Cardinal Flower

Neubig Earth Excavation

North Haven, Connecticut

KING'S MARK ENVIRONMENTAL REVIEW TEAM REPORT

King's Mark Resource Conservation and Development Area, Inc.

Neubig Earth Excavation

North Haven, Connecticut
October 1993

Environmental Review Team Report

Prepared by the King's Mark Environmental Review Team of the King's Mark Resource Conservation and Development Area, Inc.

Haddam and Wallingford, Connecticut

for the North Haven Inland Wetlands Commission

This report is not meant to compete with private consultants by supplying site designs or detailed solutions to development problems. This report identifies the existing resource base and evaluates its significance to the proposed development and also suggests considerations that should be of concern to the Commission and the Town. The results of the Team action are oriented toward the development of a better environmental quality and long-term economics of the land use. The opinions contained herein are those of the individual Team members and do not necessarily represent the views of any regulatory agency with which they may be employed.

ACKNOWLEDGEMENTS

The King's Mark 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.

Gordon Binkhorst	Geologist University of Connecticut Department of Geology and Geophysics
Carla Guerra	Environmental Analyst III DEP - Bureau of Water Management Inland Water Resources Division
Stacey Kingsbury	Environmental Analyst DEP - Natural Resources Center
Richard Kszystyniak	District Conservationist U.S. Department of Agriculture Soil Conservation Service
Brian McAninch	Geologist University of Connecticut Department of Geology and Geophysics
Ken Metzler	Environmental Analyst III Department of Environmental Protection Natural Resources Center
Donald Mysling	Fisheries Biologist DEP - Fisheries Division Habitat Conservation and Enhancement Program
Mildred Powell	Geologist University of Connecticut Department of Geology and Geophysics
Richard Stoecher	Regional Planner South Central Connecticut Council of Governments

I would also like to thank Nancy Wilson the North Haven Land Use Administrator, Jack Brandt the North Haven Zoning Enforcement Officer, Don Shabo a member of the North Haven Planning and Zoning Commission, Richard Neubig the owner and applicant, Todd Parsons from the engineering firm of Conklin and Soroka and Penelope Sharp, the environmental consultant, for their cooperation and assistance during this environmental review.

EXECUTIVE SUMMARY

Introduction

An environmental review was requested by the North Haven Inland Wetlands Commission for the Neubig Earth Excavation, Section II.

The area proposed for gravel excavation is an approximately 70 acre parcel with wetlands and Five Mile Brook bisecting it.

The proposal includes a wetland crossing for access, a maximum of 270 cubic yards of fill within wetlands, the excavation of 65,000 cubic yards of earth material outside of wetlands, and regrading adjacent to wetlands.

The Inland Wetland Commission requested the environmental review to assist them in their decision making. The Team members were asked to consider several alternatives for accessing the proposed excavation area, to discuss possible impacts of the excavation and give recommendations on mitigating any possible adverse impacts.

The review process consisted of 4 phases:

1) Inventory of the site's natural resources (collection of data); 2) Assessment of these resources (analysis of data); 3)Identification of resource problem areas; and 4) Presentation of planning, management and land use guidelines.

Geology and Hydrogeologic Implications

The earth material in the study area is predominantly ice-contact stratified drift. The area of the proposed excavation is an esker (the deposit of a river flowing under glacial ice) which consists of moderately well sorted sand and gravel. The surficial material in the western wetland is mostly recent sediment and muck. Underneath the glacial debris the bedrock is predominantly arkosic sandstone.

The route preferred by the applicant involves construction of a 110 foot roadway across a wetland. It is recommended that the thickness of the wetland deposits be determined across the wetland area prior to road construction, in order to determine the proper construction methods. Although there are no significant hydrologic constraints to building the roadway these are independent of possible wetland considerations which should be evaluated separately.

The proposed location of the road cuts across the only outlet of the wetland. The presence of the roadway could potentially affect the drainage and water levels within the wetland. The roadway does not appear to present a significant impact to lateral flow , but the presence of a permeable roadway could effect vertical flow in the wetland. The roadway might serve as a sink or a source to wetland surface water. One possible solution is to construct a relatively impermeable base to the roadway that would inhibit vertical flow through the wetland.

Proper design of the culverts should ensure that water elevations within the wetland will not be altered appreciably by the roadway.

The existence of the esker provides water storage potential for the drainage area, and

groundwater mounding within the esker can provide higher hydraulic gradients for groundwater flow in the wetlands. If the post-excavation elevations are lower than or near fluctuating water table elevation, then overland flow could result with increased erosion and sediment deposition in the wetland. The actual fluctuating level of the water table at the site should be taken into consideration when determining the post-excavation elevation, this does not appear to have been done. The water table at the proposed excavation site should be monitored for a period of time before determining the post-graveling land elevations.

Soil Resources

Soils have developed primarily in sandy, gravelly glacial outwash materials. The Hinckley and Manchester soils are well suited to the intended use. The limitations of the on-site soils for use as roadfill, gravel, and topsoil are described in Table 2.

The Hinckley and Manchester soils are among the least erodible soils found in New Haven County, and the proposed erosion and sediment control plan if implemented as planned should keep erosion and sediment problems to a minimum.

It is prudent to investigate other means of access (besides the access preferred by the applicant) before approving the planned wetland crossing.

Inland Wetland Considerations

The wetland area to be crossed (applicant's preferred crossing) is a very high quality wetland system. The soils in the area are Adrian and Palms Mucks which have an organic layer of very low strength and stability. This causes fill to settle over a period of years. Excavating is difficult because side slopes are unstable and the excavations fill with water.

Other alternative crossings should be investigated thoroughly, but if it is determined that the applicant's preferred crossing will be used, then a method which involves the least wetland intrusion should be used. Experience has shown that excavation of the organic layer is not advisable, and a crossing that spans the wetlands is preferable.

Considerations for Access Evaluation and Gravel Excavation

A linear setback of at least 25 feet should be adhered to throughout the plan, this should be established and flagged in the field, and where appropriate extended.

The depth to groundwater should be determined in order to determine the appropriate lower depth limit of the excavation. 10 feet of material above groundwater should be maintained for reasons of groundwater protection and for on-site septic systems if these are anticipated in the future.

The Alternate Route Plan needs to provide more information and address additional concerns before it can evaluated completely.

The detailed excavation plans needs to show detailed phasing and revegetation plans, it is too general for this site.

The Natural Diversity Data Base

The Natural Diversity Data Base maps and files have been reviewed and according to the information there are no extant populations of Federal or State Endangered, Threatened or Special Concern species occurring at the site.

Fisheries Resources

Five Mile Brook is characteristic of a cold water meadow stream. In 1987 it received a surface water rating of "Class A" by the Department of Environmental Protection. Designated uses for this classification are potential drinking water supply, fish and wildlife habitat, recreational use, agricultural and industrial supply, and other legitimate uses including navigation.

Five Mile Brook has never had a formal fisheries resources inventory conducted by the DEP - Fisheries Division. Fish species anticipated to inhabit a cold water meadow stream in Connecticut include brook trout, brown trout, blacknose dace, longnose dace, and tessellated darter.

Should mitigative measures not be implemented, the excavtion, regrading and future agricultural field development of this site have the potential to adversely impact aquatic habitats of Five Mile Brook. Anticipated impacts include: soil erosion, transport and in-stream deposition due to stormwater runoff, removal of riparian vegetation along the streamcourse with many negative results and nutrient enrichment from agricultural field fertilizer and herbicide runoff. These potential impacts will have many effects on the water quality, habitat quality and storage capacity of the brook.

The following recommendations should be considered to mitigate impacts: 1) maintain a minimum 100 foot open space buffer zone (no construction or alteration) along the closest encroachment of the excavation to Five Mile Brook; and 2) establish a comprehensive erosion and sediment control plan and revegetate all disturbed areas in a timely manner.

Planning Considerations

Land use in the area is currently a mix of medium and low density residential development, and in general the area has gone from active agricultural use to residential homes in the past few years.

The construction site entrance on North Hill Road appears to be the best access point in terms of sight lines, road geometry and impact on neighboring properties. An entrance off of Half Mile Road would have poor sight lines which would be a potential safety hazard.

There is going to be a lot of construction activity in the vicinity of the Neubig site due to approvals of adjacent residential subdivisions, so it will be important to monitor the excavation carefully so as no to impact the road network and neighboring residents.

The gravel excavation should not pose any serious problems if the conditions in the North Haven Regulations are followed and properly enforced.

TABLE OF CONTENTS

INTRODUCTION

An environmental review was requested by the North Haven Inland Wetlands Commission for the proposed Neubig Earth Excavation, Section II.

The entire Neubig property is ±92.47 acres in size, the Section II excavation involves ±70.56 acres. Section I has already been completed, and a construction site entrance exists on North Hill Road. The property contains several bands of wetlands and Five Mile Brook flows through the property.

The applicant is proposing to cross the wetlands to create a new access road to the eastern portion of the property for excavation access and later for farm machinery, to fill and place a maximum of 270 cubic yards of fill within wetlands, to excavate 65,000 cubic yards of earth material (gravel) from a geologic form known as an esker, and to regrade immediately adjacent to wetlands. The proposed use of the property after the excavation is complete is a hay field and possibly one building lot in the northern portion.

The Inland Wetland Commission requested the environmental review to assist them in their decision making. The Team members were asked to consider several alternatives for accessing the proposed excavation area, to discuss possible impacts of the excavation and give recommendations on mitigating any possible adverse impacts.

The Environmental Review Team Process

Through the efforts of the Town of North Haven and the King's Mark ERT, this environmental review and report was prepared for the Town. This report primarily provides a description of the on-site natural resources and presents planning, management and land use guidelines. The review process consited of 4 phases:

1) Inventory of the site's natural resources (collection of data);
2) Assessment of these resources (analysis of data);
3)Identification of resource problem areas; and
4) Presentation of planning, management and land use guidelines.

The data collection phase involved both literature and field research. The ERT filed review took place on August 25, 1993. Mapped data or technical reports were also perused, and specific information concerning the property was collected. Being on-site allowed some Team members

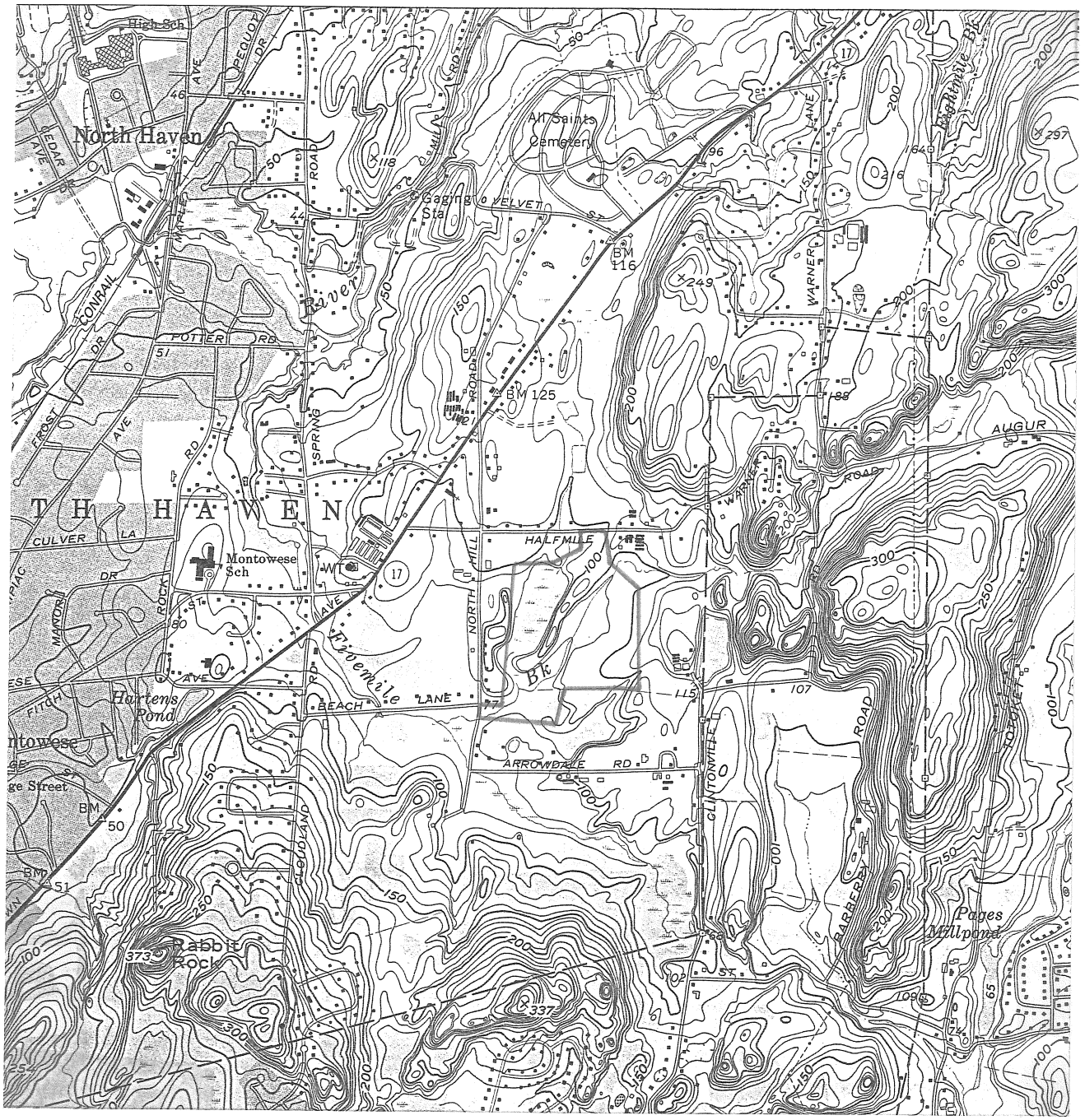
to check and confirm mapped information and identify other resources.

Once Team members had assimilated an adequate data base, they were able to analyze and interpret their findings. Results of this analysis enabled Team members to arrive at an informed assessment of the property's natural resource opportunties and limitations. Individual Team members then prepared and submitted their reports to the ERT coordinator for compilation into the final ERT report.

LOCATION MAP

Scale 1" = 2000'

—— Approximate Site



GEOLOGIC AND HYDROGEOLOGIC IMPLICATIONS OF THE PROPOSED PROJECT

Geology

The earth material in the study area is predominantly ice-contact stratified drift that was laid down by meltwater adjacent to ice during glacial melting approximately 18,000 years ago. The area of the proposed excavation is an esker, the deposit of a river flowing under ice. The esker consists of moderately well-sorted sand and gravel. South and east of the study area, there was a lake, an arm that is now the eastern wetland. (Flint, 1963).

The surficial material in the western wetland is predominantly recent sediment and muck accumulated in part as a result of the constriction in the water flow downstream. The material underlying the muck is presumably the same ice-contact stratified drift that is in the rest of the study area. Underneath the glacial debris, the bedrock is predominantly arkosic sandstone similar to that found north on Interstate 91 in the Connecticut Valley (Rodgers, 1985).

Hydrogeologic Implications

The proposed project includes an approximately 110 foot roadway across the wetland and removal of an esker deposit situated between two wetlands. Conducting gravel operations through the northern boundary of the property should have very little impact on the wetlands, but that location is not the applicant's preferred location for the roadway.

Roadway

The currently proposed location for the roadway is situated across the wetland. The actual construction of the roadway involves removal of an undetermined thickness of wetland deposits. Removal of the wetland deposits is presumably to provide a structurally sound base for the road, and is therefore necessary and recommended. It is recommended, however, that the thickness of wetland deposits be determined across the wetland area of concern, prior to road construction, in order to determine the methods necessary to construct the roadway. If wetland deposits are relatively shallow (<5 ft.), roadway construction techniques should involve only localized disturbance to the wetland. However, if deeper wetland deposits are encountered, then specific

construction plans to minimize wetland disturbance will need to be developed. The Team Geologists anticipate that proper measures will be taken to control sedimentation during all phases of excavation, as discussed in the environmental consultant's report (Sharp, 1993). *(Please refer to* **WETLANDS CONSIDERATIONS** *for other concerns with the crossing in this area.)*

The proposed location of the road cuts across the only outlet of the wetland. The presence of the roadway could therefore potentially affect the drainage and water levels within the wetland. Three areas of potential impact to water movement were identified: 1) lateral groundwater flow through the wetland deposits (below grade), 2) vertical groundwater flow; and 3) overland flow in the wetland.

The proposed roadway does not appear to present a significant impact to lateral flow in the wetland. Due to the proposed orientation (perpendicular to the wetland flow direction), and the more permeable nature of the roadway construction material, the proposed roadway should not short-circuit or restrict lateral flow in the wetland deposits.

The presence of the more permeable roadway could, however, affect vertical flow in the wetland. The roadway will provide a highly permeable pathway for vertical flow between surface water and groundwater beneath the wetland. Vertical flow through the roadway material could serve as a source or a sink to wetland surface water. The presence of an upward hydraulic gradient exists, the roadway could act as a drain to the wetland. In addition, flow conditions and hydraulic gradients may vary with seasonal and storm event fluctuations occurring within the wetlands. One potential solution is to construct a relatively impermeable base to the roadway in order to inhibit potential vertical flow through the wetland.

Elevation of the proposed culverts must be designed to prevent restriction of the overland flow through the wetland. The culvert invert elevations should be located at existing wetland grade. Proper design should ensure that water elevations in the wetland will not be altered appreciably by the presence of the roadway. Culvert size and positioning will affect overland flow paths near the roadway. The proposed use of multiple culverts would appear to minimize this effect. The Team Geologists have assumed that the culvert sizing was appropriately engineered to handle storm flow events for the drainage area.

Please note that, although there are no significant hydrologic constraints to building the roadway, these are independent of possible wetlands considerations which must be evaluated separately.

Gravel Operations

The presence of the esker adjacent to the wetland provides water storage potential for the drainage area. In addition, groundwater mounding within the esker can provide higher hydraulic

gradients for groundwater flow adjacent to the wetland. If post-graveling excavations are lower than or near fluctuating water table elevations, then overland flow could result. This could occur during storm events and periods of high water table. Overland flow could result in erosion and increased sediment deposition within the wetland.

Proposed gravel operations at the site involve the removal of the esker deposit down to a specified elevation. The proposed elevation appears to have been determined independent of a fluctuating water table and capillary fringe levels. The proposed post-gravel-removal elevation appears, however, to be in close proximity to the expected water table elevation in the southwest area of excavation. Therefore, the above-mentioned impacts of possibly lowering water tables should be considered. The actual fluctuating level of the water table at the site should be taken into consideration when determining post-graveling elevations. The water table at the proposed excavation site should be monitored for a period of time before determining the post-graveling land elevations. The Team Geologists made no definitive measurements of the water table. Please note that water table elevations were most likely at a low point at the time of the site visit, due to a prolonged dry spell.

References

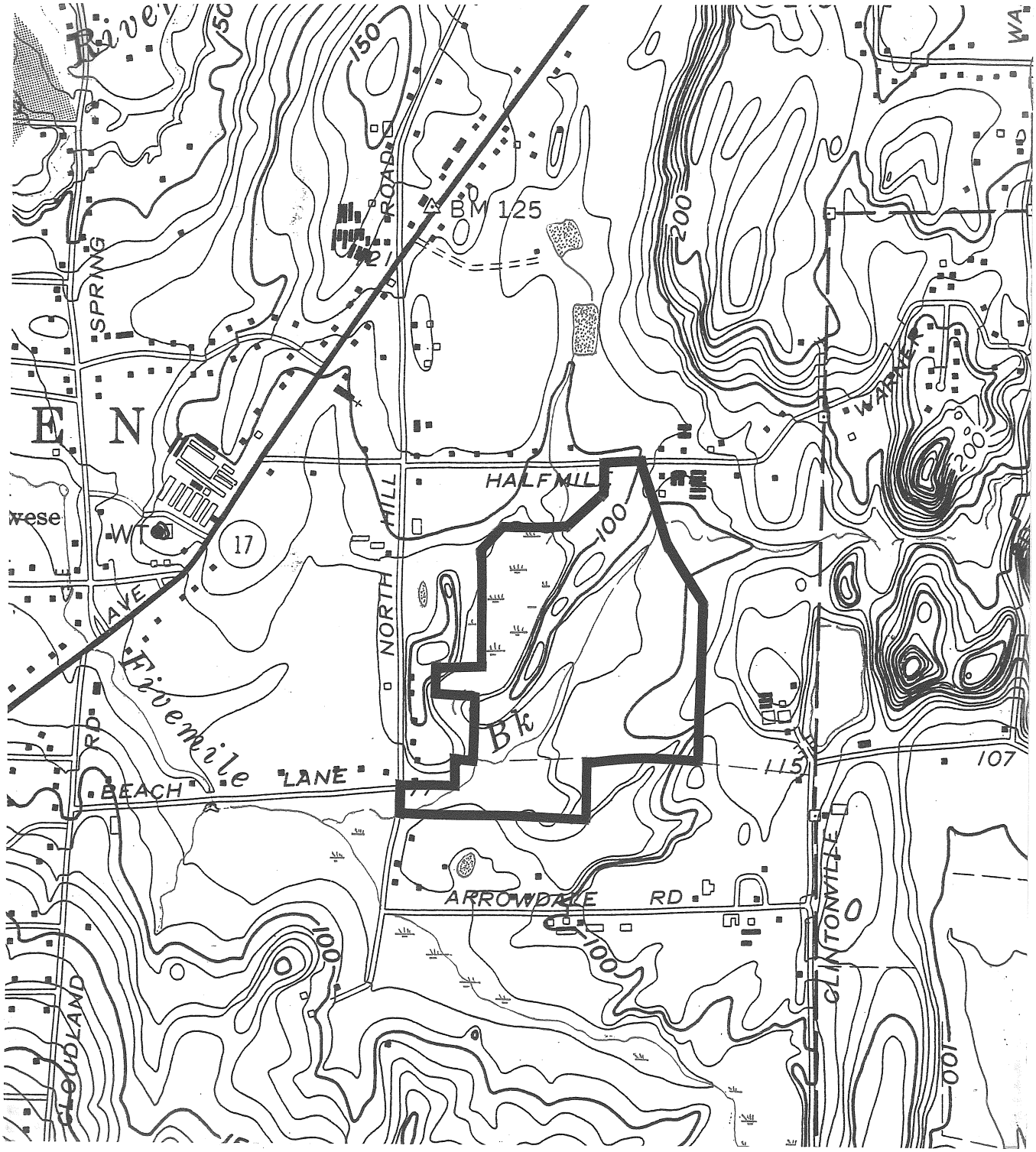
Flint, R.F., 1963 Geologic Map of the Branford Quadrangle, Connecticut, State of Connecticut Geological and Natural History Survey Quadrangle Report No. 14.

Rodgers, John, 1985, Bedrock Geological Map of Connecticut, Connecticut Geological and Natural History Survey and U.S. Geological Survey.

TOPOGRAPHIC MAP

Scale 1" = 1000'

Approximate Site Boundary

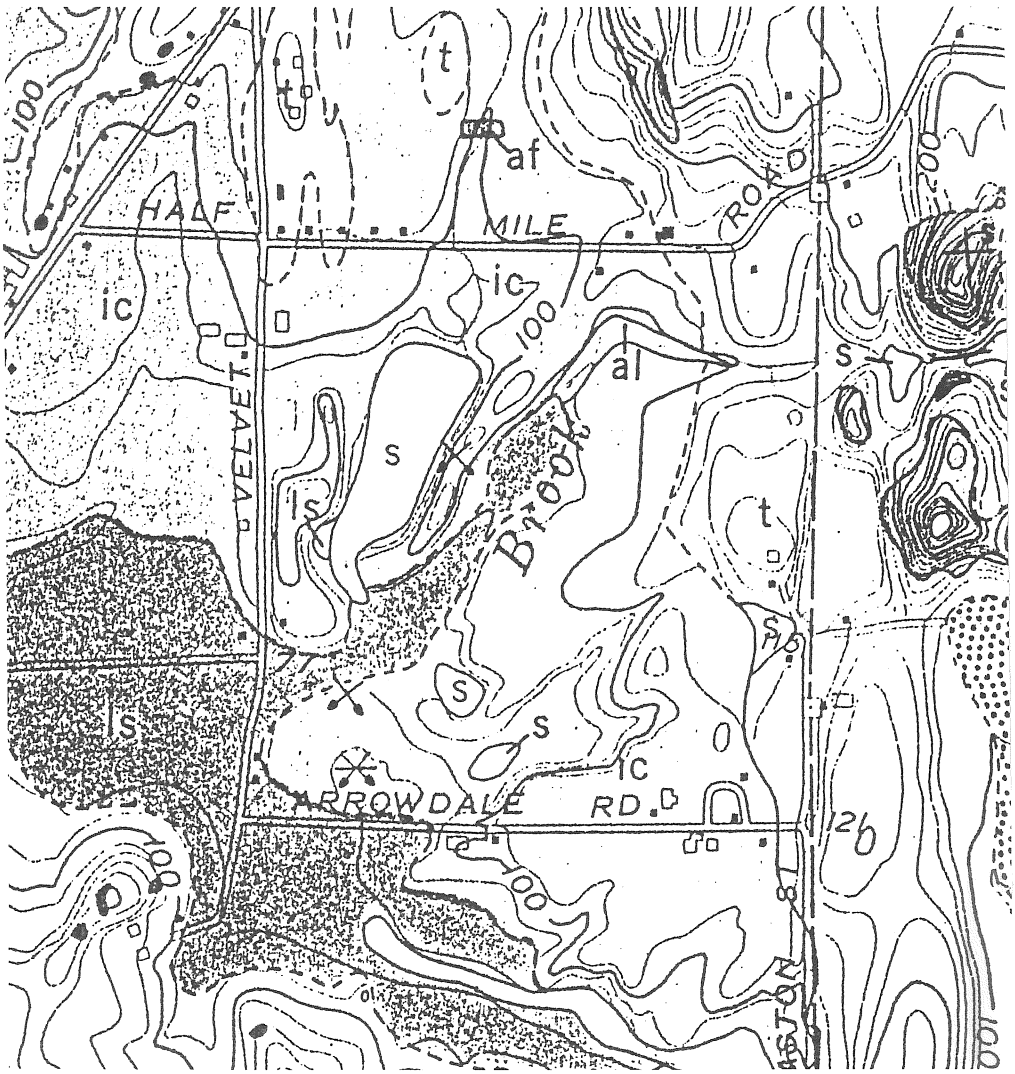


SURFICIAL GEOLOGIC MAP*

*(After Flint, 1963)

Scale 1" = 1000'

s = swamp deposits
t = till
ls = lake bottom sediments
al = alluvial deposits
ic = ice contact stratified drift



SOIL RESOURCES

General Soil Conditions

Soils within the Neubig parcel, as described in the New Haven County National Cooperative Soil Survey, have developed primarily in sandy and gravelly glacial outwash materials. The Hinckley and Manchester soils, commonly found on outwash plains and eskers, are well suited to the intended use. The Branford soils, observed at lower elevations within the parcel, have formed in loamy material underlain by coarse-textured outwash. The poorly drained Raypol and Walpole soils are found in drainageways and depressions on outwash plains and terraces, as is the very poorly drained Adrian and Palms muck. Brief, non-technical soils descriptions are provided in **Table 1**.

The limitations of on-site soils for use as roadfill, gravel and topsoil are described in detail in **Table 2.** Please see the published Soil Survey of New Haven County (1975) for a more thorough discussion of land use limitations.

Erosion and Sediment Control

The Hinckley and Manchester soils, within which most of the excavation will take place, are among the least erodible soils found within New Haven County. Implementation of the proposed erosion and sediment controls as planned should keep soil erosion and sedimentation problems to a minimum.

Additional Comments

In the interest of natural resource conservation, it would seem prudent to investigate other possible means of access to the proposed excavation site before approving the planned wetland crossing. Access from the north from Half Mile Road appears to be preferable to that presently planned, given that there would be no impact on regulated wetlands. However, just what activities are permissible within the boundaries of the gas transmission easement would have to be determined before such access could be seriously considered. It also appears that access from the west from North Hill Road, utilizing the narrow right-of-way and a renovated existing wetland crossing, could also serve the proposed excavation site provided other concerns of sight line requirements, turning radiuses and impacts on neighbors could be met.

SOILS MAP

Scale 1"=1320'

TABLE 1
NON-TECHNICAL SOILS DESCRIPTIONS

Aa ADRIAN AND PALMS MUCK. These nearly level, very poorly drained soils formed in organic materials 16 to 50 inches thick overlying sandy and loamy deposits. They are in depressions and along streams of outwash plains and glacial till uplands. Depth to bedrock is commonly more than 60 inches below the surface. These soils are ponded or have water near the surface for most of the year. Permeability is moderately rapid in the organic layers and rapid to moderately slow in the substratum. Surface runoff is very slow and the available water capacity is high.

BoA BRANFORD SILT LOAM, 0 TO 3 PERCENT SLOPES. This nearly level, well drained soils formed in loamy over sandy and gravelly glacial outwash. It is on outwash plains and terraces. Depth to bedrock is commonly more than 60 inches below the surface. The water table is commonly below a depth of 6 feet. Permeability is moderate or moderately rapid in the surface layer and subsoil, and rapid in the substratum. Surface runoff is slow and the available water capacity is moderate.

BoB BRANFORD SILT LOAM, 3 TO 8 PERCENT SLOPES. This gently sloping, well drained soil formed in loamy over sandy and gravelly glacial outwash. It is on outwash plains and terraces. Depth to bedrock is commonly more than 60 inches below the surface. The water table is commonly below a depth of 6 feet. Permeability is moderate or moderately rapid in the surface layer and subsoil, and rapid in the substratum. Surface runoff is medium and the available water capacity is moderate.

CsB CHESHIRE FINE SANDY LOAM, 3 TO 8 PERCENT SLOPE. This gently sloping, well drained soil formed in friable or firm glacial till. It is on hills, ridges and side slopes of the glaciated uplands. Depth to bedrock is commonly more than 60 inches below the surface. The water table is commonly below a depth of 6 feet. Permeability is moderate or moderately rapid in the surface layer, subsoil and substrate. Surface runoff is medium and the available water capacity is high.

HmE HINCKLEY AND MANCHESTER SOILS, 15 TO 35 PERCENT SLOPES. This moderately steep to very steep, excessively drained soils formed in glaciofluvial material. It is on the side slopes of outwash terraces, plains, deltas, kames, and eskers. Depth to bedrock is commonly greater than 60 inches below the surface. The water table is commonly below a depth of 6 feet. Permeability is rapid in the surface layer and subsoil, and very rapid in the substratum. Surface runoff is slow to very slow and the available water capacity is low.

MgB MANCHESTER GRAVELLY SANDY LOAM, 3 TO 8 PERCENT SLOPES. This gently sloping to sloping, excessively drained soil formed in sandy and gravelly water sorted materials. It is on terraces of stream valleys and on outwash plains. Depth to bedrock is commonly more than 60 inches below the surface. The water table is commonly below a depth of 6 feet. Permeability is rapid in the surface layer and subsoil and very rapid in the substratum. Surface runoff is rapid and the available water capacity is low.

MgC MANCHESTER GRAVELLY SANDY LOAM, 8 TO 15 PERCENT. This gently sloping to sloping, excessively drained soil formed in sandy and gravelly water sorted materials. It is on terraces of stream valleys and on outwash plains. Depth to bedrock is commonly more than 60 inches below a depth of 6 feet. Permeability is rapid in the surface layer and subsoil and very rapid in the substratum. Surface runoff is rapid and the available water capacity is low.

Rb RAYPOL SILT LOAM. This nearly level, poorly drained soil formed in loamy over sandy and gravelly glacial outwash. It is in shallow drainage ways and low-lying positions on terraces and outwash plains. Depth to bedrock is commonly more than 60 inches below the surface. The soil has a seasonal high water table at or near the surface much of the year. Permeability is moderate in the surface layer and subsoil and rapid or very rapid in the substratum. Surface runoff is slow and the available water capacity is high.

Wa WALPOLE SANDY LOAM. This nearly level, poorly drained soil formed in water sorted outwash and stratified drift. This soil is in depressions and drainageways on stream terraces and outwash plains. Depth to bedrock is commonly more than 60 inches below the surface. The soil has a seasonal high water table at a depth of about 10 inches from fall through spring. Permeability is moderately rapid in the surface layer and subsoil and rapid or very rapid in the substratum. Surface runoff is slow and the available water is moderate.

TABLE 2
SOIL INTERPRETATION REPORT

Map Soil	Soil Name	Roadfill	Gravel	Topsoil
Aa	Adrian	POOR, Wetness	IMPROBABLE, Too Sandy	POOR, Excess Humus, Wetness
	Palms	POOR, Wetness	IMPROBABLE, Excess Fines	POOR,Wetness, Excess Humus
BoA	Branford	GOOD	PROBABLE	POOR, Small Stones, Area Reclaim
BoB	Branford	GOOD	PROBABLE	POOR, Small Stones, Area Reclaim
CsB	Cheshire	GOOD	IMPROBABLE, Excess Fines	FAIR, Small Stones
HmE	Hinckley	POOR, Slope	PROBALBE	POOR, Too Sandy, Small Stones, Slope
	Manchester	POOR, Slope	PROBABLE	POOR, Too Sandy, Small Stones, Area Reclaim
MgB	Manchester	GOOD	PROBABLE	POOR, Too Sandy, Small Stones, Area Reclaim
MgC	Manchester	GOOD	PROBABLE	POOR, Too Sandy, Small Stones, Area Reclaim
Rb	Raypol	Poor, Wetness	PROBABLE	POOR, Small Stones, Area Reclaim, Wetness
Wa	Walpole	POOR, Wetness	PROBABLE	POOR, Small Stones, Area Reclaim, Wetness

ROADFILL - POOR: soils have a plasticity index of less than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. GOOD: soils contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 or less. Depth to the water table is more than 3 feet.

GRAVEL - IMPROBABLE: not likely to find material in suitable quantities. PROBABLE: likely to find material in suitable quantities.

TOPSOIL - POOR: soils are very sandy or clayey, have less than 20 inches of of suitable material, have a large amount of gravel, stones, or soluable salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface. FAIR: soils are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils thathave an appreciable amount of gravel, stones, or soluable salts , or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

INLAND WETLAND CONSIDERATIONS

This review is based on a review of the site development plans and additional material. A site visit was not conducted.

The primary concern of the wetlands agency is the proposed access road which crosses the southern end of the western wetland, this is the preferred route of the applicant. According to the report titles "Wetlands Evaluation Neubig Property, North Hill Road, North Haven, CT" dated June 3, 1993 the proposed roadway crosses a very high quality wetland system, perhaps the most vegetatively diverse and sensitive on the property. The soils in this location have been mapped as AA-Adrian and Palms Mucks. Soils in this map unit have an organic layer 16 to 50 inches thick. The organic layers have very low strength and stability. If fill is placed on top of the organic layers, the fill will settle over a period of several years. Excavating is difficult because side slopes are unstable and excavations fill with water.

Two alternative crossings are located in the northern portion of the western wetland which is considerably drier than the southern end. Based upon anticipated impacts to the wetland resources on the site associated with each of the proposed alternative crossings, alternative access from Half Mile Road or access across John Neubig's property would require the least amount of excavation and overall disturbance to the wetland system.

If during the discussions with the applicant, it is determined that the above mentioned alternatives are not practical due to other factors such as land ownership or traffic considerations and the agency considers approval of a crossing at the proposed location, a method that would involve the least intrusion into the wetland should be required. Experience has shown that in this case, the excavation of the organic layer is not advisable, therefore a crossing which would span the wetland, leaving the natural vegetation and surface features of the wetland intact, would be preferable.

Included in the Appendix are Best Management Practices for various methods of crossing streams and associated wetlands, a pamphlet on timber bridges, and a copy of the Inland Wetlands and Watercourses Act.

CONSIDERATIONS FOR ACCESS EVALUATION AND GRAVEL EXCAVATION

1) The "Wetland Evaluation" report prepared by Penelope C. Sharp for the applicant gives a fairly accurate description of the wetlands on site. This report contains key information on wetland values and makes a number of recommendations that should be made part of the plan such as the establishment of a linear setback from the wetland border to the excavated area and the proper placement and regular inspection of erosion control measures.

2) The linear setback of at least 25 feet should be adhered to throughout the plan. This setback should be established and flagged in the field based upon existing vegetative cover, slope, soil conditions, etc. Where an appropriate forest buffer exists it should remain, where the slopes are steep the setback should be extended with the excavation cut back into the slope leaving the existing grade and vegetation as a buffer.

3) How were the elevation in the basin wetland determined and what do they mean? Are these land surface elevation? High water? Existing water levels at the time the survey was made? This needs to be clarified to determine the groundwater underneath the area of proposed excavation and to determine the appropriate depth of excavation.

4) Assuming that there is a groundwater slope from Five Mile Brook west to the basin wetland, the high groundwater elevation needs to be established before determining the lower depth limit of excavation. The gravel excavation should maintain at least 10 feet of material above groundwater to protect the grounwater from pesticides and herbicides and to accommodate construction of on-site septic systems at some later date.

5) What is the surface water fluctuation in the basin wetland?

6) Why is a new crossing proposed when an existing one is available? (Alternative Route Plan given to Team members on the review day) What are the environmental implications of constructing an access road to the existing crossing and the repair/upgrading of the culvert under the existing crossing to accommodate heavy trucks? These concerns need to be addressed in the alternate plan.

7) A detailed excavation plan needs to be presented with excavation phases, revegetation plans, etc. The current plan appears to be copied from a book and is too general for this particular site. In addition, is the applicant the best choice for assuming the responsibility of the implementation of sediment and erosion control?

THE NATURAL DIVERSITY DATA BASE

The Natural Diversity Data Base maps and files regarding the Neubig Excavation site have been reviewed. According to our information, there are no known extant populations of Federal or State Endangered, Threatened or Special Concern Species occurring at the site in question.

Natural Diversity Data Base information includes all information regarding critical biologic resources available to us at the time of the request. This information is a compilation of data collected over the years by the Natural Resources Center's Geological and Natural History Survey and cooperating units of DEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the Data Base should not be substituted 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.

Please contact the Natural Diversity Data Base if you have any questions regarding this information (566-3540). 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.

Fisheries Resources

Site Description

Flowing southerly, Five Mile Brook is located roughly along the eastern and southern boundaries of the proposed Neubig Earth Excavation site. With a moderate gradient and meandering flows Five Mile Brook is characteristic of a coldwater meadow stream. Bank full stream channel width is approximately 5 feet with average depths of 1 foot or less. Surface flows are predominated by shallow riffle pool interspersed by pool. Stream substrate is of gravel, coarse sand, and sand/silt fines. In-stream cover is composed of undercut banks and fallen or overhanging vegetation. Riparian vegetation is comprised of dense growths of hardwoods, woody shrubs, and in part agricultural field.

Limited development within the Five Mile Brook watershed has maintained water quality which, in 1987, received a surface water rating of "Class A" by the Department of Environmental Protection. Designated uses for water of this classification are potential drinking water supply, fish and wildlife habitat, recreational use, agricultural and industrial supply, and other legitimate uses including navigation.

Aquatic Resources

Formal fisheries resource inventories of Five Mile Brook have never been conducted by the Fisheries Division. The stream has the physical characteristics of a cold water meadow stream. Fish species anticipated to inhabit such stream types in Connecticut would include brook trout, brown trout, blacknose dace, longnose dace, and tessellated darter.

Impacts

Should mitigative measures not be implemented, excavation, regrading, and future agricultural field development of the 70.56 acre site have the potential to adversely impact aquatic habitats of Five Mile Brook. Anticipated impacts include:

* Soil erosion, transport, and subsequent in-stream deposition due to stormwater runoff from unvegetated areas. Excessive erosion and sedimentation can degrade water quality and in-stream habitats in turn impacting the resident fishery population. Specifically, excessive sedimentation has the potential to:

- cause a depletion of oxygen within the water column - disrupt fish respiration and gill function

- reduce water depth resulting in a reduction of habitats used by fish for feeding, cover, and spawning reduce fish

- reduce aquatic insect production

- promote growths of aquatic plants

✷ Removal of riparian vegetation along stream courses. This has been found to result in:

- elimination of a "natural filter"; vegetation has the ability to prevent sediment, nutrients, fertilizers, and other non-point source pollutants from upland sources from entry into streams; such non-point pollutants can degrade water and habitat quality

- an increase of stream water temperature during the summer months (thermal loading) while decreasing winter water temperatures to levels where there may be a complete cover of ice

- a decrease of streambank stability thereby increasing instream siltation and aquatic habitat degradation

- an elimination of, or drastic decrease to, the supply of large woody debris to the stream; such material provides critical in-stream habitat features for numerous species of aquatic organisms

- a reduction of a substantial proportion of food for aquatic insects which in turn constitutes a reduction in a significant proportion of food available for resident stream fish

- a stimulation of excessive aquatic plant growth

- a decrease of the riparian corridor's ability to serve as a "reservoir" storing surplus runoff for gradual release back into streams during summer and early fall base or low flow periods

✷ Nutrient enrichment from agricultural field fertilizer runoff will stimulate aquatic plant growth. Herbicide runoff may result in fish kills and water quality degradation.

Recommendations

The following should be considered in effort to mitigate impacts to the aquatic resources of Five Mile Brook:

- Maintain, at a minimum, a 100 foot open space buffer zone along the excavation's closest encroachment to Five Mile Brook; no construction or alteration of riparian habitat should take place within this zone; research has indicated that buffer zones of these widths prevent damage to aquatic ecosystems by absorbing surface runoff, and the pollutants they may carry, before discharge into surface waters; please refer to the Fisheries Division Policy Statement and Position Statement for further information, it is found in the Appendix.

- Establish a comprehensive erosion and sediment control plan with mitigative measures (hay bales, silt fence, etc.) to be installed prior to and maintained through all excavation and regrading activities; all disturbed areas should be revegetated in a timely manner upon project completion.

PLANNING CONSIDERATIONS

Site Location and Land Use

The Neubig property lies in the southeast quadrant of the Town of North Haven, bordered by Beach Lane, North Hill Road and Half Mile Road. The zoning in the area is R-40 which requires a minimum lot size of 40,000 s.f. (1 acre) for development. The predominant land use in the area is currently a mix of medium and low density residential neighborhoods. The general land use in the area has gone through a steady transformation away from active agricultural use to residential development over the past few years.

Conformance with other local and state regulations

As mentioned earlier, many of the productive farms in the southeast section of North Haven are being converted to residential developments. One such residential subdivision, Pine Hill Estates, has recently been approved allowing the construction of 82 single family homes in the vicinity of the Neubig property. The Neubig excavation application is seeking to construct a wetland crossing to assist in the removal of approximately 65,000 cubic yards of material outside of the flagged wetland area and 270 cubic yards of fill within the wetlands area. The excavation will result in the major regrading of the property. According to the geologists on the site visit, the geologic upland formation to be excavated (an esker), is an excellent source of high quality gravel.The material would not require any blasting and most likely be in high demand for various construction purposes.

Besides permits by the Inland Wetland Commission for a wetlands crossing and regulated activities, the North Haven Planning and Zoning Commission would need to approve an excavation permit for the proposed gravel excavation. On a more general level, the Connecticut Conservation and Development Plan depicts the area as a conservation area of environmental concern.

Traffic Impact

The optimum access point to the Neubig excavation site in terms of proper sight lines, road geometry and overall impact on neighboring property owners would seem to be the existing construction site entrance off North Hill Road. Any sight entrance off of Half Mile Road would suffer from very poor sight lines which would be a potential safety hazard.

According to a recent traffic impact/site access study by Barakos and Landino (1990) for the neighboring 82 lot Pine Hills Estate subdivision application, North Hill Road was depicted as a local roadway with a posted speed limit of 25 miles per hour which carries little through traffic. Overall, the Barakos and Landino report suggested that the proposed Pine Hill Estate development would have minimal impact on traffic conditions in the vicinity.

North Haven Gravel and Excavation Regulations

An excavation permit must be secured from the Planning and Zoning Commission before any excavation or removal of gravel, topsoil, clay, sand, stone, loam, dirt, or any other earth material on or from any parcel of land, except when such excavation or removal is to be limited to the following:

- Necessary foundation and trench excavation in connection with work on the premises for which a building permit has been issued;

- Necessary excavation and grading for a subdivision road for which plans have been approved by the Planning and Zoning Commission;

- The removal by or for the owner from one part of his property to another of topsoil or subsoil to a maximum of **100 cubic yards** over a period of time not to exceed one year, when such removal is the purpose of landscaping, farming or construction of a pond.

North Haven Excavation Permit Application Procedures/Requirements

- Location and limits of the premises, names of abutting owners and an estimate of the amount of material to be excavated or removed.

- Grading plan showing existing contours in the area to be excavated, and proposed contours at 2 foot intervals for the area after operation. Such plans shall include the area to be excavated, as well as surrounding area if needed by the applicant, within 100 feet of the excavation, and shall be drawn at a scale not to exceed 1 inch

equals 50 feet.

- Existing and proposed drainage of the site, together with drainage easements and flowage rights.

- An estimate of the number and types of trucks and other machinery to be used on the site, hours of operation, and the locations and types of buildings to be erected.

- Proposed truck access and egress to the excavation.

- Details of the final grading and planting of the site to prevent erosion of the site at the conclusion of operations or such earlier times as may be required by the Planning and Zoning Commission.

- Existing ponds and water courses on or adjacent to the premises.

- The location of wooded areas, and existing and proposed buildings, structures, and processing equipment.

Conditions of Operation

The Planning and Zoning Commission may approve the application and issue an Excavation permit for a period of stated duration subject to compliance with the following conditions:

- No screening, sifting, washing, crushing or other forms of processing shall be conducted upon the premises unless located within a zone where such operations are Permitted Uses as provided in these Regulations. ***(Not allowed in Residential Zones).**

- No fixed machinery shall be erected or maintained within 100 feet of any property or street line.

- Excavation below the level of an abutting property or street line shall be at a distance from said property or street line to be

determined by the Planning and Zoning Commission.

- No building shall be erected on the premises except as may be permitted in these regulations or except as temporary shelter for machinery and field office subject to approval by the Commis sion and to be removed upon completion of the operations.

- At all stages of the operations proper drainage shall be provided to prevent the collection, stagnation or excessive run-off of water and to prevent harmful effects upon surrounding proper ties and watercourses.

- During the period of excavation and removal, proper barricades of fences shall be erected for the protection of pedestrians and vehicles.

- Truck access and egress to the excavation shall be so arranged and truck loads shall be so trimmed as to minimize danger to traffic on adjacent roads and nuisance to surrounding proper ties.

- Proper measures shall be taken to minimize the nuisance of noise and flying dust or rock.

- No operation shall be undertaken on the site except between the hours of 7:00 A.M. and 5:00 P.M. local time, Monday through Saturday. There shall be no blasting on the site except between the hours of 9:00 A.M. and 5:00 P.M. local time, Mon day through Friday.

- When the approved excavation and removal operations or either of them are completed, or when required by the Commission, the excavation area shall be graded and seeded as required herein. In no case will a permit be extended for more than a twelve month period unless a substantial part of the area previ- ously excavated has been properly graded and seeded.

- If as part of the excavation operation, debris or trash is encountered, the same shall be removed from the site and disposed of in accordance with applicable Town Regulations. Tree stumps and roots encountered during any excavation operation may be buried on the area provided that the same are suitably covered with earth material and further provided that such burying will not vary the approved final contours.

Performance Bond

The applicant shall post a performance bond in the amount of $1000 per acre, or a fraction thereof, or such amount deemed by the Planning and Zoning Commission sufficient to insure completion of the work following excavation in the manner set forth in listed conditions.

Conclusion

According to the applicant, past gravel excavation operations at the site did not result in any serious off-site environmental impacts. The disturbed area will consist of approximately three (3) acres at a time. There will be plenty of construction activity in the vicinity of the site due to approval of adjacent residential subdivisions. It will therefore be very important to monitor the operation and adhere to the conditions required by the regulations so as not to impact the road network and neighboring residents. Some key issues to consider include the following:

- No extensive screening, sifting, washing, processing or crushing of material should be conducted on the site.

- Shorter hours of operation (8 A.M. to 5 P.M.) Monday through Saturday and no work on holidays.

- Assurance that trucks will be equipped with covers.

- Limitations on the stockpiling of excavated materials.

- It may be appropriate for the applicant to document to the Planning and Zoning Commission how many trucks and the total amount of cubic yards of material each vehicle will be able to hold. A work schedule that documented the following

information would be useful: type of truck, gross vehicle weight of truck, location for disposal or stockpiling of material, number of days anticipated to complete the excavation including weather conditions and holidays.

In summary, it would appear that the gravel excavation should not create any serious off-site environmental concerns, as long as proper engineering standards are adhered to for the placement of the bridge crossing and drainage pipes, depths of inverts, as well as, the conditions listed in the North Haven Regulations are followed and properly enforced.

APPENDIX

Best Management Practices

Timber Bridges

Inland Wetlands and Watercourses Act

DEP Fisheries Division Policy Statement - Riparian Corridor Protection

DEP Fisheries Division Position Statement - Utilization of 100 Foot Buffer Zones to Protect Riparian Areas in Connecticut

Appendix

For Appendix Information please contact
the ERT Office at 860-345-3977