bulldozers, etc. will enter the site from Connecticut Route 81. Only passenger vehicles will be allowed to enter the site from Chittenden Road.

The site is presently composed of peat and muck soils in a low, relatively flat depression. The vegetation is exceptionally dense, with red maple and white cedar as its dominant species. Ground water was generally at or just below the soil surface and in open areas was slow moving. Field investigation indicates that there is considerable water storage in the western portion of the wetland with the water table one to two feet recently higher than at present. The removal of the "peat sponge" may significantly affect seasonal downstream flow.

In reviewing this proposal, many questions, both environmental and sociological, surfaced. The major concern of the Team members was that of future water quality in the proposed lake, its aesthetic appeal, fish and wildlife potential and its effect on flood retention and downstream flow. (See Hydrology, Fish and Wetlands sections for more detailed discussion). The quality of the peat to be mined was also questioned, as well as, the method of extraction (many fallen logs and branches have been incorporated into the peat mat which may hinder a drag-line extraction). Material for construction of the proposed sedimentation dikes should be found to be suitable for that use.

By granting a permit for a special exception to allow peat mining in this area, Killingworth will be, in effect, allowing an industrial use in a residential zone for a period of time. During the mining operation there will be a change in the quality of life in this area of the town. Noise will be a factor, but traffic increase will have the major impact. The capacity of local roads to handle additional heavy truck traffic is questionable. The planned intersection of the haul road with Route 81 is in a dangerous location. The Team Planner has done an extensive evaluation of the traffic problems inherent in this proposed plan which can be found in the Planning Concerns and Roads/Traffic section of this report. The transportation aspect of this proposal should be closely coordinated with the town of Clinton and the Connecticut Department of Transportation.

During the pre-review meeting with the developer's engineer and subsequent visits to the site, no mention was made of the ultimate goal in mining the peat from the proposed site. The only indication that the Team received was that the mining of the peat was a side benefit with the creation of a lake for recreational purposes as the ultimate goal. If the ultimate goal is the creation of a lake with the commercial value of the peat as a side benefit, additional inquiries should be made by the town including: (a) is the flow through the proposed lake sufficient to control stagnation? (b) what is the recreational value of the lake, will the bottom characteristics be suitable to boaters, swimmers, etc.? (c) what will be the chemical conditions of the lake, ph, color, etc.? Perhaps the value to the town and the local community may be lessened by disrupting the "natural" conditions presently found in the wetland.

ENVIRONMENTAL ASSESSMENT

GEOLOGY

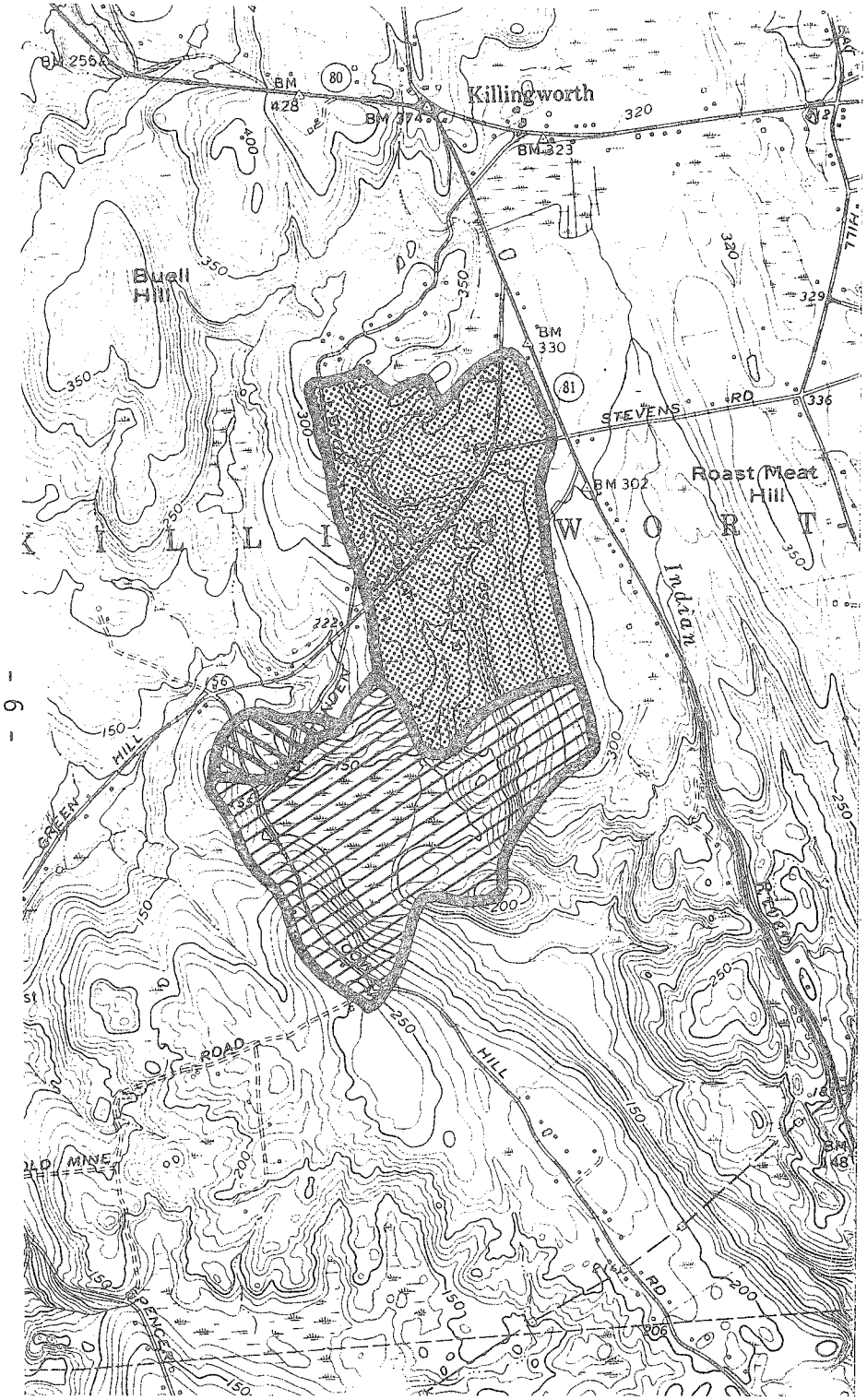
The proposed peat removal site is a swamp located in a till-bedrock basin. The surface of the swamp is essentially flat, broken only by trees and low hummocks. The hillsides that surround the swamp are composed of generally thin till and scattered bedrock outcrops. Till is a nonsorted glacial deposit consisting of rock particles and fragments of widely ranging sizes and shapes. This rock debris was collected by an ice sheet as it expanded south through New England, scraping and gouging preexisting bedrock surfaces and bulldozing former soils. The till was later redeposited by the ice without further transport by water. Consequently, local till has a variable texture, ranging from sandy and loose to silty, stony, and tightly compact. Compact till is prevalent in Connecticut, a fact which has led to its colloquial description as "hard-pan".

The geology of the swamp itself may be interpreted from records of test borings. The borings showed a fairly consistent layering or structure in the swamp: peat (or muck in some areas) is underlain in order by silt with some fine sand, fine to coarse and with some silt and gravel and till or bedrock. The boring records made available to the Team showed peat thicknesses up to 29 feet. The silts and sands were up to 23 feet thick. Bedrock was interpreted from a relatively shallow (24.5 feet) auger refusal; till is presumed from the ubiquitous presence of this material on the surrounding hillsides.

Peat and muck are distinguished generally by color and relative stage of decay. Peat is usually brown, fibrous, and only slightly decayed (individual pieces of plants are recognizable). Muck is typically black, slimy or mushy, and more highly decayed (individual plant remnants are not as easily discernible). Peat is much more valuable commercially than muck.

The sands and silts underlying the peat become coarser with depth, suggesting that they were deposited over a period of time in water of decreasing energy. It is possible that a huge block of remnant ice, detached from the main ice sheet as the latter receded, was buried in this basin, later wasting to form the beginnings of a pond. Water cascading into the basin from the northeast and northwest deposited coarse sands with some gravel. As the water level rose in the basin, the energy of deposition decreased, allowing fine sands and then silt to settle out. As sediment continued to fill the basin, the water level rose gradually but the depth of the pond became shallower. Swamp vegetation was established and has existed up to this time.

Cores of peat taken from other thick-peat areas have, through examination of fossil pollen, revealed long-term histories of the change in vegetation in those areas through time. It is recommended that the geology departments of local universities, such as the University of Connecticut, Wesleyan, and Yale be contacted to see if they would be interested in obtaining similar cores from the present swamp before the peat is totally removed.



WATERSHED OF PEAT-REMOVAL SITE

KILLINGWORTH

EXPLANATION

Drainage area of the inlet stream.

Direct recharge area of the swamp.

Possible additional direct recharge area of the swamp - may supply groundwater recharge and, during periods of heavy surface flows, intermittent surface recharge.

HYDROLOGY

Analyzing the potential hydrological effects of the peat mining-pond building operation is very difficult. Recently, the American Water Resources Association sponsored a wetlands symposium to discuss the current state of knowledge on wetland hydrology, wildlife and aesthetic values of wetlands, importance of wetlands in food chains, and other subjects. The Association published a book containing the proceedings and reports of the symposium (Wetland Functions and Values: The State of Our Understanding). In one of the many reports ("Peatland Hydrology"), authors E.S. Verry and D.H. Boelter discuss the role of peatlands in groundwater recharge, mitigation of flood flows, and streamflow distribution. The discussions, and most of the currently available data, allow comparisons of watersheds that contain substantial peatland areas with watersheds that do not. However, the authors point out that very little data has been collected for the type of operation planned for the Killingworth swamp. As they put it, "Our greatest lack of knowledge is in predicting the hydrologic impacts of drainage and peat harvesting".

The present hydrology of the swamp may be examined in terms of inputs and outputs. Water inputs to the swamp consist of ground and surface water inflow from the upstream drainage area and precipitation over the swamp itself. The total watershed of the swamp includes approximately 360-370 acres. An area of about 15 acres which feeds a swampy swale between Chittenden Road, Cow Hill Road, and Green Hill Road may also be part of the watershed; however, the channelized connection shown on the topographic map between the swale and the major swamp was not discernible in the field. If no connection exists on the surface, there still may be groundwater movement between the two areas. The overall watershed is shown in an accompanying illustration.

Water outputs from the swamp consist of surface and groundwater outflow and evapotranspiration from the swamp. It is the potential for change in total evapotranspiration that must be considered in predicting whether a change in long-term base flows will occur in the outflow stream. The reason is that total inputs to the site, whether it remains a swamp or is converted to a pond, will not be altered. As long as the basin, once emptied of peat, refilled to its present water level, streamflow changes would depend entirely on whether the pond surface lost more or less water to evaporation than the swamp did to both evaporation and transpiration. Although no data exists for this particular swamp as to present rates of evapotranspiration, data recently obtained from other swamps suggests that evapotranspiration usually exceeds evaporation from a free-water surface. (Source: "Water Resources and Wetlands", a report contained in the American Water Resources Association symposium publication cited above). Hence, base streamflows during hot, dry periods may increase if the pond is created. During spring thaws, the wetlands might be expected to thaw less rapidly than a free ice-and-snow surface, so that the normally heavy spring streamflows may be reduced by the presence of the swamp. Conversely, creation of the pond could lead to higher spring flows.

It was assumed that the pond would fill to the level existing presently in the swamp. This assumption is based on several factors. First, using a statistical average for flow rates of ungaged streams in Connecticut based on the size of the contributing drainage area, it may be estimated that the long-term average surface inflow to the swamp basin is 1 cubic foot per second (cfs). At this rate, the

entire planned excavation could fill in about 200 days. Since the excavation would actually be done in stages, less time would be required for any particular section. The bulk of the filling would occur during the normally wet fall and spring seasons, when evaporation would also be minimal. Second, the bottom of the pond would consist of silts and sands underlain by till and bedrock. These materials would not be conducive to a rapid groundwater outflow -- indeed, if they were, one would not expect the swamp to exist as it is today. Finally, the surface elevation of the pond, like that of the swamp, would be controlled by the elevation of the southeastern outlet, which would not be altered.

The effectiveness of the proposed pond, as opposed to the present swamp, in mitigating flood flows is very difficult to assess. Generally, watersheds are evaluated for flood storage capabilities by adding total swampy and ponding areas; i.e. the two different systems are not distinguished in the evaluation. This suggests that the two are approximately equally effective. Nevertheless, to the extent that precipitation onto the wetland may percolate through the hummocks of "land" above the water table while precipitation onto the pond would reach the surface instantly, a certain additional retentive ability (a "sponge" effect) may exist in the swamp. This, of course, would be partly or perhaps totally offset by the volume of potential storage space that the "land" itself occupies. Another factor to consider is the extent to which the swamp vegetation and microtopography itself slows surface flow rates. This factor would, in turn, depend upon the existing water or ice level at the time of the flood-causing storm event or snowmelt: the lower the water level, the greater the slowing effect of the wetland on surface flows. However, knowledge in the area of this specific problem is too skimpy to allow conclusions to be drawn with confidence.

Another hydrologically crucial area is water quality. Again, the data concerning the wetland's role is incomplete. A pond may serve many of the same functions as a wetland, particularly that of trapping sediment. Moreover, the removal of the swamp vegetation may cause, in the long run, a decrease in the acidity and iron-manganese content of the outflowing water (in the short run, during and immediately following the proposal, acidity and iron-manganese content may increase dramatically because of the disruption of the organic material). On the other hand, wetlands appear to have a significant buffering effect against water quality changes in the inflow stream. In some cases, secondarily treated waste water can be renovated by wetlands (source: "Wetlands and Water Quality", from the American Water Resources Association publication cited above). A pond would lack this ability and would be more subject to deterioration from future developments in the upstream watershed. So again, the overall effect on water quality in the long run may be mixed. It does seem clear, however, that the potential for substantial short-term deterioration of water quality would accompany this project.

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 1,320 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 Special Soils Report, Connecticut River Estuary Planning Region, 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 typical of this site are associated with the Adrian-Palms series (91) and the Carlisle series (92). Both soil types are poorly drained and susceptible to flooding. These characteristics, however, will not severely restrict removal of peat from this site, as most excavation equipment will remain outside this area on more stable soils.

The Adrian-Palms series a nearly level, very poorly drained, organic soil is in low depressions of outwash terraces and glacial till plains. The areas of this soil are mainly round or irregular in shape and mostly range from 3 to 80 acres. Slopes are 0 to 2 percent but are dominantly less than 1 percent.

Typically, this soil has an organic layer 24 inches thick. The upper 8 inches of the organic layer is very dark brown muck, the next 12 inches is black muck, and the lower 4 inches is very dark grayish brown muck. The substratum is dark gray gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of very poorly drained Carlisle, Saco, Whitman, and Scarboro soils. Included areas make up 5 to 20 percent of this map unit.

The permeability of this soil is rapid. The soil has moderate to high available water capacity. Runoff is very slow or ponded. This soil remains wet most of the year and is ponded for several weeks from fall through spring and after heavy rains in summer. Unlimed areas are very strongly acid to neutral in the organic layers.

This soil is poorly suited to cultivated crops because of wetness. Most areas are difficult to drain. If drained, the soil can be used to grow vegetables, but the water table needs to be carefully maintained to minimize subsidence and prevent excessive loss of organic material. Excavations are unstable. If the soil is exposed, cover crops are needed to prevent wind erosion.

The Carlisle series is a nearly level, very poorly drained, organic soil in low depressions of outwash terraces and glacial till plains throughout the county. Areas of this soil are circular or irregular in shape and mostly range from 5 to 200 acres. These soils have slopes of 0 to 2 percent, but slopes are dominantly less than 1 percent.

Typically, this soil is dark reddish brown and black muck to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of very poorly drained Adrian, Scarboro, and Whitman soils and poorly drained Leicester, Ridgebury, Raypol, and Walpole soils. Also included are a few areas of soils that are more acid than this Carlisle soil. Included areas make up 5 to 20 percent of this map unit.

The permeability of this soil is moderate or moderately rapid. Available water capacity is high. Runoff is very slow. This soil is wet most of the year, and water is frequently ponded on the surface from autumn to spring and after heavy rains in summer. Unlimed areas are very strongly acid to medium acid.

Organic material in this soil will not support heavy equipment. If the soil is drained, the organic layers subside or shrink and lower the surface of the soil. Side slopes of excavations are very unstable and slump.

The developers propose to construct a dike to facilitate draining of the excavation area during Phase I of the proposed plan. The Team is concerned that material used for this dike construction be suitable for that purpose. As we could not be sure of the area on this site that the construction material would come from, we can not determine its suitability. The town may want to require that material for construction of the dike come from a suitable off-site source.

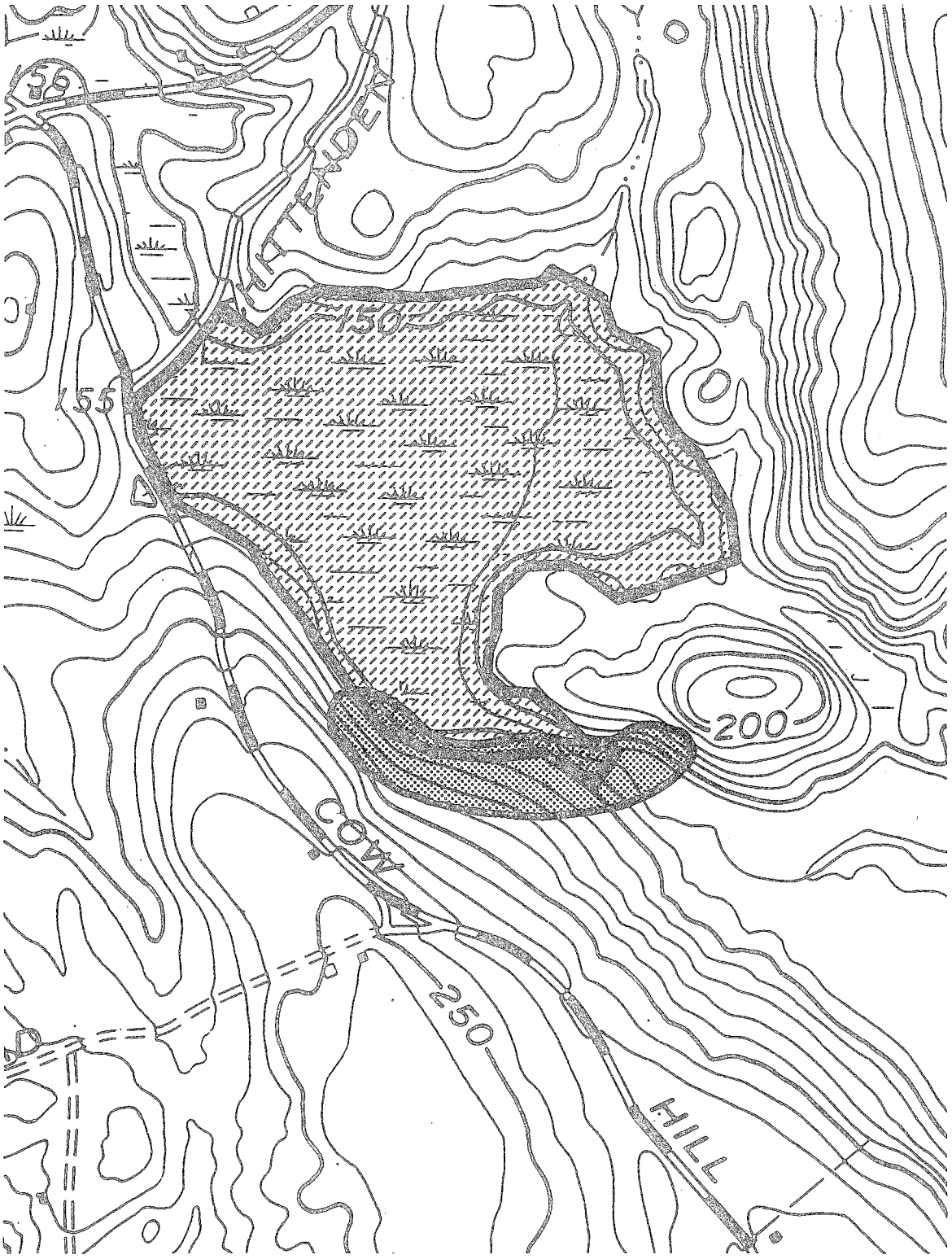
A sediment and erosion control plan has been prepared for this project by the developer. The District Conservationist has reviewed the plans and found them to provide adequate sediment and erosion control. These measures must be implemented prior to commencement of construction and maintained throughout the construction process in order to provide effective protection.

Although the test cores indicate that the volume and quality of peat in the portion of the swamp west of the stream has a sufficient marketable value (fairly well-decomposed fibrous peat with abundant woody material such as logs and branches), no tests have been taken in the Phase I operation site. Here the soil is mapped as an Adrian and Palms muck with a maximum depth of 125 cm. Field investigation indicates that the quality of the material (only muck was encountered) and the depth (in many areas - 120 cm) warrant a more detailed investigation. The quality and quantity of material may <u>not</u> be sufficient for commercial purposes nor may it be suitable for berm construction as outlined in the proposal.

WETLAND VEGETATION

This site should be referred to as a hummocky red maple-white cedar swamp, growing on fairly well-decomposed peats and muck. It is <u>not</u> a peat bog. A peat bog as defined by Team members, is a wetland in which the accumulation of sphagnum moss determines the nature of the plant communities. In southern New England, white cedar is the dominant tree species in bogs, whereas red maple is typically rare. Dwarf ericaceous shrubs such as sheep laurel and cranberry are also characteristic of this type of plant community. A species list of plants found on the site is included in the appendix to this report.

EXCAVATION AREA



N

0 660'
scale

LIMITS OF PLANNED EXCAVATION

AREA OF CONCERN IN ANY FURTHER DEVELOPMENT

The proposed peat removal operation will significantly alter the present character of the large wetland east of the intersection of Cow Hill Road and Chittenden Road. The proposed plan involves the complete removal of the cover vegetation, the mining of the organic materials for commercial purposes, and the formation of a lake within the dredged site. The most significant changes that the proposal will have on the surrounding region will be (1) the removal of a large tract of "natural" wetland providing a habitat for a large variety of plant and animal species, (2) the removal of a large headwater retention site with a possible change in seasonal flow, and (3) the potential for downstream deterioration through increased acidification and eutrophication.

Two rare and endangered species have been located in a section of the total parcel owned by Clintworth Country Estates. This development corporation owns approximately 300± acres, of which the peat excavation is a small portion. These plants have not been found in the proposed excavation area and were determined not to be immediately endangered by the current proposal to remove peat from the site. It is recommended, however, that as much of a buffer zone as possible be left between the peat drying area and the "area of concern" shown on the accompanying map. Any further development proposals planned for this area should be evaluated separately, with concern for the endangered species present. Further assistance concerning the rare plants may be obtained from the Connecticut Geological and Natural History Survey at the Natural Resources Center, DEP, State Office Building, Hartford, Connecticut 06115.

FISH

If peat is present in sufficient quantities for commercial purposes, measures should be used to prevent acidification of the brook which could conceivably kill fish throughout the tributary brook and even as far as the Indian River. Eventually the pH of the brook will be raised as a result of the peat removal; until the area is stabilized, however, some acid buffering device should be used to minimize the danger to fish life in the watershed. Although the developers have indicated that they intend to use lime to restore the water to its natural pH, it may be necessary to continue this practice long after the peat removal is accomplished.

PLANNING CONCERNS

The major planning concern which should be addressed and resolved prior to the issuance of a Special Exception Peat Removal permit is the proposed location/design of the haul road's intersection with Route 81. The proposed location, within Clinton's town border, calls for communication and coordination among the applicant's engineer, Connecticut Department of Transportation's district office and Clinton officials. The presence of a small inland wetland area near the proposed haul road's intersection with Route 81 will require a permit from the Clinton Inland Wetlands Agency. State and town officials should note that this section of Route 81 has been programmed for construction/drainage improvements because surface runoff from Roast Meat Hill Road creates hazardous icing conditions during the winter.

The long range use of this large parcel which straddles the Clinton-Killingworth town line should also be of concern. Short term decisions on the location of the haul road, alternation of site drainageways and the 48 acre lake will permanently influence the long term residential use and quality of this area. The Killingworth Planning and Zoning Commission should require that this entire operation be bonded.

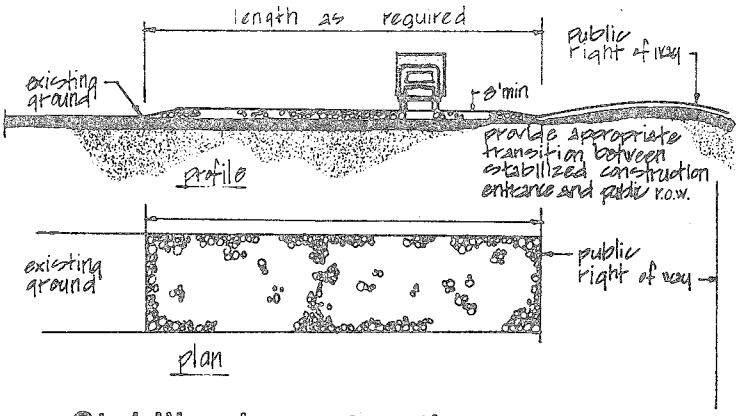
Also of concern to the planner is the off-site impact which truck traffic from the removal area will have on Route 81 and even more significantly to Clinton's business area streets/intersections. Clinton's Route 1 strip is already congested and the limited number of routes which trucks have to choose from to reach Clinton Nurseries processing facilities might mean that Route 81/Hull Street or North High Street will carry this additional traffic volume. A possible alternate route, although circuitous, that should be considered is Route 81 to I-95 and the Hammonasset Connector to Route 1.

ROADS/TRAFFIC

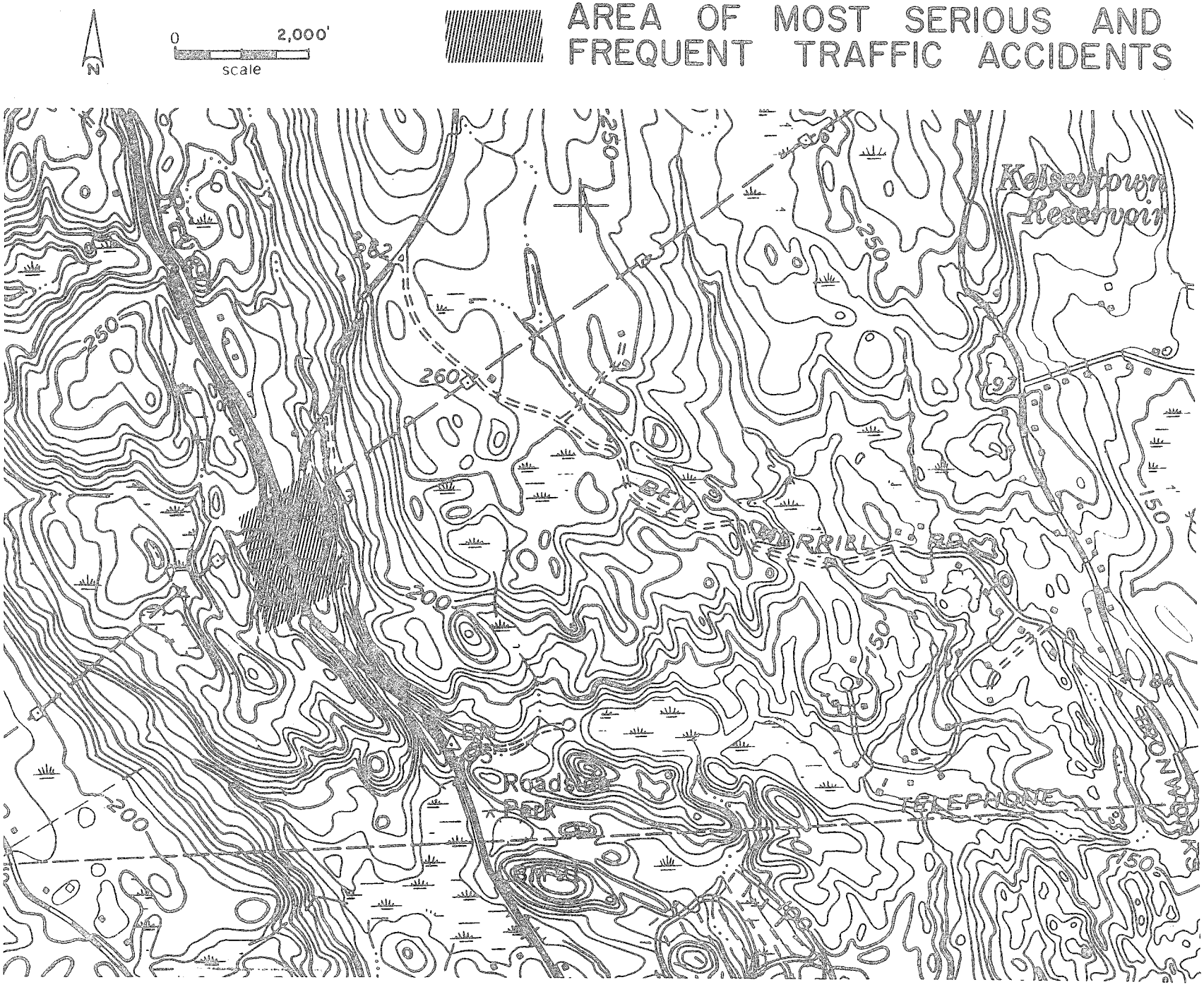
The existing town roads which provide access to this site are Cow Hill Road and Chittenden Road. Both roads are narrow travelways which have been improved incrementally over the years to meet increased traffic demands. Neither of these roads are suitable for the sustained volume of truck traffic which could result from this removal operation.

The proposal to construct a haul road from Route 81 (a State secondary two lane arterial road) has been planned as an alternate access into the peat removal site. The purpose of the haul road would be to keep truck traffic off of Cow Hill and Chittenden Roads and to limit these streets only to workers' passenger vehicles. Town officials in both Killingworth and Clinton should take note of the proposed location of the haul road as it encroaches onto Route 81. This section of Route 81 is dangerous. Directly opposite the proposed haul road is Roast Meat Hill Road, which has poor alignment and sight lines. It should be noted that the section of Route 81 from Roast Meat Hill Road south, approximately 800 feet to the Indian River crossing, has been of continuous concern to CONNDOT (Department of Transportation) and Clinton town officials because of the existing improper drainage conditions which ice up during winter months. This section of Route 81 has been identified in the Regional Transportation Improvement program as a top priority area for CONNDOT funding. Corrective construction improvements have been scheduled for this area and it would behoove both towns, CONNDOT and applicant to coordinate the design and construction of the haul road. Because this haul road's encroachment onto Route 81 will require a permit from CONNDOT's District Maintenance Manager, the towns do not have the authority over the final location or design. However, the Killingworth Planning and Zoning Commission does under Section 114 Removal of Earth Products, have the authority via the Special Exception process to exercise considerable control of this operation and through the posting of bonds, insure that its conditions of approval are fulfilled. The proposed access point onto Route 81 is at the area of steep slopes and rock cuts. The final Middlesex County Soil Survey reports indicate the property in Clinton, in addition to having bedrock escarpments, is a wetland area. The applicant therefore should present the haul road plans to the Clinton Inland Wetland Agency for a permit of this regulated activity.

Stabilized construction entrances are pads of crushed stone located at points of access to a construction site. The purpose of the stabilized entrance is to reduce or eliminate the tracking of sediment onto roads or streets. However, as with loose rock berms, their high first cost and relatively low sediment capacity make their use primarily one of public relations in construction area neighborhoods.



Stabilized construction entrance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AREA OF MOST SERIOUS AND FREQUENT TRAFFIC ACCIDENTS
Kelsertown Reservoir
250
260
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Road
TELEPHONE

Truck trips generated by this removal activity have been calculated based on the following assumptions. A trip is defined as an entry or exit from a site. Based on the total removal of 780,000 cubic yards of peat over a four-phase, five-year period the following general trip calculations have been made:

Assumptions: (*)

a) Capacity:
15 cubic yard trucks (10 wheeler) 58,300 lbs.
Gross Vehicle Weight (GVW). Permit from Dept. of Motor Vehicles for extra weight within 25 mile radius delivery area.

b) Removal Schedule: (*)
15% of 780,000 cu. yds.
Removed during Phase I = 117,000 cu. yds.
28% Phase II - 218,400 cu. yds.
28% Phase III - 218,400 cu. yds.
28% Phase IV - 218,400 cu. yds.

c) Phase I trips leaving site via Rte. 81 = 7800
Assume 250 working days = 31 trips per day
Assume 5 day week = 156 average weekday trips leaving site Monday through Friday
Phase II, trips leaving site = 14,560 total
= 58 per day
= 290 per week
Phase III and IV - same as Phase II.

d) Estimated total trips leaving site over the four-phased, five-year period - 51,480± or about 10,300± average leaving the site per year.

e) Average Daily Truck Trips generated by site =
Annual Average 24-hour volume, being the total yearly volume in both directions of travel divided by 365 days
10,300 leaving
+ 10,300 returning
20,600 ÷ 365 = 56 average daily truck trips: 5-7 trips per hour (8hr. work day).

(*) CAUTION:
These estimates should be adjusted based on size of truck and the total trips per year. Since this is a four phased operation over a five-year period "1 year" equals 15 months. This extended period will increase the working day to ± 280 per 15 month period and subsequently spreadout the number of trips leaving the site per day and per week.

HAZARDS

Natural - Apart from the disruption to the immediate peat/wetland area the proposed haul road will impact drainageways and wetlands beyond the removal site. Care should be taken in the design of the haul road to prevent erosion and major destruction of the land immediately adjacent to this road.

Man Induced - The primary concern with man-induced hazards from this site is the proposed access point onto Route 81. As noted, this is a precarious section which will require careful design of alignment, good sight lines and drainage improvements. Of concern is the down grade which loaded trucks coming off the site onto Route 81 will negotiate. Prior to approving this Special Exception the Killingworth Planning and Zoning Commission should be sure that a CONNDOT encroachment permit onto Route 81 has been approved by the District Manager.

As part of the design of the haul road consideration might be given to a stabilized construction area of crushed stone to reduce or eliminate the tracking of sediment onto Route 81. (See accompanying illustration).

Some recently received CONNDOT Accident Experience Data that has been analyzed for Route 81 in the vicinity of the proposed haul road encroachment (mile marker 3.39 Indian River north to 3.68 Clinton/Killingworth town line) follows. (See accompanying map). Accident data is for the period 10/1/76 through 9/30/79.

1) Direction - South bound vehicle accidents 7
   North bound vehicle accidents 4

2) Injuries - as observed at scene:
   4 very serious - disabling
   2 less serious - not disabling
   3 injuries - but no visible indication
   0 fatalities
   9 at or near vicinity of Roast Meat Hill Road to Indian River crossing.

3) Type -
   Vehicles traveling straight and hitting fixed objects of adjacent bank or ledge - during the period an equal number of accidents occurred when road conditions were dry as well as wet (rain, snow, slush).

4) Multiple Vehicle Accidents -
   July 17,1977 - 2 cars sideswipe in opposite directions at night 5 injured
   Feb. 4, 1977 - 2 cars involved skidding on snow-striking nearby bank/ledge 2 injured
   Jan. 11, 1978 - 2 vehicles involved, 1 hitting nearby bank/ledge when avoiding other vehicle.

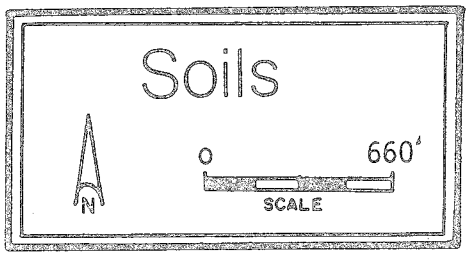
SERVICES TO SUPPORT DEVELOPMENT

No municipal services are expected to be needed as a result of this peat removal operation. As part of a safe haul road/Route 81 intersection design plan, consideration should be given to the placement of warning lights near the entrance.

ALTERNATIVE USES

One alternative use to the removal of peat and the creation of a 48-acre lake is to leave this site in its natural wetland state. The town Planning and Zoning Commission should recognize that the construction of the lake, haul road and access onto Route 81 will open this property up to eventual long-range residential subdivision. While such a possibility may be in the distant future, the Commisison should be satisfied that the basic first steps of road, drainage and pond construction are properly designed and completed because these important components will affect the quality of future home sites.

Appendix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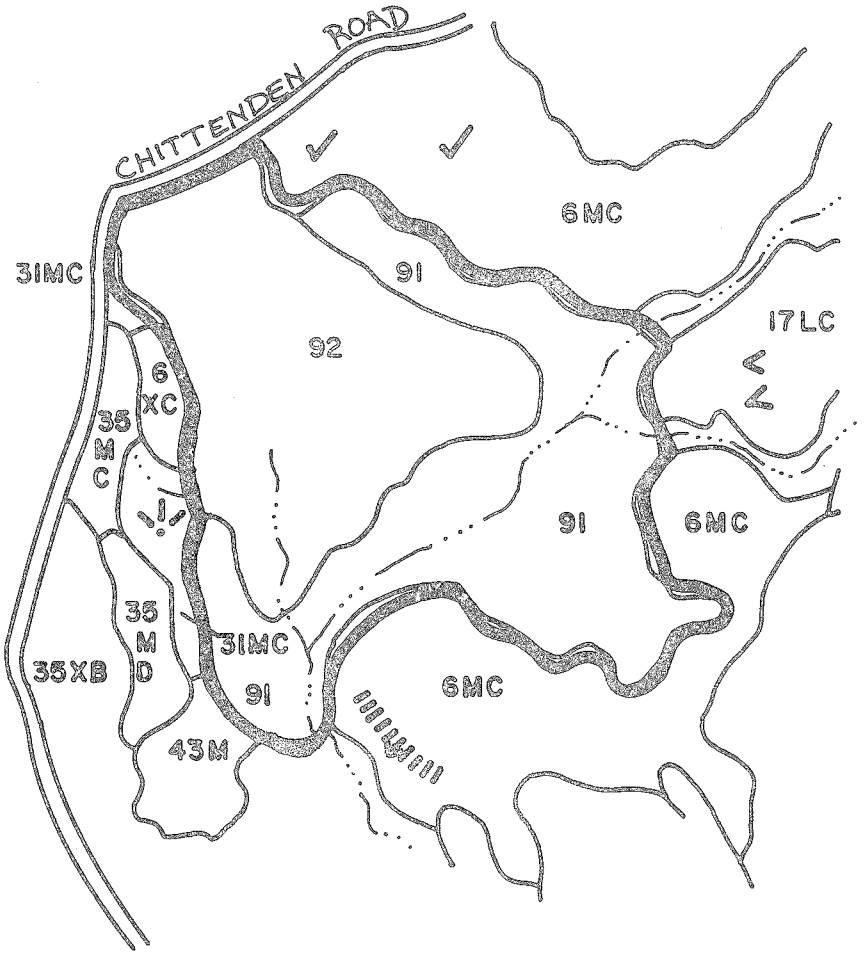
660'
SCALE


CHITTENDEN ROAD
31MC
6MC
91
92
17LC
6
XC
35
M
C
91
6MC
35
M
D
35XB
31MC
91
6MC
43M

KILLINGWORTH INDIAN RIVER WOODS SUBDIVISION & PEAT REMOVAL OPERATION

PROPORTIONAL EXTENT OF SOILS AND THEIR LIMITATIONS FOR CERTAIN LAND USES

Soil Series	Soil Symbol	Approx. Acres	Percent of Acres	Principal Limiting Factor	Urban Use Limitations*			
					On-Site Sewage	Buildings with Basements	Streets & Parking	Land-Scaping
Hollis/Charlton	17LC	46.5	14.4	Slope, shallow to bedrock, stony	3	3	3	3
Hollis/Charlton	17LD	6.5	2.0	"	3	3	3	3
Hollis/Rock outcrop complex	17ZC	55	17.0	Depth to bedrock, out-crops	3	3	3	3
Hollis/Rock outcrop complex	17ZD	17.5	5.4	"	3	3	3	3
Woodbridge	31MA	17.5	5.4	Stony	3	3	3	3
Woodbridge	31MC	15.5	4.8	Stony	3	3	3	3
Woodbridge	31XB	9.5	2.9	Stony, wet	3	3	3	2
Paxton and Montauk	35MD	24.5	7.6	Slope, stony	3	3	3	3
Paxton	35XB	20.5	6.3	Stony	3	2	2	2
Paxton	35XC	4	1.2	Stony, slope	3	2	2	2
Ridgebury and Whitman	43M	15	4.7	Wet, stony	3	3	3	3
Adrian and Palms Muck	91	37.5	11.6	Poorly drained, floods	3	3	3	3
Carlisle Muck	92	45	13.9	"	3	3	3	3
Sudbury	456A	8	2.5	Wet	3	3	2	1
TOTAL		322.5	100%					

* Urban Use Limitations: 1 = slight; 2 = moderate; 3 = severe (see back of this page for a further explanation of limitation classifications).

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.

Appendix B

Brief Species List - central portions of Killingworth peat removal site.

Tree layer coverage - 70%, dominant height - 20 m.

Acer rubrum	(Red Maple)
Chamaecyperis thyoides	(Atlantic White Cedar)
Pinus strobus	(White Pine)
Betula lutea	(Yellow Birch)
Fraxinus nigra	(Black Ash)

Shrub layer coverage - 80%, dominant height - 3 m.

Kalmia latifolia	Mountain laurel
Celthra alnifolia	Sweet pepperbush
Viburnum recognitum	Northern arrowwood
Ilex laevigata	Smooth winterberry
Ilex verticillata	Winterberry
Lindera benzoin	Spicebush
Sambucus canadensis	Elderberry
Rosa palustris	Swamp rose
Toxicodendron vernix	Poison sumac

Herb layer coverage - 15%, dominant height - 35 cm.

Coptis groenlandica	Gold thread
Symplocarpus foeditus	Skunk cabbage
Thelypteris simulata	Massachusetts fern
Osmunda cinnamomea	Cinnamon fern
Osmunda regalis	Royal fern
Thelypteris palustris	Marsh fern
Carex stricta	Tussock sedge
Carex folliculata	Sedge
Carex trisperma	Sedge
Glyceria striata	Fowl meadow-grass
Arisaema atrorubens	Jack-in-the-pulpit
Galium palustre	Marsh bedstraw

Moss layer coverage - 60%

Sphagnum spp.
Bazzania trilobata
Aulocommium palustris
etc.

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.