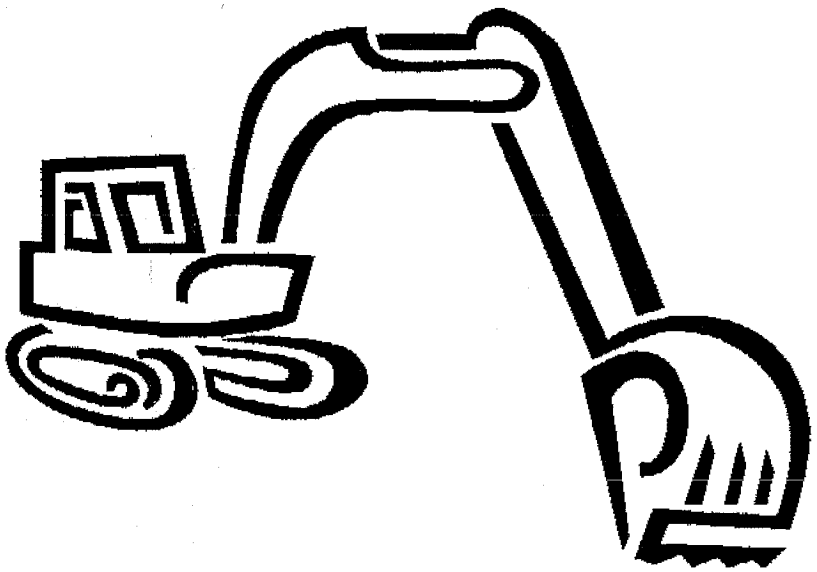
D & J Earthworks and Development, LLC Gravel Removal Operation

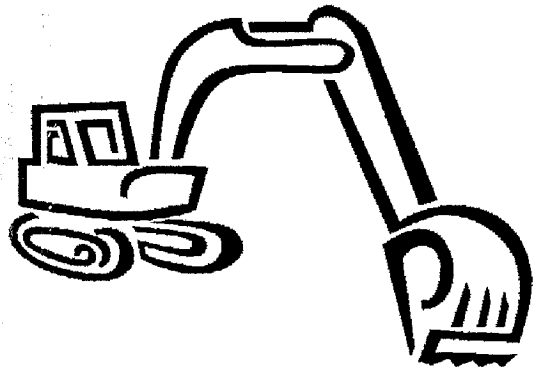
Lyme, Connecticut



Eastern Connecticut Environmental Review Team Report

Eastern Connecticut Resource Conservation & Development Area, Inc.

D & J Earthworks and Development,LLC
Gravel Removal Operation
Lyme, 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
Lyme Inland Wetlands Commission
and
Lyme Planning and Zoning Commission

April 2003

CT Environmental Review Teams
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Acknowledgments

This report is an outgrowth of a request from the Lyme Inland Wetlands Commission and the Planning and Zoning Commission to the Connecticut River and Coastal Conservation District (CRCD). The CRCD 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, March 13, 2003.

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I would also like to thank Bernie Gigliotti, Lyme wetland enforcement agent, Fred Bliven, and Tony Thurston, and Roger Dill, members of the Lyme inland wetlands commission, LeRay McFarland, Lyme planning & zoning commission, Daniel Troiano, applicant, Joseph Levy, engineer for the applicant, William Root, environmental consultant for the applicant, Keane Callahan and Donald Aubrey, for the Pleasant Valley Association, and other interested neighbors 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 plans and additional information. Some Team members made individual or additional visits to the project site. 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 applicant. This report identifies the existing resource base and evaluates its significance to potential and existing 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 sand and gravel extraction.

If you require additional information please contact:

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Introduction

Introduction

The Lyme Inland Wetlands Commission and Planning and Zoning Commission have requested assistance from the Eastern Connecticut Environmental Review Team in conducting a review of a proposed sand and gravel excavation.

The ±70 acre site is located on the south side of Beaver Brook Road in North Lyme. The site is accessed through an existing right-of-way easement from Beaver Brook Road. The proposed project is for the removal of approximately 900,000 cubic yards of material over a 10-year period.

The property is bordered by Beaver Brook to the north, an existing gravel operation to the east and undeveloped open space. The sand and gravel extraction will disturb about 15 acres of the parcel. The existing dirt access road will be upgraded to a paved driveway to the brook. The brook crossing will require a series of cross culverts and the access drive will continue (upgraded but not paved) to the extraction site. It is proposed that 60 trucks a day would enter and leave the site. The project is designed in four phases and includes a restoration plan. There is a proposed conservation open space area of ±31 acres to be given to the Town.

An ERT was conducted on this site in 1991, also for a sand and gravel excavation *(Salem Earth Products Inc. Excavation ERT Report, June 1991).*

Objectives of the ERT Study

The Town of Lyme has requested assistance in evaluating this new proposal as an update to the 1991 ERT report. Concerns include: Beaver Brook crossing,

impacts to Beaver Brook, impacts to wetlands and vernal pools, stormwater management, wildlife habitat impacts relating to red-shouldered hawk, review of restoration plan, traffic and public safety, and archaeological significance.

The ERT Process

Through the efforts of the inland wetlands and watercourses commission this environmental review and report was prepared for the Town of Lyme.

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 town and 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, March 13, 2003. Some Team members made individual and/or 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.

Figure 1

Location Map

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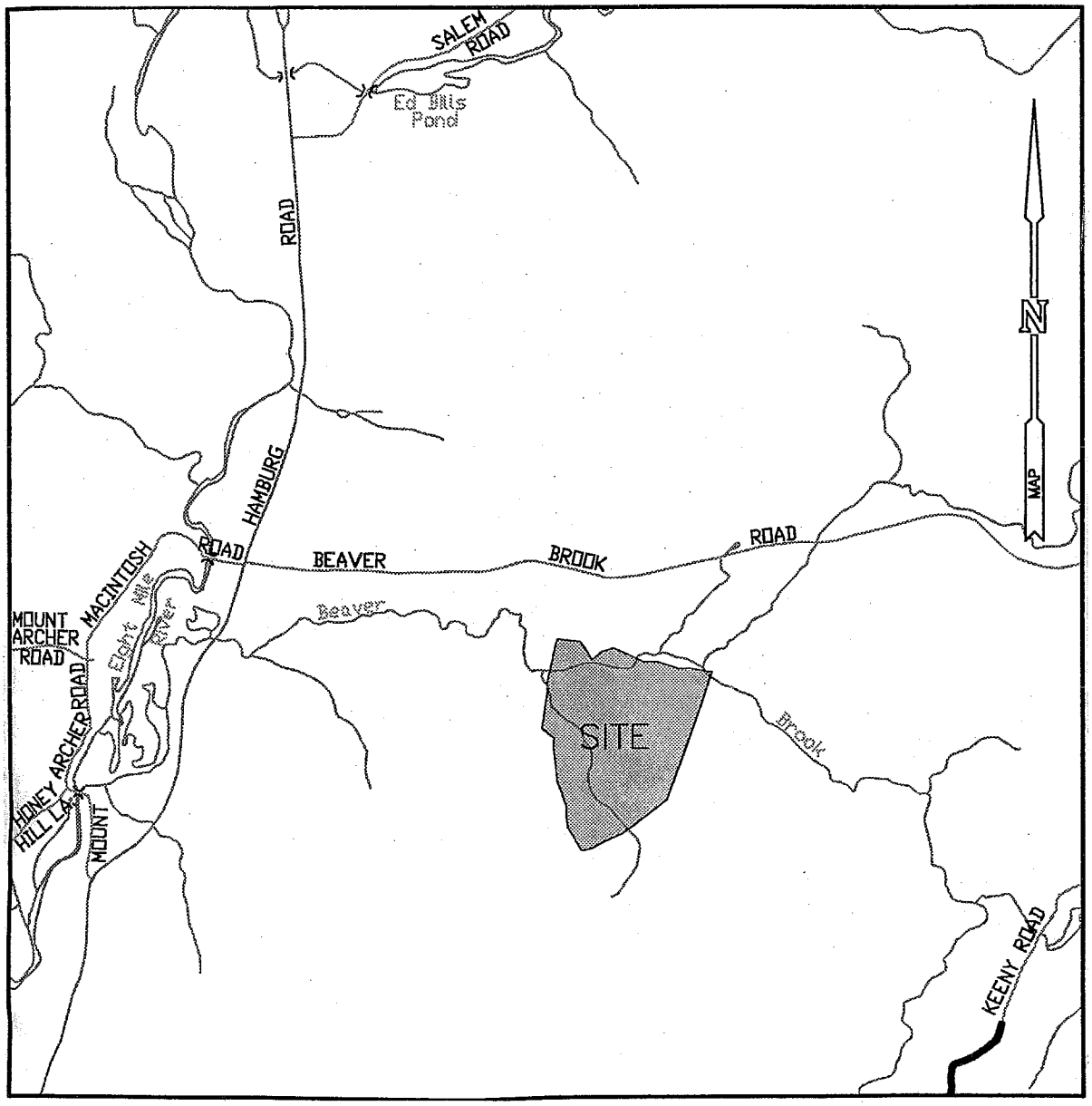

Figure 2

Topographic Map

Scale 1" = 2000'

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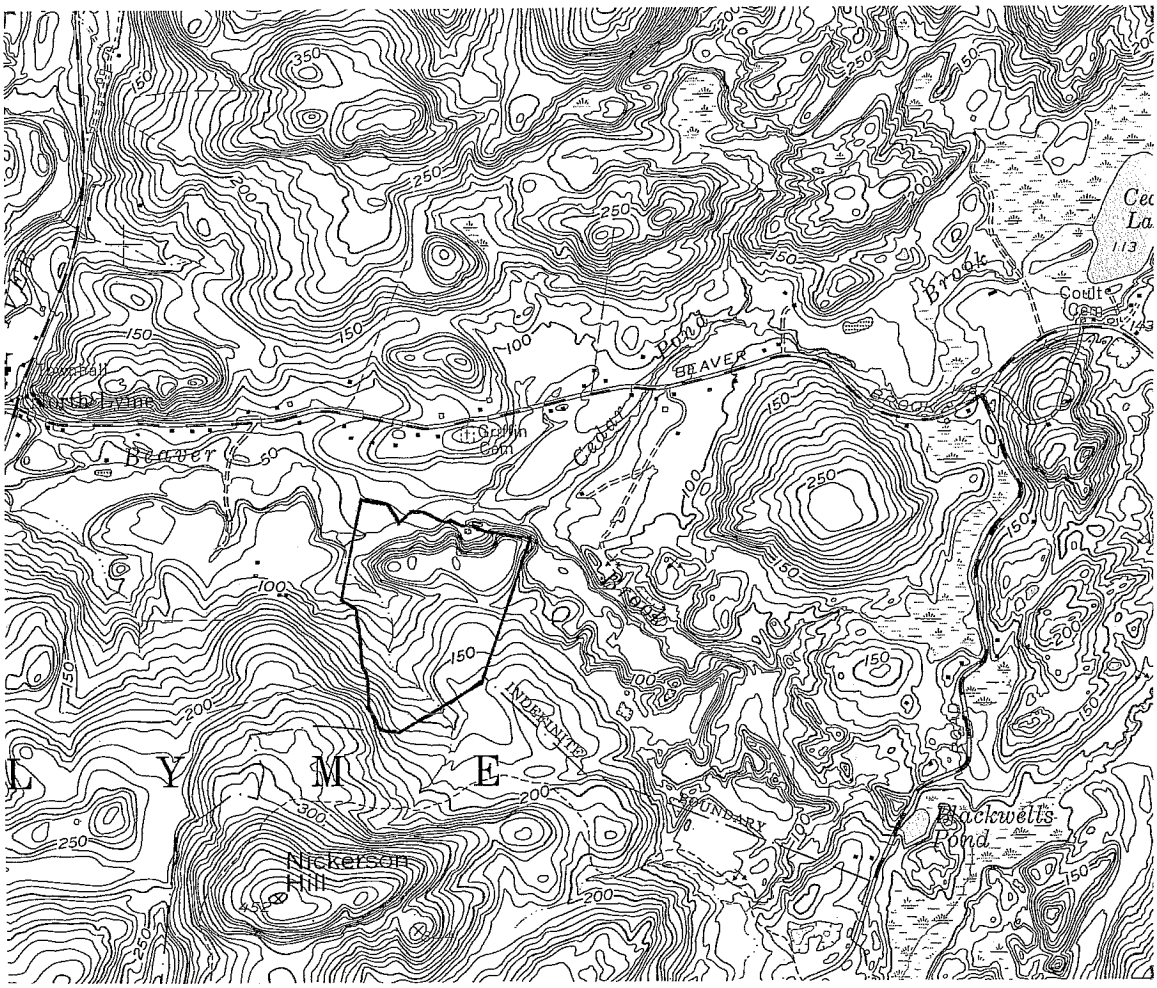

Figure 3
Site Map

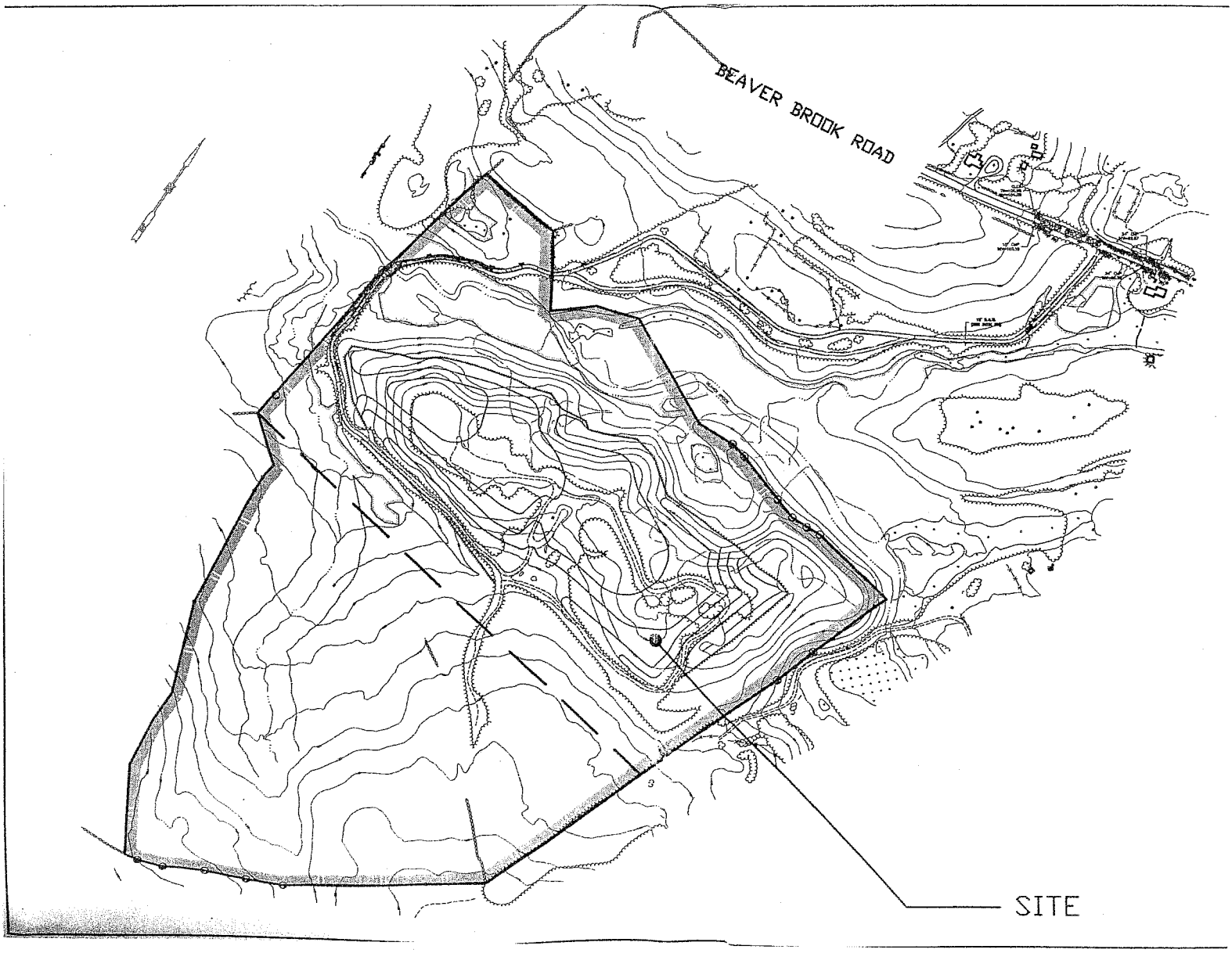

Figure 4

Soils Map

Scale 1″ = 1320′

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Conservation District Review

The following are general comments and recommendations regarding D&J Earthworks and Development, LLC's proposed sand and gravel removal operation south of Beaver Brook Road in Lyme, CT. Proposed activities include improvements to an existing dirt access road and the removal of approximately 900,000 cubic yards of material. Proposed activities with the potential of causing soil erosion and sedimentation include the clearing, grubbing, and excavating of steep slopes; construction of two wetlands crossings; grading and paving of the access road; and production of fugitive dust from the screening operation and truck traffic.

Comments in this report are based on a review of:

- Site plans titled Sand and Gravel Removal Operation, Beaver Brook Road, Lyme, CT dated 1/6/03 and revised on 1/20/03 and 3/18/03;
- Engineering Report for Sand and Gravel Removal Operation, Beaver Brook Road, Lyme, CT dated 1/13/03 and revised 1/20/03;
- Existing Conditions and Wetland Impact Assessment for Gravel Removal Operation, Beaver Brook Road, Lyme, CT dated 1/20/03;
- Milone and MacBroom response letters to the Lyme IWWC dated 1/20/03, 3/19/03, and 3/21 /03;
- Eastern ERT Report for Salem Earth Products Inc. Excavation, Lyme, CT, June 1991;
- A site visit conducted on 3/13/03.

The comments below are advisory in nature and are intended to assist the Town of Lyme municipal land use commissioners in their charge.

Soil Resources

Three upland and three wetland soils are shown on the Soil Survey Maps of New London County (USDA/Soil Conservation Service) in the project area. The soil survey maps are at a 1:15,840 scale, which means that the smallest area delineated is approximately 2.5 acres. Caution should be taken when using the soil survey maps for site-level planning since at this scale soils in a single mapped unit can differ in slope, depth, drainage, and stoniness.

Uplands in the project area are comprised of soils in the Haven-Hinkley map unit. Soils in this unit are well to excessively drained loamy and sandy soils on outwash plains and terraces. Slopes in this unit vary widely from nearly level to very steep.

Haven silt loams (HcB) are deep, well drained loamy soils with moderate surface and subsurface permeability and very rapid substratum permeability. Haven soils are generally nearly level to gently sloping and pose a moderate risk of erosion. Slopes of excavated Haven soils can however be unstable. Hinkley soils are deep excessively drained sandy soils with rapid surface and subsurface permeability and very rapid substratum permeability. They are sloping to steep, and the risk of erosion increases with the degree of steepness. The steep and droughty nature of Hinkley soils limits crop cultivation, and woodland roads in steep areas (15-35% slope) need to be carefully constructed to minimize erosion.

Summary of upland and wetland soils mapped on the proposed project site

Map Unit	Soil Type	Slope	Erosion Potential	Location
HcB	Haven silt loam	3-8%	Moderate	Uplands north of Beaver Brook transected by access road
HkA	Hinkley gravely sandy loam	0-3%	Slight	Broad level upland in the center of the area to be excavated
HkC	Hinkley gravely sandy loam	3-15%	Moderate to Severe	Entrance of access road at Beaver Brook Road and south side of proposed extraction in the vicinity of proposed unpaved access road.
HkD	Hinkley gravely sandy loam	15-30%	Severe	Entrance of access road at Beaver Brook Road and steep sloped uplands in the area to be excavated.
WvB	Windsor loamy sand	3-8%	Slight	Southeast corner of proposed extraction in the vicinity of the proposed stockpile location
Ro	Rippowam fine sandy loam	0-3%	Slight*	Wetlands associated with Beaver Brook and the vernal pool to the north of the proposed excavation.
Rn	Ridgebury, Leicester, and Whitman extremely stony fine sandy loam	0-3%	Slight	Wetlands associated with unnamed tributary to Beaver Brook to the west of the proposed excavation, downslope from proposed unpaved access road.
Ts	Tisbury	0-5%	Slight**	Wetland to the north and west of the proposed Beaver Brook crossing

**limited by wetness and a seasonally high water table; **steeply excavated slopes are unstable*

Proposed Soil Erosion and Sedimentation Control

The soil erosion and sedimentation controls required can be evaluated separately for each of the three major proposed activities:

1. Wetlands Crossings

Two wetlands crossings are proposed. The first crossing is approximately 300 feet from Beaver Brook Road. A seepage envelope is proposed to cross a finger of the most northeastern wetlands in the project area. This wetland area drains south

into an unnamed tributary that joins with Beaver Brook. The second crossing is at Beaver Brook, about mid-way between Beaver Brook Road and the entrance to the proposed extraction. A proposed crossing is designed as a series of four cross culverts. The access road will be paved across the brook and intermediate rip rap is proposed as slope protection on either side of the crossing.

Recommendations

a) A complete soil erosion and sedimentation control plan should be shown for the installation and stabilization of the four-culvert crossing of Beaver Brook. The plan should specify the methods that will be employed to protect the brook from sedimentation during the installation, the proposed time of year of the installation, and a plan to stabilize the disturbed soils in and near the brook.

b) The plans should specify the time of the year and for how long the geotextile silt fence proposed along the access road to the north of the brook crossing and along the road within the 100-year flood plain will remain in place.

c) The methods proposed to control soil erosion and sedimentation during the installation and stabilization of the seepage envelope should be specified on the site plans. The design of the seepage envelope should be supported with calculations showing that selected materials are appropriate to minimize clogging and maximize water passage.

d) Potential impacts of the access road and associated drainage located in the regulated upland review buffer to the south of the extraction should be evaluated. The proposed plan will divert drainage from the access road via water bars onto rip rap splash pads. Adequate energy dissipation and sediment control at the discharge points should be provided to minimize

impact to the downslope wetlands. The necessity of geotextile silt fence along the entire extent of this portion of the access road should be evaluated. Shorter lengths of sediment barrier installed as sequential horseshoe-shaped check dams directly downslope of each discharge point may be more appropriate, easier to maintain, and cause less disturbance during installation.

2. Road Improvements

The proposed access road will be paved from Beaver Brook Road to approximately 150 feet past the brook crossing and then will be gravel for the remainder. Water diversion control measures (water bars with modified rip rap splash pads) are proposed along the gravel portion of the access road from the limit of pavement to the entrance of the extraction site. A stone construction entrance (anti-tracking pad) is proposed where the gravel road enters the extraction. Geotextile silt fence is proposed along a portion of the paved access road north of the brook crossing and along the entire downslope (southern) side of the gravel access road.

Recommendations

a) The proposed access road has the potential to impact on-site natural recourses. To minimize potential impacts the site plan needs to comprehensively address how water, mud, and dust will be control along the entire length of the access road. Paving the entire access drive should be evaluated as a means to minimize long-term erosion and sedimentation. Standard road grade and x-cross sections should be provided showing proposed drainage and sediment trapping mechanisms for the entire length of improved road.

b) A dust control plan for the access road should be provided.

c) The limits of any proposed clearing, tree trimming, or grading along the access road should be shown on the site plans.

d) The necessity of additional construction entrance (anti-tracking pads) on the access road at the proposed gravel-asphalt transition and at the merge with Beaver Brook Road should be evaluated.

e) To protect the downslope intermittent watercourse and wetlands, appropriate erosion and sedimentation control measures should be shown to the south of the proposed entrance to the extraction at the bend in the access road.

f) All soil erosion and sedimentation controls should be inspected following the recommendations of the 2002 Guidelines, for example, inspections weekly as well as within 24-hours after rainfall of 0.5 inches or greater.

3. Earth Excavation

The proposed extraction will remove approximately 900,000 cubic yards of sand and gravel from the central portion of the site. A four-phase plan is proposed which limits activities to approximately one half of the proposed excavation area at a time. Clearing and grubbing activities will take place during the first two phases. A high point is proposed to remain around the perimeter of the excavation at all times to limit potential downslope erosion and encourage drainage to flow inwards towards the low point of the excavation. Both construction fence and geotextile silt fence are proposed around the excavation perimeter to demarcate the limits of activity. A temporary stockpile area is proposed on the southeastern portion of the project limits to the east of the

excavation entrance. A site restoration plan consisting of three different plant associations - mixed forest, hardwood forest/old field, and hardwood wetlands - has been proposed.

Recommendations

a. Access to the proposed stockpile area should be shown on the site plans.

b. A proposed plan to either stockpile or remove stumps and other debris should be provided on the site plans.

c. A dust control plan to prevent fugitive dust from the excavation and screening operation should be provided.

d. More detailed plans for clearing and grubbing activities during Phase I and II should be provided. Multi-step phasing limiting the amount of area exposed at any one time during each phase will minimize the potential of soil erosion and sedimentation. The recommendation noted on page 14 of the 1991 ERT report to cut and remove trees in multiple steps with excavation proceeding in 10 foot lifts should be evaluated.

e. Further details pertaining to the site restoration plan should be provided. Specifically;

1) The timing of seedling planting should be noted, for example, will restoration commence at the end of Phase III or only when all phases are completed.

2) How will the seedlings be protected from herbivore browsing? Will monitoring of initial establishment be provided?

3) Hinkley soils are extremely droughty, especially on slopes. The restoration plan should address how seedlings will be established in the absence of sufficient rainfall. Will irrigation be provided to establish seedlings and vegetated soil cover if required?

4) The restoration plan specifies a hardwood wetlands plant association in the area that will be excavated during Phase III. The vertical separation between the final grade at the end of Phase III and the water table should be more thoroughly explored to determine if there is adequate soil moisture to support the proposed plant species.

f) The methodology and supporting information used to determine the depth to ground water, and therefore the vertical limits of the extraction, should be provided. This information should be evaluated to ensure that the extraction will not intersect the ground water table or require dewatering operations during the final phases.

g) The plans propose using orange construction fence to identify clearing and excavation limits. In addition, geotextile silt fence is proposed downslope of the construction fence for the majority of the site perimeter. The purpose and applicability of this silt fence should be evaluated, especially on the steep forested slopes where proper silt fence installation and maintenance will cause additional disturbance on potentially erosive slopes. Silt fence has a limited life span (1 year per the 2002 Guidelines) and will need to be replaced causing additional disturbance. Clearing or excavation activities causing downslope erosion or sedimentation will most likely overwhelm the silt fence. Concerns for downslope erosion or sedimentation should be addressed through the use of buffers, phasing, and on-site control of clearing and excavation activities. If a "no activity"

zone is required a double row of construction fencing spaced 6-10 feet apart should be considered.

h. The proposed 120 foot horizontal and 40 foot vertical buffer to the vernal pool will help protect the vernal pool envelope (100-foot area around the pool that supports amphibian breeding and emergence) but will not adequately protect the pool's critical terrestrial habitat (100-750 foot beyond the pool edge that supports non-breeding amphibian activities). One vernal pool management goal** is to maintain at least 75% of the critical terrestrial habitat as contiguous forest with undisturbed ground cover. The proposed clearing and excavation on the north-facing slope above the vernal pool may impact the future success of species using the vernal pool. To determine whether the proposed buffer will adequately protect the vernal pool a biological assessment of pool including an evaluation of the extent of the critical terrestrial habitat should be completed.

**Information on vernal pools can be found in *"Best Development Practices: Conserving Pool Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States,"* Metropolitan Conservation Alliance Technical Paper Series: No. 5, 2002.

Stormwater Management Review

This project will be covered by the General Permit for the Discharge of Stormwater Associated with Industrial Activity ("the industrial general permit") as mining operations are defined as an industrial activity pursuant to section 2.(3) of the general permit. The permit requires that the site register with the Department of Environmental Protection (CTDEP) at least 30 days before the initiation of industrial activity. In addition to filing a registration, the registrant must also prepare, submit and keep on site a Stormwater Pollution Prevention Plan (the "Plan").

The Plan must include, but is not limited to, a site map as described in Section 5(b)(6)(B)(i)(1) of the permit, a description of stormwater measures and controls as described in Section 5(b)(6)(C)(iv) of the permit, a description of spill prevention and response procedures as described in Section 5(b)(6)(C)(vi) of the permit, a non-stormwater certification as described in Section 5(b)(6)(C)(viii) of the permit, and a schedule for inspections with designated personnel as described in Section 5(b)(C)(x) of the permit. In addition to preparing and following the plan, the registrant must also sample stormwater runoff from the site, pursuant to Section 5(c) of the permit, before September 30 of the year in which the site is registered as required by Section 3(d) of the permit, and annually thereafter between October 1 and September 30 except as provided in Sections 5(c)(1)(D) and (E) of the permit.

Particular detail will need to given to erosion and sediment (E & S) control measures at this site and an E & S plan must be incorporated into the Pollution Prevention Plan. Please note that while this review is based primarily on the industrial general 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 E & S plan that has been approved by the Town in conjunction with the CTDEP Inland Water Resources Division (IWRD) and/ or the local Conservation District may be included in the Plan.

Additionally, Section 5(b)(6)(H) of the industrial general permit also requires that any future construction activity on site that disturbs greater than five acres must be registered and conducted in accordance with the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities ("the construction general permit").

The following are specific comments on the plans provided during the meeting on March 13,2003 and additional information on March 21, 2003 and March 25, 2003.

- The guidelines require the installation of a reverse slope bench when the vertical height of any slope steeper than 3 :1 exceeds 15 feet, except when engineered slope stabilization structure(s) (such as an underdrain system directing runoff from the top to the bottom of the slope) is included in the slope or a detailed soil mechanics analysis calculation concludes a reverse slope bench is not necessary. Reverse slope benches (with a stable outlet) must be installed in applicable areas. A sediment trap, drainage swale, or any other appropriate control may be used to treat runoff from the reverse slope bench. Please refer to the Guidelines for design information and include a detail for the reverse slope bench and any associated swales or basins.

- Areas that are to be inactive for a period of greater than 30 days should be seeded temporarily. Areas left inactive for greater than one year should be seeded permanently.

- The water bars may need to be spaced closer together (than the 80' shown) along the steeper portions of the access road, assuming that no negative wetlands impacts result. Please refer to the Guidelines for spacing information.

- Inspections of the site should occur on a weekly basis and after rainfalls greater than 0.1 in. Inspections should consist of such items as, but not be limited to, all erosion and sediment controls and the fueling area.

- The Plan must include a discussion of how stormwater quality will be assessed prior to the removal of the plug in the fueling area to drain any collected stormwater. The discussion must include a procedure for the collection and removal of any polluted stormwater from the fueling area.

- Any wastewater discharge to the waters of the State or to groundwater generated from processing of materials mined must be permitted appropriately.

Wetlands Review

There are three wetland area concerns for the proposed sand and gravel excavation project. The first is the crossing of Beaver Brook, the second is the proximity of the unpaved quarry approach road and water bar system close to wetlands, and third is the protection of the breeding vernal pool and its environs. Each area of concern deals with a different type of wetlands and accordingly each has its own issues.

- The proposed road crossing of Beaver Brook is by means of what is primarily a side by side, two box culvert. This structure will provide 12 feet of normal flow width and an additional eight feet high water flow width. As proposed, and with correct soil erosion and sediment control measures, the integrity of the stream should be maintained. Currently the brook has a DEP mapped surface water quality that is assumed to be "A", but in all likelihood, given the location and absence of any known pollution sources upstream, the quality may well be "AA". Either way, this existing level of water quality should be maintained through and after the life of the project. Understanding that the life of the project could be 10 years, the town may want to establish whether or not the box culvert will be removed upon completion of the project and the crossing returned to its current state.

Water Quality Description

Class A

Designated uses: potential drinking water supply; fish and wildlife habitat; recreational use; agricultural and industrial supply and other legitimate uses including navigation.

Discharge restricted to: same as allowed in AA (i.e.: Discharge restricted to: discharges from public or private drinking water treatment systems, dredging and dewatering, emergency and clean water discharges).

Source: *Protection Summary of the Water Quality Standards and Classifications*, Connecticut Department of Environmental Protection.

- The approach road to the quarry very nearly abuts the downslope wetland immediately south of it. This is at wetland flags WE9 through WE12. In fact, great lengths of the unpaved road are within the wetland buffer zone as depicted on the plan. In that the road will likely remain unpaved, the opportunity for erosion, and resulting sediment problems, exists. While the plan has proposed water bars and rip-rap pads, over the course of ten years it is easy to envision the pads filling with sediments and the resulting overflow bringing sediments to the wetlands. A strict plan of maintenance for the rip-rap pads should be drawn up to avoid this scenario.

- A number of issues concerning the vernal pool are apparent and need to be explored before the phased work in this area begins. Three points are stated below and are followed by discussion.
    1. The pool is very productive. The Team learned that at a minimum spotted salamanders, newts, green frogs, wood frogs, and the ubiquitous spring peeper were reported to be present. This Team member observed egg masses, spermatafores and vernal pool water insects on the day of the field walk (3/31/03). Taken together, this is the most diverse population of vernal pool species that this Team member has encountered in a long time. One of the attractions to this locale is undoubtedly its isolated distance from any disturbance.

2. The applicant's environmental consultant indicated that the water level of the vernal pool has little to no change over the course of a year.
3. A rough approximation of the watershed for the vernal pool has been calculated. It is estimated to be about 4.3 acres in size. The extent of the new watershed that would serve the vernal pool after completion of the gravel excavation is about 2.3 acres. This represents 53% of the pre-extraction watershed. Thus, the proposed plan would remove 2 acres or 47% of the watershed of the vernal pool. (While the actual numbers will be changed with more complete calculations, the percentage ratio of kept-to-lost land will likely be along the lines of these percentages.)

Discussion

One of the issues that has been treated from completely opposite sides is that of which moisture regime is feeding the vernal pool. Without further fieldwork we can only use available information. If the water level of the pool fluctuated through the seasons it would more than likely be mimicking the groundwater levels that fed it. The pool water level would be high in the spring runoff season and much lower to non-existent in the middle of the summer. In that scenario, the pool would likely be influenced by the groundwater and the seasonal fluctuation that it exhibits.

However, the Team has been told that the water level stays essentially the same the year round. This could indicate that the pool is perched, that is, it has a non-permeable bottom which does not allow for pool water to infiltrate into the ground below. If the pool is perched, has a non-permeable bottom and is not influenced by groundwater, then the water level, by default, is maintained through precipitation and surface drainage from its watershed

lands. If this is the case, the reduction of 47% of its watershed could have telling impacts on the pool ecology.

The greatest part of the watershed of the pool extends away from the pool uphill to the southwest and southeast. Here the slopes are steep, in some places approaching 45 or more degrees. The USGS's Northeast Amphibian Research and Monitoring Initiative produced a document for their vernal pool survey method protocol entitled: *Wood Frog and Spotted Salamander Egg Mass Counts and Percent Vernal Pools Occupied by Amphibian Species on DOI Lands in the Northern United States.*[1]* In it they state that ..."(spotted) salamanders require both wetlands (usually vernal pools) for breeding and surrounding upland woodlands, where they spend about 95% of their lifetime burrowed underground , for survival". Dr. Michael Klemens stated in a personal communication that "..slope would not pose a problem -- in fact salamanders often gravitate towards slopes. Better drained habitat for subterranean lifestyles". (E-mail 4/9/03) So it would seem that the value of the upland slopes for at least this one vernal pool species is fairly critical.

Dr. Klemens also suggests in his recently co-authored book with Aram J.K. Calhoun entitled *Best Development Practices - Conserving Pool Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States* the upland use by various vernal pool amphibians can range to 386 feet for spotted salamanders and 1550 feet from the pool for juvenile wood frogs (3835 feet for adults). Indeed, he suggests there be no development in the 100 foot buffer around a vernal pool and no more than 25% in the critical terrestrial habitat, that is the distance from 100 feet to 750 feet way from the pool. It remains to be seen if this project can meet the 25% figure.

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[1] This document can be obtained via - http://www.mp2-pwrc.usgs.gov/earmi/projects/#eggmasscounts.

Recommendations

The vernal pool needs to be studied further before work proceeds. Vernal pools by their very nature are delicate systems. Every pools' preservation demands that an understanding of their hydrology and natural ecology be understood before a project commences.

The questions needing answers include:

- What populations use the pool for breeding purposes?
- Does surface or groundwater maintain the water level in the pool?
- What will be the effect of the loss of 47% of the upland watershed on the species needing terrestrial habitat and on the surface runoff which may or may not feed the pool?
- Will 75% of the critical terrestrial habitat be maintained?

When these questions are answered, the town will be able to proceed in their decision for the protection of this fragile system with more confidence.

Wildlife Resources Review

The two main wildlife resource concerns raised by the Lyme Inland Wetland Commission include the potential for red-shouldered hawks to nest on the property and the presence of the vernal pool directly adjacent to the proposed excavation site.

Red-shouldered Hawks

Red-shouldered hawks begin nesting in March in swamps, river valleys and bottomland forests. They feed on small mammals, reptiles, amphibians, crayfish, insects and small birds found within their nesting habitat, woodland clearings and fields. Nests are typically constructed 20 to 70 feet above the ground in the main crotch of a mature-canopy hardwood tree. Nests are large (2 to 3 feet wide) and deep, usually constructed with sticks and twigs, and lined with shredded bark, leaves and softwood sprigs. Eggs are laid in mid-April and hatch in mid-May. The young are able to fly by late June or early July. Although red-shouldered hawks are widely distributed across the state and are known to nest in even relatively suburbanized areas, they are generally considered to be intolerant of human activity. The low nesting success of red-shouldered hawks is attributed to human disturbance around nest sites, predation of adults and young by nesting great horned owls, and low prey availability. Barred owls are known to share nesting habitat with red-shouldered hawks.

The red-shouldered hawk is currently listed as a Species of Special Concern in Connecticut. The potential for red-shouldered hawks to forage and nest on the property is high given the mix of mature forest, wetlands and field/woodland openings present both on and off the site, and the relatively isolated, undisturbed nature of the property. Numerous potential nest trees (i.e., mature, large-

crowned hardwood trees with large branches) are present within and adjacent to Beaver Brook and associated riparian zone.

The consultant's report suggests how impacts to nesting hawks may be minimized during roadway construction and culvert installation, but does not provide recommendations for identifying and protecting nest sites while the excavation plan is being executed.

Of all the raptor species, red-shouldered hawks are considered to be one of the more area-sensitive and disturbance-sensitive species. Some studies suggest that a minimum of 25 acres (600 foot buffer) of mature forest be maintained around known nests and that these sites remain free from disturbance throughout the nesting period (March through mid-July in Connecticut). Red-shouldered hawks exhibit a strong attachment to nest sites by returning to the same area, or even the same tree, year after year, and they winter over much of their nesting range. A survey of the property should be conducted now to determine whether red-shouldered hawks are nesting. If a nest is located, a buffer zone of at least 330 feet should be established around the nest and the site should remain free from disturbance during the nesting season. Any documented nest site should be reported to the Connecticut Department of Environmental Protection's Natural Diversity Database (860/424-3540).

Vernal Pool

Spermatafores, several egg masses and spring peepers (calls) were observed in the vernal pool during a site walk in late March 2003. The vernal pool appears to be highly productive and worthy of further investigation based on, 1) the diversity of amphibians noted by the consultant (i.e., spotted salamanders, wood frogs, green frogs, spring peepers, red-spotted newts), 2) the presence of a rather expansive wetland complex (associated with Beaver Brook) that surrounds the site, and 3) the relatively undisturbed nature of the property. Based on the

habitat and the known distribution of marbled salamanders and spotted turtles in area, it is highly likely that these species also occur on the property (Hank Gruner, personal communication). It is recommended that a dip net survey be conducted to determine whether marbled salamander larvae are present in the pool.

The consultant's report does not provide adequate direct evidence or information (literature citations) to support that the proposed excavation will not impact the pool or the wildlife that uses the pool. How the removal of the forest canopy on the north-facing slope might affect the pool's microclimate (e.g., temperature), the import of organic material into the pool, and the amount of course woody debris in the uplands should be addressed. The report does not address the upland habitat needs (i.e., foraging, dispersal and hibernation) of the amphibians using the vernal pool for breeding. The consultant had noted during the site visit that the steeply rising slope south of the pool (north-facing slope) would not be conducive to the presence of amphibians, but provides no direct evidence or literature citations in the report to support this statement. Some species of salamanders are known to use drier habitats such as well-drained slopes near forested areas. The marbled salamander, for example, is generally found in or near mixed deciduous forest and appears to prefer dry, friable soils including sand and gravel deposits areas, and rocky slopes. This species migrates to dried-up vernal pools or the edges of ponds or swamps in late August and early September to deposit its eggs.

It is recommended that a vernal pool assessment be conducted at this site, as described in Calhoun, A.J.K. and M.W. Klemens. 2002. Best development practices: Conserving pool-breeding amphibians in residential and commercial developments in the northeastern United States. MCA Technical Paper No. 5, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York. Over 75% of the proposed excavation site is located within the area referred to as "critical terrestrial habitat" for pool-breeding amphibians. The

assessment tool in this document provides a means for determining the relative ecological significance of the pool (Tier I, Tier II or Tier III). The assessment involves determining the biological value of the pool (i.e., species abundance, species diversity, and pool vulnerability) and the condition of the surrounding uplands extending 750 feet from the pool edge. Based on the results of the assessment, a set of guidelines and management recommendations are provided in the document to assist in developing a site protection strategy. It is suggested that the Town consult with Dr. Michael Klemens (mca@wcs.org) with the Wildlife Conservation Society in Rye, New York, or other local expert in vernal pool ecology, for their opinion regarding the proposed excavation phasing and site restoration plans once the ecological assessment is completed.

Note: Copies of the Calhoun and Klemens (2002) publication may be obtained from the Metropolitan Conservation Alliance, Wildlife Conservation Society in Rye, New York (914/925-9175). Please refer to the Conservation District Review and Wetland Resources sections of this report for further comments concerning the vernal pool.

References

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Fisheries Resources

Fisheries comments provided in the 1991 Salem Earth Products Inc. Excavation ERT report are still very pertinent to the new proposal known as the D&J Earthworks and Development Sand and Gravel Removal Operation. Below are comments specific to the new proposal.

Beaver Brook

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No new fisheries resource information is available within Beaver Brook since the data collected by the DEP stream survey team in 1989 and as described in the 1991 report. There is no reason to believe that fish species diversity within this watercourse has significantly changed since that time.

Relative to anadromous fisheries, since the original proposal, the DEP has been actively involved in the restoration of anadromous fish populations (river herring Atlantic salmon, sea-run brown trout, sea lamprey) within the Eight Mile River and East Branch Eight Mile River having developed fishways at Moulson Pond and Ed Bill's Pond. Beaver Brook, a tributary of the Eight Mile River is not considered a major component of anadromous fish restoration efforts within the Eight Mile River Watershed. While it's possible that river herring could utilize lower stretches of Beaver Brook, beaver dams located below the proposed project area may possibly impede upstream passage.

Recommendations

The developer has sufficiently addressed all major fisheries resource concerns outlined in the 1991 ERT report relative to the protection of Beaver Brook including fish passage at the road crossing, the implementation of a 100 wide foot

open space riparian buffer zone along the watercourse and the development of an erosion and sediment plan to minimize site runoff.

Concerning the construction time period of when box culverts should be installed in Beaver Brook, the following updated specific comments are offered in that as a best management practice, any unconfined instream construction 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 movement of resident fishes, 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.

A Watershed Management Perspective

These recommendations are given from the perspective of improving water quality and maintaining and supporting designated uses of the waters of the State in accordance with Connecticut's Water Quality Standards.[1] These recommendations also reflect the DEP's growing commitment to address water quality concerns from a watershed perspective, taking into account the cumulative impact of numerous activities within a given watershed that may affect water quality.

The following recommendations may overlap with those of other ERT members who are dealing with more specialized aspects of the review (i.e. fish and wildlife habitat, historic/archaeological significance, wetlands, stormwater, erosion and sedimentation control, etc.). In such cases, these recommendations are meant to support or supplement these specialized reviews, not to supplant them.

Proposed Project

The project is a wholesale commercial sand and gravel operation proposing to disturb a total of approximately 15 acres of a ±70 acre site located on the south side of Beaver Brook Road in North Lyme. Approximately 900,000 cubic yards of material are proposed to be excavated within a 10-year period.

Special Consideration

The Beaver Brook watershed represents subregional drainage basin (#4803) located within the Eightmile River Regional drainage basin (#48). In November 2002, Congress authorized the study of the Eightmile River for possible inclusion

[1] State of Connecticut Department of Environmental Protection, Effective 1996 and 2002. Water Quality Standards. Bureau of Water Management - Planning and Standards Division. Hartford, CT.

in the National Wild & Scenic Rivers Program to determine if this watershed possesses outstandingly remarkable scenic, recreational, geologic, fish and wildlife habitat, historic, cultural or other similar values. The study is underway and being conducted by the Eightmile River Wild & Scenic Study Committee that is comprised of members from the communities of Lyme, Salem and East Haddam, local land trusts, municipal officials, CT River Estuary River Regional Planning Agency, Natural Resource Conservation Service, CT Department of Environmental Protection, and The Nature Conservancy.

Location Description

The site is a sand and gravel deposit just south of the confluence of Cedar Pond Brook and Beaver Brook. The predominant soils are Hinkley gravelly sandy loam, 15 to 45 percent slope and Hinkley gravelly sandy loam, 0 to 3 percent slope at the apex. This site is not unique in that there are many other hills of Hinkley soils and sand and gravel deposits in the area, some having higher elevations than the subject site. To the east is an old, reportedly, occasionally active gravel pit. The southern border of the property abuts Nehantic State Forest. North of the site is one of two sawmills within the area. Current access to the site is along a woods road which presently fords Beaver Brook. The site has been harvested of older trees, leaving a well-established forest of younger trees. The surrounding terrain is hilly and predominantly second growth forest, which is characteristic of this rural setting.

Water Quality Classification

Beaver Brook has approximately an 8.4 square mile watershed and serves as a primary tributary to the Eightmile River, encompassing approximately 14% of the entire Eightmile River watershed. The site is located in the lower third of the watershed. The surface water quality designation for Beaver Brook is Class A; the designation for the Eightmile River is Class B with a goal of Class A.

Class A surface waters have the following designated uses: habitat for fish and other aquatic life and wildlife; potential drinking water supplies; recreation; navigation; and water supply for industry and agriculture. Class B/A surface waters are not be meeting the criteria for one or more designated uses.

The groundwater designation is Class GA which has the following designated uses; existing private and potential public or private supplies of water suitable for drinking without treatment; baseflow for hydraulically connected surface water bodies.

Project Description

The proposed sand and gravel excavation, a four-phase project, will transform the terrain from an irregularly shaped, oblong hill with steep slopes to a concave shape with a perimeter of the excavation area remaining higher than the interior. This is proposed to assist in the control of erosion and sedimentation during the mining process. As a result, the lowest elevation of the spoon-shaped bowl will be below, but separated from Beaver Brook by an approximately 30' high divide. This will enable the construction of a wetland area as part of the applicant's diverse restoration planting plan.

The proposed project has been designed to address concerns identified in a previous ERT report for a similar sand and gravel mining operation proposed at the same site in 1991. Erosion and sedimentation are purported to be mitigated by the phased excavation that will excavate inward, creating a bowl and thereby containing any erosion and sedimentation. Access will be along an existing woods road that will be paved. A ford, which has widened the stream channel, will be upgraded to a quadruple box culvert crossing with the two center culverts being depressed in accordance with previous recommendations made by DEP Fisheries. Although the woods road will be paved to a width of 12 feet, the

culvert crossing will be twenty-four feet wide. Understandably, given the nature of the truck traffic, a culvert crossing wider than the road width is wise for safety purposes, however, this reviewer questions whether being twice the road width isn't excessive.

Conclusion

Provided that the proposed project is executed with the proposed plans; any supplemental recommendations provided by the ERT team members (re: fueling area); and in accordance with the *2002 Connecticut Guidelines for Soil Erosion and Sediment Control* (revised), the water quality impacts should be minimal. As additional mitigation, the applicant proposed to donate ±31 acres of land adjacent to Nehantic State Forest to the Town of Lyme as open space. The proposed restoration plantings plan, if successful, will render a diverse community of mixed forest, hardwood forest/old field, hardwood wetlands, and meadow, although the scenic vista of forested hillside will be markedly diminished. There should be little or no impact on the watershed as a result of the proposed mining excavation, provided that appropriate best management practices and the restoration plantings plan are followed.

Archaeological Review

A review of the State of Connecticut Archaeological Site files and maps shows one archaeological site in the project area, and, three additional sites in close proximity along Beaver Brook. The project area site (CT 78-51) represents a Native American encampment of unknown age adjacent to the brook along the terrace in the northwest portion of the project area. Beaver Brook and its tributaries represent an important topographic and environmental area for prehistoric hunting and gathering economies. Based on excavations conducted at the archaeological sites adjacent to the project area, we can predict that CT 78-51 is an occupation that probably dates to over 4,000 years ago.

The Office of State Archaeology **strongly** recommends an archaeological reconnaissance survey for the project area to re-locate Site 78-51, and identify other cultural resources, which might be effected by the proposed undertaking. This survey should be conducted to identify all cultural resources in the areas planed for development and provide recommendations on their significance and preservation strategies. The survey should be conducted in accordance with the Connecticut Historical Commission's *Environmental Review Primer for Connecticut's Archaeological Resources*.

The State Office of Archaeology would look forward to working with he Town of Lyme and the applicant in providing any technical assistance in the conservation and preservation of its cultural resources in the project area.

Planning Review

The request for ERT review of the D&J Earthworks and Development Sand and Gravel Removal Operation project was submitted by the Lyme Inland Wetlands Commission and the Planning and Zoning Commission and is for the purpose of assisting in conducting an environmental impact review and to provide recommendations as the Team sees fit. As a note, an ERT review was previously conducted in June of 1991 with a final report issued for a similar project that was to be conducted by Salem Earth Products Inc. Excavation. It is understood that pursuit of approvals for the earlier project was abandoned during the municipal application project.

Description of the Property

The subject site is a 70+ acre site in North Lyme located south of Beaver Brook Road approximately one mile east of the Route 156 intersection. As described in ERT materials, the property is bordered to the east by an existing gravel operation with the remaining border area being undeveloped open space and residential properties. The proposed area has been previously logged and is now a mix of forest patches, shrubs and grassy areas. The project is described as removal of approximately 900,000 cubic yards of material over a 10-year period. This is a 10% reduction in product volume over that proposed in 1991 (1,000,000 CY vs. 900,000 CY).

Site Review

From a planning perspective, issues of concern surround access to and from the site, the significant level of truck traffic that is expected, and the retention of the rural character in the Town of Lyme. The following concerns are noted:

(1) Frequency of Truck Traffic on Beaver Brook Road

Removal of sand and gravel from the site was described to occur in two modes. First, it is understood that materials will be removed and trucked to a stockpiling site in North Branford. Trucks moving material to North Branford will travel west on Beaver Brook Road, turn left and head south on Route 156 and then enter Interstate 95 in Old Lyme for the westerly trip to North Branford. Material will also be removed and trucked directly to other project sites on an as needed basis. Trips to other project sites would likely be carried out turning both north and south on Route 156. This described operation would suggest that trucking along Beaver Brook Road will occur in more or less a continuous fashion, possibly for the entire 10 year period. The applicant described a desire to haul 50 to 60 truckloads of material per day using up to six 3-axle trucks. At this rate, this calculates to approximately 100 to 120 trips back and forth on Beaver Brook Road daily. The Commission and the Town will need to evaluate whether this level of heavy truck activity can be accommodated by the neighborhood as well as the roadway itself.

(2) Adequacy of Beaver Brook Road

Concern is raised with respect to the adequacy of Beaver Brook Road to accommodate the passage of large trucks in several specific locations. First, as Beaver Brook Road terminates into Route 156, there is a limited "landing area" at that intersection. In other words, the hill leading down to Route 156 does not level out significantly prior to the stop sign. This creates a less than optimum condition when large, fully loaded trucks attempt stopping in that location, especially during wet or icy conditions.

Second, as vehicles turn onto Beaver Brook Road from Route 156 and travel the first several hundred feet, they must crest a narrow hill. When a

3-axle truck crests that hill, it appears that there would be little extra room for passage of another vehicle, this where the site line over the hillcrest is obscured. Given the size of the trucks and the 100 to 120 truck possible trips along Beaver Brook Road on any given day, this less than optimum condition would likely be multiplied numerous times daily, leading to a significantly greater potential for hazardous road conditions at this location. Since upwards of six trucks may be operation on any given day, the possibility of two trucks passing at this point is also a potential as well.

(3) Potentially Inadequate Site Line on Route 156

A "drive-by" inspection of the Route 156/Beaver Brook Road intersection suggests that a less than optimum site line exists north on Route 156. Specifically, as a driver looks to turn left from Beaver Brook Road onto Route 156, there is a relatively short site line to the right (north) in the area fronting the Town Hall. At the time of inspection, an attempted southerly turn onto Route 156 was abruptly terminated when a high speed, southerly-traveling vehicle appeared to the north, quickly passing the Beaver Brook Road intersection. With the slow acceleration of a fully-loaded 3-axle truck making its way onto Route 156, it seems likely that a hazardous situation could be created. Again, with the significant number of times that such a southerly turn onto Route 156 by fully-loaded trucks would be occurring daily, the potential hazard would be significantly multiplied.

(4) Adequate Site Entrance/Exit

Inspection of the entrance to and from the site suggests that it may be difficult for the applicant to provide adequate provisions for safe entrance and exit onto Beaver Brook Road from the site. It will be important for the Commission to require a well-designed entrance that includes a significant

apron that will withstand upwards of 120 daily trips in and out the site, half of those trips with 3-axle trucks fully loaded with sand and gravel. Based upon the described 50 to 60 loads a day leaving the site, this would mean that trucks could enter and exit the site upwards of 250 to 300 times every week for upwards of 10 years.

(5) Site-Specific Considerations

Consistent with the Planning Consideration section presented in the June, 1991 ERT report, the current Lyme Zoning Map and Zoning Regulations indicate that the area surrounding the proposed site is zoned RU-80 and is principally intended for the construction of single-family residential homes with additional allowances for conversion of older structures to two-family residential dwellings. Other permitted uses include allowances for home occupations, letting of rooms for boarders and various agricultural uses. In that sand and gravel operations are permitted by Special Exception in the RU-80 District, a site-specific review of the proposed location of the operation within the context of the neighborhood will be required.

Therefore, questions that will be before the Lyme Planning & Zoning Commission include whether or not the sand and gravel operation is appropriate at the proposed location given site and access constraints and other local considerations. Since other nonconforming industrial uses are located nearby (a saw mill and another sand and gravel operation), the proposed sand and gravel removal operation does not appear to be inconsistent with the general neighborhood. Issues of concern from a planning perspective, however, will likely be whether the proposed operation will be too intensive for the neighborhood and whether or not Beaver Brook Road is adequate for such an operation. The Commission will have to decide whether these specific site conditions, including

concerns of inadequacy of Beaver Brook Road for the passage of a significant number of large trucks over an extended period of time, the significant number of daily truck trips and the resulting increase in probability of hazardous traffic conditions as a result, and potentially inadequate site lines at the hill crest and Route 156 intersection warrant the approval of a Special Exception for this operation in this location at the intensity proposed.

(6) Processing of Sand and Gravel On-site

The applicant has described that shakers and separators will be utilized on site and that up to six 3-axle trucks will be staged from the site. It is assumed that the trucks will be stored overnight at the location. Although the site is approximately 70 acres in area and is located over 1500 feet from Beaver Brook Road, the sound of material processing at the site, day in and day out, could create noise problems to neighboring residences. In addition, it is typical that diesel trucks are often started early in the morning and allowed to warm up for a significant amount of time prior to use. The Commission may want include conditions with any approval that would establish a reasonable start time for operations at the site, including the starting of diesel motors and processing equipment. In addition, the Commission may want to consider limits on daily hours of operation and limiting or eliminating weekend work. All of these limitations would serve to better integrate potentially disturbing operations into a neighborhood that includes nearby residences.

Summary

In order to reduce many of the potential conflicts enumerated in the foregoing discussions, perhaps the Commission should consider limiting the operation in some way so as to dramatically reduce the impacts of truck traffic on Beaver

Brook Road and the Route 156 intersection. Such limitations could include the number of truck trips per day or conditions that require trucks to leave the site east on Beaver Brook Road rather than toward Route 156, if local road conditions will accommodate such alternative routes. The Commission will undoubtedly rely on Section 10.6.7 of the Lyme Zoning Regulations which states that ***"...truck access to earth material operations shall be so arranged as to minimize danger to traffic and nuisance to surrounding properties. Safety of truck access and adequacy of site lines, given speed limits involved, shall be certified by a traffic engineer...."***. The Town should consider hiring their own consulting traffic engineer to review the applicant's traffic certification.

Other conditions to consider imposing include limiting commencement and conclusion of daily operations so as to minimize noise disturbance to surrounding neighbors, including noise created by idling diesel trucks and operation of processing equipment on site. The Commission should consider minimizing weekend impacts as well, only allowing such operations if and when the applicant appears before the Commission and specifically outlines their intentions. Any variations from proposed and approved operations of the operation should be made only after the Commission has reviewed and approved such variations.

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.