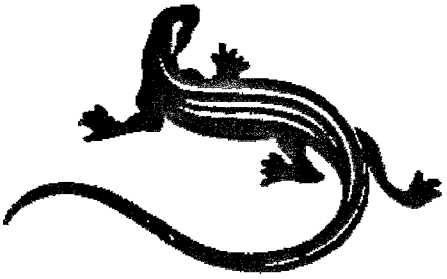

Clark Pond Construction

Killingworth, Connecticut
February 1990

EASTERN CONNECTICUT ENVIRONMENTAL REVIEW TEAM REPORT

Eastern Connecticut Resource Conservation and Development Area, Inc.

Clark Pond Construction

Killingworth, Connecticut

Review Date: December 12, 1989
Report Date: February 1990

EASTERN CONNECTICUT
ENVIRONMENTAL REVIEW TEAM
Eastern Connecticut
Resource Conservation and Development Area, Inc.
P.O. Box 70, Route 154
Haddam, Connecticut 06438
(203) 345-3977

ENVIRONMENTAL REVIEW TEAM REPORT
ON

Clark Pond Construction

Killingworth, Connecticut

This report is an outgrowth of a request from Killingworth Inland Wetlands and Watercourses Agency to the Middlesex County Soil and Water Conservation District (SWCD). The S&WCD referred this request to the Eastern Connecticut Resource Conservation and Development (RC&D) Area Executive Council for their consideration and approval. The request was approved and the measure reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The ERT met and field checked the site on Tuesday, December 12, 1989. Team members participating on this review included:

Steve Hill	Wildlife Biologist DEP - Eastern District Headquarters
Tom Ladny	Soil Conservationist U.S.D.A. - Soil Conservation Service
Dan Mayer	Environmental Analyst DEP - Inland Water Resources Division
Ken Metzler	Biologist DEP - Natural Resources Center
Brian Murphy	Fisheries Biologist DEP - Eastern District Headquarters
Elaine Sych	Environmental Review Team Coordinator Eastern Connecticut RC&D Area, Inc.
Bill Warzecha	Geologist/Hydrologist DEP - Natural Resources Center

Prior to the review day, each Team member received a summary of the proposed project, a list of the town's concerns, a location map, a topographic map, and a soils map. During the field review the Team members were given plans and

copies of a conservation plan. The Team met with, and were accompanied by members of the Planning and Zoning Commission and the Inland Wetlands and Watercourses Agency, the Wetlands Officer, the Zoning Enforcement Officer and the consultant for the applicant. Following the review, reports from each Team member were submitted to the ERT Coordinator for compilation and editing into this final report.

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

The Eastern Connecticut RC&D Executive Council hopes you will find this report of value and assistance in making your decisions on this proposed excavation project to create a pond.

If you require additional information, please contact:

Elaine A. Sych
ERT Coordinator
Eastern Connecticut RC&D Area
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Haddam, Connecticut 06438
(203)345-3977

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1. Location, Land Use, Zoning, and Topography

The Clark property, about 52 acres in size, is located southeast of Killingworth Center. Site boundaries include Chittenden Road, an unimproved town road on the northwest, Connecticut Route 80 on the north, Connecticut Route 81 on the west, and mainly residential properties on the east and south.

According to site plans made available to Team members on the review day, the applicant wishes to excavate a wildlife pond in a relatively large wetland at the site's northern limits. The wildlife pond, which would consist of 9.6 acres of open water, 3.3 acres of shallow marsh and 1.1 acre of island, would be hydraulically connected to an existing ±1.0 acre man-made pond in the central parts of the site. This pond was expanded from a smaller pond that existed on the site in 1965. A review of a 1934 air photo of the area indicates that no surface water body existed on the site. However, drainage ditches were dug in the area of the existing pond before 1934. The reason for this work is unknown. Most of the existing pond was expanded after 1980. Remnants of this activity include stock-piled soil materials in the vicinity of the pond.

It was indicated that approximately ±200,000 cubic yards of unconsolidated materials would be excavated in order to create the pond. Approximately 70% of these materials would comprise sand and gravel, while the remainder consists of organic material, i.e., peats and mucks. Assuming the total excavation is 200,000 cubic yards and the excavation rate equal to about 20-15 yard trucks per week day, it is estimated that the project duration would be 3-4 years, not taking into account the Killingworth Planning and Zoning Regulations concerning excavations.

The zoning map of Killingworth identified the northern and eastern limits of the site to be zoned commercial. The remainder of the site is zoned rural residential, which allows single family homes on lots of 80,000 square feet or larger. It is not known if the proposed wildlife pond would be located in the commercial zone, which may allow the mining of sand and gravel with certain provisions or by special permit. The zones and their respective boundaries should be shown on the plan. It is understood that mining sand and gravel in the residential zone would not be compatible and, therefore, require a variance or special exception permit.

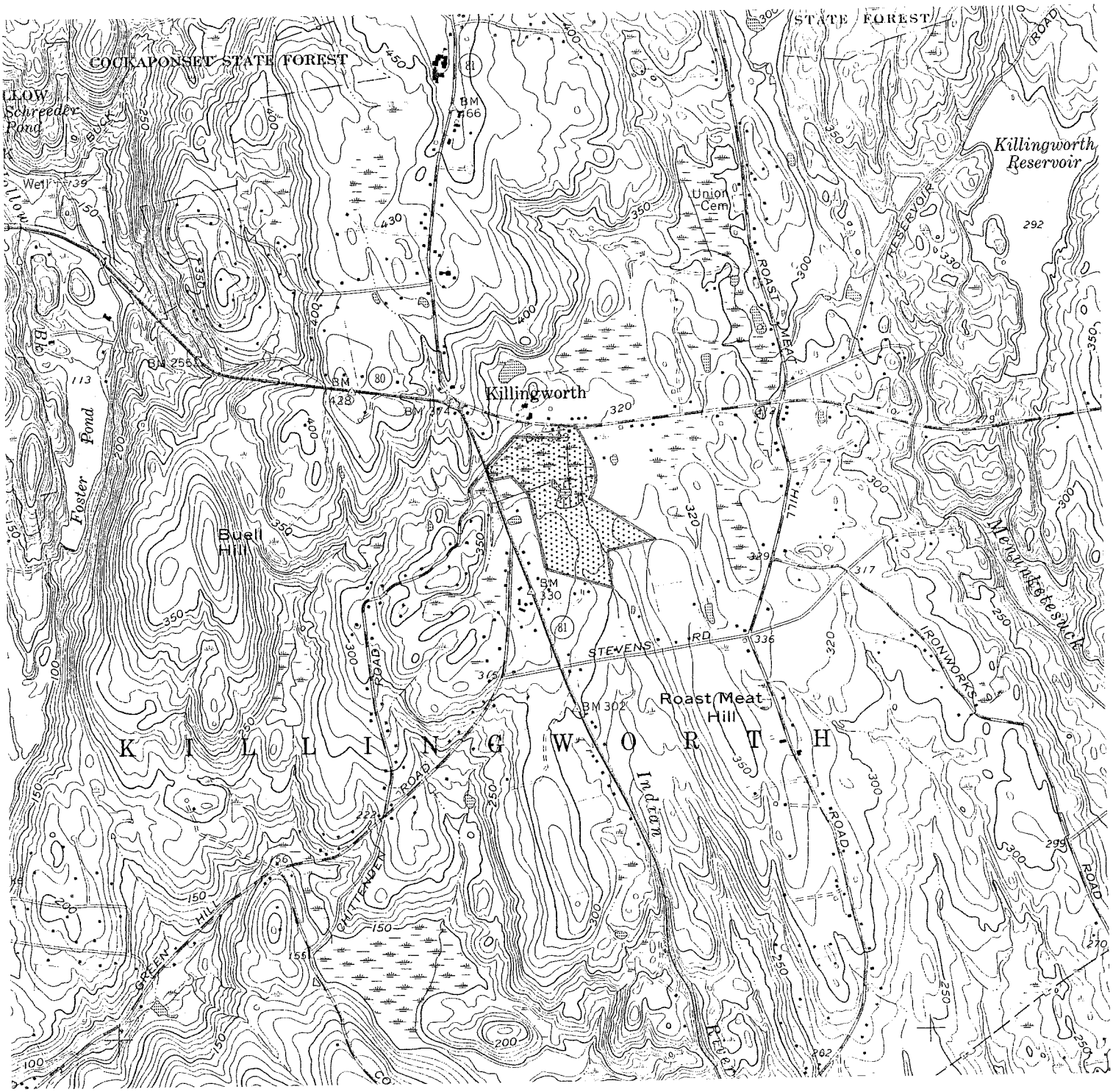
The site and vicinity have been historically used for single-family residential and agriculture uses. Transition to the present has retained the primarily residential use but there is an increase in commercial land uses, especially along Routes 80 and 81 in the town's center.

The proposed wildlife pond would be located in the wetland at the northern limits. Level slopes occur throughout this area. The remainder of the Clark property slopes gently (about 2%) to the Indian River, the outlet stream for the wetland which encompasses the proposed pond site.

LOCATION MAP

Scale 1" = 2000'

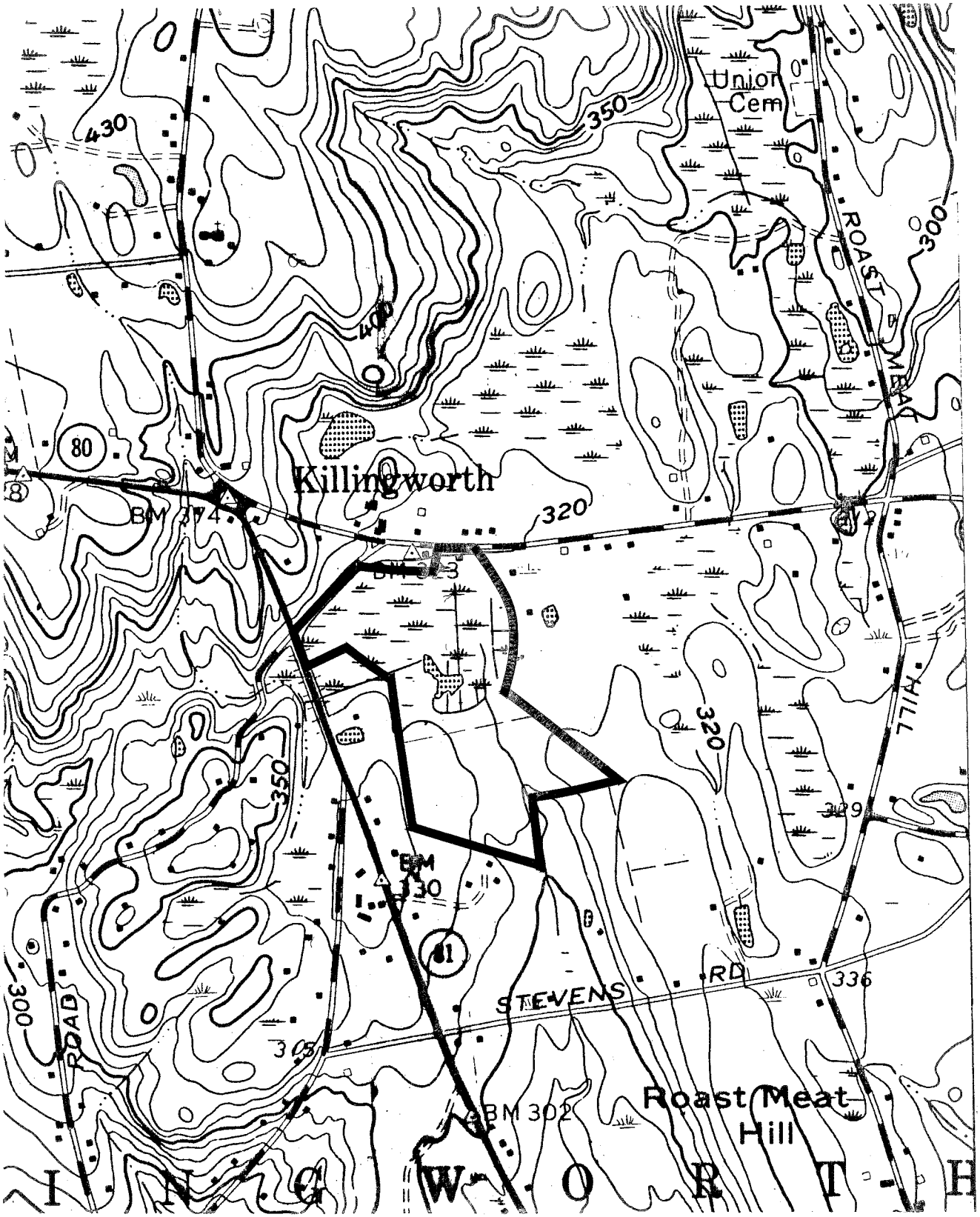
Approximate Site



TOPOGRAPHIC MAP

Scale 1" = 1000'

Approximate Site Boundary



2. Geology

The site is located entirely in the Clinton topographic quadrangle. A bedrock geologic map (QR-29, by L.L. Lundgren, Jr. and R.F. Thurrell, 1969 and 1970) and a surficial geologic map (QR-28, by R.R. Flint 1968 and 1969) for the quadrangle have been published by the Connecticut Geological and Natural History Survey. Both maps can be purchased at the Department of Environmental Protection's Natural Resources Center in Hartford. Also, cited for this section of the report is the Soil Survey for Middlesex County.

Bedrock exposures were not observed during the field walk in the vicinity of the proposed wildlife pond. Soil and bedrock geologic mapping data for the quadrangle indicates that bedrock is not exposed on the Clark property. The closest outcrops occur north and northwest of the property.

The bedrock underlying the site and much of the region is identified as Monson Gneiss, a light to dark, medium to coarse-grained gneiss. "Gneisses" are rocks in which bands of elongate minerals alternate with bands of minerals that have a blockier or more rounded shape.

The exact depth to the bedrock surface in the vicinity of the proposed wildlife pond is unknown. A review of map entitled Contour Map of the Bedrock Surface, Clinton Quadrangle, Connecticut, by F. P. Haeni, 1974, which is largely based on information or data from well completion reports, test holes and other geologic maps indicate that the depth to bedrock in the vicinity of the proposed wildlife pond probably ranges between 10 and 20 feet.

The applicant's technical consultant indicates that he wishes to excavate the pond to a maximum depth of 20 feet. Based on Haeni's map there is a possibility that bedrock will be encountered, particularly in the western parts, before reaching the 20 foot desired maximum depth. Depth to the bedrock surface increases moving west to east across the wetland. Borings that advance through earth materials in the area of the proposed pond will allow determination of the type, texture, and thickness of unconsolidated materials, depth to bedrock, if it is encountered, and depth to the water table. The location of the borings should be shown on the plan along with a description of the materials encountered in each hole as well as the other pertinent information mentioned above. Lastly, they should penetrate to the desired depth of the pond.

In consideration of soil and surficial geologic mapping data, those unconsolidated materials overlying bedrock in the vicinity of the proposed pond include glacially deposited sand and gravel (ice-contact stratified drift) and swamp sediments. The latter materials, which are post-glacial overlie the sand and gravel. They consist of silt, sand and clay mixed with organic matter in poorly drained areas. A thin layer of till probably occurs between the stratified drift and bedrock surface.

The proposed pond is located on the western edge of a massive deposit of sand and gravel located roughly between Route 81 and the Menunketusuck River and Steven Road and Union Cemetery. These materials were deposited by meltwater streams that emanated from chunks of glacier ice located in the Menunketesuck River Valley. Meltwater streams carried the accumulated rock particles and fragments from the stagnant portions of these ice tongues, depositing the material both near and far from the ice. Where deposited near the ice, the meltwater sediments, which are known as "ice contact stratified drift," principally consist of medium to coarse sand and gravel.

Map QR-28, mentioned earlier suggests that the surficial deposits in the vicinity of the proposed pond comprise "ice contact stratified drift." The exact thickness of these materials nor their texture are known. Testing, which includes soil borings will be needed to verify this information.

The sand and gravel deposits in the area of the proposed pond would be favorable for commercial uses mainly in the construction industry. These deposits are also generally rapidly permeable. Where saturated, relatively thick (usually 40 feet or greater) and close to a major streamcourse, they may be favorable for yielding moderate to large amounts of water to individual well(s). Hydrogeologic data are incomplete for the Clark property and vicinity, and therefore would require further investigation i.e., test holes, test wells, etc. to determine the aquifer potential of the stratified drift deposits in the area. To the Team's knowledge, there are no public water supply wells tapping the sand and gravel aquifer.

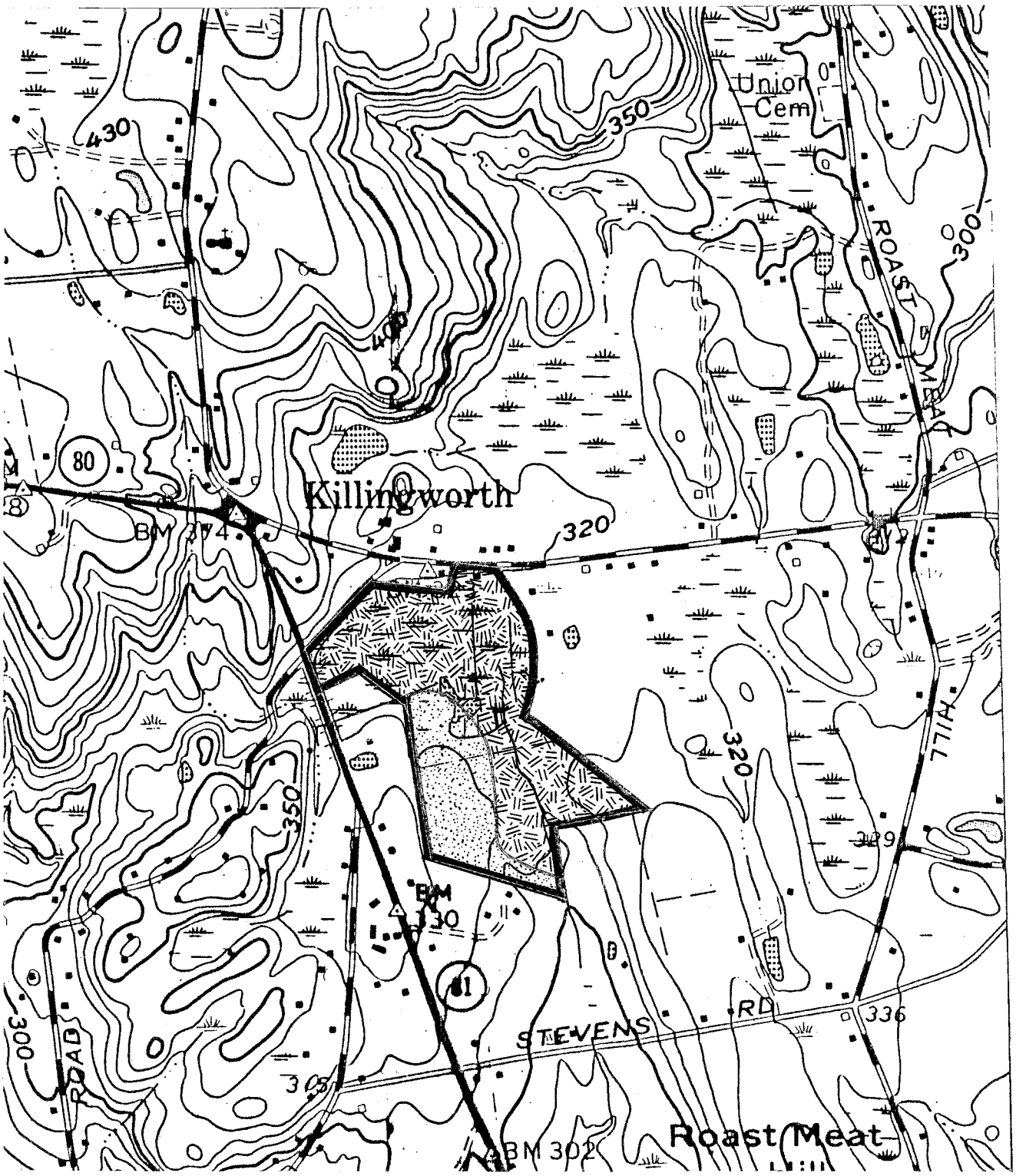
According to the Soil Survey of Middlesex County, the soil types that comprise the swamp deposits in the area of the proposed pond include Adrian muck (Aa) and Scarboro mucky loamy fine sands (Sc). Both are regulated inland-wetland soils. As such, the proposed wildlife pond will require a permit by Killingworth Inland Wetlands and Watercourses Agency.

GEOLOGIC MAP

Scale 1" = 1000'

Entire site is underlain by Monson Gneiss

Stratified Drift (sand and gravel)
Thick Till (probably 40' or greater)



3. Soil Resources

Soils

The soils involved in this proposal are of two basic soils groups: Aa - Adrian muck and Sc - Scarboro mucky loamy fine sand. Both soils are nearly level and very poorly drained. They are regulated wetlands as identified by the Inland-Wetland Act of 1972. These soils are subject to flooding and are poorly suited for cultivated crops, woodland production and community development.

Adrian muck is an organic soil formed in depressions of outwash terraces and glacial till plains. Typically, the top 24" - 34" is muck that is underlain with sand, loamy sand or fine sand. It contains an excessive amount of fines and humus which makes it unsuitable as construction material. The fines quickly become suspended during excavation and will remain suspended a relatively long time. Excavations are unstable and slopes are subject to slumping.

Scarboro muck, loamy fine sand is a deep very poorly drained soil formed on outwash plains, deltas and terraces. It typically has a thin black organic surface layer over a dark mucky loamy sand horizon, underlain by grayish loamy sand, coarse sand and loamy fine sand. This soil is poorly suited to trees, but it is better suited to woodland than to most other uses. Again, steep slopes of excavations are unstable and will slump. The water table is at or near the surface over half the year.

Information Clarification

The Conservation Plan Map distributed by Soil Resource Consultants during the ERT review on December 12, 1989 does not correspond with the original Conservation Plan Map and the Record of Cooperator's Decisions and Progress in Application (conservation plan) that is in the cooperator's official file maintained in the S.C.S. office at Middlesex Extension Building in Haddam. The differences are:

1) There is no pond proposed in section I, "wildlife". The conservation plan calls for managing this 19 acre section as wetland wildlife habitat and retaining it as "a shrub swamp by the removal of overtopping hardwoods during the winter months".

2) The only pond planned was a small 1/4 acre wildlife pond in section II, approximately 100 feet west of the existing house.

The Conservation Plan is dated 11/14/77; developed 2+ months after the date on the distributed conservation plan map. If a pond had been proposed for section I, it would have been discussed in the conservation plan. There is no such

discussion. Any implied planning or approval of this pond proposal by the USDA Soil Conservation Service is erroneous and the distributed conservation plan map is deemed misleading.

Erosion and Sediment Control

Section 5 of the Act Concerning Soil Erosion and Sediment Control (PA 83-388) requires that a soil erosion and sediment control plan be submitted with an application for development when the disturbed area of such development is more than one half acre. All towns have been required to incorporate the regulations of this act into their own town regulations. Killingworth has incorporated these regulations as required and specifies in Section 114(D) that a detailed erosion and sedimentation control plan be developed for projects for removal of earth products. Since the proposed project entails earth removal from an area of ±15 acres, it would be expected that a detailed erosion and sediment control plan will be developed and submitted for review and certification. Such plans have not been submitted to date, and it is safe to say that the comment about erosion and sediment control on the site plan given to Team members is not sufficient to meet such regulations for erosion and sediment control planning.

For a project of this magnitude and duration, erosion and sediment control and restoration will have to be properly planned and implemented. Additionally, there will have to be follow-up and enforcement by the town to insure that maximum protection is being used at all times. There are several mitigating avenues that can be followed or addressed to reduce the potential impact this project may incur. These include:

1. A complete and extensive erosion and sediment control plan as required by town and state regulations. This plan needs to be very specific in its narrative, the scheduling of the construction and erosion and sediment control sequences, winter/spring site protection, restoration and restabilization with permanent vegetation and responsibility for timely application and maintenance of all erosion and sediment measures.

2. Bonding to sufficiently cover the entire extent and duration of this project. This bonding should be of a guaranteed nature that is immediately accessible to the town should the need arise.

3. Restrictions on the amount of disturbed area and volume of removal for any one year.

4. Phased construction that would require restabilization of completed sections prior to significant disturbances to the next sections.

5. Permit renewals on an annual or 2-year period with renewal based on

satisfactory performance and erosion and sediment control and restabilization efforts.

6. Timely inspections and enforcement by the town. The person responsible for the erosion and sediment control measures should provide progress reports to the town as deemed necessary.

7. Restrictions on excavation during periods of expected high flows or adverse conditions. This usually occurs from mid-autumn to late spring.

8. Investigation of alternate construction and material removal methods to reduce the amount of sedimentation and suspension of fines that would occur. Dragline construction involves great disturbances just by its nature and would involve material handling at several stages.

9. Initial construction and removal in areas isolated from streams and concentrated overland flows. These areas of stream flow should be completed last during periods of low flow in mid to late summer. Temporary redirecting of the concentrated flows away from the construction area is an alternative for consideration.

10. Erosion and sediment control measures to be utilized. Besides isolating the work area, measures such as sediment and debris basins, temporary cover, fine mesh silt fencing for suspended fine removal, construction, entrance pads, spoil pile locations and removal specifications and other measures should be investigated in order to reduce possible detrimental effects.

11. Temporary and permanent vegetative cover. This is one of the most important measures that must be properly implemented and followed. The recommendations in Chapter 6 of the Guidelines For Soil Erosion and Sediment Control must be strictly adhered to and applied in a timely manner. Any restabilization methods using vegetated cover is virtually useless if applied after October 1. ***Restabilization efforts must be completed prior to October 1 to allow proper winter/spring protection.*** Every effort must be taken to reseed the disturbed areas immediately following regrading activities. The person responsible for implementing the erosion and sediment control measures must assume responsibility to this timely restabilization. If this fails to occur, bonding should be immediately pulled and applied to restabilization affects.

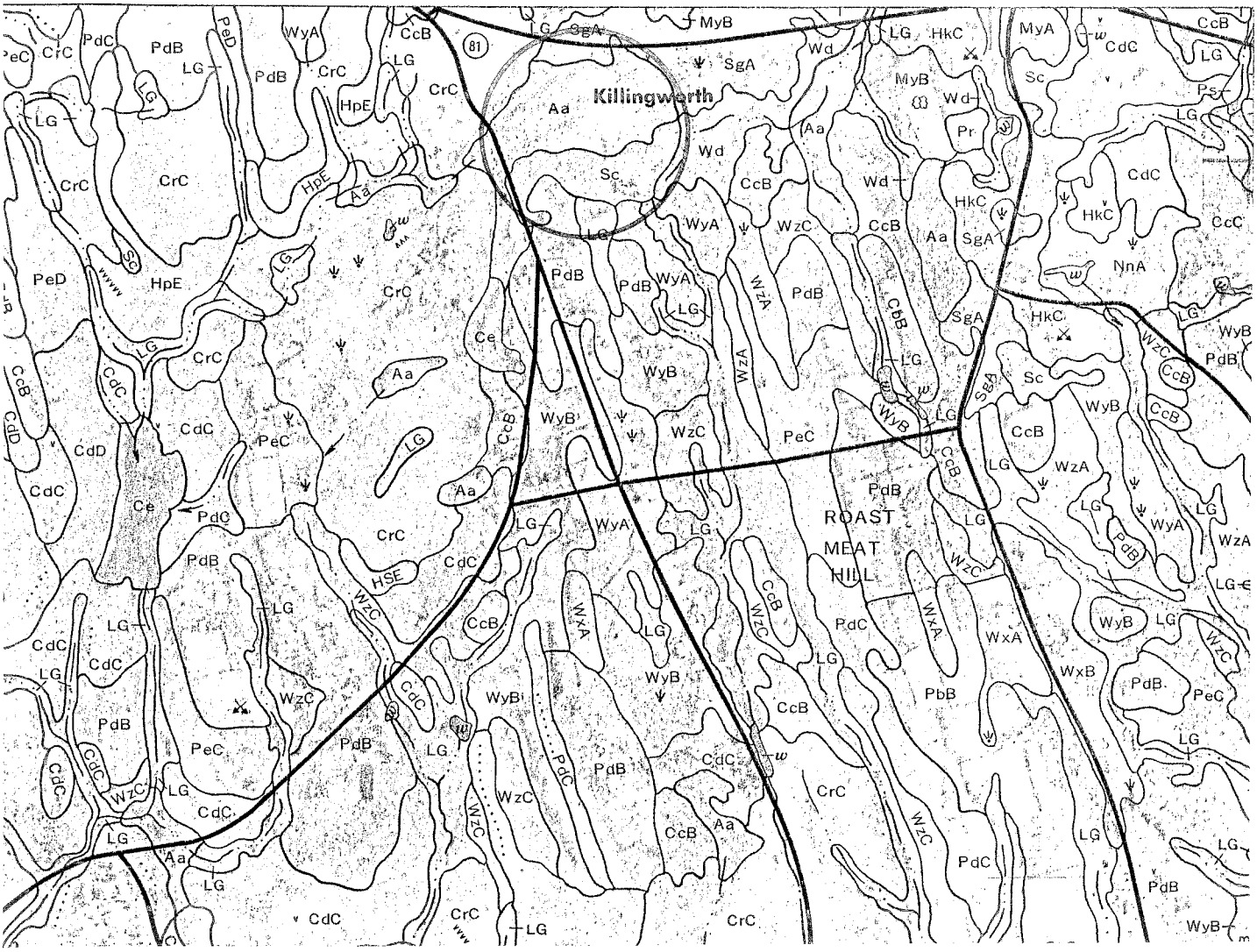
12. Winter shutdown provisions should be developed for protection during this period of reduced activity.

13. Immediate seeding of spoil piles with temporary cover. Sediment barriers would not provide complete protection.

14. Proper installation and maintenance of erosion and sediment control measures are critical. Inspection and approval of these measures by town officials should be conducted prior to issuance of final permits.

SOILS MAP

Scale 1" = 1320'



4. Hydrogeology

The site proposed for a wildlife pond is located in the upper regions of the Indian River watershed. At its point of outflow to Clinton Harbor (Long Island Sound), Indian River drains an area 7.91 square miles or 5,062 acres. Indian River will be the outlet stream for the proposed wildlife pond. From the intersection of Indian River and the outlet for the proposed pond, the River drains an area of about 262 acres or about 5% of its total drainage area.

Groundwater in the vicinity of the Clark property is classified by the Connecticut Department of Environmental Protection as GA, which means that it is suitable for private drinking water supplies without treatment. According to the Water Quality Classification Map of Connecticut by J.E. Murphy, 1987, the watercourses (e.g., Indian River) that occur on the site have not been classified by the Connecticut Department of Environmental Protection, but, by default, are considered class "A" water resources. Class "A" resources may be suitable for drinking, recreational, or other uses and may be subject to absolute restrictions in the discharge of pollutants, although certain discharges may be allowed.

The stratified drift deposits (sand and gravel). which will be mined during the pond excavation are primarily recharged by infiltrating precipitation. They also obtain recharge from the infiltration of streams and other surface flow from surrounding upland areas and by man-made sources such as road drainage and septic systems.

Sand and gravel (stratified drift), because of its permeability and topographic position, receives more infiltrating precipitation than bedrock or till, which occurs in the southern parts of the Clark property. Recharge to bedrock and till is estimated to be about one third of that seen in stratified drift.

The proposed wildlife pond would be excavated into the sand and gravel deposits in an area where the water table is very close to the surface. Assuming that upon completion, the pond is 14 acres in size and has a medium depth of 8 feet, then its total capacity is estimated to be about 34 million gallons. The latter is based on a storage volume of 104 acre/feet. [One acre foot is equal to the amount of water to a depth of 1 foot over 1 acre, a total of 325,851 gallons.]

Using a publication entitled "Building a Pond",U.S. Department of Agriculture, Farmers Bulletin No. 2256, the approximate number of acres needed in the watershed above the proposed pond for each acre foot of water to be stored is estimated to be roughly 182 acres (1.75 acres for every acre foot of water stored). The drainage area for the proposed pond, which is about 262 acres, thus representing about 1.5 times the acreage that would be required using the above figures.

Although there is no gaging station near the proposed pond site, it is possible to estimate the flow duration characteristics of the River at the proposed pond using a method described in Connecticut Water Resources Bulletin No. 24 (Upper Connecticut River Basin). The estimates are tabulated below in units of both cubic feet per second (CFS) and millions of gallons per day (MGD). These figures are based on statewide distribution of average streamflow for a standard 30 year reference period October 1, 1930 through September 3Q, 1960.

Table 1

Estimated flow duration characteristics of Indian River at the proposed pond outlet.

Percent of time flow equal/or exceeded	1	10	30	50	80	90	95	99
Flow equalled or exceeded in million gallons per day	2.9	1.13	.58	.32	.087	.05	.03	.014
Flow equalled or exceeded in CFS	4.51	1.76	.9	.5	.135	.077	.05	.0225

It is also possible to estimate the mean annual outflow from the watershed at the outlet of the proposed pond by using a method outlined in the Connecticut Department of Environmental Protection Bulletin No. 35 Streamflow Information for Connecticut with Applications to Land-Use Planning by Michael A. Cervione. Jr. The mean annual outflow from Indian River at the proposed pond outlet is estimated to be about .8 cubic feet per second or .5 million gallons per day. According to the chart above the mean annual outflow is equalled or exceeded slightly more than 30% of the time.

Groundwater Budget Data for the Proposed Project

The water level in the wetland and existing pond on the Clark property depends, as with any other watershed area, on the seasonal and long-term water budget. This water balance can be expressed as:

$$P = Rs + Rg + ET + S$$

Where:

P = precipitation
Rs = surface water runoff
Rg = groundwater runoff
ET = evapotranspiration
S = change in storage

Changes in storage are balanced over time, but may be significant on a seasonal basis or during times of above average rainfall or drought. For example, the most severe drought on record occurred during the 1960's. It is known that during this period dry land areas which would now be recognized as having wetland soils were encroached upon by on-site sewage disposal systems for various developments. In the 1970's, when above average rainfall occurred, septic system failure occurred when the ground water table rose back up to more normal levels.

In an average year, groundwater levels are lowered during the growing season when evapotranspiration demands are high and fall back during the fall and winter months when the infiltration of precipitation.

Precipitation

Based on The Climate of Connecticut, Brumback, 1965, the median annual precipitation for the vicinity of the Clark property is about 48 inches.

Evapotranspiration

Evapotranspiration is the combined loss of water occurring as a result of direct evaporation and plant transpiration. In Connecticut, evapotranspiration is estimated to be about 50 percent of precipitation, or about 24 inches annually (based on 48" of annual rainfall). Evaporation from open water bodies in this region is about 30 inches annually. Thus, in general, water losses to the atmosphere are greater from lakes or ponds than from uplands. However, wetland areas where the groundwater table is at or very near the land surface also have high evapotranspiration rates. This is why it feels humid near wetlands on warm days.

While there would be some adjustment in the balance of evapotranspiration from wetlands versus evaporation from surface water bodies, it is expected that these changes would probably be too small to quantify for the proposed wildlife pond.

Surface Water Runoff

Surface water runoff is direct runoff as sheet runoff and streamflow. Total streamflow includes such direct runoff plus groundwater outflow, which will be discussed below. As noted earlier estimates of streamflow on ungaged streams can be developed by a method outlined in Connecticut Department of Environmental Protection Bulletin No. 35 (Cervione, 1982). The watershed area for the proposed pond as measured by a computerized planimeter, is .4 square miles; thus, average total water runoff is calculated to be 500,000 gallons per day.

Groundwater Runoff

As mentioned earlier, stratified drift, because of its permeability and topographic position, receives more infiltrating precipitation than bedrock or till. Consequently, the average annual groundwater runoff varies with the percentage of the drainage basin underlain by stratified drift. When not exploited by water supply wells, that recharge eventually percolates through the aquifer to discharge to the surface water system i.e., Indian River. Studies comparing stream base flow, the portion of streamflow derived from groundwater, with the percent stratified drift in a basin have been used to analyze this relationship and develop methods for estimating the amount of groundwater outflow occurring in a particular setting. (Connecticut Water Resources Bulletin No. 35, Cervione, 1982)

The geology underlying Indian River watershed at its point of outflow of the proposed pond is estimated to comprise ten percent stratified drift. Based on regression analysis by the U.S. Geological Survey, the groundwater outflow is about 40 percent of surface runoff or about 200,000 gallons per day. This water discharges to the Indian River aquifer system (Connecticut Water Resources Bulletin No. 27, D. Mazzaferro et. al., 1979).

Groundwater Gradient

Groundwater elevations for the site are unknown. Monitoring wells in the area of the proposed pond would need to be installed and measured in order to determine groundwater gradients. Based on the stratified drift deposits and topography, it is expected that the groundwater gradient in the vicinity of the proposed pond is relatively flat.

Pond Construction/Mining Activity

Details on the manner in which the unconsolidated materials (sand and gravel and organic material) would be removed were not available during the pre-review

meeting. The applicant's technical consultant indicated that the materials would probably be removed by dragline bucket.

If permitted the excavation and dredging of the pond will inevitably disturb and mobilize fine-grained particles. In order to avoid environmental damage to local watercourses on and off site, it will be important to contain and filter disturbed water. As such, a thorough erosion and sediment control plan will be required and should be strictly enforced by the town. The plan should provide protection to contiguous wetlands that will not be excavated and Indian River mainly during the excavation period. The use of hay bales, silt fences, anti-tracking devices, and settling basins will help to protect off-site transport of fine-grained earth materials. In addition, a phasing plan should describe clearing, grubbing, stockpiling of materials, finished grades for the side banks of the pond which should not be steeper than 3:1, reseeding, and final reclamation of the area. Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, should be referenced during the preparation of the plan.

Finally, the applicant and prospective contractor must fully understand the hydrogeologic characteristics of the sand and gravel in the vicinity of the excavated pond and their responsibility for maintaining existing water quality. Of special concern, will be methods for the appropriate handling, storage and disposal of excavation machinery, especially hydrocarbons and petroleums used for equipment maintenance and fuel. These materials should not be stored on the site. Also, refueling and maintenance of excavation equipment should not take place over the sand and gravel aquifer.

At least initially, it seems likely that there would be a minor drain on the sand and gravel aquifer system in the immediate area to fill the pond. As each dragline bucket is removed, water will fill the void draining the local water from around it. This effect would be gradual, a one time event and would stabilize once the excavation was completed. Nevertheless, there is a chance that nearby wells, especially the dug type, which tap the local water level, may be temporarily affected by the work. If these type of wells exist in proximity to the proposed pond, background data (water quality, quantity, etc.) should be collected and groundwater levels monitored during the pond construction to verify whether or not there are significant changes.

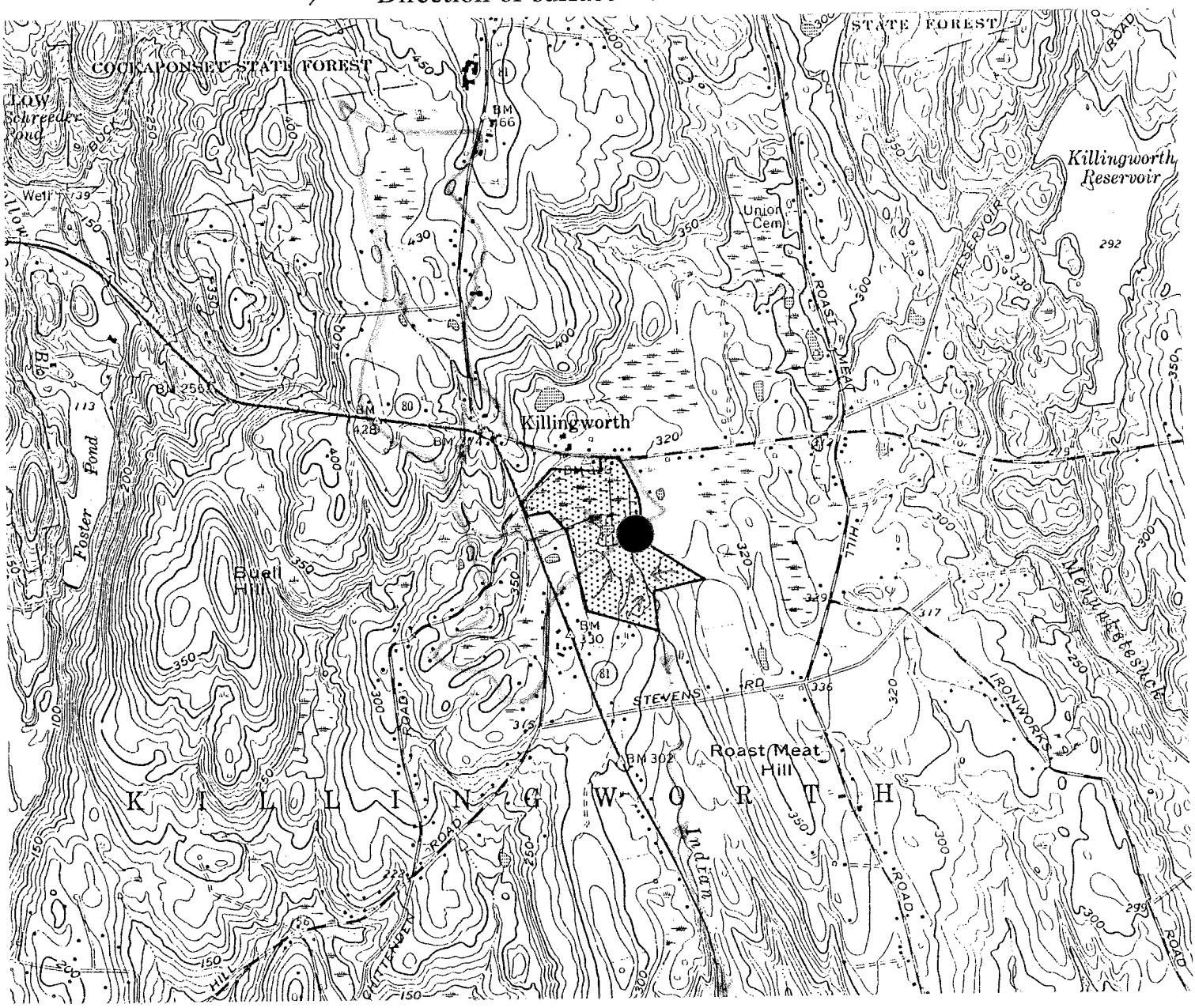
The wetlands to be excavated serve many obvious hydrological and ecological functions. They act as natural runoff retention basins, reducing downstream flood flows during storms. They trap sediments from upstream areas. They change water quality through biochemical processes, often resulting in clearer water. They also serve as habitat for many species of animals and plants. For these reasons and others, the proposed ±14 acre pond needs to be studied very carefully from a hydrologic, ecologic and biologic standpoint.

In reviewing the proposal, the Inland Wetland Commission needs to determine the impact of replacing the wetland with an open waterbody. If the Commission determines the wetland is serving an important hydrological or ecological function and that the impact of the activity will be significant they may deny the activity altogether or, at least, require measures that would minimize the impact, i.e., reduction in the size of the pond.

WATERSHED BOUNDARY MAP

Scale 1" = 2000'

Watershed Boundary
Point of outflow (intersection of the proposed pond outlet and the Indian River
Watercourses showing direction of flow
Direction of surface flow



5. Wetland Review

Site Description and Proposed Activity

The site under review is located at the southeast corner of the intersection of Routes 80 and 81. The entire parcel is approximately ±52 acres in size, of which approximately ±19 acres are classified as wetlands. The parcel has little to no change in elevation, but drains to the south through a ditch into the Indian River. The delineated wetland soils consist of Adrian mucks and Scarboro mucky loamy fine sand.

The applicant is proposing to excavate approximately 198,634± cubic yards of sand and gravel from approximately ±14 acres of wetlands for the stated purposes of habitat improvement and recreational use. After completion of the proposed activities the site would contain a ±9.6 acre pond and approximately ±3.3 acres of created marshes,the remaining acreage would either be left in its natural state or remain as island areas within the pond. Due to restrictions on earth removal within the Town of Killingworth's Planning and Zoning Regulations the proposed activity would have to be conducted over an extended period of time, roughly 5 to 10 years, unless a special exception is granted. During the review meeting it was explained that the materials would be removed by a dragline, sidecast and temporarily stored on site and allowed to drain. No washing of the excavated materials would be performed and all excavated materials would be removed from the site. The excavated area would reach a maximum depth of 20 feet, and be approximately 2 - 3 feet deep within the proposed marsh areas.

Wetland Functions and Impacts

The wetlands on site comprise a large portion of the headwaters of the Indian River which flows into Long Island Sound approximately ±6.3 miles from the site of the proposed activity. This area is very flat and drainage has been enhanced by several ditches which extend south of the wetland under a driveway and into the Indian River. The majority of the system is either forested or shrub swamp with a small open waterbody located in its southern portion. As defined by the U.S. Fish and Wildlife Service's National Wetlands Inventory this wetland is classified as follows:

PFO/SS1Ed ***Palustrine, forested, shrub-scrub, broad leaved deciduous, seasonally saturated, partially drained/ditched.***

This wetland is densely vegetated and provides excellent habitat, including food sources and shelter, for birds and small mammals. This wetland also provides for the filtration of sediments, and other contaminants which may enter the

watershed, prior to waters discharging into the Indian River. In all likelihood this area probably performs significant water storage functions during storm events, and metering functions during drier periods of the year. However, the application does not address any hydraulic concerns, making any conclusions on the role and value of this wetland with regard to the above functions speculative. Due to the quality of habitat in this area the recreational and educational potential of the site is high, however, access to and movement through the area is difficult. Lastly, the area does possess aesthetic and open space value, but since the proposal does not contain any permanent structures, these values would only be temporarily disturbed and no long term impact would occur.

The impacts which could be expected if the proposed activity is allowed would be significant. The excavation of the existing wetland system and creation of an open waterbody of the size proposed by the applicant would result in a reduction in the vegetative diversity of the parcel and displacement of wildlife within the area. Due to the expected time for the completion of the removal activities, there would be ongoing disturbances to wildlife, and to the aesthetic value of the site. Given the nature of the soils found on the site and the type of activities proposed the potential for sedimentation and stabilization problems is high. If the site were to experience a large storm event, 50 or 100 year, during a period of excavation activities, the transportation of sediments and other fine material from the site could have serious adverse impacts to habitats downstream of the site. Since there is no technical information contained within the application which examines the existing hydrology of the site, or contrasts proposed hydrology, it is very difficult to determine what the expected rates of sediment transport would be, regardless of storm events.

There is also a question as to the prudence of replacing a diverse shrub/forested and open water system with a large open waterbody system, especially if wildlife use and improvement is the goal of the activity. Despite the intentions of the applicant to create shallow marsh and emergent areas, the commission should be conservative in their expectations and regard those areas as creation attempts since their functional value as emergent systems is not guaranteed. There will also be a significant loss of surface water renovation capacities within the watershed and a potential increase in the water temperature downstream of the site due to thermal warming.

Recommendations and Conclusions

1) It does not appear that the applicant has fully considered the implications and impacts to wildlife which would result from the proposed activities. Since the stated purpose if the project is to improve wildlife habitat the no-build alternative may prove to be the most feasible and prudent.

2) Since the proposed activities may result in significant modifications to the

hydraulics of the watershed a thorough review of the existing and proposed hydraulic conditions should be submitted as a portion of the application materials. Until such technical information is received it is impossible for the commission to fully consider and evaluate many essential aspects of the proposed activity.

3) Many aspects of the application were incomplete and should be addressed prior to the commission making any final decision. Such information should include a narrative of project phasing, a map and narrative of erosion and sediment control plan, a map showing access roads and spoils areas to be used during the excavation activities, an environmental inventory, and a pre- and post-construction hydraulic analysis. In addition if the commission has any other concerns they should request the information to be submitted as part of the application.

4) Based upon a delineation of the contributing watershed to this area, and consultation with staff, this project must be submitted to the Inland Water Resources Division of DEP for a Diversion Permit. However, this permit requirement and any other which may be needed, including a Federal 404 Permit, does not have any bearing on the analysis or decision by the local commission.

In conclusion, the proposed activity does not appear to be the most prudent or feasible in light of the stated purposes and uses for the site. Additionally, application materials are grossly insufficient for the purposes of a full and proper evaluation of the proposed activities.

6. Natural Diversity Data Base

The Natural Diversity Data Base maps and files regarding the project area have been reviewed and according to the information, there are no known extant populations of Connecticut "Species of Special Concern" or Federal Endangered and Threatened Species that occur at the site in question.

Natural Diversity Data Base information includes all information regarding critical biologic resources available to us at the time of the request. This information is a compilation of data collected over the years by the Natural Resources Center's Geological and Natural History Survey and cooperating units of DEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigions. Consultation with the Data Base should not be substituted for on-site surveys required for enviornmental assessments. Current research projects and new contributors continue to add new information that is incorporated into the Data Base as it becomes available.

7. Wildlife Resources

Habitat Type Descriptions

The habitat types on this property includes mixed hardwood forest, and wetland areas. The variety of habitat types provides for a diversified wildlife population. Examples of wildlife species in each habitat is provided along with an appendix of species likely to be found in these areas.

Mixed Hardwood Forest

This habitat consists of a variety of hardwood species including red maple, beech, red oak, elm, hickory and birch. Understory vegetation includes witchhazel, elderberry, multiflora rose, grape, blackberry, and hardwood regeneration. Wildlife frequenting such habitat types include deer, fox, raccoon, gray squirrel, woodpeckers (pileated, hairy and downy), ovenbirds, scarlet tanagers, black-throated blue and green warblers, barred owls, broad-winged hawks and various non-game species such as shrews, voles and snakes.

Wetlands

This habitat type consists of forested and shrub wetland areas. Vegetation consists of red maple, sweet pepperbush, highbush blueberry, winterberry, spicebush, swamp azalea,and silky dogwood. A small pond located near the existing residence appears to have been excavated in the past. Snags with numerous cavities are scattered throughout the area. The wetland complex has a high value for wildlife due to the diversity of cover types. Wetland forested areas provide habitat for a variety of bird species. Species frequenting such habitat include hairy woodpecker, blackcapped chickadee, tree swallow, common yellow-throat, red-eyed vireo, red-winged blackbird, and eastern peewee. Waterfowl species such as black ducks and mallards would utilize the wetland areas. Numerous amphibians and reptiles including water and garter snakes, salamanders, newts, and spotted and painted turtles are likely to use this wetland.

Impacts of Development

The proposed project will dramatically alter the wetland system by converting 14 acres of forested and shrub wetland to open water. This will convert complex habitat with a high species richness to a relatively simple system that will support fewer numbers and species of wildlife.

Species List

REPTILES

Common Snapping Turtle
Painted Turtle
Spotted Turtle
Wood Turtle
Eastern Box Turtle
Eastern Worm Snake
Eastern Ribbon Snake
Northern Black Racer
Northern Ringneck Snake
Black Rat Snake
Eastern Milk Snake
Eastern Smooth Green Snake
Northern Redbelly Snake
Eastern Garter Snake

AMPHIBIANS

Jefferson's Salamander
Spotted Salamander
Marbled Salamander
Northern Dusky Salamander
Northern Two-lined Salamander
Northern Spring Salamander
Four-toed Salamander
Redback Salamander
Slimy Salamander
Mudpuppy
Red-spotted newt
Eastern American Toad
Northern Spring Peeper
Gray Tree Frog
Bullfrog
Green Frog
Pickerel Frog
Northern Leopard Frog
Wood Frog

MAMMALS

Opossum
Masked Shrew
Water Shrew
Smoky Shrew
Short-tailed Shrew
Least Shrew
Hairy-tailed Mole
Eastern Mole
Star-nosed Mole
Little Brown Bat
Keen's Myotis
Silver-haired Bat
Eastern Pipistrelle
Big Brown Bat
Red Bat
Hoary Bat
Eastern Cottontail
Eastern Chipmunk
Woodchuck
Gray Squirrel
Red Squirrel
Beaver
Deer Mouse
White-footed Mouse
Boreal Red-backed Vole
Meadow Vole
Woodland Vole
Muskrat
Southern Bog Lemming
Norway Rat
House Mouse
Meadow Jumping Mouse
Wood!and Jumping Mouse
Porcupine
Coyote
Red Fox
Gray Fox
Raccoon
Short-tailed Weasel
Long tailed Weasel
Mink
Striped Skunk

Southern Flying Squirrel
White-tailed Deer

River Otter

BIRDS

Northern Goshawk
Broad-winged Hawk
Rough-legged Hawk
American Kestrel
Ring-necked Pheasant
Wild Turkey

Killdeer
Mourning Dove
Yellow-billed Cuckoo
Eastern Screech Owl
Barred Owl
Short eared Owl
Common Nighthawk
Whip poor-will
Ruby-throated Hummingbird
Red-headed Woodpecker
Yellow bellied Sapsucker
Hairy Woodpecker
Pileated Woodpecker
Eastern Wood-Pewee
Acadian Flycatcher
Willow Flycatcher
Eastern Phoebe
Eastern Kingbird
Purple Martin
Northern Rough-winged Swallow
Cliff Swallow
American Crow
Black capped Chickadee
Red-breasted Nuthatch
Brown Creeper
House Wren
Marsh Wren
Northern Mockingbird
Eastern Bluebird
Gray cheeked Thrush
Hermit Thrush
American Robin
Ruby crowned Kinglet

Red-shouldered Hawk
Red-tailed Hawk
Sharp-shinned hawk

Ruffed Grouse
Northern Bobwhite
American Woodcock

Common Barn-Owl
Great Horned Owl
Long-eared Owl
Northern Saw-whet Owl
Chuck will's-widow
Chimney Swift
Be#ted Kingfisher
Red bellied Woodpecker
Downy Woodpecker
Northern Flicker
Olive-sided Flycatcher
Yellow-bellied Flycatcher
Alder Flycatcher
Least Flycatcher
Great Crested Flycatcher
Horned Lark
Tree Swallow
Bank Swallow
Blue Jay
Fish Crow
Tufted Titmouse
White-breasted Nuthatch
Carolina Wren
Winter Wren
Gray Catbird
Brown Thrasher
Veery
Swainson's Thrush
Wood Thrush
Golden-crowned Kinglet
Blue-gray Gnatcatcher

Cedar Waxwing
Loggerhead Shrike
White-eyed Vireo
Yellow-throated Vireo
Philadelphia Vireo
Blue-winged Warbler
Tennessee Warbler
Nashville Warbler
Yellow Warbler
Yellow-rumped Warbler
Magnolia Warbler
Black-throated Blue Warbler
Pine Warbler
Palm Warbler
Blackpoll Warbler
Black and White Warbler
Prothonotary Warbler
Ovenbird
Louisana Waterthrush
Connecticut Warbler
Common Yellowthroat
Wilson's Warbler
Yellow-breasted Chat
Northern Cardinal
Indigo Bunting
Rufous-sided Towhee
Chipped Sparrow
Vesper Sparrow
Fox Sparrow
Lincoln's Sparrow
White throated Sparrow
Dark-eyed Junco
Red-winged Blackbird
Rusty Blackbird
Brown-headed Cowbird
Northern Oriole
Purple Finch
Red Crossbill
Common Redpoll
American Goldfinch
House Sparrow

Northern Shrike
European Starling
Solitary Vireo
Warbling Vireo
Red-eyed Vireo
Golden-winged Warbler
Orange-crowned Warbler
Northern Parula
Chestnut-sided Warbler
Black-throated Green Warbler
Cape May Warbler
Blackburnian Warbler
Prairie Warbler
Bay-breasted Warbler
Cerulean Warbler
American Redstart
Worm-eating Warbler
Northern Waterthrush
Kentucky Warbler
Mourning Warbler
Hooded Warbler
Canada Warbler
Scarlet Tanager
Rose-breasted Grosbeak
Dickcissel
American Tree Sparrow
Field Sparrow
Sharp-tailed Sparrow
Song Sparrow
Swamp Sparrow
White-crowned Sparrow
Bobolink
Eastern Meadowlark
Common Grackle
Orchard Oriole
Pine Grosbeak
House Finch
White-winged Crossbill
Pine Siskin
Evening Grosbeak

Species potentially inhabiting habitats of study area.
* Connecticut Wildlife checklist of birds, mammals, reptiles and amphibians.

8. Fish Resources

Site Description

The sand and gravel operation, as a "pond creation", will result in the excavation of ±14 acres of wetlands. Existing wetland habitat on the property site which is located at the junction of Routes 80 and 81 will be altered and transformed into open water pond habitat. These wetlands are part of the upper Indian River headwaters. This report will address impacts to wetlands/local aquatic resources and delineate appropriate measures to mitigate impacts.

Fish Population

Outflow from the property wetlands form the headwaters of the Indian River. Habitat capable of supporting stream fishes is found south of the Stevens Road crossing. This stream is annually stocked by the DEP Bureau of Fisheries and Wildlife with yearling brook trout. Other fish species expected to inhabit the stream are: native brook trout, blacknose dace, fallfish, white sucker, and common shiner. Since thc Indian River is a coastal stream, a wide variety of marine and estuarine fishes would be found in the lower stretches of the stream within the town of Clinton.

Surface waters of the unnamed brook are classified by the Department of Environmental Protection (DEP) as "Class A". Designated uses for this classification are: potential drinking water supply, fish and wildlife habitat, recreational use, agricultural and industrial supply, and other legitimate uses.

Impacts

1. Loss and degradation of wetland habitat. Proposed gravel mining operations will cause a permanent loss of 14 acres of invaluable wetland habitat. Wetlands are beneficial in several ways. They serve to: (1) control flood waters by acting as a water storage basin, (2) trap sediment from natural and man-made sources of erosion, and (3) help filter-out pollutants from runoff before they enter watercourses. The loss of these wetlands can degrade water quality of Indian River or alter the low flow regime. Maintenance of low flows is critical to the survival of stream fishes.

2. Site soil erosion and sedimentation of Indian River from gravel mining areas. Mining activities will suspend sediments within local waters creating extreme turbid conditions. If not properly contained, turbid waters will cause stream degradation in downstream areas. Excessive sediment deposition could damage the aquatic ecosystem in the following ways:

(1) Sediment reduces the survival of resident fish eggs, aquatic insects, and the amount of usable habitat required for spawning purposes.

(2) Sediment contributes to the depletion of dissolved oxygen (CTDEP 1989). Organic matter associated with soil particles is readily decomposed by microorganisms thereby effectively reducing oxygen levels.

3. Impacts to downstream environments. Any water quality and habitat degradation that occurs as a result of mining activities may eventually be observed in downstream areas. Heavy stream siltation events due to gravel mining operations have been documented at other locations in eastern Connecticut. Consequently, it is critical that the town review this development not only as to potential impacts on a local site specific basis, but also on a "watershed-wide" basis. This approach will insure that vital aquatic resources and wetlands within the entire watershed are properly protected.

Recommendations

Excavation should not be allowed within the undisturbed wetlands. Existing wetland habitat is too valuable to be destroyed for the purpose of sand and gravel excavation. It is doubtful that a project which will result in such a large and irreplaceable loss of wetlands will receive approval from federal agencies that regulate inland wetlands. Recent policies of these agencies are geared towards "no-net" loss of wetlands.

Bibliography

CTDEP (Connecticut Department of Environmental Protection) 1989. Non Point Source Pollution: An Assessment and Management Plan. CTDEP, Hartford.

ABOUT THE TEAM

The Eastern Connecticut Environmental Review Team (ERT) is a group of professionals in environmental fields drawn together from a varety of federal, state and regional agencies. Specialists on the Team include geologists, biologists, foresters, soil specialists, engineers and planners. The ERT operates with state funding under the supervision of the Eastern Connecticut Resource Conservation and Development (RC&D) Area --- an 86 town region.

The services of the Team are 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, landfills, commercial and industrial developments, sand and gravel excavations, 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 official 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 and the ERT Coordinator. A request form should be completely filled out and should include the required materials. 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 and request forms regarding the Environmental Review Team please contact the ERT Coordinator: 203-345-3977, Eastern Connecticut RC&D Area, P.O. Box 70, Haddam, Connecticut 06438.