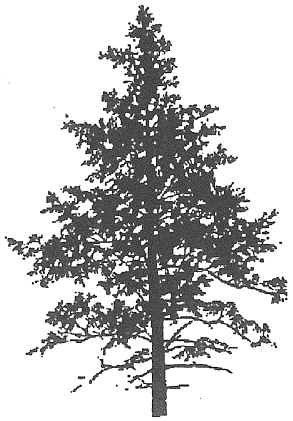
COMSTOCK RIDGE SUBDIVISION



EAST HAMPTON, CONNECTICUT

Eastern Connecticut Environmental Review Team Report

Eastern Connecticut
Resource Conservation and Development Area, Inc.

COMSTOCK RIDGE SUBDIVISION

East Hampton, Connecticut

Environmental Review Team Report

Prepared by the
Eastern Connecticut Environmental Review Team
of the
Eastern Connecticut
Resource Conservation and Development Area, Inc.

for the
Planning and Zoning Commission
East Hampton, Connecticut

August/September 1998

CT Environmental Review Teams
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Acknowledgments

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

The Eastern Connecticut Environmental Review Team Coordinator, Elaine Sych, would like to thank and gratefully acknowledge the following Team members whose professionalism and expertise were invaluable to the completion of this report.

The field review took place on Thursday, July 23, 1998.

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Rob Rocks	Forester DEP - Eastern District (860) 295-9523

I would also like to thank James Carey, land use administrator, Peter Carli, the applicant and Richard Dimmock, the project engineer, for their cooperation and assistance during this environmental review.

Prior to the review day, each Team member received a summary of the proposed project with location and soils maps. During the field review Team members were given additional plans and information. 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 plans 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 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 reviewing this proposed subdivision.

If you require additional information please contact:

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Introduction

Introduction

The East Hampton Planning and Zoning Commission has requested assistance from the Eastern Connecticut Environmental Review Team in conducting a review of a proposed subdivision.

The ±130 acre site is located on Waterhole Road which forms the East Hampton/Colchester town line. The site is zoned R-1, with a minimum 80,000 square foot lots. The proposed subdivision known as Comstock Ridge is composed of 48 single family house lots with on-site sewage disposal and water supply wells. A 6500' through road is planned that will connect with North Moodus Road in East Haddam. There is an existing house and outbuildings on Waterhole Road. The site contains pasture, woods, ponds, streams and wetlands and is in the Salmon River watershed. The road contains one wetland crossing and a 320,000 square foot pond is proposed.

Objectives of the ERT Study

The Commission has asked for assistance and guidance in determining the appropriateness of the subdivision design with concerns in the following areas: soil erosion and sediment control, stormwater management, wetland impacts and vernal pool information, previous land use, fisheries impacts, watershed impacts, site design, traffic and access and archaeological significance.

The ERT Process

Through the efforts of the planning and zoning commission this environmental review and report was prepared for the Town of East Hampton.

This report provides an information base and a series of recommendations and guidelines which cover the topics requested by the commission. Team members were able to review maps, plans and supporting documentation provided by the applicant.

The review process consisted of four phases:

1. Inventory of the site's natural resources;
2. Assessment of these resources;
3. Identification of resource areas and review of plans; and
4. Presentation of education, management and land use guidelines.

The data collection phase involved both literature and field research. The field review was conducted on Thursday, July 23, 1998 and some Team members made additional site visits. The emphasis of the field review was on the exchange of ideas, concerns and recommendations. Being on site allowed Team members to verify information and to identify other resources.

Once Team members had assimilated an adequate data base, they were able to analyze and interpret their findings. Individual Team members then prepared and submitted their reports to the ERT coordinator for compilation into this final ERT report.

Topographic Map

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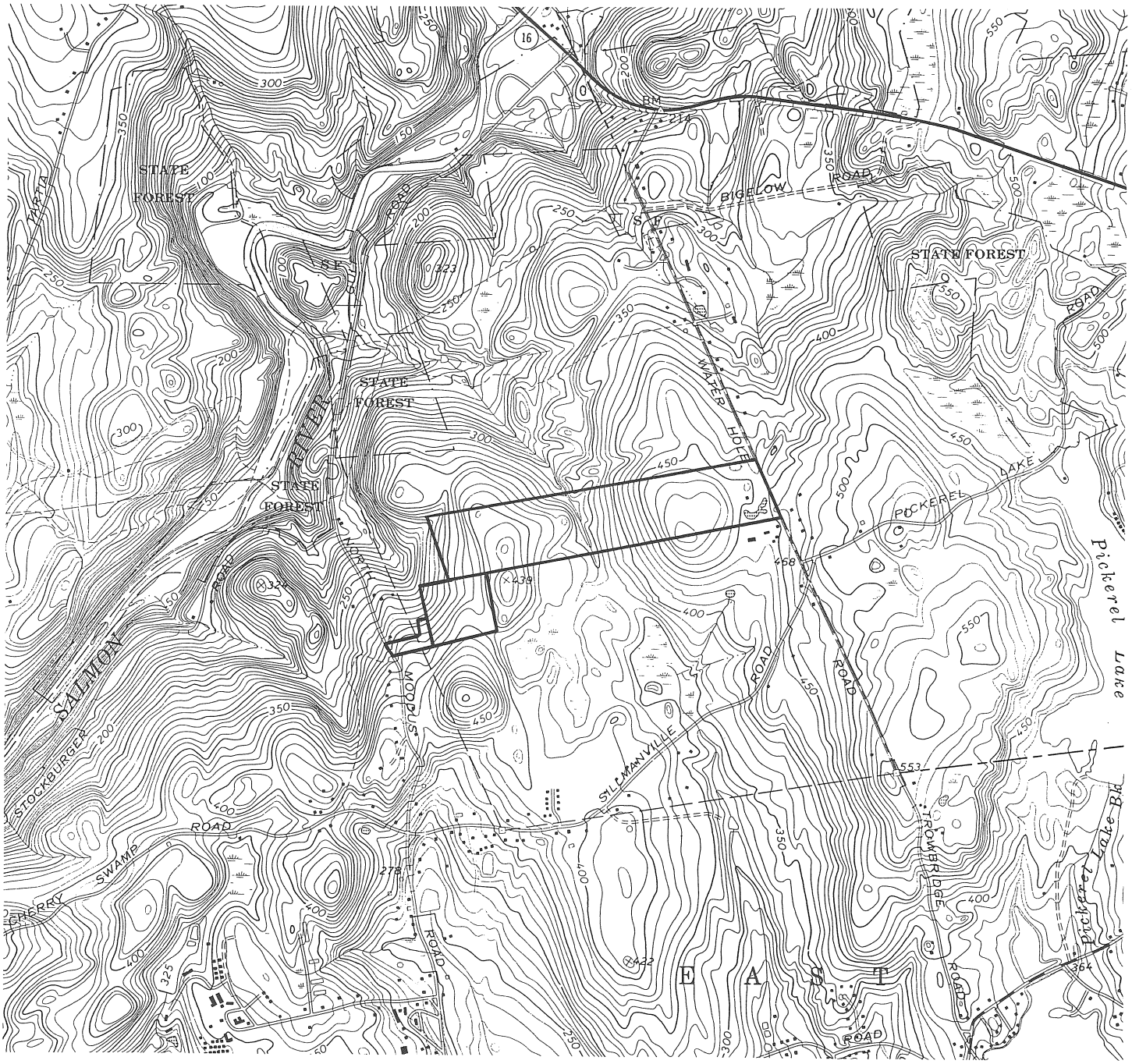
Scale 1″ = 2000′



Topography and Geology

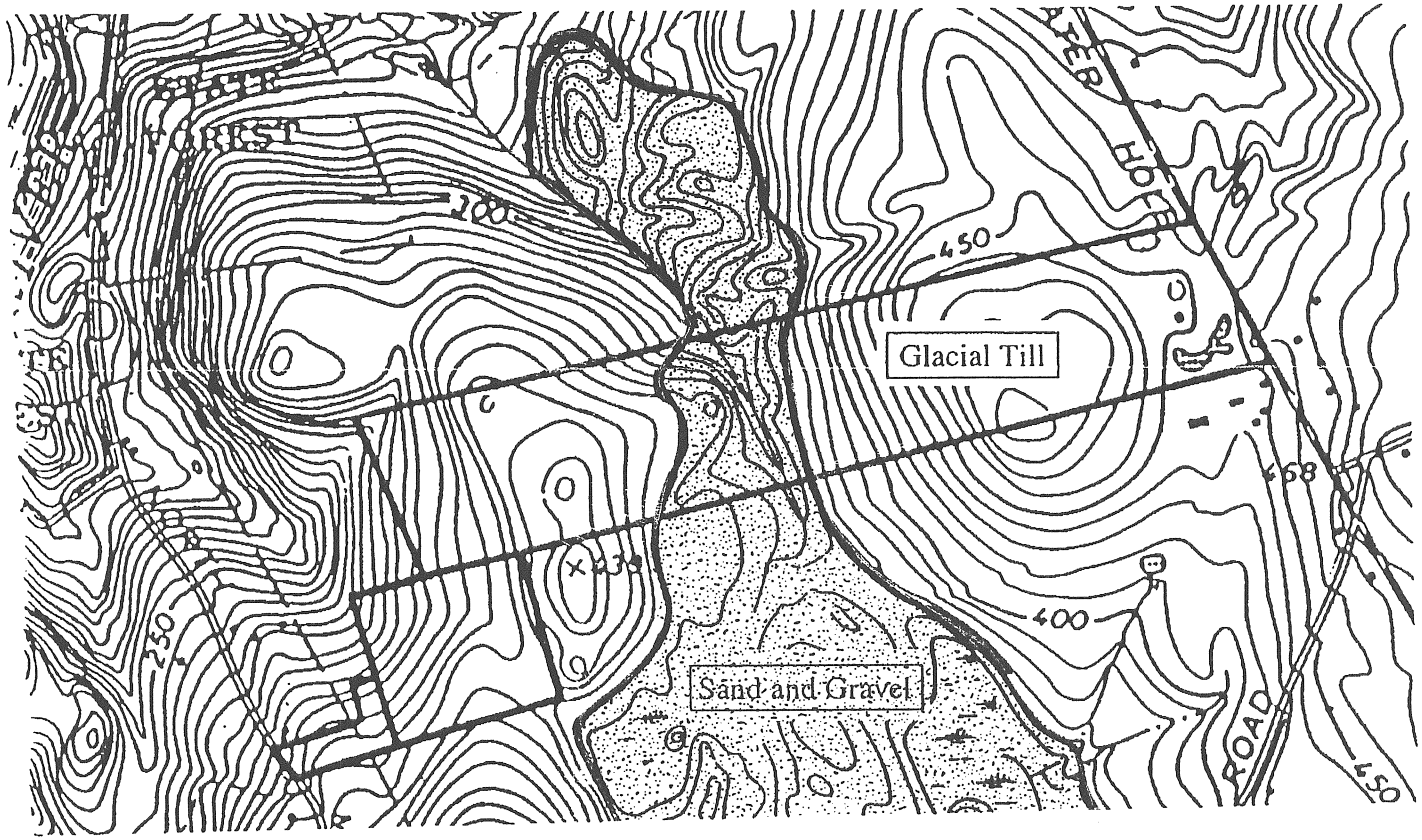
The 130 acre site proposed for development straddles the well defined valley of a small unnamed stream which flows NNW into the Salmon River. Slopes average 1 in 10 along the valley sides but are somewhat gentler on the uplands. Bedrock is generally shallow over most of the area although outcrops are not common. Glacial till, a relatively impermeable inhomogeneous mixture of clay, silt, sand and boulder sized material blankets the uplands. A thin deposit of much more permeable well sorted sand and gravel fills the lower portion of the valley. (see Surficial Geology Map) This material was deposited by glacial meltwaters as the last major ice sheet retreated from the area roughly 13,000 years ago. The bedrock which underlies the whole area at a depth of 10 to 20 feet is a heterogeneously interlayered mix of brownish-gray quartz-biotite-feldspar schist and a greenish gneiss made up of calcium rich feldspar and diopside silicate minerals. The layering dips shallowly to the north. The rock fractures readily along the layering as well as near vertical joints. Much of the groundwater flowing from the uplands into the stream valley probably channeled along these fractures.

References

Lungren, Lawrence, Jr., Ashmead, Lawrence, and Synder, George, L. 1971, The Bedrock Geology of the Moodus and Colchester Quadrangles. Connecticut Geological and Natural History Survey QR-27.

O'Leary, Denis W., 1975. Surficial Geology of the Moodus Quadrangle. USGS GQ-1205.

Surficial Geology in the vicinity of the Comstock Ridge Subdivision



Scale 1inch = 1000 feet

Wetland Review

Vernal Pools

Wetland and watercourse resources on this parcel include six (6) small isolated wetlands and three watercourses along with varying amounts of wetlands associated with these watercourses. All wetlands and watercourses exist within the Salmon River watershed. The most formidable watercourse flows from south to north, bisecting the property. This unnamed watercourse lies within 3000 feet of the Salmon River at the northern property line.

According to the applicant's soil scientist, who is also experienced in vernal pool ecology, 3 of the 6 isolated wetlands contain obligate vernal pool species including the spotted salamander, marbled salamander, wood frog and fairy shrimp. These pools include the one on the western portion of lot 4, the "waterhole" on lot 1, and the one on the eastern portion of lot 4. The smaller pond by Waterhole Road on lot 4 did not reveal any obligatory vernal pool species, nor did the two isolated wetlands in the western portion of this parcel, which do not have the hydrologic conditions required of a vernal pool.

Vernal pools are small, shallow, circular depressions in the landscape which fill with water during the wetter periods of the year (spring and late fall), and become drier during the warmer summer months. True vernal pools also support unusually diverse assemblages of wildlife. Much of this wildlife is **solely** dependent on these areas for one or more periods of their life cycle. Because of the absence of permanent water, fish do not live in these ephemeral pools, making these areas very attractive to certain animals which would normally fall prey to these carnivorous fish. Rare and endangered wildlife, primarily amphibian species, are commonly found in these pools. Most importantly however, the amphibian life which uses these pools as breeding grounds soon migrate into the surrounding uplands to live out their adult phase and

return to the pools to only to breed. Migration distances vary significantly between species. One literature search turned up figures ranging from a minimum of 200 feet and a maximum of 750' with an average migration of about 525'. The wood frog has a significantly larger dispersal range, known to be as far as one half mile from the breeding pool.

Another phenomenon peculiar to vernal pools is that they often exist, as in this case, in groups, which have been shown to cooperate as a functional whole, with some pools in the group serving as a genetic "source" producing amphibian stock, and others as a genetic "sink" receiving this genetic stock. While research on this phenomenon is on-going, it is suspected that the interplay between each pool in the group is crucial to their long-term survival.

It should be mentioned here that none of the observed amphibian species discussed above is found on state or federal endangered species lists, yet scientists have been documenting a general downward trend in amphibian species with one of the probable causes being upland habitat fragmentation. The wood frog is particularly susceptible to this fragmentation phenomenon. It has been shown in a Rhode Island study, that wood frogs require an unbroken territory of at least 100 acres and preferably over 1000 acres to in order to proliferate.

Based on 1) what appears to be a very dynamic, multi-pool community of amphibians, 2) the developing evidence of declining amphibian populations, and 3) the studies which have documented the upland habitat requirements of these wetland dependent species present on this site, it is suggested that the applicant consider reconfiguring the eastern portion of this proposed subdivision to allow for less development and less impact on this critical habitat.

Without a formal, spring-time amphibian survey to determine precisely in what direction and for what distances these species are migrating, it is suggested that lots 1-11 be eliminated with conservation restrictions placed on this area. This open space

entrance to the property could be utilized as an attractive selling point for the remaining 37 lots. The subdivision road in this area should be built with no, or very low-gradient "cape-cod curbs." Standard 6 inch curbs have been found to be an insurmountable barrier to migrating amphibians. The applicant should also investigate the possibility of removing the stormwater outlet coming off of CB 3 and carrying this flow through to CB 2 and into the northern pond as proposed. However, this stormwater flow should be pre-treated prior to its outlet into this pond. This treatment could include a closed "vortex"-type sediment removal system and/or an open sediment basin or "anti-chamber" constructed just upstream of the pond.

Other Recommendations

- Re-aligning the road crossing @ 51+00 200 feet to the north where the wetland corridor is significantly narrower and impacts would be much less. With the steeper relief, it may also be prudent to install a high box culvert, precast concrete arch(s) or span bridge. These features will act to further reduce impacts to wetland soils as well as aquatic life within the stream. (see Fisheries section of this ERT for further details).

- Reduce the size of the "New Pond" to that necessary for stormwater treatment/detention and perhaps wetland impact compensation. This amount of disturbance within the riparian zone of the watercourse is not recommended. Stormwater treatment and detention is recommended here at this location to protect the water quality of this watercourse and guard against streambank erosion. A 2-year water quality treatment outlet and a 10-year streambank erosion protection outlet (staged) could be used to achieve these goals.

- Demonstrate and/or provide for a 2-year storm, stormwater quality storage volume for the proposed basins located off of stations 31+50 and 17+25.

- Place conservation restrictions on lands adjacent to the central watercourse which stipulate that no clearing or disturbance of the vegetation take place. An undisturbed buffer of at least 100 feet is suggested. These restrictions should be placed on the deeds of the involved properties along with the meets and bounds of describing its extent.

- For information regarding potential impacts to wetlands resulting from erosion and sedimentation, please refer to the Soil and Water Conservation District and Resource Concerns sections of this ERT report.

Other items which should be placed on the plans include:

- Schedule of major construction activities (including erosion and sedimentation control measures), preferably in the form of a "Gant" type bar chart listing each activity in proper sequence and assigning to them start and stop dates,

- Abutting land owners,

- Signatures and seals of the consulting engineer/land surveyor/soil scientist (sans seal) certifying the accuracy of the information contained on the plans,

- Non-wetland soil types as designated on USDA-NRCS Soil Survey or by soil scientist including boundaries and map unit symbols,

- Location of subsoil and topsoil stockpiles,

- Location, description and size of existing and proposed storm sewer outlets and culverts with design calculations and details which demonstrate their ability to control erosion,

- Location, description and volumes of proposed sediment/detention basins, sediment traps and check dams including design calculations and details,

- Off-site, down-stream, effects of pre- and post-construction peak flow changes,

- Maintenance requirements of temporary measures during construction period including the name and phone number of person responsible for this maintenance,

- Maintenance requirements for permanent measures (stormwater basins, outlets, etc.) after the construction period including the name and phone number of the person responsible for this maintenance,

- An attached report outlining the functions and values of the wetlands and watercourses present along with the anticipated impacts to these resources and the applicant's plans to mitigate for these impacts as listed in section 7.9 of East Hampton's Inland Wetland Regulations.

Applicable State and Federal Programs

Existing and proposed dam location and design, including temporary and permanent sediment/detention basins should be registered with the Dam Safety Unit of DEP Inland Water Resources division. Contact Wes Marsh at 424 3706 to pursue this matter.

If this project will impact between 5,000 square feet and one (1) acre, project review is required by both the US Army Corps of Engineers (A.C.O.E.) and this division of the

CT-DEP. If this project will impact more than 1 acre of inland wetlands, an individual 404 application to the A.C.O.E. will be required. However, these are basic guidelines. A.C.O.E. or CT-DEP action may be required for other specific activities proposed for wetland areas. For questions regarding these regulatory programs contact the A.C.O.E. at 617-647-8338 1 800-343-4789 or Sally Snyder of the CT-DEP at 424-3019.

Be advised that, inasmuch as it causes the alteration, modification, or diminution of the instantaneous flow of the waters of the state, the proposed crossing of the central watercourse may require a permit from this division as called for in the Connecticut Water Diversion Policy Act (sections 22a-365 through 22a-378 of the Connecticut General Statutes). It is recommended that the applicant call Bob Gilmore of this division at 424-3019 to determine the need for such a permit.

Review of Environmental Site Assessment

The site of the proposed Comstock Ridge Subdivision is partially occupied by the former East Hampton Metal Finishers (EHMF) facility, that operated from 1946 until the early 1 970s. Reportedly, the EHMF operation performed grinding and polishing of mostly brass plumbing fixtures. The EHMF site is void of vegetation owing to heavy metal contamination, particularly copper. Although a natural constituent of soil, at elevated concentrations copper is toxic to plants.

A preliminary environmental site assessment was prepared by Shanahan Consulting for Peter Carli, developer of the subdivision (see *Phase I Environmental Site Asessment and Soil and Well Tests of Comstock Ridge Subdivision, East Hampton, CT, August 1998* prepared by Shanahan Consulting). Limited soil and ground water samples collected by Shanahan revealed elevated copper, arsenic, and lead concentrations above Connecticut's Regulation of Department of Environmental Protection concerning Remediation Standard (§22a 1 33k) for direct exposure and leachability. However, ground water analytical results were below the risk-based standards.

Peter Carli has taken a proactive approach to resolving the contamination issues associated with EHMF. Through a CT DEP voluntary clean-up program, Mr. Carli and the owners of the EHMF parcel can remediate this land. The preliminary assessment by Shanahan addresses most of the issues of concern. The CT DEP Site Remediation Section wants to be assured that this property is remediated to standards. To that end EHMF has been listed on the data base of sites that should be assessed and possibly remediated.

The CT DEP wants to be informed of additional investigation and remediation at the EHMF facility site. All parties involved should please be advised of the pending Public Act No. 98-134: An Act conceming the Reporting of Certain Significant Environmental Hazards by Owners of Contaminated Properties. This act, effective October 1, 1998, requires that a technical environmental professional must notify his client and property owner after determining that pollution being investigated at a parcel is causing or has caused significant contamination. The owner of the property that is a source of such contamination must notify the CT DEP. In some circumstances, if the owner fails to notify the CT DEP, the technical environmental professional's client must notify.

There are areas of concern that have not as yet been thoroughly addressed in Shanahan's preliminary assessment, that ought to be considered more fully in further site investigation and remediation:

- Although chlorinated solvents were not detected in the two ground water samples collected, and information gathered to date does not suggest their use by EHMF, it is important to note that historically metal finishing shops did employ solvents. It would therefore be wise and prudent to sample wells serving homes in the subdivision for volatile organic compounds (VOCs), including solvents. This is especially important because onsite soil was not evaluated for VOCs and only two ground water samples were collected.

  Notwithstanding the dug well being located downhill of the EHMF shop, information on the hydrogeology beneath the site is unavailable. The conclusion that the limited ground water samples support a finding of no significant threat to potability of the ground water is premature. It is important to note that VOCs may not be present in the shallow or very deep aquifer, but may be exist in an intermediate strata.

- The bedrock well serving the house adjacent to EHMF was installed in 1993. Prior to its installation, how was potable water supplied to the house? Was the well abandoned because of contamination? Shanahan's report indicates the 1993 well was found potable at the time of installation. The report also mentions a 1989 potability test. On which well was the 1989 test performed? Did analytical tests include VOCs, petroleum hydrocarbons, and heavy metals?

- There are two indoor basement fuel oil tanks in the house. How old are the tanks? Were there ever underground fuel tanks serving the house that were abandoned? If so, did the tanks leak?

- A more complete sweep of parameters of potential contaminants needs to be evaluated. For instance, petroleum hydrocarbons, semivolatile compounds, and pesticides should be considered, simply because this site is a historic metal shop, adjacent to a farm, that is proposed to become a residential property. Shanahan's reconnaissance of the shop revealed an oily spill on the floor. An open plastic tub of apparent waste motor oil was in the shop. An empty container labeled DTE Oil was in the shop. (What is DTE Oil?) Although no sign of oily or chemical residue was observed on the ground at the floor drain's discharge location, subsurface contamination may exist. Subsurface sampling would be helpful information.

- The site is adjacent to a farm. Agrichemical pollution should be considered (i.e., pesticides and nitrates).

- The stated purpose of Shanahan's environmental assessment of EHMF was to evaluate whether or not subsurface contamination by oils and hazardous chemicals exits on site. But, the soil samples collected were strictly surficial. Further soil sampling should include more surficial and subsurface sampling to define extent and degree of metal contamination. Sampling is also necessary to evaluate

petroleum and VOC contamination as a stated mission of the assessment. Even though the metal contaminants detected in the surface soils tend to be strongly absorbed to soils, and therefore not generally transported large distances into ground water, the limited available data does not allow for a conclusion that metal contamination at EHMF is limited to surficial soils.

- A debris pile was observed by Shanahan Consulting; reportedly of household waste and discarded farm equipment circa 1930s and 1940s. Visual observation did not show evidence of oils of hazardous chemicals. Nonetheless, the pile and surrounding soil may have hazardous or nonhazardous waste constituents that may cause pollution. Collection of samples and suitable laboratory analysis is warranted in the area of the waste pile. Soil samples should be surficial and to a reasonable depth.

If the East Hampton Town officials, citizens, property owners, subdivision developer, or Shanahan Consulting have any questions about the assessment or remediation of the EHMF site they should not hesitate to contact John Hirschfeld with the CT DEP Site Remediation Section at (860) 424 -3893.

Stormwater Management

Construction Activities

Since the site construction involves the disturbance of over five acres, Connecticut's General Permit for the Discharge of Stormwater and Dewatering Wastewaters (the "Permit") will cover the project. The permit requires that the site register with the Department of Environmental Protection (CTDEP) at least 30 days before the start of construction. The registrant must then prepare and keep on site during the construction project a Stormwater Pollution Control Plan (the "Plan"). If the disturbance exceeds 10 acres at any one time, a copy of the Plan must be submitted with the registration. Please note that while this review is based primarily on the state Permit, many of the erosion and sedimentation issues are included in the Connecticut Guidelines for Soil Erosion and Sediment Control (the "guidelines"), and are issues that must be dealt with on a local level before being included in the Plan.

The Plan must include a site map as described in Section 6(b)(6)(A) of the General Permit and a copy of the erosion and sedimentation (E&S) control plan for the site. The E&S plan that has been approved by the Town in conjunction with the CTDEP Inland Water Resources Division (IWRD) and the local Soil and Water Conservation District may be included in the Plan. This plan and site map must include specifics on controls that will be used during each phase of construction. Specific site maps and controls must be described in the Plan, as well as construction details for each control used. The permit requires that "the plan shall ensure and demonstrate compliance with" the guidelines. The current plans do not meet these requirements.

Due to the amount of soil disturbance, one of the best ways to minimize erosion potential would be to phase construction in order to minimize unstable areas. Section 6(b)(6)(B) requires a more detailed identification of construction sequencing and

accompanying changes in controls than are currently shown on the E&S Plan, and the Plan must be flexible to account for adjustment of controls as necessary to meet field conditions. At a minimum, the plan must include interior controls appropriate to different phases of construction.

The permit (Section 6(b)(6)(D)) requires inspections at least once every seven calendar days and after every storm of 0.1 inches or greater. The plan must also allow for the inspector to require additional control measures if the inspection finds them necessary, and should note the qualifications of personnel doing the inspections. In addition, the plan must include monthly inspections of stabilized areas for at least three months *following* stabilization. In particular, there must be someone available to design and adjust E&S controls for changing site conditions, who has the authority and resources to ensure that such necessary changes are implemented.

Section 6(b)(6)(C)(ii) of the permit requires the plan to address dewatering wastewaters, which this site may generate. The plan does not currently address treatment of dewatering wastewaters.

The permit (Section 6(b)(6)(C)(i)(2)) requires that for areas where between two and five acres will be disturbed, a sedimentation basin or sedimentation trap will be available that will store a minimum of 134 cubic yards of water per acre disturbed; and for an area where greater than five acres are disturbed at one time, the Plan must show that a sediment basin will be available that will store a minimum of 134 cubic yards of water per acre disturbed. The existing erosion and sedimentation control plan does not meet this requirement.

Silt fence is designed to filter runoff from one square acre of construction as stated in the Guidelines. Areas larger than this discharging to a single row of silt fence need additional controls.

Soil and Water Conservation District Review

The following comments and recommendations concern information from the field review and review of the project plans prepared for Peter Carli by Dutch & Associates, Civil Engineers, Colchester, CT.

These comments focus on the erosion and sediment control plan for the project specifically.

1. The soil types for this project should be plotted on the plans. It is difficult to evaluate possible impacts if all necessary information is not on the same plan. A symbol should also appear on the key. The symbol for the wetland boundary should also be on the key.

2. The total amount of land to be disturbed should be indicated. If the project is going to disturb more than five acres, then it will be necessary for the applicant to develop a Pollution Prevention Plan as required in the Connecticut General Permit for Construction Activities.

3. Calculations should be included for the proper design and sizing of the basins to be used as sedimentation basins during construction and permanent detention basins. *The Connecticut Guidelines for Soil Erosion and Sediment Control (1988)* should be followed for these specifications. Also, the details on the plans should include the proper specifications for the riser and outfall structures.

It is unclear why the applicant wants to create such a large pond if it is to be used for stormwater treatment or sediment trapping. Such a large pond is not necessary, and complications will arise in the construction of the pond itself. The plans do not show how the steep slopes leading to the pond will be stabilized or how protection will be in place to make sure sediment is not transported from the pond area downstream during construction. The construction sequence should include details on the pond construction, including where equipment will enter the area, how material will be extracted, where material will be stockpiled and how exactly off-site sedimentation will be kept to a very minimum.

4. Phasing of the project should be detailed to show that only sections of the project will be completed at any one time. The project should minimize the amount of area open to the elements at any one time. In addition, the construction sequence should state that the E&S controls that are put in first should be stabilized and remain in place until the rest of the project is stable and complete.

5. The location of soil stockpiles ringed with the proper erosion controls should be indicated on the plans. Also, the location of any dewatering areas for wet soils should be located on the plans away from any wetland areas.

6. Details of the provisions for wetland and stream crossings should be on the plans. It may be necessary to provide for a diversion during the stream crossing.

7. Provisions have not been made for proper E&S management on each of the individual housing lots. It is important to make sure that materials from individual lots are not transported into the stormwater drainage system during construction. Also, how much of each of the individual lots does the

developer expect to clear? It is recommended that clearing stay to a minimum.

8. Details should be provided to show how the steep grades along the new road will be stabilized. It may be necessary in use some strong geotextiles in certain locations.

9. Peastone should not be used to the proper construction of rock check dams. *The Connecticut Guidelines for Soil Erosion and Sediment Control (1988)* give specifications on the proper use and design of rock check dams. It is recommended that they be used even more than currently called for in the plans.

10. There is concern about the general lack of proper E&S controls on the site, especially for the installation of the road. This area contains some very steep grades, and there will be many challenges with E&S control. It will be important that sediment is managed as close to the site of origin as possible, using more controls than currently shown on the plans. Controls can be used in sequence, and may need to be changed through the course of the project. Provisions should be made for winter conditions and also for at the end of the day, especially when storms are expected. Proper installation and maintenance of controls will be of critical importance.

Resource Concerns
Natural Resources Conservation Service

Farming

The Dill farm, adjacent to the proposed subdivision, is an old established farm that is still active. Until recently, it was a dairy farm with about 100 milk cows and several pigs. Most of the dairy herd is gone and hogs and beef cows are now raised. Historically, the Dills have pastured their animals on the Jaffe parcel, the site of the proposed development. Additionally, the Dills used the parcel to its north to grow silage corn and hay. Access to the corn and hay fields was through the Jaffe parcel. Thus, the Dills stand to lose pastureland and access to corn and hayfields.

The 131 acre Dill farm is a State of Connecticut Purchase of Development Rights (PDR) farm. Its development rights have been purchased by the State's Department of Agriculture and no development would be allowed on this farm. It will remain in farming and open space. As such, normal farming activities will include animal and machinery noises, dust from fields and smells which new neighbors may object to. The smells were evident the day of the ERT field investigation. The potential lot buyers must be informed of the right to farm issues and the noise and smells that will occur.

In addition to access and right to farm issues, the Dills have expressed concerns regarding trespass and vandalism, illegal hunting, contamination of the farm's well (which is not shown in the subdivision plans) and surface water runoff from the existing pond in lots 1 and 2. Historically, runoff from this pond has flowed across the barn yard originating through a low point through the stone wall at the northwest corner of the Dill's equipment barn. This flow was documented in the 1980's, especially during 1982 and other times of heavy rain and runoff. Dark staining from ponded water was observed within 10 feet of Dill's stone wall during the ERT field review. This

ponding extends beyond the wetland limits shown and could affect the house and septic system proposed in lot 1.

Several lots have homes located fairly close to the corn fields and the well for lot 25 is located within 20' of a corn field where fertilizer and pesticides are applied.

Soils

The soils located within the parcel are glacial till predominantly 3 to 15% slopes. There are several areas that exceed 15% slopes that present special problems for erosion and sediment control and septic systems. The paxton and woodbridge soils typically include a hardpan layer in their soil profile usually around 30" thus causing a perched water table from late autumn through late spring. The soil potential rating for septic tank absorption fields is medium and concerns include slow perc rate and depth to water table. An engineered system is needed and corrective measures would include fill, curtain drains, larger absorption fields and/or surface drainage. Paxton and woodbridge dominate the eastern and western portions of the proposed subdivision.

The soil survey also indicates bedrock outcrops in the vicinity of lots 7, 8 and 10. If bedrock is at or near the surface, severe limitations would exist for road and drainage installation as well as basements and septic systems. Further soil investigations are called for the verify bedrock depth.

The central portion of the proposed subdivision is dominated by better drained canton and charlton soils which generally lack the hardpan layer. The soil potential rating for septic system absorption fields is very high with no concerns other than potential erosion on steeper slopes.

The well and extremely well drained soils (hinckley, agawam and merrimac) located along the main stream corridor are comprised of sands and gravels on steep slopes.

They have fast to very fast percolation rates that leads to incomplete treatment of septic wastes. Concerns include the leaching of these partially treated wastes into the ground water and stream as well as erosion of the slopes where natural vegetation was removed for road, septic system and house installation.

Erosion and Sediment Control

The E&S control plan lacks information and detail and allows great possibility for failure. Specific examples include the use of peastone dumped into the bottom of swales (totally inadequate), silt fence installed across swales of concentrated flow (not designed for that purpose) and catch basin outlets that outlet near the top or mid slope on steep slopes. Rock lined channels frequently fail in this situation due to improper design and installation. The 24" RCP which outlets between lots 40 and 42 includes outletting a larger capacity pipe into a 115' channel averaging 17% slope, coming from a pipe on a 11.5% slope. There is also a bend in the channel which is a failure point.

The E&S control plan must specifically address with detail all concerns as specified in chapter 4 of the *CT Guidelines for Soil Erosion and Sediment Control,* revised 1988. General statements referring to the Guidelines do not constitute an adequate plan. Where are the specifics for the contractors to follow and where are the design specifications for the sediment or detention basins? Phasing and winter shutdown and site protection need to be addressed. Use of bioengineered practices incorporating vegetation and soft armoring is strongly encouraged to lessen site impacts. The erosion and control plan, along with the inadequately designed practices, fail to address erosion and sedimentation concerns in a watershed that is sensitive to these problems.

Proposed Pond

The proposed construction of a seven acre "fire pond" poses severe ecological consequences to the adjacent stream and possibly to Salmon River through sedimentation and warmer water. Construction of any pond, of any size, in this narrow stream corridor would be an inappropriate disturbance of the natural resource. Instead, the natural riparian and forest buffer of a minimum of 100', or to the top of steep slopes should be preserved in its natural condition to trap nutrients, protect the slopes from erosion and sedimentation, adsorb runoff, and maintain stream temperatures and habitat. Gravel removal within the buffers should also be prohibited for those same reasons.

Alternatives for water supply should be considered. For instance, several communities now use buried concrete tanks for storage of water. Also, an agreement with the Dill farm to utilize existing farm ponds in an emergency could be discussed.

Buffers

There is a national conservation buffer initiative presently promoted by the USDA Natural Resources Conservation Service (NRCS) to install and maintain buffers on farms and elsewhere to protect and enhance natural resources. There are several buffers such as filter strips, riparian (streamside) forest buffers, field borders, etc. that are designed to protect the resources. It has been shown that buffers provide numerous benefits and are effective. They improve water quality by trapping sediment and nutrients in runoff, reduce runoff through infiltration, reduce erosion, provide shade for cooler water and provide physical barriers between pollution sources and wetlands. Forest buffers act to filter air pollution and cool the air and they provide valuable wildlife habitat for many species. They serve to provide greenways along wetland corridors and reduce habitat fragmentation. Buffers also provide open space and outdoor opportunities and should be permanently preserved as such.

Knowing the importance of buffers, it is recommended that a riparian forest buffer of a minimum of 100' be maintained around all wetlands with consideration for increased width around the vernal pools and steep slopes along the stream channels. No clearing for lawns or septic systems should take place within the buffers. To reduce disturbance to the stream and riparian buffer at the road crossing, it is recommended that a small bridge be utilized. This would eliminate the restrictive culverts that affect wildlife traveling the wetland corridor. Most importantly, it greatly reduces the amount of filling of wetland and potential sedimentation. The drainage way flowing through lot 27 should not be culverted and it should be allowed to connect with the stream without barriers or disturbances.

Consideration should be given to repositioning the proposed basins away from the border of wetlands and out of the buffers. The elimination of road culverts and curbing should be considered in this situation to reduce the conversion of sheet flow to accelerated concentrated flow that becomes destructive to the wetland systems. Alternatives should be explored.

Specific Resource Concerns by Lot

Lot #1 -
Recommend elimination

- high water table
- frequent surface water flooding (beyond wetland boundary)
- possibility of septic system failure
- possible detrimental effect and pollution of Dill farm wells from septic system
- valuable forest buffer area for pond/vernal pool
- nutrient and pesticide runoff into pond/vernal pool

Lot #3 -
Recommend elimination

- leach field on steep slope and sloped towards pond/vernal pool

- eliminates valuable forest buffer for pond/vernal pool
- nutrient and pesticide runoff into pond/vernal pool
- fragments forest habitat and possible population connection between vernal pools in lots 1, 4, and 9.

Lots #4, #6, #9 and #11 -
Recommend elimination

- critical habitat for vernal pool species
- vernal pools and pond need protection and preservation from human disturbance and pollution
- possible groundwater and surface water pollution from septic systems with detrimental water quality effects on vernal pool and pond
- soil contamination in Lot #4
- Lot #9 has house and well too close to farm border and driveway infringes too close to wetland and impacts buffer

Lots #16, #17, #18, #19, #20 and #21 -

- concern for increased erosion and sediment potential due to steep slopes

Lots #22, #23, #25 and #27 -
Recommend elimination

- increased erosion and sediment potential
- riparian forest buffer preservation along stream strongly recommended, retain as open space along with area designated as "New Pond"
- allows for realignment of road to lessen impact at stream crossing
- critical wildlife habitat
- Lot #27 contains an intermittent drainage way which is part of the wetland system. It is a deep gorge with steep side slopes which will easily erode if the vegetation is removed the proposed well site for lot 25 is located within 20' of a cornfield where fertilizer and pesticides are applied. The soil in this area is better drained
- this area along the stream may be archaeologically significant and needs further investigation.

Lots #5 and #7
Combine lots

- reduce disturbance to forest buffer for vernal pool and pond/vernal pool
- shallow soils/bedrock outcrop possible in Lot #7
- possible water quality decrease from two septic systems between two wetlands

Lot #10
Investigate

- possible shallow soils and bedrock in area of the proposed house and septic system

All lots west of lots 32 and 37, and the roadway

- higher erosion and sedimentation potential due to steep slopes, areas of fill and close proximity to the western wetland system.
- Recommend the establishment and preservation of a riparian forest buffer of a minimum of 100' width that is NOT part of the proposed lots. Thus, some lots will have to be combined.
- detailed erosion and sedimentation control plans for these lots with limitations on clearing to be shown on the plans
- consider another bridge crossing to lessen impact on wetland
- remove basin away from wetland and out of buffer
- additional information on parcel between Dill farm and road.

Soils Map

Scale 1" = 1320'

The Natural Diversity Data Base

The Natural Diversity Data Base (NDDB) maps and files regarding the project area have been reviewed. According to our information, there are no known extant populations of Federal or State Endangered, Threatened or Special Concern Species that occur at the site in question. This information is not necessarily the result of comprehensive or site-specific field investigations and consultations with the Data Base should not be substitutes for on-site surveys required for environmental assessments.

A report written by Mr. Robert T. Bradbury of East Hampton, Connecticut indicates that many state listed wildlife species were found on the property. State listed species included in his report were Eastern Box Turtle, Eastern Hognose Snake, Eastern Ribbon Snake, Northern Leopard Frog, Sharp-shinned Hawk, Cooper's Hawk, American Kestrel, Whip-poor-will, Common Nighthawk, and Brown Thrasher. The Team biologist has not verified these records but believes it may be important to gather more information on the presence or absence of these animals on this property. Current research projects and new contributors often identify additional populations of endangered species and locations of habitats of concern.

Mr. Bradbury's report was forwarded to the DEP Wildlife Division for further evaluation. As indicated by the NDDB, our records currently do not reflect knowledge of state listed wildlife species occurring at the project location. A DEP wildlife biologist reviewed a copy of the wildlife list submitted by Mr. Bradbury for the site and believes that many of his sightings are quite likely for the area in question, however, he does not reference when these species were observed. Given the number of state-listed species he reported from the project area, follow up surveys at appropriate times of the

year for a given species may be important to reconfirm the presence of these animals in the project area. The Wildlife Division has not made an on-site inspection of the project area.

Natural Diversity Data Base information includes all information regarding critical biological 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 investigations. Consultations with the Data Base or the DEP Wildlife office should not be substitutes for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the Data Base as it becomes available.

Also be advised that this is a preliminary review and not a final determination. A more detailed review may be conducted as part of any subsequent environmental permit applications submitted to DEP for the proposed site.

Fish Resources

Stream Resources

The unnamed tributary to the Salmon River was surveyed from the Gulf Road Crossing upstream to the location of the proposed road crossing for the Comstock Ridge Subdivision. This high gradient, perennial stream cuts through a steep valley. The stream's riparian zone is mainly comprised of Eastern Hemlock stands which grow along steep slopes.

This headwater stream supports a high quality coldwater fish community comprised of native brook trout. Adult size brook trout, mostly less than 6 inches in size, were mainly observed to occupy pool or deeper water habitats. Fish were observed in the upper part of the watershed in the area of the proposed subdivision. For example, the pool directly adjacent to wetland flag #48 contained adult brook trout.

Mesohabitat is in the form of alternating step-pool habitats in very steep sections and long stretches of pool/riffle habitats in moderate gradients. Step-pool habitat contained medium to large size boulders whereas pool-riffle stretches were mainly comprised of small cobbles and gravel substrates. Brook trout utilize these clean gravel substrates for spawning and egg incubation habitats. The stream contains minimal amounts of fine silts and coarse sands.

Brook trout usually spawn in the month of October in Connecticut. Eggs incubate within the gravel substrate throughout the winter and hatch sometime in March. When hatched, brook trout larvae or sac fry remain in the gravel until the yolk is absorbed. Fry emergence occurs when fish reach about 1.5 inches in length.

The unnamed tributary to the Salmon River is the type of stream that the general public would overlook as too small to support fish; however, fisheries biologists and stream ecologists recognize this habitat as very sensitive and critical to the production and survival of headwater brook trout populations.

Impacts

1. Pond Construction

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The most immediate fisheries resource concern with this subdivision is the proposed excavation of the large pond adjacent to the unnamed tributary of the Salmon River. The pond is part of 6.4 acres of dedicated open space. The main purpose of this pond is unclear. Whatever the reason(s) for the pond, its construction can cause myriad and significant impacts to fisheries resources. The following narrative delineates negative impacts due to pond construction.

A. Permanent Alteration of the Riparian Zone: A significant amount of disturbance will occur within the riparian zone and adjacent upland areas including the removal of more than 500 linear feet of native vegetation. Riparian vegetation serves several vital functions in the maintenance of biologically diverse stream and riparian ecosystems. Vegetated riparian ecosystems: (1) naturally filter sediments, nutrients, fertilizers, and other non-point source pollutants from overland runoff, (2) maintain stream water temperatures suitable for spawning, egg and fry incubation, and rearing of resident finfish (3) stabilize streambanks and stream channels thereby reducing instream erosion and aquatic habitat degradation, (4) supply large woody debris to streams providing critical instream habitat features for aquatic organisms, (5) provide a substantial food source for aquatic insects which represent a significant proportion of food for resident finfish, and (6) serve as a reservoir, storing

surplus runoff for gradual release into streams during summer and early fall base flow periods.

The most immediate and profound fisheries resource impact of vegetation alteration along this tributary to the Salmon River will be the increase in solar heating on the stream. Increased solar heating translates into increased surface water temperatures. The coldwater, native brook trout community in this watercourse is highly dependent upon a shaded tree canopy to help ameliorate increases in surface water temperatures. Because of the alteration of the riparian tree canopy along this bank, this stretch and downstream areas of stream will undoubtedly become less suitable for coldwater fish habitation.

B. Erosion and Sedimentation: Site soil erosion and sedimentation of the unnamed tributary to the Salmon River are a major concern. The area of the proposed pond is characterized by steep, hilly topography and presents a major challenge to properly control soil runoff. Due to the high gradient nature of this watercourse, soil runoff could very easily be conveyed downstream into the Salmon River. If sediment runoff does occur, the following damage to stream ecosystems could be expected: (1) Sediment reduces the survival of resident fish eggs and hinders the emergence of newly hatched fry. Adequate water flow, free of excess sediment particles is required for fish egg respiration and successful hatching. (2) Sediment reduces the survival of aquatic macroinvertebrates. Since aquatic insects are important food items in fish diets, reduced insect populations levels in turn will adversely affect fish growth and survival. Fish require an excessive output of energy to locate preferred prey when aquatic insect levels decrease. (3) Sediment reduces the amount of usable habitat required for spawning purposes. Excessive fines can clog and even cement gravels and other desirable substrates together. Native brook trout may be forced to disperse to other areas not impacted by siltation. (4) Sediment reduces stream pool depth. Pools are invaluable stream components since they provide necessary cover, shelter, and resting areas for resident fish. A reduction of usable fish habitat can

effectively limit fish population levels. (5) Turbid waters impair gill functions of fish and normal feeding activities of fish. High concentrations of sediment can cause mortality in adult fish by clogging the opercular cavity and gill filaments. (6) Sediment encourages the growth of filamentous algae and nuisance proportions of aquatic macrophytes. Eroded soils contain plant nutrients such as phosphorous and nitrogen. Once introduced into aquatic habitats, these nutrients function as fertilizers resulting in accelerated plant growth. (7) Sediment contributes to the depletion of dissolved oxygen. Organic matter associated with soil particles is readily decomposed by microorganisms thereby effectively reducing oxygen levels.

C. Thermal Loading: Thermal loading or increase in ambient surface water temperatures during the summer is a serious concern with pond development. Pond waters will become heated from solar radiation. These warm waters will be directly conveyed into the unnamed tributary, a coldwater resource. Water temperatures greater than 70° F will seriously threaten trout survival. Typical, pond water temperatures will exceed 85° F in the summer. The release of warm water into the stream will create a highly unsuitable environment for native brook trout and as a result, an undetermined length of stream, downstream from the influence of warm pond waters will become devoid of brook trout.

D. Intrusion of Warmwater Fish: Ponds are purposely or often inadvertently stocked with warmwater fish species such as largemouth bass, sunfish, and pickerel species. Escapement of these species into the stream could upset the natural balance of the downstream fish community. Due to thermal loading, warmwater species will be able to survive and better adapt to the stream environment. As a consequence, warmwater species will outcompete and displace the native brook trout community.

2. Road Construction

Placement of fill for road construction may result in stream sedimentation problems if proper erosion and sedimentation controls are not followed. Impacts due to stream sedimentation were previously discussed.

3. Fish Passage Concerns

No information was provided relative to the specific design of the stream crossing. Typically, culverts are proposed. Culverts not designed with fish passage considerations may impede upstream fish passage. For example, culverts installed "at grade" may impede fish passage by creating insufficient water depths or sheet flow conditions during low flow periods and high water velocities during storm events. In addition, culvert floors replace the natural stream materials with an artificial surface.

Recommendations

1. It is strongly recommended that the large pond not be constructed. The ecological ramifications of pond construction are numerous and immediately threaten the health and integrity of fisheries resources. Removal of the pond will help maintain the existing fish community, water quality standards and instream habitat conditions within the unnamed tributary to the Salmon River. If you protect the unnamed tributary, you will protect the Salmon River. However, any water quality problems and habitat degradation that occur within this unnamed tributary will eventually negatively impact the Salmon River.

2 . Maintain at the minimum, an 100 foot open space buffer zone along the edge of the unnamed tributary to the Salmon River. No construction or alteration of natural vegetative habitat should be allowed in this zone. Research has shown that 100 foot buffer zones help prevent damage to aquatic ecosystems that support diverse fish and

aquatic insect life. These buffers help absorb surface runoff and other pollutants before they can enter wetlands and aquatic habitats.

3. The applicant needs to develop an aggressive and effective erosion and sediment control plan. Proper installation and maintenance of erosion/sediment controls are critical to environmental well being. This includes such mitigative measures as sediment basins, filter fabric barrier fences, staked hay bales, and sediment catch basins. Land disturbance and clearing should be kept to a minimum and all disturbed areas should be restabilized as soon as possible. Exposed, unvegetated areas should be protected from storm events. Proper installation and maintenance of controls are particularly important on this project since surface water drains downslope to the Salmon River.

4. The preferred design option at the stream crossing would be the installation of a clear span bridge or arch culverts that do not have a bottom or floor. This infrastructure type would help maintain existing natural instream habitat features and ensure upstream fish passage for resident species. If multiple culverts with floors are proposed (the least preferred option), one of the culverts would have to be installed 6-12 inches below stream grade. With this design, the sunken culvert should be aligned such that it conveys the average daily flow regime. The culvert installed at a higher grade would be used to accommodate flow regimes greater than bankfull events.

5. Care should be exercised so as not to increase turbidity levels in unnamed tributary of the Salmon River when installing the stream crossing infrastructure. As a best management practice, any unconfined instream work should be restricted to the period from June 1 to September 30, inclusive. A June 1 through September 30 timeframe can be utilized as an effective mitigation measure for construction related disturbances due to the following reasons: (1) timeframe will serve to protect the spawning, egg incubation, and fry development of resident fishes, (2) timeframe does not interfere with seasonal migratory behaviors, and (3) timeframe coincides with historic low

rainfall levels in Connecticut, a period in which instream construction activities such as dewatering, excavation, trenching, and cofferdam placement are most effective.

Vegetation

The ±130 acre parcel proposed for subdivision into 48 single family lots may be divided into several broad vegetation categories. These include Mixed Hardwoods, Softwoods/Hardwoods, Hardwood Swamp/Wetland, Old Field, Open Field and Plantation. Below are brief descriptions of each of these vegetation categories. The location and acreage of these areas were obtained from 1995 aerial photographs and are only approximate. They are depicted on the Forest Vegetation Map. The field inventory of vegetation types was conducted in late July. A more comprehensive inventory of the herbaceous vegetation which is present in each of these categories should be made at different times throughout the year by a botanist.

Most of the forested portions of this tract were harvested several years ago. At that time almost all of the merchantable oaks were removed leaving the smaller and less vigorous trees to grow in the residual stand. Along with these trees are occasional large but poor quality and less valuable, from a timber standpoint, species such as American beech, white oak and white ash. These trees are aesthetically pleasing to homeowners and provide food and cover for wildlife.

The hemlock which are present within the property are infested with the Hemlock Woolly Adelgid. This insect may cause widespread hemlock mortality significantly altering the species composition of the portions of the forest where it is at present found.

Vegetation Types

A. Mixed Hardwoods

The Mixed Hardwood type totals approximately 67 acres and is dispersed throughout the property. This type is dominated by reasonably healthy pole size trees (5" to 11" in diameter at breast height (d.b.h.)) which range from 60 to about 100 years of age. In some areas these trees are somewhat crowded and beginning to decline in health and vigor. Larger and older trees are present but they are few in number and widely scattered. They were left during the last harvest because they were not valuable enough to be cut and sold as timber. The overstory in this vegetation type is dominated by black birch, American beech, red maple, yellow birch, tuliptree, white ash and sugar maple with red oak, black oak, scarlet oak, white oak, sassafras, cottonwood, aspen, shagbark hickory, pignut hickory, mockernut hickory and eastern hemlock mixed in. Red maple, white ash, yellow birch and tuliptree dominate where the mixed hardwood type makes a transition to the Hardwood Swamp/Wetland type and also along streams and seeps. The understory vegetation which is present throughout includes hardwood tree seedlings, flowering dogwood, maple leaved viburnum, hophornbeam, American hornbeam, azalea, beaked hazelnut, American chestnut sprouts, witch-hazel, highbush blueberry, spice bush, sweet pepperbush, barberry*, and occasional multiflora rose*. Ground cover vegetation includes poison ivy, Virginia creeper, green briar, raspberry, grape, rattlesnake plantain, Canada mayflower, wild sarsaparilla, bluets, starflower, wood aster, club moss, evergreen wood fern, hayscented fern, bracken fern, sensitive fern, Christmas fern and many other species of grasses, sedges and wild flowers.

B. Softwoods/Hardwoods

Approximately 26 acres of the Softwoods/Hardwoods vegetation type are present within this parcel. Between 40% and 60% of this vegetation type is made up of seedling to small sawtimber size eastern hemlock with black birch, red maple, yellow birch, tuliptree, sugar maple, white ash, sassafras, American beech, shagbark hickory,

mockernut hickory, pignut hickory, red oak, black oak and white oak intermixed. Many of the hemlock which are present are infested with the Hemlock Woolly Adelgid and appear to be declining in health and vigor. Understory vegetation is light where the hemlock are still healthy and cast dense shade. In areas where the adelgid infestation is severe, causing the hemlock to decline, and also the areas where the large oaks have been removed, the understory is moderate and includes hemlock seedlings, hardwood tree seedlings, highbush blueberry, witch-hazel, maple leaved viburnum, hophornbeam and American hornbeam. Multiflora rose* and barberry* have become established in some of the more open areas. Poison ivy, club moss, Christmas fern, hayscented fern, Canada mayflower, spotted wintergreen, grasses and sedges were observed as ground cover where filtered sunlight reaches the forest floor.

C. Hardwood Swamp/Wetland

There are approximately 13 acres of the Hardwood Swamp/Wetland vegetation type present within this parcel. Included are three vernal pools. The vegetation which is present is somewhat variable with all size classes and age classes of trees represented. Each wetland is dominated by red maple and may include occasional yellow birch, black gum, white ash, sugar maple, red oak, gray birch, American elm, black birch, tuliptree and hemlock. Some of the larger trees which are predominantly located in the wetland areas adjacent to streams have cavities which make excellent den sites for many species of wildlife. The wetlands which are located adjacent to open areas are dominated by young seedling and sapling size trees and a dense shrub layer. Shrub species that are present include spice bush, sweet pepperbush, American hornbeam, highbush blueberry, swamp azalea, button bush, winterberry, witch-hazel, barberry*, and multiflora rose*. Skunk cabbage, false hellebore, tussock sedge, club moss, sphagnum moss, poison ivy, Virginia creeper, green briar, raspberry, cinnamon fern, Christmas fern, sensitive fern, evergreen wood fern, royal fern, steeplebush, meadowsweet, Canada mayflower, wild geranium, wild sarsaparilla, aster spp., sedges and other wild flower species are present as ground cover.

D. Old Field

The Old Field vegetation type occupies about 13 acres of this site and may be found in several locations. The vegetation which is present in these areas is variable. This is primarily due to soil moisture differences and the timing of the establishment and spread of hardwood and softwood trees and shrubs. Eastern red cedar are present with old field juniper, planted white pine, pitch pine and larch, flowering dogwood, gray birch, gray-stemmed dogwood, red maple, black cherry, choke cherry, quaking aspen, speckled alder, highbush blueberry, multiflora rose*, autumn olive*, barberry*, maleberry, arrowwood, crab apple, bayberry, Tartarian honeysuckle*, Japanese honeysuckle*, and staghorn sumac which are scattered throughout. Ground cover vegetation is comprised of grasses, sedges, poison ivy, bittersweet*, poke weed, goldenrod, ragweed, raspberry, cinquefoil, Queen Anne's lace, milkweed, thistle, ox-eye daisy, daisy fleabane, black-eyed Susan, spirea, meadowsweet and other wildflower and weed species.

E. Open Fields

The Open Field vegetation type makes up about 8 acres of this parcel. These areas are either being grazed by cows or are being mowed periodically to keep hardwood vegetation under control. The vegetation which is present in these areas is dominated by grasses, sedges, wild flower and weed species with scattered eastern red cedar. Multiflora rose*, autumn olive* and hardwood tree seedlings are encroaching into some areas. Some of the wild flower and weed species which were observed include daisy fleabane, ox-eye daisy, black-eyed Susan, milkweed, Queen Anne's lace, goldenrod spp. and ragweed spp..

F. Plantation

There are approximately two acres of conifer Plantation which are present within this tract. White pine along with occasional Norway spruce and larch were planted approximately 30 years ago perhaps as a leaf screen for the pond. Today they are very crowded and are declining in health and vigor. American elm, red maple, black birch,

black cherry and sugar maple have become established in the understory in some areas. The eastern red cedar and gray birch which were present at the time this plantation was established are being shaded out of existence by the dense overstory canopy which has developed. On the edges of this stand where sunlight reaches the forest floor barberry*, poison ivy, Virginia creeper, sugar maple seedlings, dolls eyes, beggar ticks, and trillium are present as ground cover.

*Invasive exotic vegetation has become established on some of the review site, especially in openings. Of special concern are several invasive plant species which have the potential to become major components of the ecosystem by out competing native species. These include barberry, multiflora rose, bittersweet, Tartarian honeysuckle, Japanese honeysuckle and autumn olive. Although some of these species provide wildlife with food and cover, they are aggressive competitors with native plant species. In some areas the presence of one or more of these species may precluded the establishment of other more desirable native plant species. Mechanical removal or chemical control of these plants is effective but will become more difficult as they become more widespread.

Limiting Conditions/Potential Hazards

At this time hemlock are present on approximately 20% of this property. All of the trees that were sampled regardless of size or location were infested with the Hemlock Woolly Adelgid. The Hemlock Woolly Adelgid is a small aphid-like insect that feeds on young Eastern Hemlock twigs during all seasons of the year with the greatest damage occurring during the spring. The loss of new shoots and needles seriously impairs the hemlock's health and vigor. The Adelgid is dispersed by wind, birds and mammals and is at the present time almost impossible to control in a forested environment. Cultural and chemical control methods have proven to work well in ornamental landscapes. Biological control agents such as the Asian ladybird coccinellid beetles show promise, but widespread availability and use is probably many years off.

Defoliation and resulting mortality can occur within several years after infestation. Infested hemlock die at different rates and deteriorate quickly after death. Although standing dead hemlock provide excellent foraging and cavity nesting habitat for many species of birds they do create problems. Dead hemlock trees not only pose a direct threat to people and property, they may also pose a long term wild fire hazard and are generally not aesthetically pleasing.

Potential hazards throughout the property include dead trees, dead tree parts and those trees whose roots or trunks have a high probability of falling due to excessive decay, lean or severe crowding such as the white pine in the plantation. These trees become hazard trees if there is a high probability of them falling and injuring people or damaging property. All trees with the above-mentioned characteristics would be hazardous if located within striking distance of a structure or along areas of high use such as the proposed hiking trails, yards or roads.

The creation of openings in the forest (from building roadways and clearing house lots) will increase the susceptibility of the trees to windthrow at the leeward edge of the openings. Trees adjacent to or in openings that are created on soils with a high moisture content or on windward slopes will have the greatest risk for windthrow. These newly exposed trees are also susceptible to ice, snow and wind storms which may cause considerable crown breakage.

Clearing forest vegetation for the construction of the proposed pond site will impact the tributary to the Salmon River which now flows through this area. The reduction of shade producing forest vegetation and the creation of the impoundment will undoubtedly change the flow and raise the temperature of the water which reaches the Salmon River. The magnitude and importance of this change will be addressed elsewhere in this report.

Construction activities that occur too close to trees that are to be retained will adversely effect their health, vigor and longevity and potentially create future hazard trees. Trees

are very sensitive to the condition of the soil within the entire area of their root systems which generally extends well beyond the spread of their crowns. Excavation, filling and the general use of heavy machinery will lead to some degree of soil compaction that will adversely affect the soil moisture and aeration balance. This imbalance could lead to a decline in tree health and vigor and may even lead to tree mortality within three to five years. Physical damage to the root system (by excavation) or bark damage may allow the introduction of decay organisms which may result in the decline of a trees health over time. The older and/or larger a tree is, the more readily it is affected by the negative impact of construction related activities. The delayed effect of construction activities on trees can create future problems that are expensive to rectify once utilities, roads, septic systems and homes are in place.

Aesthetic Considerations

The forested lots and proposed conservation land should provide many of the rural amenities for which many home buyers are looking. The aesthetics of a forest depends upon numerous characteristics of the individual trees, the forest as a whole and the landscape. Some of these characteristics include: size of the trees, density of the forest, variety of forest scenes, unique or interesting features, amount of dead and down woody material, depth of view into the forest, and visual attractiveness of the bark texture and leaf and flower color. Generally, forests with large trees and a deep unobstructed view into the woods are most desirable. Unfortunately the majority of large healthy trees were removed at the time of the last harvest. The larger trees that do remain especially if they are reasonably healthy should be retained and protected as "standards" for their aesthetic and wildlife value.

Management Considerations

The maintenance and development of healthy vigorous trees and forests should be considered in the development of this property. In addition to the environmental and aesthetic amenities they provide, the presence of healthy trees increases the value of

house lots. A reconnaissance of the trees on the individual house lots should be performed in conjunction with laying out the construction site in order to identify the best trees to be retained. The trees to be retained should be healthy, free of decay and preferably a long lived species such as red oak, white oak, hickory, sugar maple and American beech. Other species are acceptable if they are healthy and not prone to insect infestation or disease. These trees may be retained in groups or "islands" to reduce the impact of soil disturbance and mechanical injury.

Both individual trees and "islands" of trees can be designated for retention with vinyl flagging or fencing prior to construction so that tree injury may be avoided. No excavation, filling or driving of heavy equipment should be permitted within 25-50 feet (depending on tree diameter - the larger the tree to be retained the greater the no disturbance area should be) of single trees or groups of trees. Another general rule is no excavation, filling or heavy equipment should be permitted within two times the radial spread distance of the retained tree's crown. Finally, trees left on site around houses should be away from the house at least for a distance equal to the height of the tree. The negative effects of construction on trees is not usually visible at the time the work is done. Soil compaction, root injury, and scraped bark are stressors that contribute to insects and diseases infesting the tree long after machinery has left the sight. This creates hazards and problems for home owners as trees die several years after construction. These problems can be minimized or eliminated when proper care is taken with vegetation during development

When making grade cuts, trees should be removed back from the cut for at least a distance of two feet for each one foot of depth of cut, e.g. 20 feet back for a 10 foot cut. Where feasible roads, driveways, houses and septic systems should be relocated slightly in the field to protect healthy, highly aesthetic trees which are going to be retained. Tree and vegetation clearing and removal will take place on a significant portion of the proposed subdivision. The sawtimber size trees (11.1" in diameter at breast height (d.b.h.) and larger) even though they are generally of low value and the pole size trees

(6.1 " to 11 " in d.b.h.) that are going to be removed should be utilized as sawlogs and fuelwood rather than chipped and removed at a cost to the developer.

Water Quality and Forest Management

Healthy woodlands provide a protective influence on water quality. They stabilize soils, reduce the impact of precipitation and runoff and moderate the effects of adverse weather conditions. By so doing, woodlands help to reduce erosion, sedimentation, siltation and flooding. Research has shown that soil protected by the cover of leaf litter and humus associated with woodland areas contributes little or no sediment to streams.

Improper and careless harvesting of timber for development or commercial purposes may, however, lower water quality in several ways: 1) erosion, siltation and sedimentation caused by improperly located and improperly constructed access roads, skid trails, yarding areas and stream crossings; 2) siltation and sedimentation caused by logging debris left in streams, interfering with natural flows; 3) thermal pollution resulting from complete or partial harvesting of streambank vegetation, eliminating shade; 4) chemical pollution caused by improper application of herbicides and insecticides (it should be noted, however, that in Connecticut the widespread use of chemicals in forest management is not prevalent and therefore does not constitute a great threat to water quality at this time); 5) influx of nutrients caused by the application of fertilizer, soil conditioners and wetting agents (used in forest fire control).

In 1979, a field study and analysis of timber harvesting operations in Connecticut revealed no significant contribution to the degradation of water quality. However, this study did identify sedimentation resulting from erosion as a principal potential problem. Felling trees does not generally cause erosion. Approximately 90% of sedimentation from harvesting operations originates from exposed soil on logging roads, skid trails and yarding areas. Most erosion and sedimentation associated with

woodland harvesting activities occurs during and immediately after harvesting. The basic principles of erosion control needed to reduce or avoid damage to the environment include:

1. Disturb as little land as possible.
2. Use erosion control measures to protect disturbed areas.
3. Reduce the speed and volume of runoff.
4. Divert runoff from disturbed areas.
5. Install perimeter controls around disturbed areas.
6. Conduct conscientious maintenance of erosion controls.
7. Assign someone the direct responsibility of implementing and maintaining erosion control measures.

For more in-depth information please see "TIMBER HARVESTING AND WATER QUALITY IN CONNECTICUT; A Practical Guide for Protecting Water Quality While Harvesting Forest Products." Prepared by the Connecticut RC&D Forestry Committee, 1990. (Soon to be reprinted).

This publication and additional technical advice and information on best management practices, forest products harvesting or other aspects of forest management may be obtained from:

State Forester's Office
79 Elm Street
Hartford, CT 06106
(860)424-3630

Conclusion

Trees and forests have value in reducing climatic extremes, controlling runoff, filtering out pollutants from the air and water, reducing noise, providing aesthetic enjoyment, creating wildlife habitat, recharging aquifers, supplying wood fiber and functioning as a carbon sink. Healthy forests provide these long term amenities. Therefore a good

relationship between development and the retention of forested open space is essential if generations to come are to enjoy a high quality of life. Trees around houses can be healthy, long lived and valuable if treated properly in the conversion from unbroken forest to residential subdivision.

FOREST VEGETATION MAP

Comstock Ridge Subdivision, East Hampton, CT

July 23, 1998

NORTH

▲

SCALE 1"=1000'

LEGEND

PROPERTY BOUNDARY

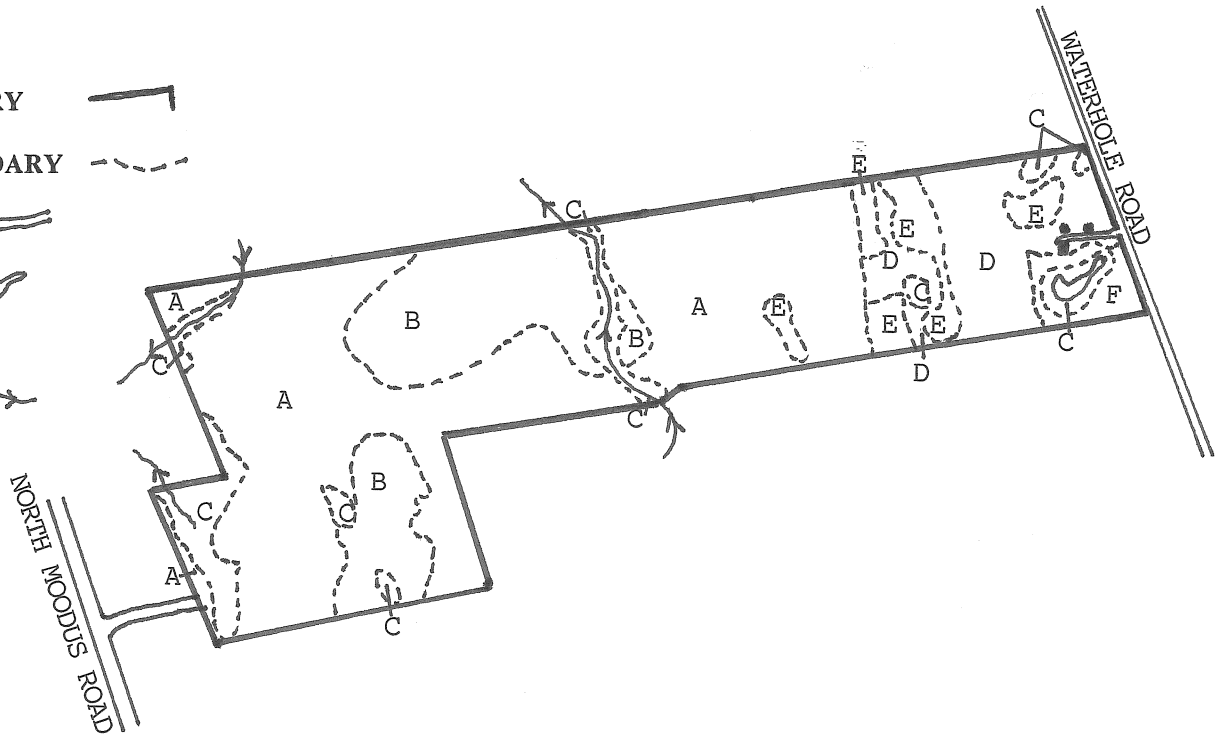
VEGETATION BOUNDARY

PAVED ROAD

POND (1+-ACRE)

STRUCTURES

STREAM



VEGETATION TYPES

A. Mixed Hardwoods.....67+- ACRES

B. Softwoods/Hardwoods.....26+- ACRES

C. Hardwood Swamp/Wetland...13+- ACRES

D. Old Field.....13+- ACRES

E. Open Field.....8+- ACRES

F. Plantation.....2+- ACRES

Archaeological Review

A review of the state of Connecticut Archaeological Site Files and Maps shows ten (10) prehistoric native American settlements located in immediate proximity to the project area. Portions of the proposed project area possess high sensitivity for Indian archaeological sites dating back to over 7,000 years ago. These sites represent hunting and gathering camps and early agricultural villages. In fact, artifact collectors and amateur archaeologists have reported numerous stone tools, including projectile points and ground stone implements, from agricultural fields associated with the project area.

The Office of State Archaeology (OSA) and the Connecticut Historical Commission, which serves as the State Historic Preservation Office (SHPO), strongly recommend an archaeological reconnaissance survey for Comstock Ridge. The US Army Corps of Engineers (ACOE) is currently reviewing the applicant's preliminary permit vis-à-vis wetland-related activities. SHPO has advised ACOE that a professional survey is required in order to identify, evaluate and manage prehistoric archaeological resources which might effected by the proposed undertaking.

The Office of State Archaeology and the Connecticut Historical Commission are prepared to offer the applicant and the Town any technical assistance in conducting the recommended archaeological survey. All archaeological survey work should be conducted in accordance with the Connecticut Historical Commission's *Environmental Primer for Connecticut's Archaeological Resources.* The Office of State Archaeology and the Connecticut Historical Commission look forward to working with all parties to ensure the preservation and conservation of all archaeological sites which might be effected by this proposed subdivision.

Planning Comments

Forty-eight single family detached housing units are proposed for this subdivision, which will increase traffic on local roads. The 1997 Trip Generation Manual, produced by the Institute of Transportation Engineers, shows the average rate of trips to be 9.57 per dwelling unit on a weekday, slightly higher on Saturdays, and lower on Sundays. As a result, an average of 460 trips would be produced by the subdivision on any given weekday. The directional split would be 50% entering and 50% exiting. The subdivision would access the parallel Water Hole Road and North Moodus Road with through road 6,500 feet in length. There is easy access to Route 16 to the north and Route 149 to the south from the subdivision.

It was stated that the ground water table in many places is only twenty-four to thirty inches. All homes will have on site wells and septic systems. The leachfields will have to be designed to the proper specifications due to their proximity to the high water table.

The developer mentioned that the proposed pond as shown in the plans is not going to be used as a detention pond for storm water run-off and is for aesthetic purposes only. It may be better to leave this area as open space rather than constructing the pond. The pond could attract undesirable wild life such as deer, geese, raccoons, etc. that could destroy gardens and landscaping or pose a threat to family pets. The pond could also be a hazard to children who may play in the area. Leaving this area as open space would also reduce impacts to the nearby stream and wetland.

Consider creating a minimum fifty foot, preferably a hundred foot, conservation easement around the wetland associated with the stream, and wetland on the western side of the subdivision. Delineate the easement on the lots where applicable, so the home owners know its boundaries. This would affect lot numbers 22, 23, 25, 36, 38, 40, 42, 44, 46, 47, and 48.

Stone walls bisect the through road, driveways, houses, and yards in many parts of the subdivision. Retain the stone walls as much as possible and incorporate them into the landscape of the lots promoting their aesthetic value in the subdivision. Similarly, retain and incorporate the tree lines around the pasture lands into the subdivision to promote their aesthetic value. This will make the resulting lots and entire subdivision more attractive.

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: 860-345-3977, Eastern Connecticut RC&D Area, P.O. Box 70, Haddam, Connecticut 06438.