



411 Main Street LLC Business Park Access

**Deep River
Connecticut**

Eastern Connecticut Environmental Review Team Report

Eastern CT Resource Conservation & Development Area, Inc.
411 Main Street LLC

Business Park Access Deep River, Connecticut



Environmental Review Team Report

**Prepared by the
Eastern Connecticut Environmental Review Team
Of the
Eastern Connecticut Resource Conservation & Development Area, Inc.**

**For the
Conservation Inland Wetland Commission
Deep River, Connecticut**

Report #593

December 2005

**CT Environmental Review Teams
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Acknowledgments

This report is an outgrowth of a request from the Deep River Conservation and Inland Wetlands Commission to the Connecticut River and Coastal Conservation District and the Eastern Connecticut Resource Conservation and Development Area (RC&D) 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, Wednesday, August 17, 2005.

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I would also like to thank Jodie Chase, George Atwood and Nancy Howard, conservation and inland wetland commission members, Nancy Howard, conservation and inland wetland commission clerk, Susan Board, planning and zoning commission member, and Jodie

Gebhard, project manager, 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 viewed a presentation and were given preliminary plans. Some Team members made separate or follow-up visits to the 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 landowner/applicant. This report identifies the existing resource base and evaluates its significance to the proposed use, 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 the review of the access for this proposed business park.

If you require additional information please contact:

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Introduction

Introduction

The Deep River Conservation and Inland Wetland Commission have requested Environmental Review Team (ERT) assistance in reviewing preliminary plans for access to a campus-style business park.

The 57 acre project site is located at 411 Main Street (Route 154) just north of the Essex town line. Access to the site will be from Route 154 and the applicant has presented three potential access routes to gain entry to the interior portions of the site. All potential routes will have to cross wetlands. Wetlands were flagged by a certified soil scientist. The concept plan for the business park available for Team members to review did not reflect the applicant's current thinking for design of the park. Some maps showed actual buildings and others just showed possible building site areas. The emphasis for this ERT review is on the access road and not a review of the building and parking layout.

Objectives of the ERT Study

The Conservation and Inland Wetland Commission and the applicant are interested in information and recommendations identifying the best access road location. Concerns and information requested include:

- Effect of the project on natural resources, especially wetlands;
- Soils limitations and opportunities;
- Stormwater management;
- Traffic and access;
- Suggestions and recommendations to minimize impacts.

Given the wide range of perspectives of the Team members involved in the review there were some differences in preferred access location. The Team did not reach a consensus, but instead is able to offer information and opinions on reach proposed route.

The ERT Process

Through the efforts of the Deep River Conservation and Inland Wetland Commission this environmental review and report was prepared for the Town of Deep River.

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

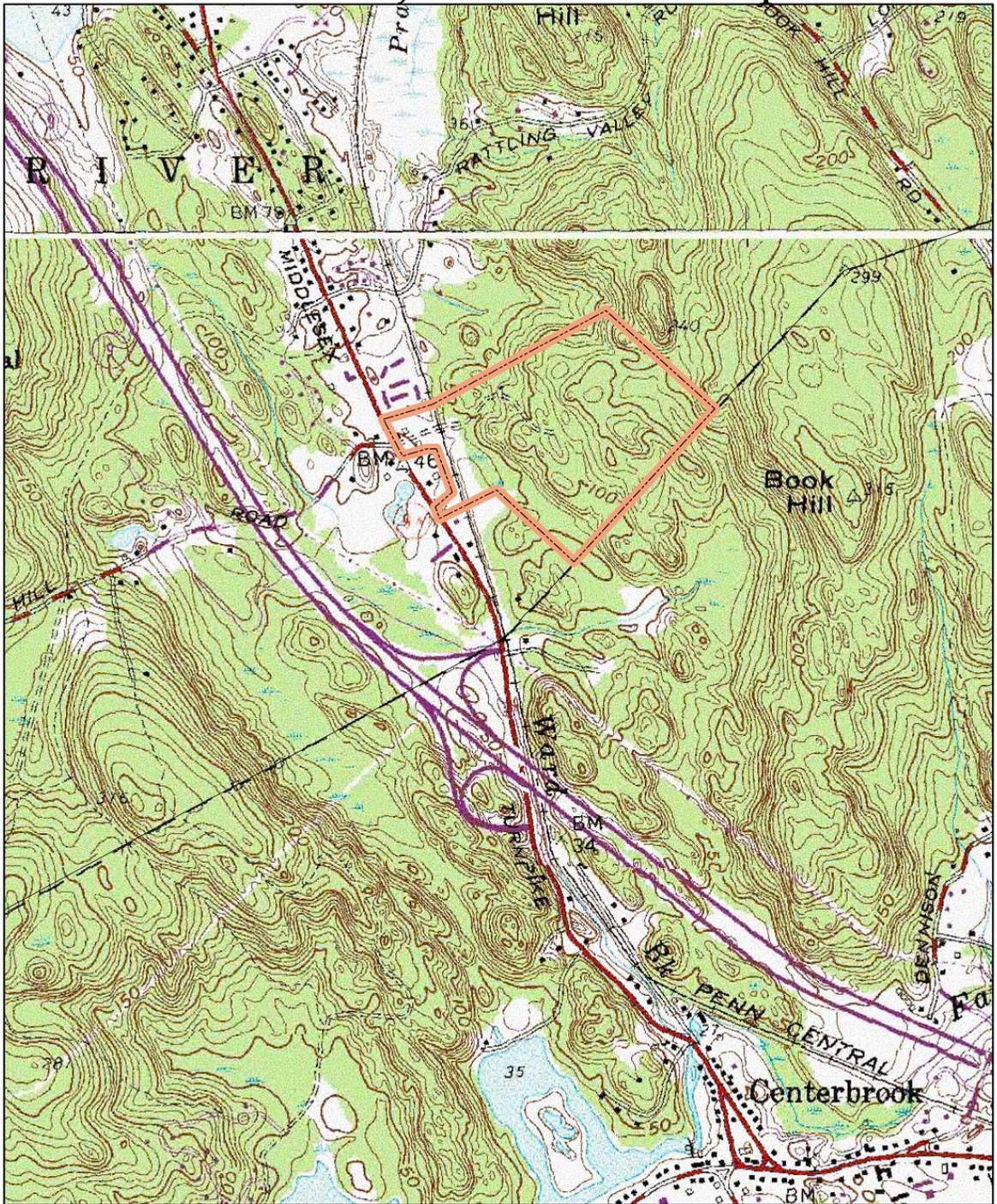
The review process consisted of four phases:

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

The data collection phase involved both literature and field research. The field review was conducted Wednesday, August 17, 2005 and some Team members made separate 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.

ERT Project Location Map



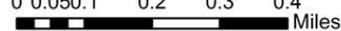
The Connecticut Environmental Review Team

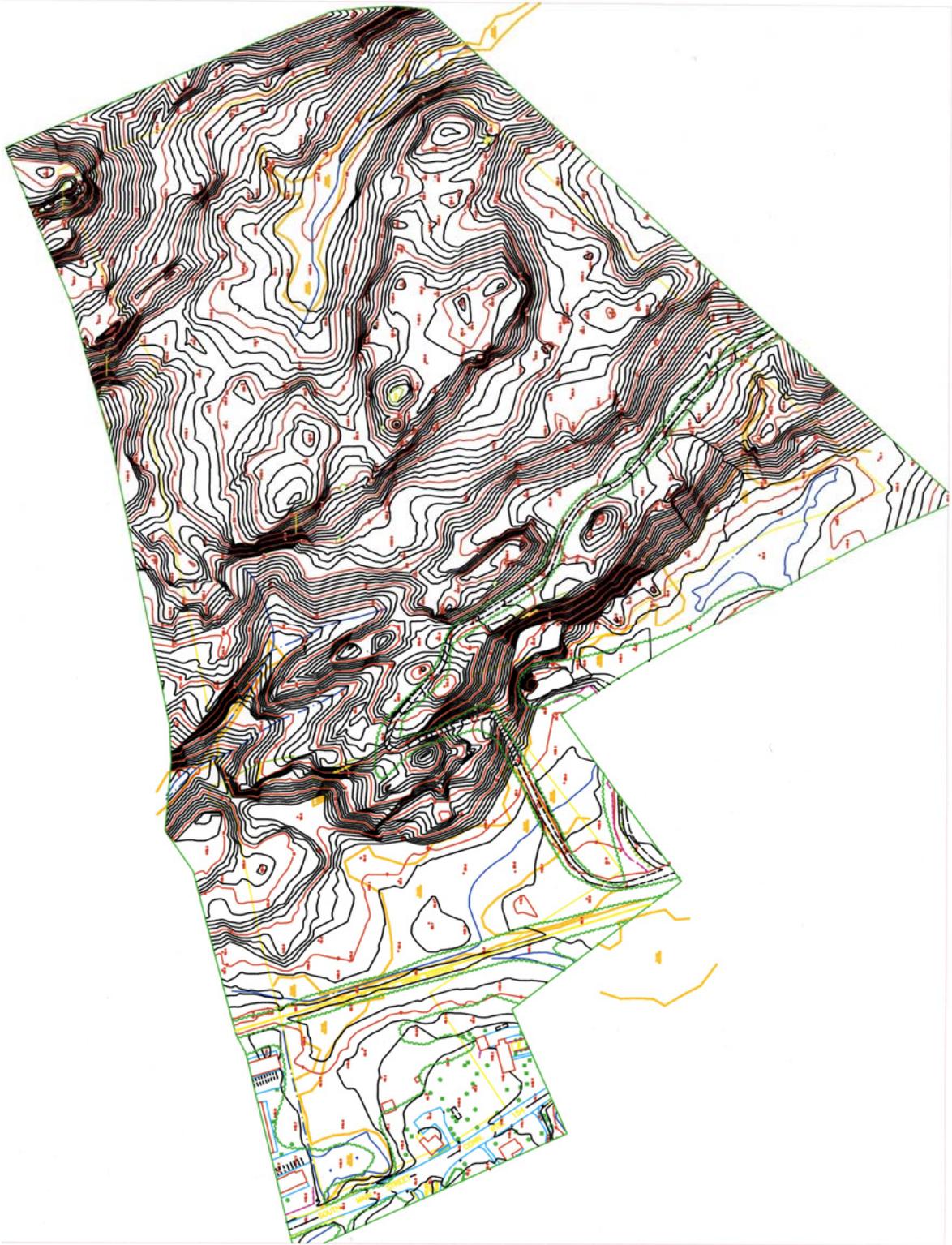


This map was prepared by and for the Connecticut Environmental Review Team. This map is for educational use only. It contains no authoritative data. December 2005.

 Proposed Area for ERT Study

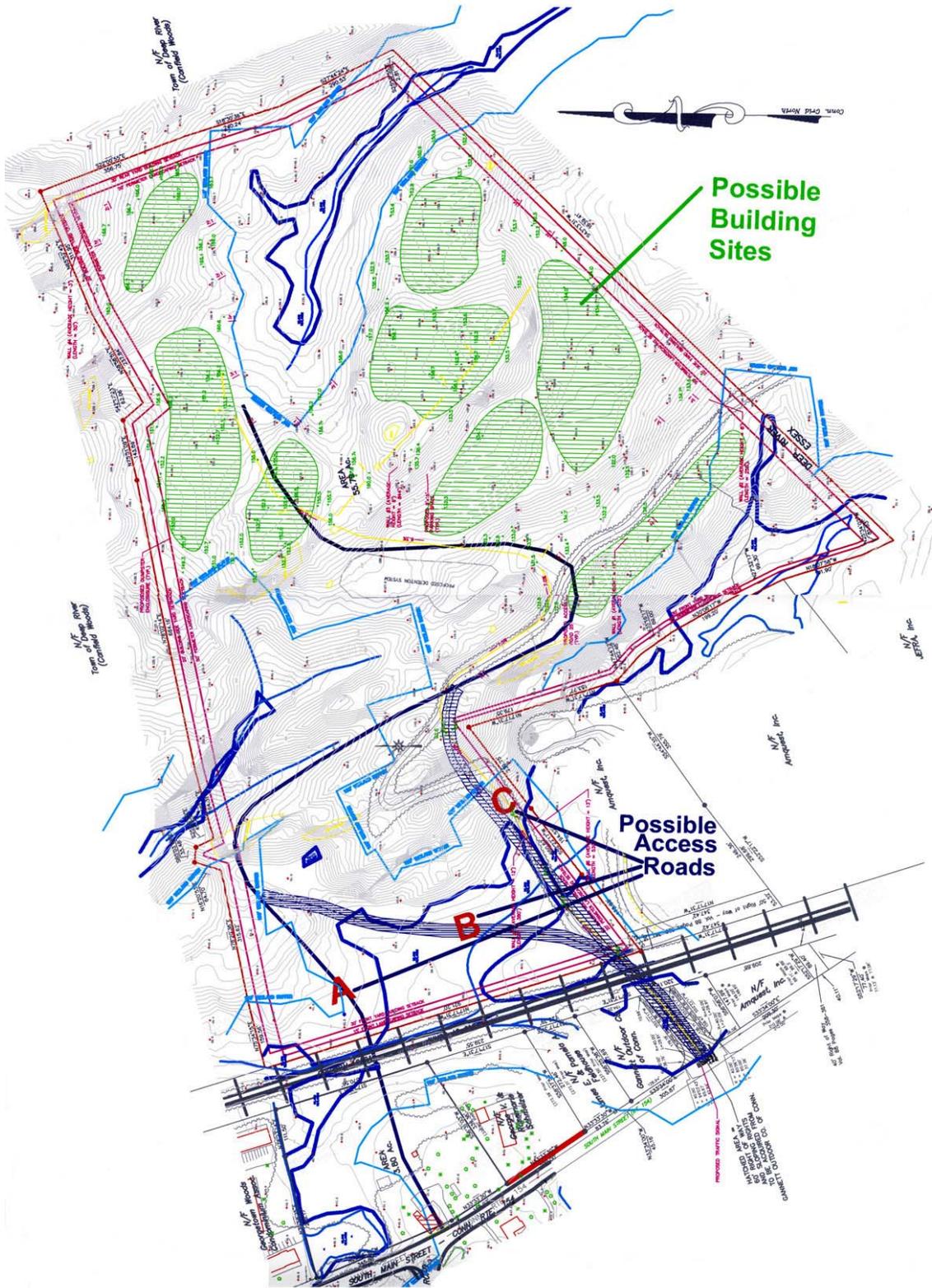
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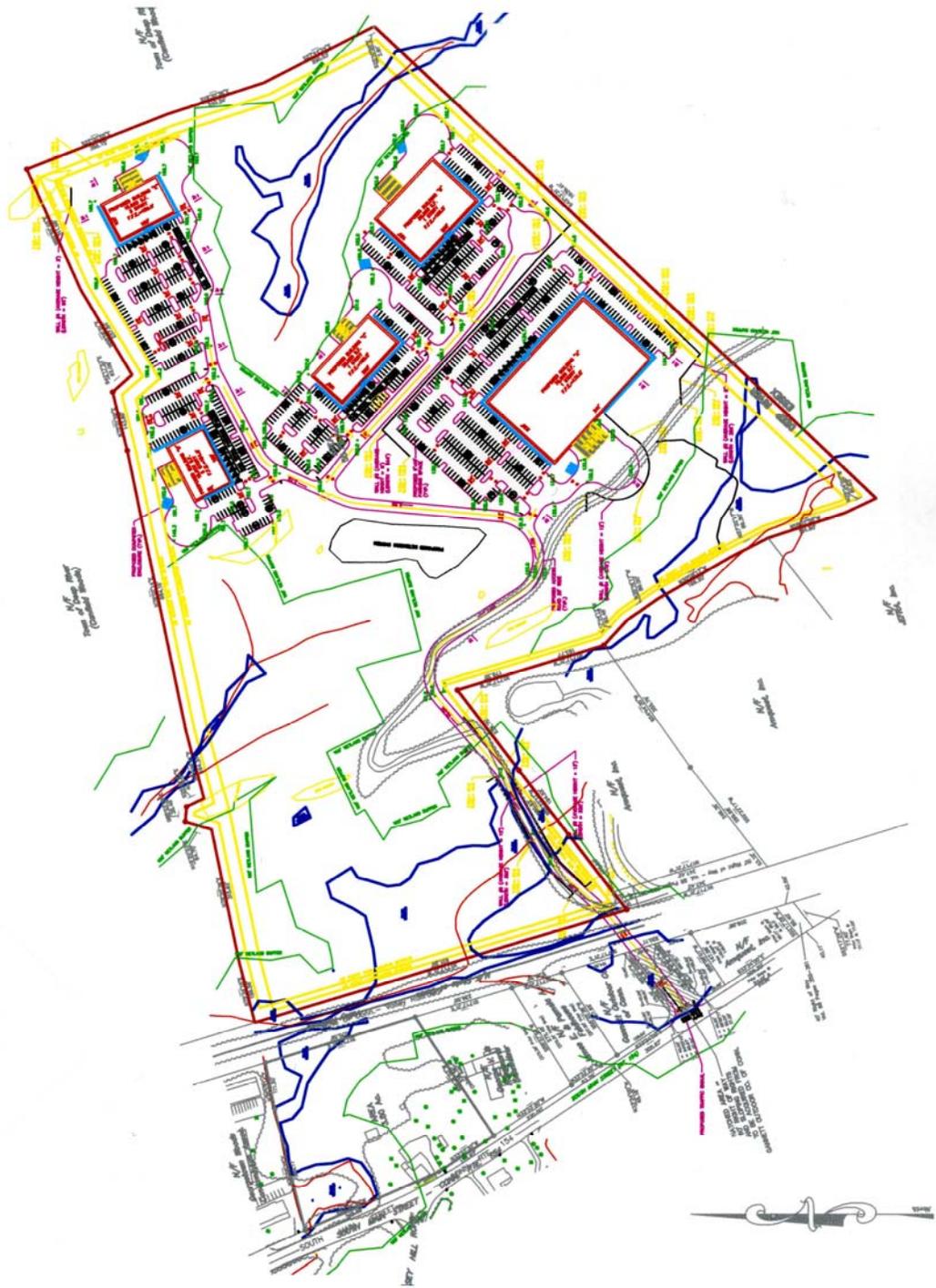
←
North Arrow

Topographic Map



411 MAIN LLC 500 MAIN ST., SUITE #5, DEEP RIVER, CT 06417
PRELIMINARY CONCEPTUAL SITE PLANS FOR 411 MAIN LLC
Telephone: 860 526-3510 email: jgebhard@sbcglobal.net

8/17/05



411 Main, LLC Conceptual Site Plan 4/29/04

411 Main LLC c/o 500 Main St., Suite #5, Deep River, CT 06417

Project Manager: Jodie Gebhard Ph: 860-526-3510

Topography and Geology

Topography

The 57 acre parcel proposed for development as an office park campus occupies a hilly terrace-like shoulder on the range of hills east of Deep River that includes Book Hill and Rattling Valley Hill. The topography is gentle to moderate and locally rugged with a relief near 140 feet. Bedrock outcrops are abundant and soils are thin over most of the area. The topography is characterized as a series of steep, locally cliffed, slopes with intervening swales that rise like a flight of stairs from the valley



FIGURE 1. Looking west across swale at outcrop of grey gneiss of Precambrian age.

through which the Valley Railroad runs to the hills of the eastern part of the parcel. The valley elevation is just less than 40 feet above sea level in a ditch next to the railroad tracks. Wetlands occupy much of the valley area. Possibly the ditch was dug in an effort to partially drain these wetlands. The maximum elevation of the hills on the parcel is just greater than 190 feet.

A drainage divide passes roughly northeast/southwest through the parcel (see Fig. 2). North of the divide overland drainage flows into the north flowing creek in Pratt Cove. South of the divide drainage flows into the south-flowing Ward Brook, a tributary to Falls River. Approximately 60% of the area drains into Pratt Cove drainage basin and 40% drains into Falls River basin. Thus toxic materials inadvertently spilled on the site potentially could

release contaminants into two watersheds. Possibly site drainage could be engineered to route all stormwater drainage into one or the other basin.

The topography will require extensive grading during the proposed development. The abundance of rock outcrops suggests that much of the grading will have to be done with explosives.

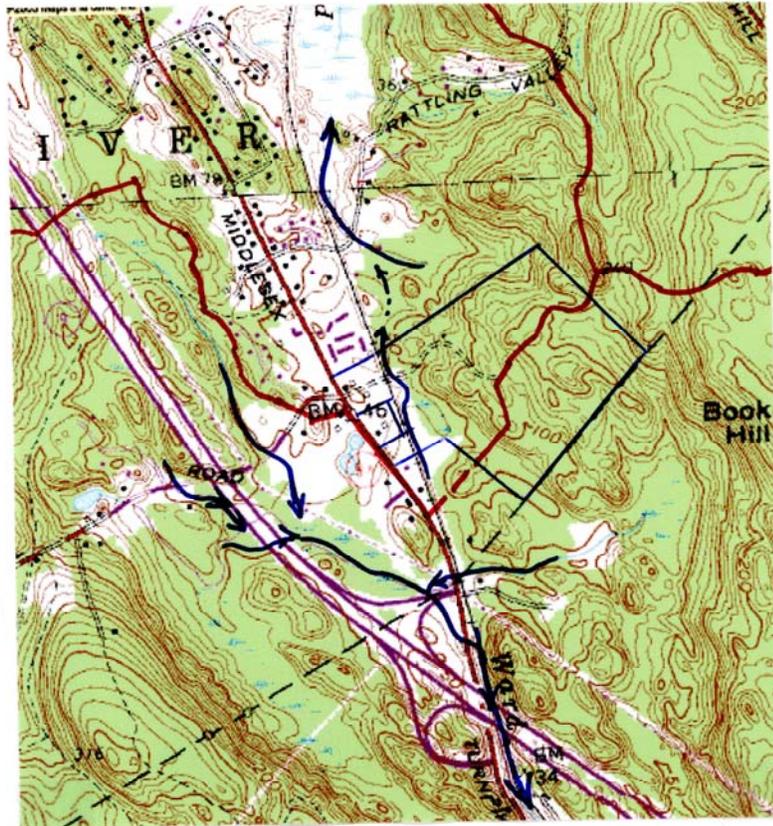


FIGURE 2. Topographic map showing drainage (watershed) divide passing through parcel. Lines with arrows indicate stream flow direction.

Surficial Geology

(Fig. 3). Maps published by Flint (1975), O'Leary (1977) and Stone and others, (1992) indicate that the upland area on and adjacent to the parcel is covered by thin glacial till deposits. Till is composed of unsorted debris, mud, sand and pebbles, eroded by glaciers that

covered Connecticut 20,000 years ago. When the great ice sheets melted, the debris they had entrained was left behind as a soil-like material covering the bedrock.

Water released when the ice melted formed streams that flowed through cracks and crevasses in the ice and down valleys on the underlying bedrock. Sand and gravel, derived from the glacier and from erosion of till, were deposited on the stream bottoms and along their banks. The deposits are referred to as stratified drift. They are found on the bottom of the valley occupied by Pratt Cove and completely filling a shallow valley that extends through the town of Deep River.

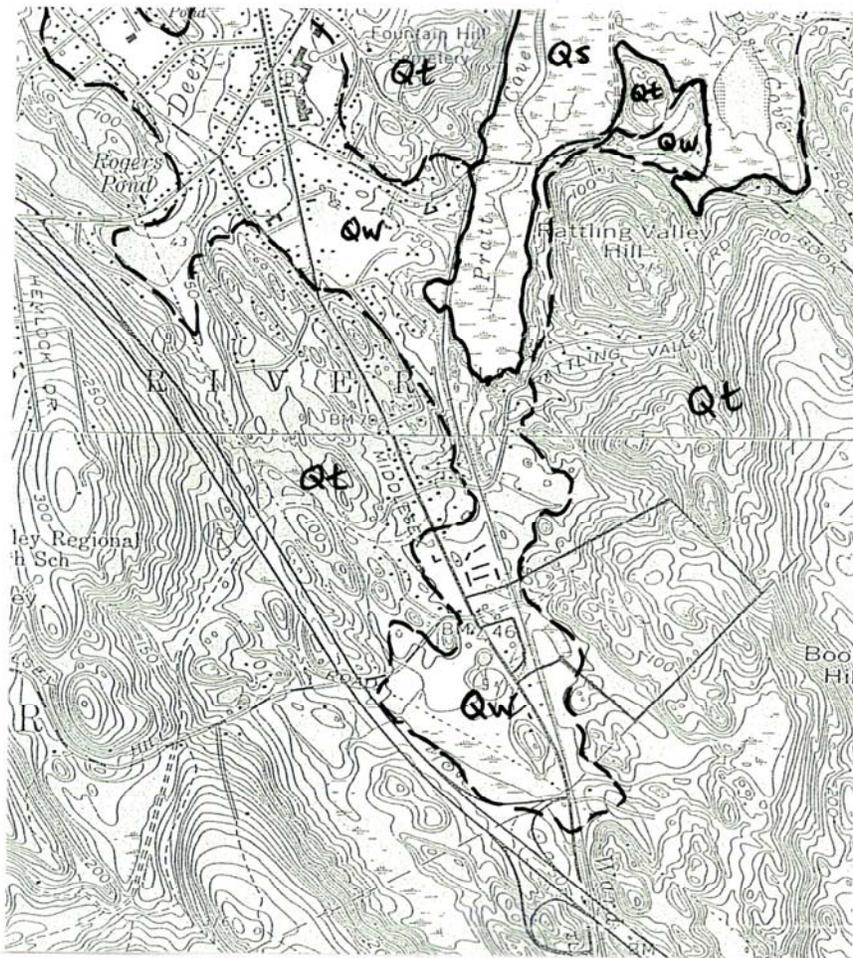


Figure 3. Surficial geology of Deep River area (after Flint, 1975, and O'Leary, 1977)
Qt=glacial till; Qw=stratified sand and gravel, referred to as "outwash" by Flint; Qs=salt marsh mud.

Bedrock Geology

(Fig. 5). Bedrock is everywhere close to the surface in the higher terrain. Most of the development parcel is underlain by three categories of rock: (1) gray quartz-biotite-feldspar gneiss, (2) cream-colored granite gneiss, and (3) calc-silicate gneiss. Slicing across the parcel is a major fault (long inactive) that juxtaposed material from two different tectonic plates: the far-traveled Avalon Plate and the North American Plate (see Figure 4). None of the rocks on the parcel contains minerals that will rapidly decay. Thus any rock excavated during grading should make appropriate fill material in low areas.

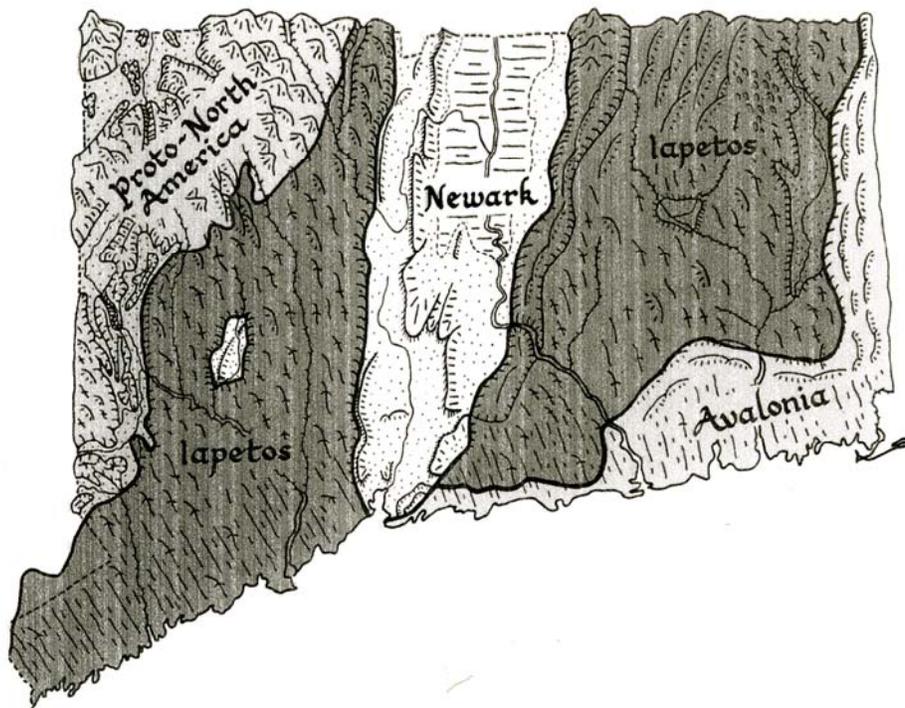


Figure 4. Terrane map (from Bell, 1985, p.50). Iapetos is rock material that was accreted onto the Proto-North American Plate and is referred to in this report simply as North American Plate. Newark is younger rock material that was deposited on top of the North American Plate during the Mesozoic Era.

The cream colored granite gneiss is part of the Avalon Terrane (plate) and, until recently, was thought to be Precambrian in age (about 900 million years old; Rodgers, 1985). Wintsch (1994) demonstrated that the granite gneiss has intrusive relations with the Precambrian rocks of the Avalon Terrane, but assigned a Devonian age (about 400-million years old) to the rocks, based on isotopic ages. The granite gneisses crop out in the north and eastern part

of the development parcel. Rodgers (1985) correlated these rocks, based on lithologic similarity, to the Rope Ferry Gneiss (Precambrian) in age of southeastern Connecticut.

Gray gneiss crops out in the south-central area of the development parcel. It is mapped by Wintsch as the older Precambrian rocks into which the granite intruded. The gneiss is bounded on the west by the inactive Honey Hill Fault that marks the boundary between the Avalon Plate and the North American plate. (The fault is exposed in the town of Deep River at a town park off Southworth Street (see McHone, 2004, p.74-75). Rodgers (1985) correlated these rocks to the Tatnic Hill Formation (Ordovician age – 475 million years) which in other parts of the state consists of rocks that were part of the ductile shear-zone associated with the Honey Hill-Lake Char Fault (Wintsch et al, 1995).

The third rock type is found on the lower southwesterly slopes of the development parcel: medium-grained calc-silicate granofels with interfolia of medium-grained schist. These rocks are Silurian in age (425 m.y.) and part of the early North American plate. They weather slabby and were quarried some time ago, probably for dimension stone. The foundation of a house at the intersection of Kelsey Hill Road and Rte. 154 is constructed of stones of this formation and possibly were derived from the old quarry.

History

500 million years ago the Avalon Plate lay east of the North American Plate and was separated from it by a wide ocean (Coleman, 2005, Fig. 8A; Bell, 1985, p.149). Plate tectonic processes resulted in the Avalon Plate traveling southwestward, over-riding the ocean floor at a subduction zone. Volcanic rocks formed above the subduction zone at the leading edge of the Avalon Plate (see Coleman, Fig. 15B). Gradually the ocean became narrower and eventually Avalon collided with North America and welded onto it. The result was a massive mountain range that has since been eroded away. The Honey Hill Fault, which at the time was 10 or more kilometers beneath the mountain surface, is the record of this past earth history.

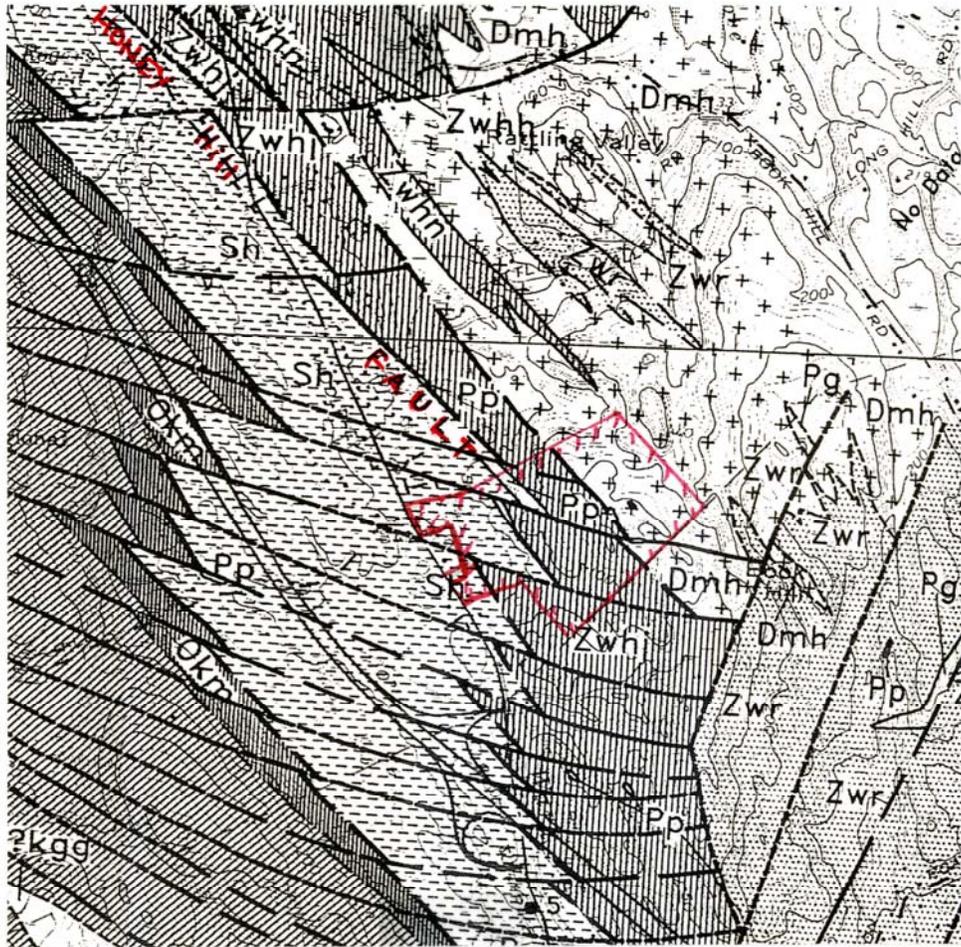


Figure 5. Geologic Map of the part of the Deep River Area (from Wintsch, 1994).

Rocks of the Avalon Plate (Avalon Terrane east of Honey Hill Fault)

- Dmh** Millstone Hill Granite, Devonian in age; light pink to gray, medium-grained gneiss intruded into older rocks of the Avalon Plate.
- Zwhj** Jennings Hill lithofacies of Precambrian Waterford Complex: medium gray, medium-grained, well foliated gneiss and amphibolite.

Rocks of the North American Plate (Merrimack and Bronson Hill Terrane of Wintsch, 1994, west of Honey Hill Fault).

- Sh** Hebron Formation, Silurian: medium-grained calc-silicate gneiss and medium-grained schist.
- Okmo** Monson Gneiss, Ordovician age: “granite” gneiss (tonalite) exposed west of parcel.
- Okm** Middletown Formation, Ordovician age: mostly amphibolite, exposed west of parcel.

Rocks intruded into both Avalon and North American Plate

- Pp** Permian age pegmatite.

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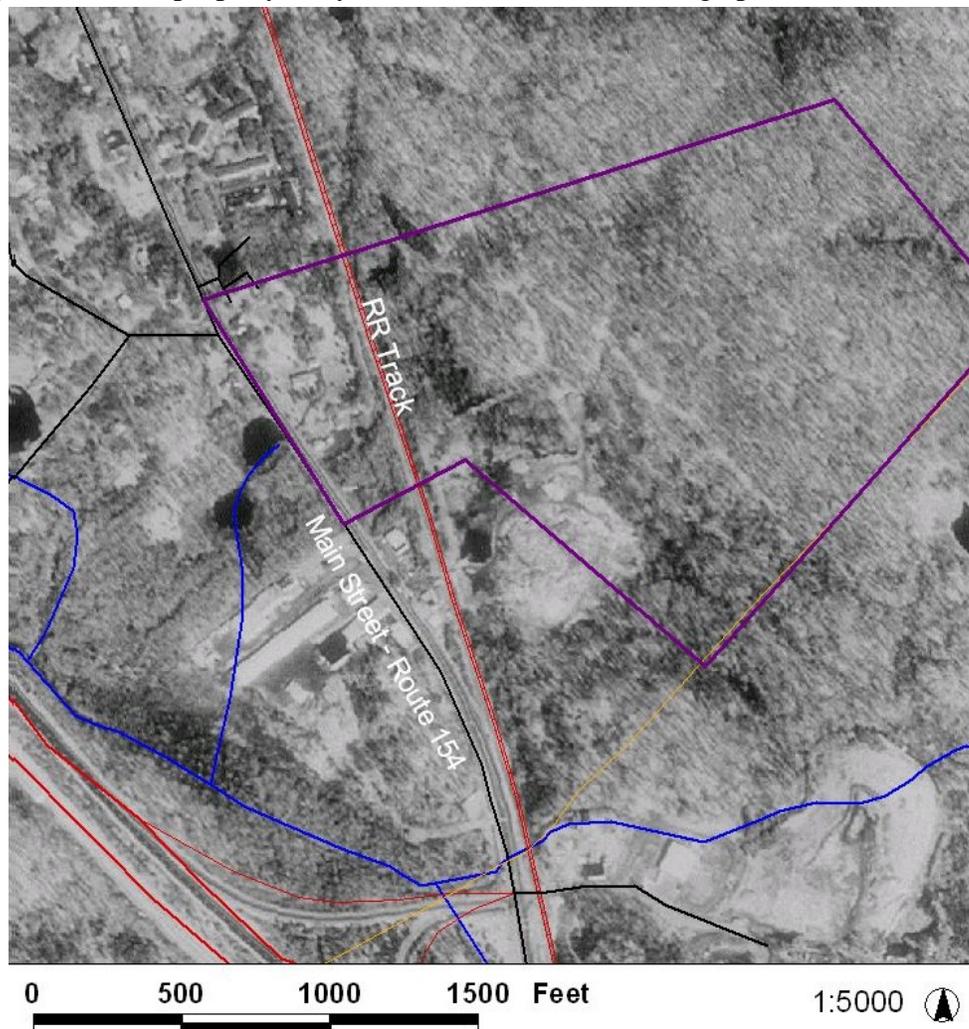
Conservation District Review

The following are general comments and recommendations regarding 411 Main Street LLC's proposed campus style business park development at 411 Main Street in Deep River, Connecticut. Information used to develop this report includes the Soil Survey Maps for Middlesex County (USDA/SCS); CT DEP Environmental GIS data including the USDA/NRCS soils coverage; Official Soil Series Descriptions from the USDA/NRCS Soil Survey Division; and a site visit conducted on August 17, 2005. This report is advisory in nature and is intended to assist the Town of Deep River and 411 Main LLC consider environmental concerns and opportunities related to conceptual development options for the property.

Current Site Conditions

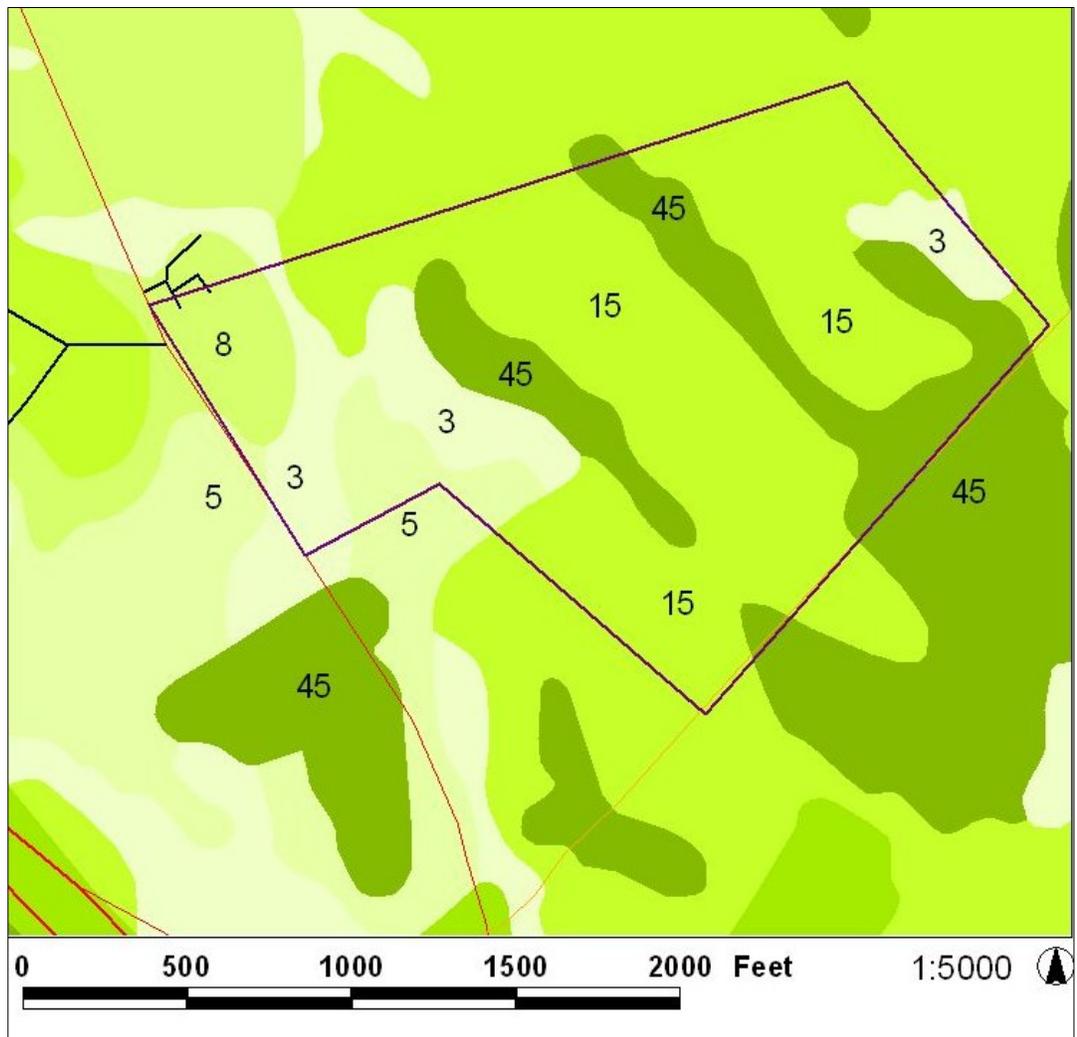
The subject property is located at 411 Main Street (Route 154) in Deep River, CT (see Figure 1). The majority of the 57 acres are within the Falls River subregional drainage basin which flows south to the Connecticut River and the Connecticut River subregional drainage basin which flows northward. Topographic mapping suggests that there is a north-south drainage divide on the parcel, however, local land use change, and in particular the railroad track that bisects the western portion of the property, may have altered natural drainage patterns.

Figure 1.
Approximate parcel
boundary of 411
Main Street, Deep
River.



From the lowest elevation of approximately 40 feet above sea level, the property rises east to an elevation of 160 feet above sea level. The topography varies across the parcel, from gentle slopes associated with the broad forested wetland in the western portion of the property (3-8% maximum) to strongly sloping and steep slopes in the central and eastern portions of the property (15-45% maximum, see Figure 2). The entire parcel is currently wooded, with a number of prominent bedrock outcrops and ridges throughout.

Figure 2. Maximum percent slope shown on the statewide GIS soils mapping (1:12,000-scale datalayer of soils in Connecticut, USDA/NRCS).



Soils

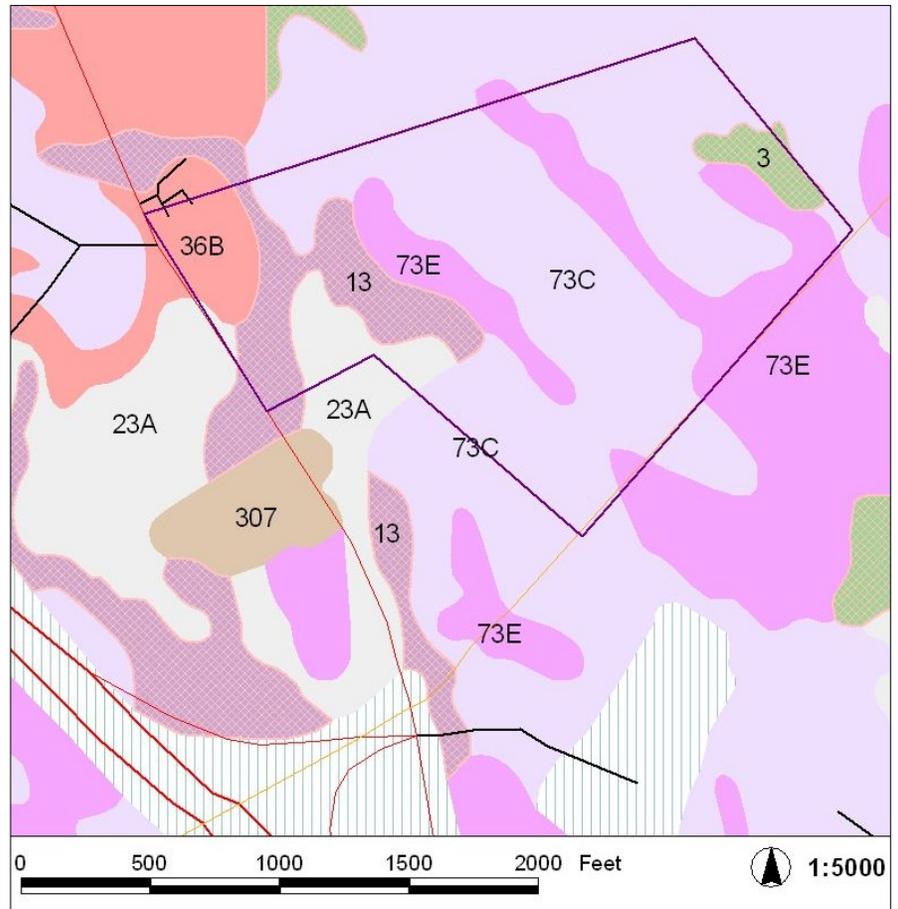
Four inland wetland soils distributed across three map units and five upland soils are shown for the subject property on the USDA/NRCS soils GIS coverage (see Table 1 and Figure 3). The majority of the proposed development is shown as very rocky Charlton-Chatfield Complex with slopes ranging from 3-15% (Map unit 73C) to 15-45% (Map unit 73E). Soils in this complex are closely intermingled, and vary from deep and well drained (Charlton) to shallow to bedrock (Chatfield).

Table 1. Select features of the predominant soils at 411 Main Street, Deep River

Map Symbol	Soil Description	Slope (%)	Hydrologic Group	Drainage	Restrictive Layer	Erosion Potential
3	Ridgebury, Leicester and Whitman	0-3	D	Very Poorly to Poorly (wetlands)		
13	Walpole	0-3	D	Poorly (wetlands)		
23A	Sudsbury	0-5	B	Somewhat Poorly to Moderately Well	Seasonally high water table	Slight
73C	Charlton-Chatfield ¹	3-15	B	Well	Bedrock (20-40")	Moderate to Severe
73E	Charlton-Chatfield ²	15-45	B	Well	Bedrock (20-40")	Severe
36B	Windsor	3-8	A	Excessively		Slight

¹Identified as Charlton-Hollis (CrC) and ²identified as Hollis-Charlton (HpE) in the Middlesex County Soil Survey

Figure 3. Soil map units shown for the subject property on the USDA/NRCS GIS soils mapping. These data are at a 1:12,000 scale, with the smallest area (polygon) delineated of approximately 3 acres. Caution should be taken when using soil survey mapping for site-level planning since at this scale soils in a single mapped unit can differ in slope, depth, drainage, and stoniness. Map unit 307 south of the property is Urban Land.



Below are descriptions of the soil series mapped on the subject property based on the Official Soil Series Descriptions available in the Soil Survey of Middlesex County (USDA/Soil Conservation Service) and from the NRCS Soil Survey Division online at:

<http://ortho.ftw.nrcs.usda.gov/osd/>.

Official Soil Series Descriptions

CHARLTON

The Charlton series consists of very deep, well drained loamy soils formed in till. These soils are nearly level to very steep soils on till plains and hills. The soils is formed in acid till derived mainly from schist, gneiss, or granite. Surface runoff is medium to rapid. Permeability is moderate or moderately rapid throughout.

Areas of Charlton that have been cleared of stones are used for cultivated crops, specialty crops, hay, and pasture. Many scattered areas are used for community development. Stony areas are mostly wooded. Common trees are red, white, and black oak, hickory, sugar maple, red maple, black and gray birch, white ash, beech, white pine, and hemlock.

CHATFIELD

The Chatfield series consists of moderately deep, well drained, and somewhat excessively drained soils formed in till. These soils are nearly level to very steep, and are on glaciated plains, hills, and ridges. The soils formed in a moderately thick mantle of till overlying granite, gneiss, or schist bedrock. Rock outcrops are rare to common and are limited to the more resistant bedrock. Crystalline bedrock is at depths of 20 to 40 inches. Potential for surface runoff ranges from low to high. Permeability is moderate or moderately rapid.

Most areas of Chatfield soils are in woodland. Major tree species include white and red oaks, sugar maple, beech, hemlock, white pine, eastern red cedar, and Atlantic white cedar. Some small cleared areas are used for pasture, are idle, or are sites for residential and recreational development.

SUDBURY

The Sudbury series consists of very deep, moderately well and somewhat poorly drained soils. They are nearly level to strongly sloping soils in slight depressions and on terraces and foot slopes in areas of glacial outwash and on gentle foot slopes. The soils formed in water sorted sandy and gravelly materials derived mainly from granite, gneiss, and schist. Surface runoff is slow to moderate. The internal drainage is restricted by a seasonal high water table. Saturated hydraulic conductivity is high in the upper solum and high or very high in the lower solum and substratum.

Most areas of Sudbury are used for growing hay, pasture, field and truck crops. Some are forested areas with mainly red maple, gray birch, hemlock, larch, white pine, and red, black, and scarlet oaks.

WINDSOR

The Windsor series consists of very deep, excessively drained soils formed in sandy glacial outwash. They are nearly level to very steep soils on glaciofluvial landforms. The steeper slopes are typically on terrace escarpments. Surface runoff is negligible to medium. Saturated hydraulic conductivity is high or very high.

Most Windsor soils are forested or in low growing brushy vegetation. Some areas are used for silage corn, hay, and pasture. Small areas, mostly irrigated, are used for shade tobacco, vegetables and nursery stock. Some areas are in community development. Common trees are white, black, and red oak, white pine, pitch pine, gray birch, poplar, red maple, and sugar maple.

WALPOLE (W)

The Walpole Series consists of very deep, poorly drained sandy soils formed in outwash and stratified drift. They are nearly level and gently sloping soils in shallow drainageways and low-lying areas on terraces and plains. The soils formed in sandy glaciofluvial and stratified drift materials derived mainly from crystalline rocks. Surface runoff is slow. Permeability is moderately rapid in the solum and rapid or very rapid in the substratum. Walpole soils have a water table at or near the surface much of the year.

Most areas of Walpole are wooded. Cleared areas are used for hay and pasture. Drained areas are used for silage corn and hay. Common trees are red maple, white oak, white ash, aspen, elm, white pine, and hemlock.

LEICESTER (W)

The Leicester series consists of very deep, poorly drained loamy soils formed in friable acid glacial till derived mostly from schist, gneiss, and granite. They are nearly level to gently sloping and are in low-lying depressional areas and drainageways of glaciated hills. Surface runoff is slow. Permeability is moderate or moderately rapid in the solum and moderate to rapid in the substratum. Leicester soils have a water table at or near the surface much of the year.

Most areas of Leicester are wooded. Some areas are in brushy unimproved pasture. Cleared areas are used for hay or pasture. Common trees are red maple, red oak, elm, aspen, gray birch, white pine, balsam fir, red spruce, and ironwood.

RIDGEBURY (W)

The Ridgebury series consists of very deep, somewhat poorly and poorly drained soils formed in till derived mainly from granite, gneiss and schist in slightly concave areas and shallow drainageways of till uplands. They are commonly poorly drained but the range includes the wetter part of somewhat poorly drained. Runoff is negligible to medium. Saturated hydraulic conductivity ranges from moderately low to high in the solum and very low to moderately low in the substratum. A perched, fluctuating water table above the dense till saturates the solum to or near the surface for 7 to 9 months of the year.

Ridgebury soils are largely forested to gray birch, yellow birch, red maple, hemlock, elm, spruce and balsam fir. Cleared areas are used mainly for hay and pasture.

WHITMAN (W)

The Whitman series consists of very deep, very poorly drained soils formed in depressions and in drainage ways of glacial till uplands derived mainly from granite, gneiss, and schist. They are shallow to a densic contact. Permeability is moderate or moderately rapid above the dense till and slow or very slow within it. Saturated hydraulic conductivity ranges from moderately high or high in the solum to very low to moderately high in the densic material. Runoff potential is negligible to high. A perched water table, or excess seepage water, is at or near the surface for about 9 months of the year.

Nearly all areas of Whitman are forested. Only a few areas are cleared and drained and used for pasture. Alder, gray birch, red maple, hemlock, elm, spruce, balsam fir, sedges, rushes, cattails, and other water-tolerant plants are the principal vegetation.

(W) = poorly or very poorly drained soil that is defined as a wetland soils in Connecticut

The development potential of the Charlton-Chatfield Complex, the most prevalent soil type on the subject property, is somewhat to very limited by steep slopes, bedrock outcrops, shallow soils, and a moderate to severe erosion hazard. The proposed access road from Main Street into the development area will cross through the Walpole wetland soil, which is very limited by depth to the saturated zone and frost action, and possibly through Windsor soils (if access is to the north) with limited suitability for shallow excavations due to the potential for caving of cut slopes.

SOIL TYPE	Charlton-Chatfield Complex		Sudbury	Windsor	Ridgebury, Leicester & Whitman	Walpole
Map Symbol	73C	73E	23A	36B	3	13
DEVELOPMENT LIMITATIONS						
Dwellings with or without basements	Somewhat to Very ^{2,3}	Very ^{2,3}	Somewhat to Very ¹	Not	Very ¹	Very ¹
Local Roads	Somewhat ^{2,3,4}	Very ^{3,4}	Somewhat ¹	Not	Very ^{1,4}	Very ^{1,4}
Shallow Excavations	Very ^{2,3}	Very ^{2,3}	Very ¹	Very	Very ¹	Very ¹
Lawns and Landscapes	Somewhat ^{2,3,5}	Very ^{2,3,5}	Somewhat ^{1,5}	Very ⁵	Very ^{1,5}	Very ^{1,5}
Paths and Trails	Somewhat ^{3,6}	Very ^{3,6}	Not	Not	Very ¹	Very ¹
STORMWATER TREATMENT LIMITATIONS						
Underground Gallery	Very ^{2,3}	Very ^{2,3}	Somewhat ³	Somewhat ³	Very	Very
Infiltration Trench	Very ^{2,3}	Very ^{2,3}	Very ^{1,3}	Somewhat ³	Very ¹	Very ¹
Stormwater Wetland	Very ³	Very ³	Very ^{3,5}	Very ⁵	Not	Not
Stormwater Pond	Very ^{3,5}	Very ^{3,5}	Very ⁵	Very ⁵	Not to Somewhat	Somewhat

¹Depth to saturated zone

²Depth to hard bedrock

³Slope

⁴Frost action

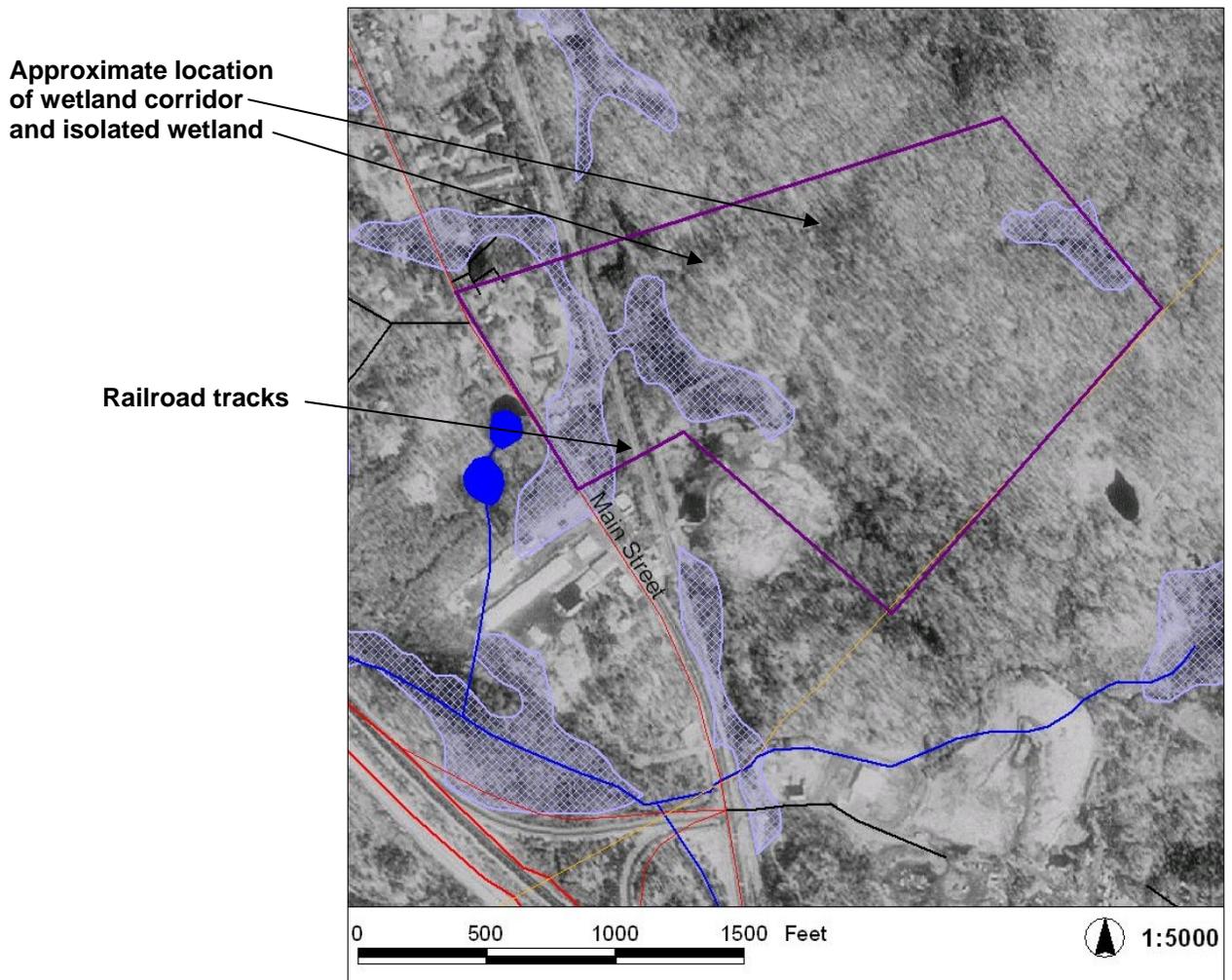
⁵Droughty

⁶Stony

Wetlands

A broad wetland corridor transects the western property boundary, extending on either side of the railroad tracks. The wetlands have been ditched along the railroad right-of-way, and a gently sloping drainageway with pockets of native vegetation was observed on either side of the tracks. One of the other three wetland areas delineated on site by a soil scientist is shown as wetland on the soils maps (in the south eastern portion of the property). The small isolated wetland and the north draining wetland corridor located in the central portion of the property identified during the field delineation do not show up on the soils maps.

Figure 4. Wetlands soils (hatched), watercourses and waterbodies (solid blue) shown on and near the subject property on the USDA/NRCS GIS soils mapping.



Proposed Business Park Development

The preliminary conceptual site plans for the proposed business park shows eight (8) development pods to be scattered throughout the eastern portion of the property. There are two potential access points to the interior development area from Main Street. The north access is directly across from Kelsey Hill Road through an existing residential lot with a single family home and the south access is approximately 600 feet to the south in an area with no existing structures. The northern access point may require a slightly longer road but a shorter wetlands crossing. Due to the elevation changes on the property, access to the interior portion of the property will most likely require the road to be fairly long and steep in sections.

Recommendations

1. Although conceptual only, the northern access appears to be favorable to the southern access. Because the wetlands are narrower, and are mostly confined to the area already disturbed adjacent to the railroad tracks, this option should require less total wetlands impact. The southern access would require a wider wetlands crossing and possibly the use of extensive retaining walls. Structural retaining walls will bisect the wetlands and possibly sever the north/south connectivity of the wetlands corridor. The total amount of wetland impact for the northern access can only be determined once there are engineered plans (even if preliminary in nature as there are for the southern access road).
2. A number of substantial trees and large bedrock outcrops were observed on the property during the field walk. Areas of unique natural resource value should be identified and any proposed site development plans should take their preservation into consideration.
3. The westernmost development pod is situated at the edge of a steep slope in close proximity to the downgradient wetland (50-100 feet). This pod should be eliminated due to the potential for both short term (during construction) and long term (post-construction) adverse impacts of permanently disturbing an area that drains over steep slopes to the wetlands below.
4. A single large stormwater detention facility is shown on the conceptual plans. Alternative and low impact development techniques should be used to design a plan that balances protection of natural resources with economic goals for the proposed business park.
 - a. Design the development pods to best “fit the terrain” in order to reduce the total amount of land disturbed (cleared/graded) and to protect the most vulnerable and sensitive areas.
 - b. Maintain wide vegetated buffers to on-site wetlands and watercourses. The width of intact (undisturbed) buffers that remains should be based on the steepness of the slopes and the erodibility of the soils (see the CT DEP upland review areas guidance document).
 - c. Preserve the site’s pre-development hydrology in order retain hydrologic conditions in downgradient receiving waters.
 - d. Minimize the total amount of impervious surfaces (e.g., roofs, roads, parking areas) to the greatest extent practical. Consider using pervious paving materials for overflow

parking, driveways and walkways rather than impervious pavements and reducing road widths.

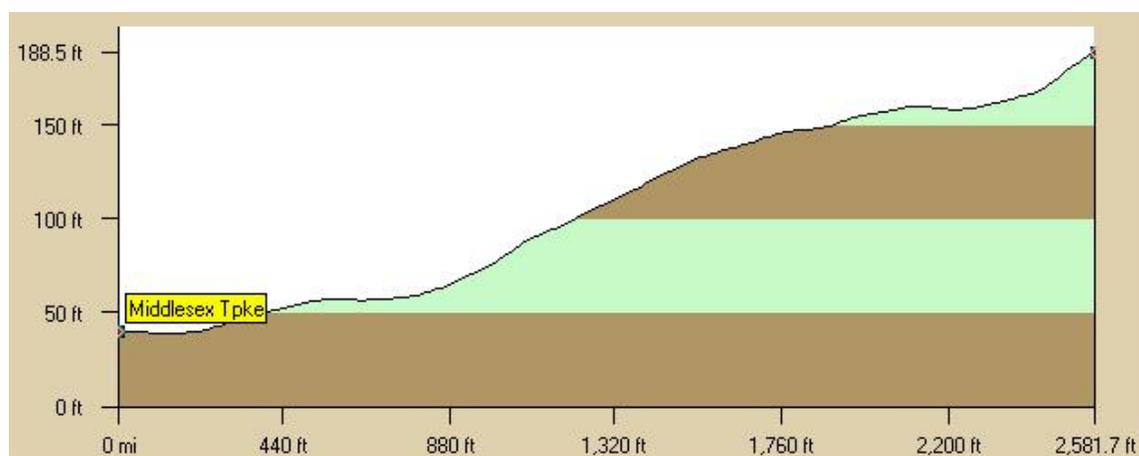
- e. Disconnect impervious areas, e.g., break up the discharge from roofs, roads, and parking areas rather than collecting all stormwater runoff for discharge to one location.
 - f. Develop a stormwater management plan that considers water quantity and water quality. Consider low impact development practices such as vegetated swales, buffers, and filter strips; bioretention/rain gardens; dry wells/leaching trenches; rainwater harvesting; vegetated roof covers (green roofs).
5. Soils across the majority of the development site are in the Charlton-Chatfield Complex, which are approximately 45% Charlton, 30% Chatfield and 25% other minor components including rock outcrops. The development potential of this complex is limited by the shallow depth to bedrock and the steepness of slopes. On site soil testing should be conducted to determine the distribution of deep Charlton soils versus the shallow Chatfield soils. Additional care should be taken when designing site development plans to avoid steep areas with the greatest potential for erosion, and minimize the total amount of land disturbed at any one time through proper construction phasing.

Wetland Review

The wetland review Team member made his initial visit to the site on September 13, 2005. He subsequently revisited the site on December 2, 2005 to complete this section of the report with a fresh view of the property in mind.

Description

The information provided to the ERT describes the project site as 57 acres in size. However, when calculated for area using GIS software the area shows to be 63 acres. The property varies in elevation above mean sea level (MSL) ranging from 40 feet on the west, abutting Route 154, to as much as 180 feet in the northeast part of the parcel. Looking at the parcel in profile from west to east, it is flat on the west, lying at 40-50 above MSL and then rises abruptly from this plain to 100 – 150+ feet about 650 to 850 feet in from the road. The plain makes up about 13% of the parcel, but it dominates the concern from a wetland perspective.



This level/plain area is divided almost in half east and west by the Connecticut Valley Railroad, a low traffic rail line that is primarily tourism based and only occasionally run.

The dominant wetland system west of the railroad bed is the channelized waterway that begins on the property at Route 154/Middlesex Turnpike. It appears that at one time drainage may have passed under Route 154 from west of the road but that is not now the case.

The wetland passes behind the V-shaped billboard in a ditched channelway leading to a small ponded area on the Schmelzer Property. From there it continues along in the channelway immediately to the west of the railroad bed collecting runoff from other areas before passing under the road near railroad marker “W”. This under-road-bed passage is just a few yards north of the wooden footbridge.

Once under the rail bed the channeled waterway merges with the wetland drainage flowing along the bed on the east side of the tracks. This continues to increase its flow rate as it continues across the landscape passing over a small waterfall where it becomes Simon Brook. It then passes under Rattling Valley Road ultimately flowing into Pratt Cove.

This wetland system has been historically impacted by the ditching behind the billboard and the laying of the rail road bed. But it is now stable and is the headwaters of the watercourse that feeds Pratt Cove and the Connecticut River. The land in the area between the Turnpike and the RR bed is very flat. The water ponds in the ditches until it reaches a critical mass and begins flowing north. It also pools on the property in a variety of locations as seen below.



View looking over ponded water at the back of the V-shaped billboard and out onto Route 154



The dike and ditch system that channels the water looked quite different in September than in December when the water stood in excess of 12 inches deep, as seen above.



*This is the ponded area on the Schmelzer property that has its outflow north into the channel abutting the RR tracks (as seen in September). It features a diversity of wetland vegetation including wetland obligate species such as cattails (*Typha* sp.).*



Here on the left the channelized flow is seen downstream from the above ponded area, then on the right passing under the railroad bed near railroad marker "W".



The passage under the RR bed occurs just north of RR marker “W” and the nearby wooded footbridge.

This area between the Route 154 and the railroad bed is dominated by red maple forested wetland, though the extensive wetland boundaries can be hard to visualize completely because of the variety of land ownership along Route 154. And it is this area that one of the options for entrance roads must pass over to reach the drier upland portion of the parcel.

The wetland system is also extensive on the flat/plain area east of the RR bed. Again because of the nature of the mapping it is a challenge to visualize the entire system of which these wetlands are a part. Only when the whole system is understood can a decision be made about the impacts of various proposals. In this case the wetland mapping shows 3-4 acres of wetland soils east of the RR bed. This wetland unit is divided by an existing dirt/logging road along the southeast boundary of the parcel. Approximately one acre lies southeast of the logging road and the balance of the wetlands to the northwest. The logging road effectively dams the water on both sides, though the area is flat and there are three corrugated metal pipes which pass beneath the roadway connecting the wetlands. At the time of the visit in September the area was dry. The return visit in December showed standing water accumulated over a broad expanse of this landscape. At the time of the December visit there was no discernable direction of flow of these flooded wetlands. Rather, the area was expansively ponded with standing water.



The three pipes of the logging road culvert system are seen in mid-September and in early December.

Additional wetlands in the uplands of the parcel are delineated on the map given to the team. These are primarily fingers of wetlands following valleys downslope.

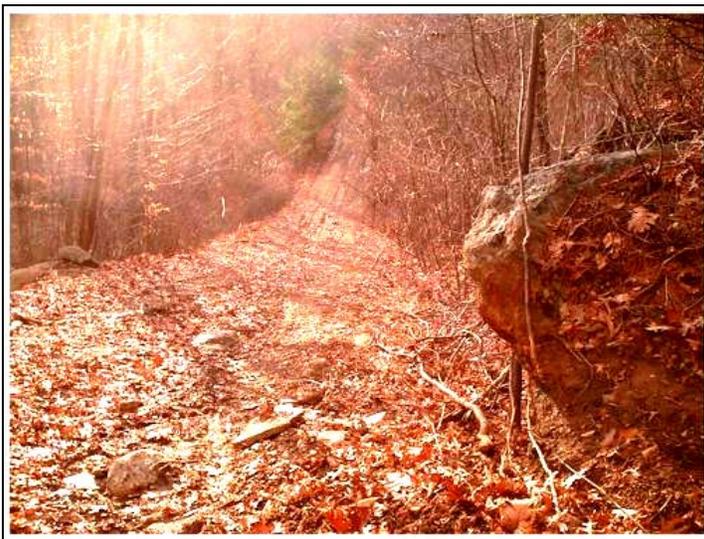
Analysis of the Three Road Options

All three of the proposed roadways pose challenges to the protection of the wetland resources on the property.

Road B cuts across the greatest area of wetland and would have the most far-reaching impact on the health of the wetland system. This reviewer does not consider proposed road “B” as a viable option.

Road C poses an interesting scenario in that it impacts headwaters portions of the wetland systems on both sides of the RR tracks.

In this proposal, a one lane logging road bed is already in place. However, this road, as it comes down off the uplands onto the level where the three culvert crossing occurs, is very steep. In addition, it would have to be widened considerably to meet local regulations. Given the amount of sand and salt needed to keep a road of this type passable in the cold months, the construction needed improve the road to a minimal two lane standard, and the water flow rate so low that the wetland would have no possibility of cleansing itself of accumulated sands and silts, this road cannot be considered and viable option.



This view from the top of the existing logging road looking downslope gives some idea of the steepness of slope any version of proposed roadway “C” would have to take into account. (Taken in December 2005)

Proposed roadway ‘A’ *could* potentially have the most minimal impact on the wetlands system depending on exactly where it is built. Again, the broken wetland delineation lines on the maps make it especially difficult to ascertain the exact field locations for analyzing any proposal. However, there is a point in this wetland system that tapers to a very narrow waterway.

If a road does cross this wetland, it is imperative that it pass over the narrowest wetland channel in this area to minimize impact. In general, this location can be described as the area east-north-east of the house opposite Kelsey Hill Road. The path is essentially through the back yard of this property and in the general vicinity of the footbridge pictured above. (Discussion with team members described a paper road that passes through this property as it continues east from Kelsey Hill Road.) However, these wetland areas can be extensive when flooded because of the level terrain and, as a result, must be walked by the commission in a wet period to more fully understand the wetlands that will be impacted. Only then can the best roadway path be specified and a decision made for the final plan.

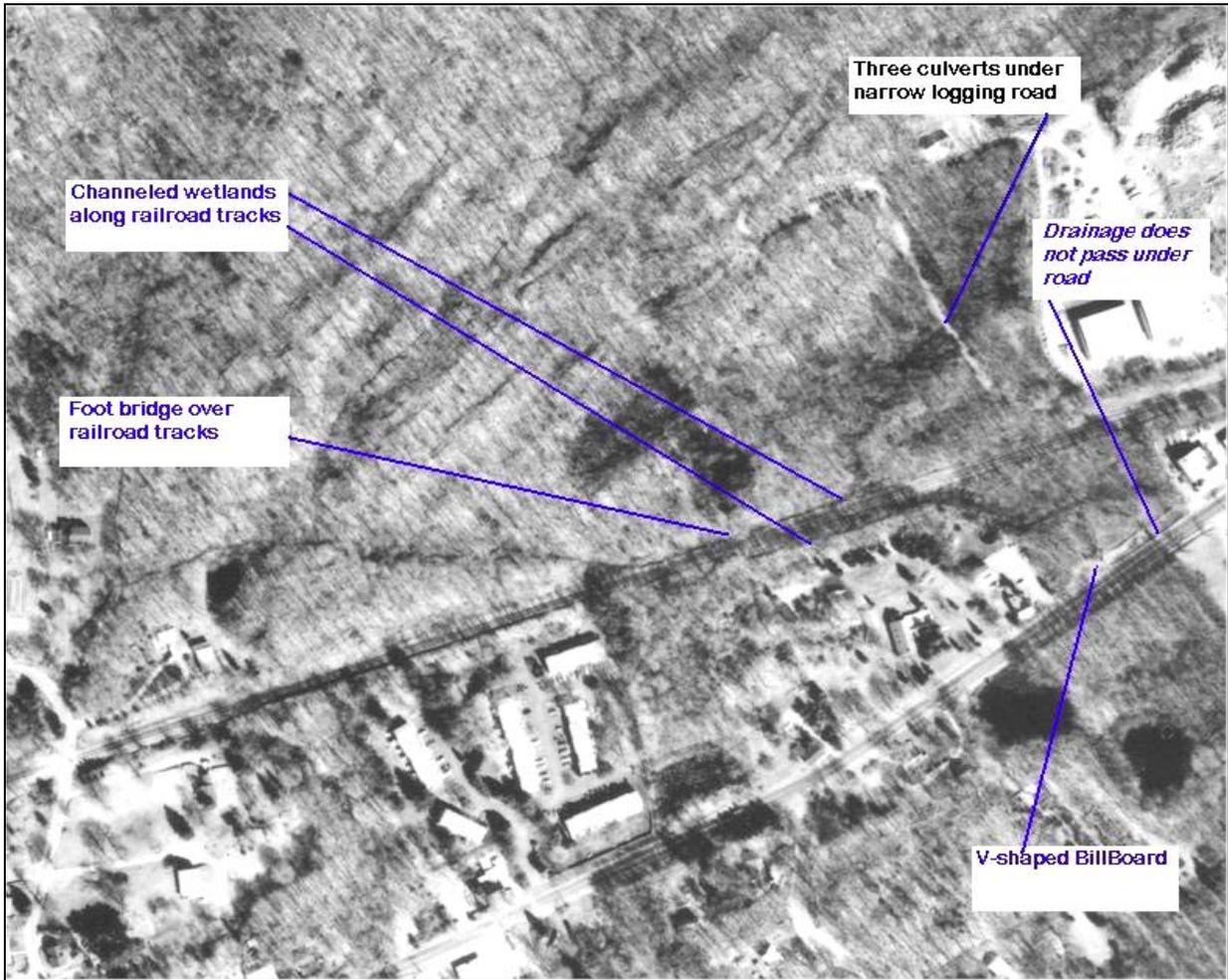
Additional Comments

- If the wetland buffers are observed, all up-hill wetlands should be well protected.
- The visit to the site in mid-September yielded field notes of ‘Dusty dry roads . . . Wetlands dry at this time. Sphagnum moss completely dried out. However, telltale signs of prolonged pooling of water evident’.

The buttressing of trees and matted leaves on the ground are often good clues to the seasonal presence of standing water. The return visit in December saw the low areas with much ponded water as suspected earlier in the year. The ditches behind the billboards and the inundated lowland at the three culverts on the logging road sampled to a depth of at least 12 inches.

This brought up the possibility that various pools could be breeding vernal pools of late winter and early spring. It is for this reason that the site must be walked when wet, preferably in the vernal pool season to establish the best pathway for any potential road.

- The steepness of slope is always a concern regarding erosion and sediment control and the potential impact as wetland runoff. Many hundreds of square feet of impervious surface is proposed (rooftops, parking lots, roadways, etc). This water as we see in the first graphic of this section will want to work its way downslope – and into the waterways. Special attention should be given not only to detention basins during construction, and to the as-build design, but also to the makeup and responsibility of a long-term maintenance plan for these easily forgotten fixtures. The failure of these detention and sediment trapping systems can easily lead to direct impacts to the quality and the health of these headwater wetlands.



Aerial image from the year 2000 displaying important points of discussion.

The Natural Diversity Data Base

The Natural Diversity Data Base maps and files have been reviewed regarding the project area. According to our information, there are no known extant populations of Federal or State Endangered, Threatened or Special Concern Species 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 Environmental and Geographic Information 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.

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.

Planning Considerations

Background

The parcel in question, owned by the Mislick family of Deep River, has been the subject of development interest for a number of years. The property owner/developer recently requested and received a change of the zoning classification of the property to Turnpike Industrial District (TID) in order to take advantage of the fact that the surrounding area has been developed in much the same way - nearby properties are developed with both light industrial and commercial land uses. In addition, the Planning & Zoning Commission is generally of the feeling that the type of development contemplated by the owner/developer is consistent with the goals of the Town for this area of Deep River. The parcel was formerly residentially zoned.

Site Characteristics

The site is located on the eastern side of Route 154 within a mile of the Essex town line and is bordered to the north by the conservation parcel known as Canfield Woods, owned by the Town. Property occupied by light industrial and commercial uses border the parcel to the southwest of the elevated portion of the property. The portion of the parcel located within 600 to 1000 feet of Route 154 is relatively flat and is occupied by a significant area of inland wetlands as well as the single railroad track owned by the State of Connecticut and leased by Valley Railroad. Both the wetlands and railroad tracks will have to be crossed in order to gain access to the majority of the site located further to the east.

Further east of the relatively flat portion of the property, the topography rises steeply from elevations less than 50 feet to about 200 feet. A smaller portion of inland wetlands is located in the far southeastern corner of the site at the higher elevations. Approximately eight tentative building sites are shown on schematic plans, all to be located in the higher elevations of the property. In general, the wetlands within the flat area in close proximity to Route 154 are generally described as more significant wetlands than the smaller wetlands area located in the far southeastern corner of

the site. As a result of the project being in the early stages of development, detailed site and construction information was not available for review at this point in time. The developer's representative indicates that the ERT process is in part to assist the developer in deciding which approach to take prior to spending a lot of time and money.

Planning Comments

The Regional Planning Agency's involvement in the ERT process often centers on site access issues, but can spill over into other planning issues as well. As stated earlier, the major concern with the development of the subject parcel, at least at this preliminary stage in the review process, appears to be impacts to inland wetlands caused by potential routes of access to the developable portion of the site.

Site Access - Route 154 (Middlesex Turnpike)

Based upon information available at the time of review, the largest challenge to the site appears to be the best way to gain access from Route 154 to the higher developable portions of the property further east with a roadway that is both safe and impacts wetlands to the least extent practicable. In schematic plans, the developer presents three different paths to the aforementioned developable area. The three access paths to the uplands are labeled Possible Access "A", "B" and "C". Possible Access "B" and "C" are shown entering the site at the southern property boundary along Route 154 while Possible Access "A" would enter further north nearer the northern property boundary and across from Kelsey Hill Road. The developer indicates that the most desirable access path for their purposes would be Possible Access "B".

(1) *Possible Access "A"* - This access route is located along the northern frontage of the property on Route 154 in the location of a several hundred year old residential structure across from Kelsey Hill Road. The developer states that the necessary removal of this structure in order to accommodate this route of access is the least favorable for several reasons, including political "fallout". In addition to the political challenge the developer feels would exist, *Possible Access "A"* is located at the crest of a small hill directly across from the intersection of Kelsey Hill Road with Route 154. The *Possible Access "A"* entrance is also located on the inside of a slight curve which, along with the existence of the small hill, makes sight lines particularly difficult in this location. Although this access location would

seem to produce the least wetland impact (from the perspective of area impacted) of the three access alternatives, from a safety perspective, it seems to be the *least* feasible access location due to what appear to be the inadequate sight lines.

(2) Possible Access "C" - Possible Access "C" passes directly over inland wetlands at the southern boundary of the site prior to crossing the single track of the Valley Railroad. Once past the railroad track, the access road would continue eastward over an existing farm road that crosses through the wetlands between the tracks and the elevated portion of the property. From that point, the road would have to pass directly up the rise in topography in a way which would create the need for substantial rock removal and the construction of substantial retaining walls. The direct path up the steepest portion of the rise to the uplands would create, according to the developer, an unacceptably expensive and disruptive accessway to the development sites on the upland portion of the property. Of the two southern access paths ("B" and "C"), the developer indicates that *Possible Access "C"* is the least desirable path of entry to the uplands.

(3) Possible Access "B" - Possible Access "B", the most desirable route as expressed by the developer, crosses the same wetlands and railroad track at the southern boundary of the site as *Possible Access "C"* but then turns northward through wetlands away from the existing farm road before crossing to non-wetlands and then up the hill on the northern boundary of the site. The wetlands crossing that would result from *Possible Access "B"* appears to be the most substantial in terms of area of wetlands impacted. The benefit of *Possible Access "B"*, as stated by the developer, is that it will avoid the substantial cost and disruption of the natural terrain required by the construction of a roadway straight up the steep slope (*Possible Access "C"*) while at the same time, avoiding what are anticipated to be negative feelings over the removal of the old residential structure across from Kelsey Hill Road (*Possible Access "A"*).

Site Access - The Valley Railroad

Although mentioned above, it is necessary to reiterate that any access roadway to the developable portion of the site will have to cross the single railroad track of the Valley Railroad. Although not a heavily traveled right-of-way, it will be important for the property owner/developer to gain

comments and approvals from affected parties including the Valley Railroad and the State of Connecticut, the lessee and owner of the railroad right-of-way.

Summary

From the information submitted and gathered through site inspections, it appears that *Possible Access "B"* may be the most desirable route to the higher elevations of the property, given the different challenges posed by the other two access routes. It is recommended that, if Possible Access "B" is chosen as the access route to pursue, every effort be made to minimize impacts to the wetlands by orienting the crossing in such a way so as to minimize the area of fill placed within the wetlands. In addition, the developer should consider minimizing the quantity of fill by exploring various crossing methodologies in order to leave as much of the wetlands un-impacted by solid fill as possible. This may include consideration of bridge structures rather than simply placing several culverts that are intended to pass water through from one side of the crossing to the other. The extent of such an effort should be guided by information regarding the quality of wetlands areas that will be impacted. Consideration should also be given to the creation or restoration of wetlands on-site to replace lost or impacted wetlands, if feasible.

Traffic and Access Considerations **(ConnDOT Review)**

Proposed Access Location

The proposed 57-acre high-tech/bio-tech business park site is located north of the Deep River/Essex town line off State Route 154 (Main Street).

Figure 1 shows the conceptual site plan for a 155,000 sq.ft. business park the developer submitted to the Environmental Review Team for review and comment. The site plan includes two potential access locations along Route 154, which are shown as Options 1 (Roadway A) and 2 (Roadways B&C) in Figure 2. The Option 1 access location is near the intersection of Kelsey Hill Road and Route 154. The Option 2 location is at a location along Route 154 where there are billboards, just north of an existing stop-controlled business park driveway.

The 2003 average daily traffic volumes within the vicinity of the site are shown in Figure 2. Preliminary site analysis, using the ITE Trip Generation Model, indicates that the business park will generate approximately 2500 trips per day.

The development, as proposed, would meet the general requirements for obtaining a certificate of operation from the State Traffic Commission (STC) under Section 14-311 of the Connecticut General Statutes. This law requires that developments generating large volumes of traffic on state roadways obtain a certificate of operation from the STC. This statute pertains to developments with a minimum gross floor area of 100,000 sq. ft. or providing 200 parking spaces, having access on state highway, abutting a state highway, or substantially impacting state highway traffic.

It is recommended that the professional services of a traffic engineer be obtained to perform a traffic analysis that quantifies the impacts associated with the development. This analysis will include identifying existing roadway traffic and expected site generated traffic during a typical day, and during morning and afternoon peak hour traffic periods; capacity

investigation for surrounding intersections, roadways and interchanges affected by the development; and identification of any high accident areas along Route 154 in the vicinity of the development. A comprehensive investigation of traffic conditions should be included in order to determine whether the development will warrant a traffic signal. The Federal Highway Administration has developed warrants to define minimum conditions for traffic signal installations. The warrants take into account the traffic volumes on the major and minor roadways in an 8-hour day, accident experience and pedestrian volume.

Proposed Access Roadway

Three potential access roads are being considered for the development. One alternative is located at the Kelsey Hill Road/Route 154 access location. Two other alternatives are being considered at the southern access location on Route 154, as shown on Figure 2. All access road alternatives cross the Connecticut Valley Railroad, an active State-owned rail line.

Kelsey Hill Road (Roadway A): This roadway will have some impact on existing wetlands and will require an at-grade railroad crossing as well as removal of an existing residential structure. An act of legislation would be needed in order to get a new at-grade railroad crossing. There appears to be a potential for sightline problems, as the access road will intersect the curve on Route 154.

Entrance (Roadway B): This roadway option appears to have the most wetland impacts of the three roadways and permission for a new at-grade railroad crossing will be needed to build the roadway across the railroad.

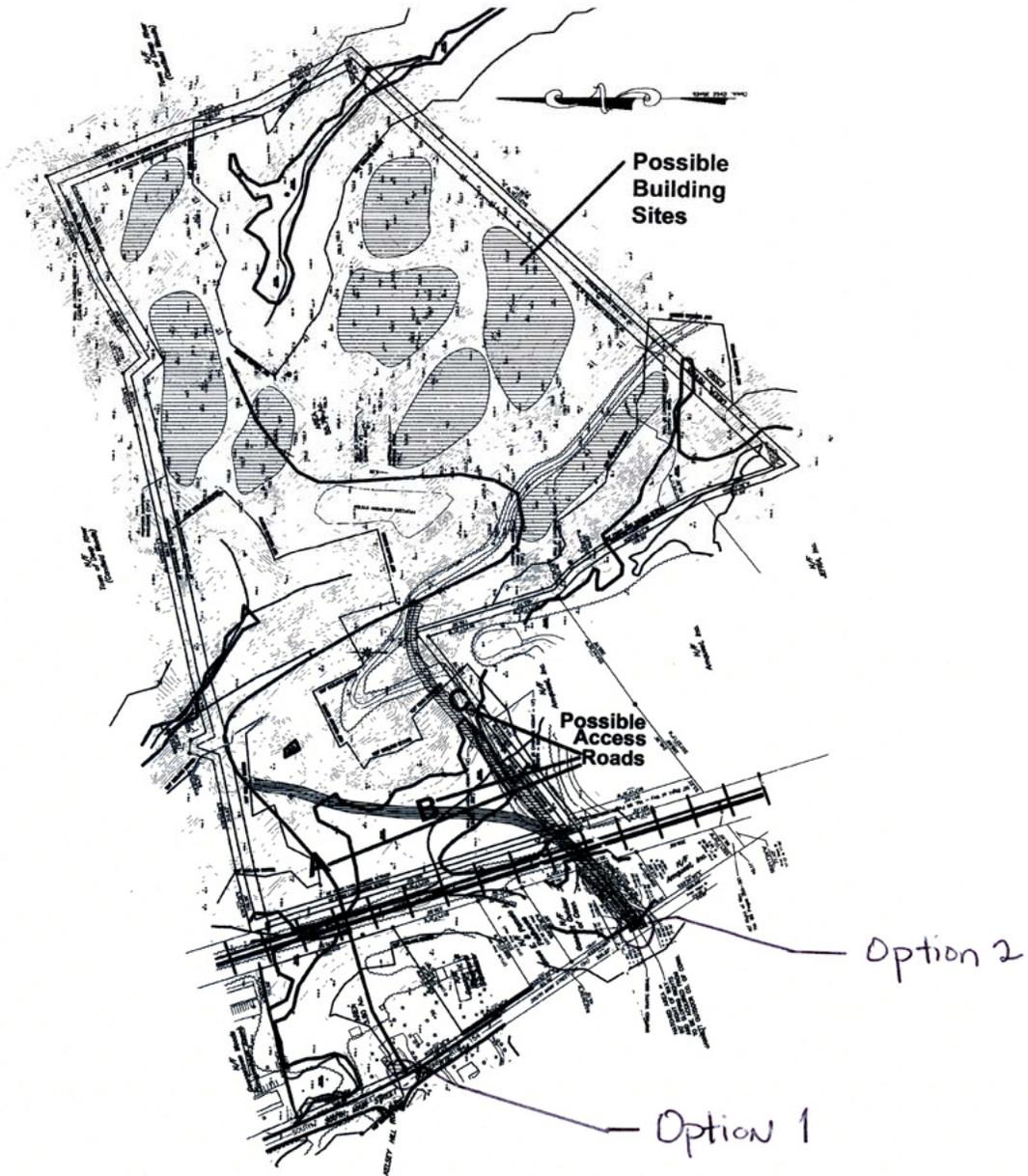
Entrance (Roadway C): Due to the roadways' location at steep terrain, a large retaining wall would be needed for this access road, as well as a new crossing at the railroad. Some wetland impacts will be also necessary. As an alternative to an at grade crossing of the railroad tracks, a grade separated crossing could be considered. However, a 20-foot clearance would be needed for the road to safely make a grade-separated railroad crossing, making it difficult, if not impossible for the road to touch down prior to intersecting with Route 154. Without having a profile of the roadway for this alternative, it is not possible to determine if the construction of this roadway is feasible.

The Connecticut Valley Railroad is an active rail line owned by the Department of Environmental Protection (DEP). Coordination with DEP is highly recommended before any final approvals are made for this development. The contact person for DEP is Suzanne Barkyoumb, Land Acquisition & Management Division, (860) 424-3077. The Department of Transportation's Office of Rails should be contacted to discuss the best scenario for the crossing of the railroad at either access location. The contact is Michael Donnarumma (203) 789-7657 or Peter Labouliere at (203) 789-6925.

It is recommended that the conceptual plan for the three possible access roadways be discussed at a pre-submission meeting with the STC, prior to a formal application submittal. During the application process, the most practical access roadway location for the development, along with any improvements needed on Route 154 will be investigated. Under Section 14-311 it becomes the responsibility of the developer to pay for any roadway improvements required ensuring that the operation of the facility will not affect the safety of the public. The contact for STC is Robbin Cabelus, Executive Director, (860) 594-3020, or email robbin.cabelus@po.state.ct.us.

**411 Main Street LLC Development Project
Deep River, Connecticut**

FIGURE 1



411 MAIN LLC 500 MAIN ST., SUITE #5, DEEP RIVER, CT 06417
PRELIMINARY CONCEPTUAL SITE PLANS FOR 411 MAIN LLC
Telephone: 860 526-3510 email: jgebhard@sbcglobal.net

ABOUT THE TEAM

The Eastern Connecticut Environmental Review Team (ERT) is a group of professionals in environmental fields drawn together from a variety of federal, state and regional agencies. Specialists on the Team include geologists, biologists, foresters, 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, active adult, 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 and/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 Conservation District and the ERT Coordinator. A request form should be completely filled out and should include the required materials. When this request is reviewed by the local Conservation District and approved by the ERT Subcommittee, 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.