

The Ridges at Deer Lake Phase III

Killingworth, Connecticut



Eastern Connecticut Environmental Review Team Report

Eastern Connecticut Resource Conservation & Development Area, Inc.

The Ridges at Deer Lake

Phase III



Killingworth, Connecticut

Environmental Review Team Report

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

**for the
Planning and Zoning Commission
Killingworth, Connecticut**

March 2002

**CT Environmental Review Teams
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Acknowledgments

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

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

The field review took place on Tuesday, January 15, 2002.

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I would also like to thank Franklin Matthies, planning & zoning commission alternate, Cathie Jefferson, zoning enforcement officer, Virginia Lane, David Gumbert and Helen Brady, conservation commission members, Bruce Dodson, Killingworth Land Trust, , David Denvir, first selectman, Charles Mandel, engineering representative, Andree Duggan, neighborhood group, Terry McDermott and Charles Caldwell, adjacent property owners, for their cooperation and assistance during this environmental review.

Prior to the review day, each Team member received a summary of the proposed project with location and soils maps. During the field review Team members were given plans and additional reports and information. Some Team members made individual or additional visits to the project site. Following the review, reports from each Team member were submitted to the ERT coordinator for compilation and editing into this final report.

This report represents the Team's findings. It is not meant to compete with private consultants by providing site plans or detailed solutions to development problems. The Team does not recommend what final action should be taken on a proposed project - all final decisions rest with the town and applicant. This report identifies the existing resource base and evaluates its significance to potential development, and also suggests considerations that should be of concern to the town. The results of this Team action are oriented toward the

development of better environmental quality and the long term economics of land use.

The Eastern Connecticut RC&D Executive Council hopes you will find this report of value and assistance in reviewing this proposed subdivision.

If you require additional information please contact:

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Table of Contents

	Page
Acknowledgments _____	ii
Table of Contents _____	v
Introduction _____	1
Soil and Water Conservation District Review_____	6
Wetland Resources Review_____	15
Stormwater Management Review_____	22
On-site Subsurface Sewage Disposal Comments _____	26
The Natural Diversity Data Base _____	28
Archaeological Review_____	29
Planning Review_____	31

Introduction

Introduction

The Killingworth Planning and Zoning Commission has requested assistance from the Eastern Connecticut Environmental Review Team in conducting a review of the proposed The Ridges at Deer Lake Subdivision - Phase III.

The ±172 acre site is located off of Green Hill Road and will be a continuation of earlier Phases (I & II) of The Ridges at Deer Lake Subdivision. Buell Hill Road and Beaver Dam Roads will be continued to form a loop system with one cul-de-sac. The proposal reviewed by the ERT included 32 lots with a minimum lot size of 2 acres. The homes will be served by individual on-site sewage disposal systems and water supply wells. Total open space proposed is 39.77 acres with two additional conservation easement areas. The site includes numerous stonewalls, stone cairns and foundations from earlier homestead activities.

The Killingworth Inland Wetlands Commission has already acted on this application and granted approval.

Objectives of the ERT Study

The commission is requesting the review to assist them in their evaluation of this proposed project. Specific concerns include wetland impacts, erosion and sediment control, stormwater management, sewage disposal, site design, open space design and archaeological and historic preservation. The ERT report will provide a discussion of potential impacts, and guidelines and recommendations for the mitigation and protection of the natural and cultural resources.

The ERT Process

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

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

The review process consisted of four phases:

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

The data collection phase involved both literature and field research. The field review was conducted on Tuesday, January 15, 2002. Some Team members made individual and/or additional site visits. The emphasis of the field review was on the exchange of ideas, concerns and recommendations. Being on site allowed Team members to verify information and to identify other resources.

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

Figure 1.

Topographic Map

Scale 1" = 2000'

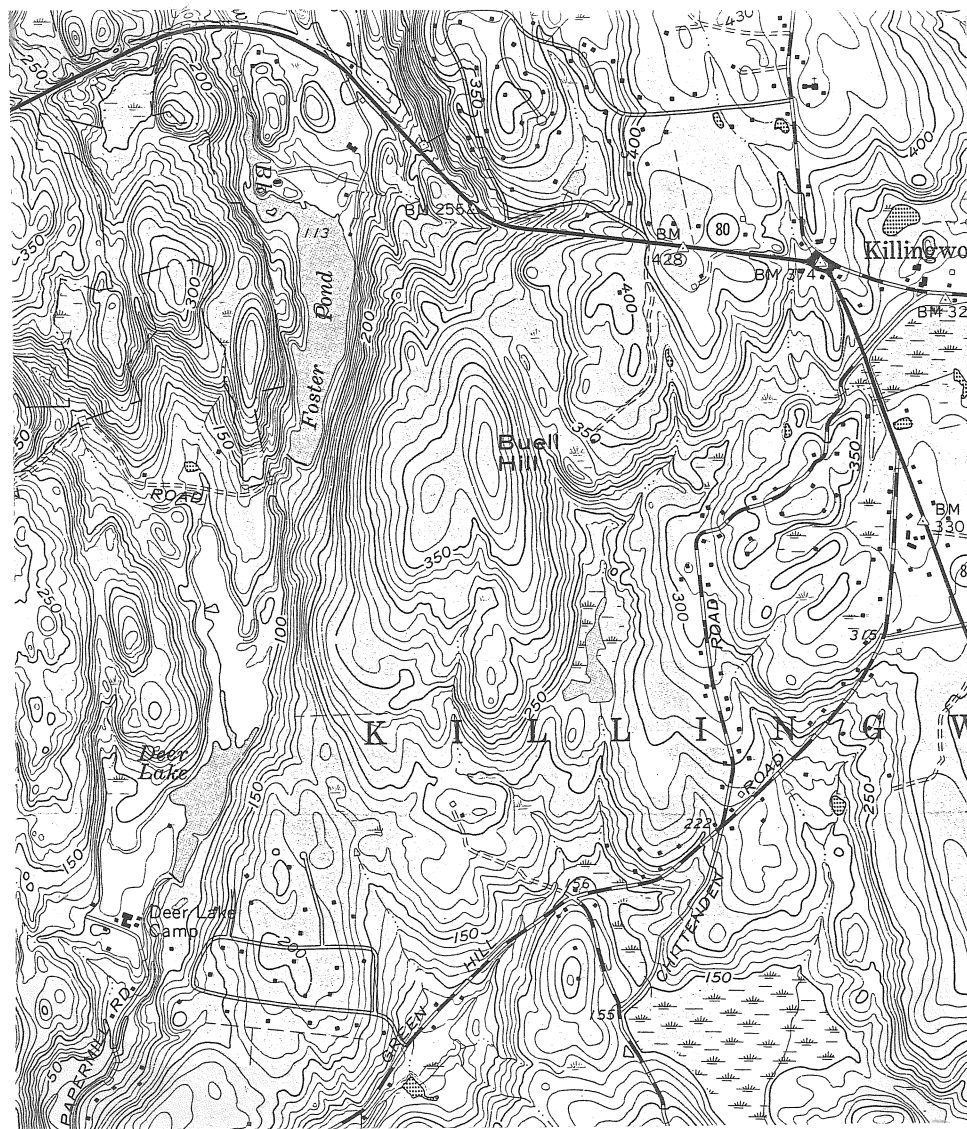


Figure 2.

Soils Map

Scale 1" = 1320'

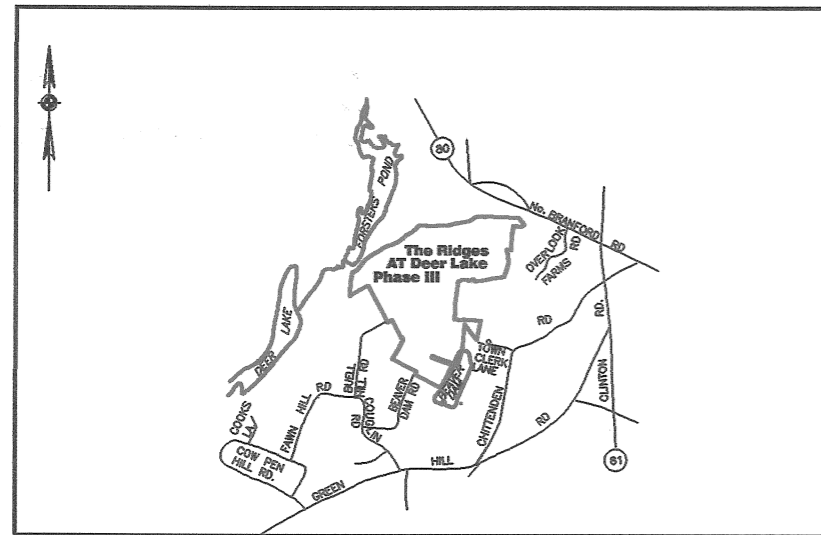


"The Ridges At Deer Lake"

Phase III

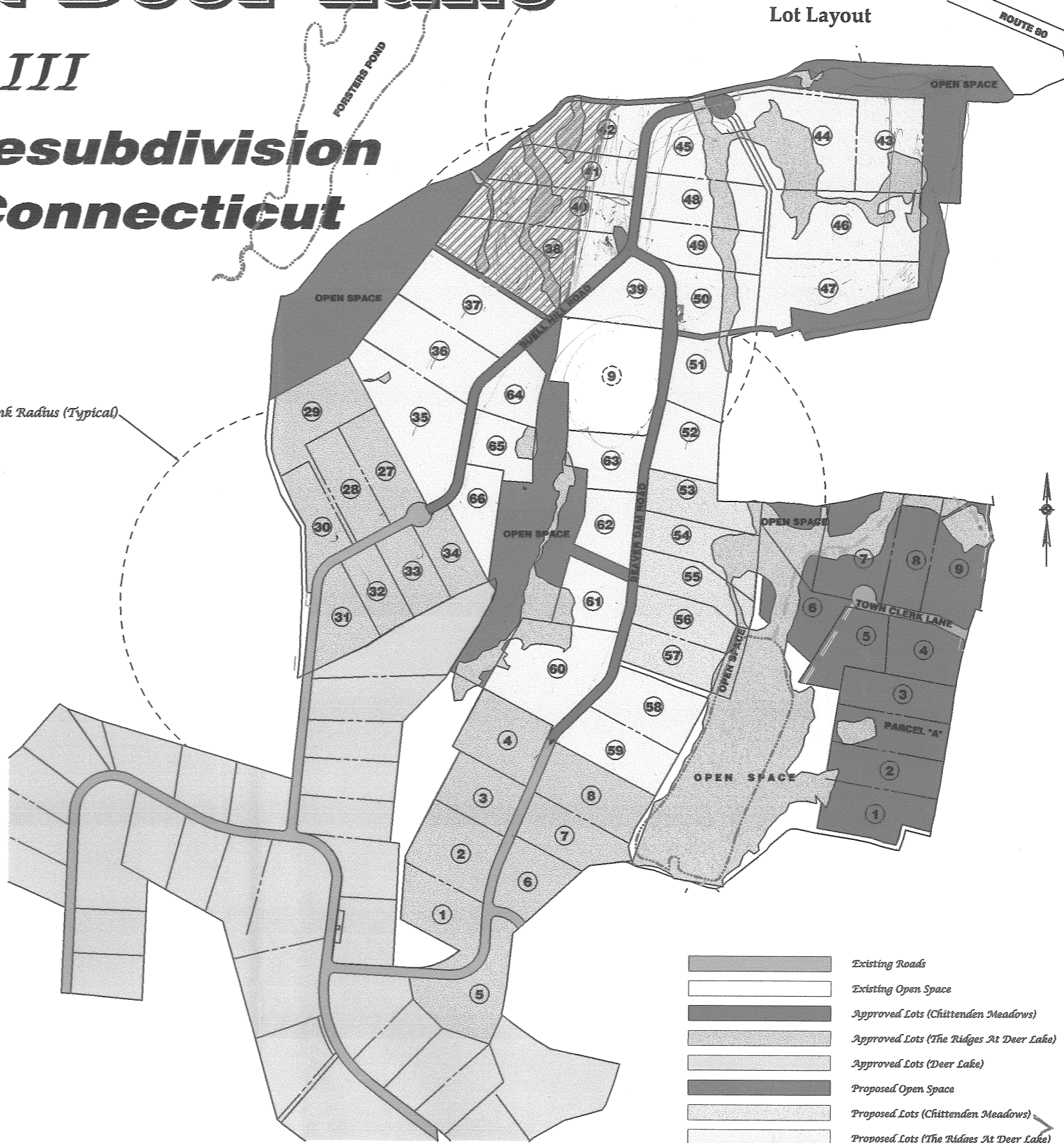
A Residential Resubdivision Killingworth, Connecticut

Figure 3.
Lot Layout


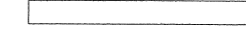


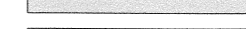


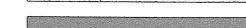




Location Map 1" = 1000'

Fire Tank Radius (Typical)



Key Map 1" = 300'

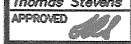
-  Existing Roads
-  Existing Open Space
-  Approved Lots (Chittenden Meadows)
-  Approved Lots (The Ridges At Deer Lake)
-  Approved Lots (Deer Lake)
-  Proposed Open Space
-  Proposed Lots (Chittenden Meadows)
-  Proposed Lots (The Ridges At Deer Lake)
-  Proposed Roads
-  Inland Wetlands

SCALE: As Noted	5
Per PAZ	
Per Town Review	
Per State Review	

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Cover Sheet
"The Ridges At Deer Lake"
Phase III
Buell Hill Road & Beaver Dam Road
Killingworth, Connecticut

DATE	2-2-01
DRAWING	0-0591
PROJECT	4267-III
FILE	4267-01-CV
DRAWN	Anthony Bolduc
DESIGNED	Thomas Stevens
APPROVED	
SHEET	1 of 28

Schedule Of Drawings		
Sheet Number		Title
1	Of 28	COVER SHEET
2	Of 28	LOT LAYOUT PLAN AND HISTORICAL AND ARCHAEOLOGICAL FEATURES PRESERVATION PLAN
3	Of 28	R.S. & S.D. - L. & G. Plan LOTS 35 - 36
4	Of 28	R.S. & S.D. - L. & G. Plan LOTS 37 - 38 & OPEN SPACE
5	Of 28	R.S. & S.D. - L. & G. Plan LOTS 40 - 42
6	Of 28	R.S. & S.D. - L. & G. Plan LOTS 45, 48 - 49
7	Of 28	R.S. & S.D. - L. & G. Plan LOTS 50 - 52 & OPEN SPACE
8	Of 28	R.S. & S.D. - L. & G. Plan LOTS 53 - 55 & OPEN SPACE
9	Of 28	R.S. & S.D. - L. & G. Plan LOTS 56 - 59
10	Of 28	R.S. & S.D. - L. & G. Plan LOTS 60 - 62 & OPEN SPACE
11	Of 28	R.S. & S.D. - L. & G. Plan LOTS 62 - 63
12	Of 28	R.S. & S.D. - L. & G. Plan LOTS 39 & OPEN SPACE
13	Of 28	R.S. & S.D. - L. & G. Plan LOTS 64 - 66 & OPEN SPACE
14	Of 28	R.S. & S.D. - L. & G. Plan LOTS 44 - 46 & OPEN SPACE
15	Of 28	R.S. & S.D. - L. & G. Plan LOTS 47 & OPEN SPACE
16	Of 28	R.S. & S.D. - L. & G. Plan LOTS 43, 46 & OPEN SPACE
17	Of 28	R.S. & S.D. - L. & G. Plan OPEN SPACE
18-23	Of 28	ROAD PROFILES
24	Of 28	DRAINAGE CROSS SECTIONS
25	Of 28	SOIL EROSION PLAN
26	Of 28	DETAIL SHEET
27-28	Of 28	SOILS DATA

Soil and Water Conservation District Review

The following are general comments and recommendations regarding the proposed "Ridges at Deer Lake" subdivision in Killingworth, CT. The project consists of 32 residential homes to be constructed on 172 acres. The comments are based on:

- a review of a 1" = 40' site plan dated February 2, 2001,
- a site visit conducted on August 15, 2001 with Tom Stevens, design engineer,
- a site visit conducted on August 17, 2001 with Tom Stevens, design engineer, and Mike Vissichelli, Army Corps of Engineers,
- and a review of concerns submitted by Terry McDermott, adjacent property owner, to the Planning and Zoning Commission on August 7, 2001,
- participation in the ERT meeting at the Killingworth town office 1/15/02 (did not attend the field visit portion).

These comments are advisory in nature and are intended to assist the Killingworth Planning and Zoning Commission in their charge.

Site Description

The Ridges at Deer Lake subdivision is located in the Chatfield Hollow Brook Watershed. Wetlands and hilly terrain with moderate to steep slopes and bedrock outcrops characterize the site. Trees and shrubs cover the majority of the site. Canopy cover is greater than 75 percent, with the exception of the open Buell Hill area. This area has less than 25 percent canopy cover. Numerous cairns and stone walls are located throughout the property.

Surface runoff drains into several subdrainage areas. Buell Hill is one of the highest points on the site at 391.8 feet (lot 9) and effectively divides the site into

three subdrainage areas. Water drains from Buell Hill towards the northwest through several wetlands to Foster Pond, to the south through a wetland area, and to the east to a wetland and pond area. Water draining to Foster Pond continues to Deer Lake and the Hammonasset River. Along the eastern section, water drains down into a wetland valley between two north-to-south ridges.

Soils

Soil information obtained from the *Soil Survey of Middlesex County, Connecticut, 1979* indicates that the predominate soils are a mix of sandy loams. The soils are generally well drained but have poorly drained Leicester and Ridgebury soils intermingled throughout the site.

The soils have the potential to be moderately-to-highly erodible, with the exception of the wetland soils, Carlisle muck and Leicester, Ridgebury, & Whitman. Steeply sloped areas of Paxton and Montauk and Woodbridge soils are susceptible to slumping when excavated.

The majority of the houses are sited over soils with the potential for severe erosion. Quickly establishing plant cover, providing temporary diversions, and siltation basins will reduce erosion and sediment loss. Onsite septic systems in this area will require careful design and installation because of the shallow depth to bedrock in many places.

Soil Descriptions

Soil Description	Erosion Hazard
Canton and Charlton very stony fine sandy loams (3-8% slopes)	moderate hazard
Canton and Charlton extremely stony fine sandy loams (3-15% slopes)	moderate to severe hazard
Canton and Charlton extremely stony fine sandy loams (15-35% slopes)	severe hazard
Charlton-Hollis very stony fine sandy loams (3-15% slopes)	moderate to severe hazard
Hollis-Charlton extremely stony fine sandy loams (15-40% slopes),	severe hazard
Paxton and Montauk very stony fine sandy loams (3-8% slopes)	moderate hazard
Paxton and Montauk very stony fine sandy loams (8-15% slopes)	severe hazard
Paxton and Montauk extremely stony fine sandy loams (3-15% slopes)	severe hazard
Paxton and Montauk extremely stony fine sandy loams (15-35% slopes)	severe hazard
Woodbridge extremely stony fine sandy loams (3-15% slopes)	severe hazard
Carlisle muck	wetland soils
Leicester, Ridgebury & Whitman extremely stony fine sandy loams	wetland soils

The minimum area required for a building lot is based on the types of soil present on the site. The minimum buildable area is calculated using a formula that assigns different values to the various soils classes depending upon their building characteristics and limitations. The Town of Killingworth regulations state that the soils contributing to the minimum buildable area must be contiguous. The zoning regulations also require that the applicant use the *Soil Survey of Middlesex County, Connecticut, 1979* to calculate the minimum buildable area, unless an approved qualified engineer or soil scientist shows that the Middlesex County soil survey map is incorrect.

An intermittent watercourse is shown in the *Soil Survey of Middlesex County, Connecticut, 1979* crossing lots 45, 48, 49, and 50 through the minimum buildable area, but the intermittent watercourse is not shown on the site plan for lots 48 and 49. During the August 15, 2001 site walk, a dry channel was observed in the

area of lots 45, 48, 49 and 50, thereby, indicating that a watercourse occasionally flows through these lots. According to the Killingworth zoning regulations, section 61B (p. 61-9), watercourses contribute zero percent to the minimum buildable area. It is unclear if an intermittent watercourse affects the minimum buildable lot calculation, given that the area should be calculated using contiguous soils.

Recommendations:

1. Verify the presence of watercourse(s) within the wetland area for lots 45, 48, 49, and 50. All watercourses should be shown on the plans.
2. Clarify the methodology for calculating minimum buildable area when a watercourse is present. For lots 45, 48, 49, and 50, verify that the minimum buildable lot area calculations are correct, meet the contiguous soil definitions, and that lots have <25 percent wetland soils.

Erosion and Sediment Control

Erosion and sediment control will be critical given the hilly terrain, steep slopes, erodible soils, and proximity to the wetlands and nearby Forsters Pond and Deer Lake. **The primary goal on this site is to minimize erosion and sediment loss during the early phase of construction.** Road construction for this development involves significant cuts and fills and will require careful layout to prevent substantial erosion. Construction of the relatively steep Buell Hill and Beaver Dam road extensions and the proposed driveways will erode and channel water and sediment to wetland areas (on lots 43-46 and 48-51) and the existing Phase I and II subdivisions during the early development of Phase III. Appropriately designed, installed, and maintained erosion and sediment controls will reduce the amount of erosion and sediment loss, reduce the amount and total cost for replacement fill, protect water quality, and protect upland and wetland habitat.

The existing cul-de-sacs on Buell Hill Road and Beaver Dam Road will be extended into the third phase of the subdivision. The Buell Hill Road extension will have an initial 9.8 percent upward grade and the Beaver Dam Road extension will have an initial 8 percent upward grade. Appropriate erosion and sediment control measures will need to be installed as soon as possible to prevent water and sediment from washing down the steep slopes and into the Phase I and II lots. This is especially important because significant erosion and sediment loss was occurring on lots 29 and 32 from water draining from upslope lots.

Significant gully erosion was observed on the initial section of the existing dirt road that enters the Phase III site from the Beaver Dam Road cul-de-sac during the August 15, 2001 site visit. The eroded areas will deepen and expand during early phase road construction.

The grading of Buell Hill Road within the Phase III area will affect the fringe wetlands near lot 9 and the wetlands on lot 45. The fringe wetlands across from lot 9 are located next to a low point in Buell Hill Road. At this location, the road slopes downwards at a three percent grade and then ascends at a six percent grade. Water will drain from both the south and north sections of the road and into the wetlands during the initial road construction.

At the end of Buell Hill Road, the road slopes downward at a seven percent grade. Water will drain into the wetlands on lot 45. The wetlands at this location are considered to be wetlands under the State of Connecticut's definition, but are not considered to be wetlands under the federal wetland definition. Regardless, this area and the fringe area wetlands should be protected during the early phases of road construction. Stabilizing the site and diverting water off the road before it reaches the base of the slopes is necessary in order to reduce erosion and sediment impacts on the wetlands.

The proposed driveways are another source of significant erosion and drainage problems. Overall, the majority (18/32) of the driveways are steep with slopes equal to or exceeding 10 percent and are long (18/32) with driveway lengths exceeding 130 feet. Driveways to access lots 46 and 47 were designed to circumvent wetland areas. However, the driveway for lot 46 is steep (10 percent slope) and both driveways are long (560 -1400 feet).

Specific wetland areas that are particularly susceptible to erosion from the driveways include:

- the proposed twin driveway that crosses the wetlands on lot 44 to access lots 46, and 47.
- wetland areas on or adjacent to lots 35, 40, 42-44, 46, 48-51, 54-59 that are located directly downslope from driveways or proposed house locations with steep slopes of 10-25 percent.

Other areas on the site that are susceptible to erosion include:

- driveways with slopes of 10 percent on lots 36, 38-41, 49, 51-57, 59, and 63.
- driveways longer than 130 feet on lots 35, 37-39, 42-44, 49-52, 55-57, and 66. The majority of these driveways have 10 percent slopes. Driveways for lots 35, 37, 42, 50, and 66 have slopes less than 7.5 percent, but will channel water and create both drainage and erosion problems.

Vegetation will be maintained within the rear and side building setbacks.

Vegetation will also be maintained across at least 50 percent of the front of the lot. This practice will help reduce erosion and sediment loss.

Thomas A. Stevens and Associates, Inc. submitted a site plan with erosion and sediment control design specifications for temporary sedimentation basins,

grassy swales, silt fences, baled hay erosion checks, and a seeding plan. Additional comments regarding the plan are discussed below.

Recommendations:

1. Request installation of antitracking pads for individual lots when house construction begins.
2. Request that road diversions are incorporated into the erosion and sediment control plan especially for the road segments with 8 percent or greater grade. Request that driveway diversions are incorporated into the erosion and sediment control plan especially for driveways longer than 100 feet and/or with a slope greater than 5 percent.
3. As each lot is developed, ensure that adequate erosion and sediment control measures are installed and maintained especially for lots with:
 - driveways immediately adjacent to wetlands (lots 43, 44, 46, and 47)
 - steep and/or long driveways (lots 35-44, 46-47, 49-57, 59, 63, and 66)
4. On lot 46, silt fencing is shown running up the slope. Silt fencing should run parallel to slope contours. Consider replacing the hay bales with stone check dams. The stone check dams will last longer, remain in place, and help filter sediment from stormwater. Also, consider placing a water bar across the road at the curve near the staked hay bales. The water bar will divert and prevent water from concentrating and eroding the driveway.
5. Request that the developer select native trees and shrubs for the planting plan.

Wetlands and Watercourses

The applicant proposes to install one wetland crossing for access to lots 46 and 47, fill one fringe wetland adjacent to lot 38, install three discharge points towards wetlands on lots 38, 60, and 66 and grade within the 50 foot buffer on lot 46. A detailed alternatives assessment for the driveway crossing was not available.

Wetlands on lots 38, 40, 41, and 42 drain towards Foster Pond onto forestry land owned by the State of Connecticut. The land was deeded to the state as an inviolate wildlife refuge. Three pipes discharge and drain from each of the three wetlands. The discharges are eroding portions of the woods road that traverses the western subdivision boundary.

Recommendations:

1. Request that the applicant provide a more detailed assessment of the alternatives for wetland crossing.
2. Request that the existing vegetation surrounding the wetlands be protected to the maximum extent possible in order to protect plant and wildlife habitat within the wetland corridor.
3. Consider that developing lots 43-46 and 48-51 will fragment the wetland habitat.
4. Consider the impacts of fertilizer runoff from residential lawns on wetland habitats, Foster Pond, and any other nearby water bodies.

Vernal Pools

Two potential vernal pools were observed during the site walk. The potential vernal pools are located within the open space area lots 65 and 66 and on lot 47. Another pool might exist on lots 41 and 42.

Vernal pool organisms spend the majority of their life in upland habitat away from the pool. Alterations in the upland habitat such as significant cuts and fills and extensive grading associated with road and driveway construction will change the topography, vegetation, and hydrology of the existing upland habitat. These changes can adversely affect vernal pool organisms that are living in the upland areas. Consequently, road, driveway, and house construction will

potentially displace existing vernal pool organisms, impede future migration, and reduce the population of these organisms.

Recommendations:

1. Consider the short and long-term impacts of developing and removing upland habitat on potential vernal pools.

Stormwater Quality

Specific design elements for removing pollutants from stormwater were not included in the plan.

Recommendations:

1. 1. CT DEP's general permit for the discharge of stormwater and dewatering wastewaters from construction activities requires treatment of at least 80 percent of the suspended solids from the post construction site. **While the town is not responsible for compliance with stormwater regulations, if additional treatment is required by the DEP, the treatment measures should be shown on the plan prior to final approval.** A number of best management practices are available. The District can provide assistance if additional information is needed regarding the specific measures.
2. Consider impact of any increase in runoff.
3. Develop a stormwater pollution control plan.

Wetland Resources Review

Site Overview

The site is located in the south central part of town and encompasses 172+ acres of which 39.77 will be set aside for as open space. This is the third and final phase of what is now an existing subdivision.

The elevation of the parcel ranges from ± 400 feet in the north-northeast part of the parcel to about 250 above sea level where a stream course leaves the property along the east central boundary. This 150 foot drop in elevation over a 250 foot distance represents a 60% slope and, while it is the exception and not the rule, it shows that change in elevation throughout the parcel can reach some challenging proportions. The land surface is mostly forested with the exception of one open field and one old field now grown to saplings. It is an area of many long and well-crafted stone walls and a variety of stone cairns.

Wetlands are spread fairly evenly over the parcel. There is a concentration in the northwest that is mostly in the open space set-aside, and in the northeast that are somewhat larger and are within the bounds of the subdivision. The southwest-central wetlands are also set aside as open space and the wetlands near the southeast are along the border and away from development. The wetlands tend to run in a north to south pattern and occur as long linear features like fingers on the landscape.

National Wetland Inventory Classification

The U.S. Fish and Wildlife Service has mapped and classified the wetlands and watercourses using a system of codes for all the topographic maps in the state. This parcel occurs on the Clinton quadrangle, 1:24,000 scale National Wetland

Inventory (NWI) maps. Because of the scale of mapping, the inventory classifies wetlands that are the largest or most conclusively observed on the aerial photography.

In this case all the wetlands observed are mapped as palustrine wetlands, with palustrine being defined as: *of or pertaining to a swamp; marshy*. They carry the classification of PFOIE. This is palustrine (P), forested (FO), mixed broad-leafed deciduous (1), seasonally saturated (E).

Water Quality

The surface water quality (which includes the wetlands and watercourses) of the parcel have all been mapped by the Department of Environmental Protection as being Class A. Assumptions are made on many of the watercourses over the extent of the map and not every watercourse gets quality tested, but with no known sources of pollutants and this being a headwaters wetland it has been given the water quality classification of A.

In addition, the groundwater classification for the area is also A for the same reasons listed above. The descriptions of these classifications are:

Class A

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

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

Class GA

Designated uses: existing private and potential public or private supplies of water suitable for drinking without treatment; base flow for hydraulically connected surface water bodies.

Discharge restricted to: same as for GAA (i.e.: discharges limited to: treated domestic sewage, certain agricultural wastes, certain water treatment wastewaters.) and discharge from septage treatment facilities subject to stringent treatment and discharge requirements, and other wastes of natural origin that easily biodegrade and present no threat to groundwater.

Source: *Protection Summary of the Water Quality Standards and Classifications (1997)*, Connecticut Department of Environmental Protection, Bureau of Water Management.

Soils

The wetland soils on this parcel were mapped by Mr. Richard Snarski. The wetland areas were flagged in the field and labeled on the map. This combination of information made the locating of wetlands in the field an easy task. The wetlands the Team visited on the field walk were all forested wetlands with a full overstory of trees and a full mixed, often thin understory of shrubs and herbs.

Two soil types make up these wetlands:

- Ridgebury, Leicester and Whitman soils complex, which are extremely stony; and with a dual rating of poorly drained and very poorly drained within the complex. These were formed over glacial till and they are dominant on the parcel.

- Scarborough Mucky Loamy Sand soils which are very poorly drained and have formed over stratified sands and gravels.

As mentioned above and documented on the NWI maps, the wetland areas are all forested, in many cases with a boldery and mossy, and, at the time of the field walk, leaf covered, forest floor.

Comments

Wetland soils mapping:

The question came up at the office discussion and in the field about the difference between the Connecticut defined limits of wetlands and the wetlands that are mapped under the federal jurisdiction. If the predetermined wetland soil occurs on the landscape, in Connecticut the extent of it is considered to be a wetland.

The Federal wetland designation uses the three-parameter method wherein each of three different parameters must occur for the area to be considered wetland. The three parameters are hydric soils, hydrophytic vegetation, and hydrology. Connecticut uses soil type to delineate the wetland boundary and these are the boundaries mapped on the plans. Typically, the expanse of wetlands mapped only by soil type is larger than the expanse using the federal jurisdictional indicators. This is the case here and the procedural differences in methodology explain the difference in the scope of the wetlands.

Importance of wetland buffers :

It is applaudable the distance the development has kept house and septic systems from the wetlands. Wetland buffers are important because they have the ability to filter out unwanted materials from the wetlands. Buffers act as final sediment filters which are especially important during construction and while the land

surface is being disturbed. They also protect the wetlands from post construction sediments such as road sands and pesticide and fertilizer runoff from yard and garden applications. In Killingworth the buffer areas are 50 feet in width and this line has been delineated on the maps.

Intrusions into/Crossing of the wetlands:

Intrusions into and the crossing of wetlands occurs in the vicinity of the cul-de-sac at the top of Buell Hill Road. Here the roadway crosses a wetland strip and two driveways, which lead from the cul-de-sac, cross another strip southeast of the first. These in combination are the largest impacts to the wetlands. At this area however, and at this time of year it would appear the impact on the functionality of the wetlands is minimal. The Inland Wetlands Commission has already approved these plans.

Vernal Pools:

Two potential vernal pools were visited on the field walk. One is located at the southwest border of lot 47 and the other east of lot 66 in the Open Space Parcel 'B'. It would take seasonal observation to confirm these as vernal areas, but as they are shown on the plans, both show minimal impacts regarding direct disturbance, constriction of neighboring upland habitat and proximity to high levels of either foot or automobile traffic.

Rain Gardens/Treatment of roof runoff:

A very simple and innovative technique that is being used increasingly to treat roof runoff is the concept known as rain gardens. When employed as a storm water management and groundwater infiltration technique rain gardens are simple, visually attractive storm water devices that decrease the burden on the storm water collection system and allow for on-site infiltration of impervious surface runoff.

A simple way to visualize a rain garden is when the concept is applied to the interior area of a cul-de-sac. Instead of being mounded with soil and planted, the inner circle relief instead is a slightly dipped or depressed. This is then selectively planted with native, moisture tolerant plants and becomes an infiltration area for rainfall. Smaller depressions on the landscape around the home serve in combination as discharge points for roof runoff.

An introduction to rain gardens can be found at <http://www.mninter.net/~stack/bassett/gardens.html>. This site includes a description, frequently asked questions, a planting list - although the site originates outside of New England, and a diverse collection of informative links¹ including at least one (slightly dated) cost analysis.

One enemy of rain gardens is compressed soil often compacted by construction equipment. Early planning for placement can avoid this problem. Once built, rain gardens re-infiltrate storm water runoff on site and decrease the demands on the proposed storm water collection system. The individual lot sizes on this proposal would seem to be an excellent fit for this simple "technology."

Stormwater Outfall points:

The plans show three locations of discharge from the stormwater collection system. These are located south of lot 60, along the southern boundary of lot 66, and into the open space northeast of lot 37 in Conservation Easement 'A'. Two of the locations show the plunge pool energy dissipater outside of the 50-foot wetland buffer. The dissipater at the Conservation Area however discharges within the buffer about 25 feet from the wetland. It is recommended that this be moved outside the buffer so that the final effluent can take full advantage of the 50 feet distance for final filtering before entering the wetland.

¹ The best three links are those for: U of M Extension, Virginia Dept. of Forestry and the EPA.

Depiction of streams:

It is typical that streams, both intermittent and perennial, be shown on plans of development. Whereas the wetland soils have been delineated, the watercourses do make up the second half of the Inland Wetland and Watercourses Act and should be depicted both for reference and planning purposes on the proposal plans.

Grass areas/Lawn:

It was apparent from driving through the constructed portions of the subdivision that many homeowners do make use of large grassed backyards. If the town feels the amount of lawn area is an issue for the lots that could impact wetlands (i.e.: the wetland areas often receive yard wastes and pesticide and fertilizer runoff) and/or for the loss of woodland the consideration of deed restrictions should take place soon.

Subdivision Perimeter Trail:

This is an excellent concept, an educational and health opportunity and should be made passable as much as possible throughout the entire subdivision. Since this proposal is not an association complex but one of individual home ownership it is up to the town commissions to take the lead and see that the developer brings the plan to fruition. It is likely no other single source will be as convenient to work with after construction is complete.

Stormwater Management Review

The following review comments are based on the requirements of the Department of Environmental Protection's (DEP) General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities ("the construction general permit"). Many of the requirements of the construction general permit overlap with the requirements of local agency(ies) and the Connecticut Guidelines for Soil Erosion and Sediment Control ("the guidelines").

Since the proposed development involves the disturbance of over five acres, the owner or developer of the site must register this site with the DEP thirty days prior to the commencement of construction activity. Additionally, a Pollution Control Plan ("the PCP") must be prepared and kept on site during the entire life of the construction project.

The PCP must include a site map as described in Section 6(b)(6)(A) of the construction general permit and a copy of the erosion and sedimentation (E & S) control plan for the site. An E & S plan which has been approved by the Town of Killingworth in conjunction with the DEP Inland Water Resources Division (IWRD) and the local Soil and Water Conservation District may be included in the PCP. The PCP and site map must include specifics on controls that will be used during each phase of construction, pursuant to Section 6(b)(6)(B) of the construction general permit. Specific site maps and controls must be described in the PCP, as well as construction details for each control used. The construction general permit requires that "the plan shall ensure and demonstrate compliance with "the guidelines." The Plan must be flexible to account for adjustment of controls as necessary to meet field conditions.

The PCP must demonstrate that the post-construction stormwater treatment system has been designed with a goal of 80% removal of total suspended solids, pursuant to Section 6(b)(6)(C)(iii)1) of the construction general permit. Such measures may include, but are not limited to, stormwater detention basins, stormwater retention basins, swirl concentrator technology structures (such as Vortech, Downstream Defender, Stormceptor, Stormtreat, or similar), vegetated swales, deep catch basin sumps (4'+) and stormwater infiltration devices. The PCP must also discuss the installation of velocity dissipation devices at all discharge locations as a post construction stormwater management measure. A detail of proposed measures as well as drainage calculations must be provided. If site conditions allow, DEP recommends the installation of retention or detention basins because of maintenance, cost, and efficiency considerations. The elimination of point sources through the use of level spreaders or curb elimination should also be evaluated.

The construction general permit (Section 6(b)(6)(D)) requires inspections of all areas at least once every seven calendar days and after every storm of 0.1 inches or greater. The PCP must also allow for the inspector to require additional control measures if the inspection finds them necessary, and should note the qualifications of personnel doing the inspections. Since the proposed site has areas with significant slopes and numerous wetland areas requiring protection, ongoing inspections and adjustments of controls will be an important aspect of this project. Additionally, the PCP must include monthly inspections of stabilized areas for at least three months following stabilization.

The following are comments are specific to the proposed project based on review of the site plan provided on January 15, 2002:

- Although the installation of temporary sediment basins to receive drainage from the road is shown, more basins may be required onsite in areas where road and/ or house construction disturb an area greater than 2 acres at any

one time. For such areas, the construction general permit requires the installation of a sediment trap and/or a sediment basin with the ability to store 134 cubic yards of water storage per acre drained. If an area greater than 5 acres is disturbed at any time, a sediment basin with an outlet engineered to remove sediment must be installed.

- The sediment removal structure proposed to be installed is inadequate as a post construction stormwater management measure. In order to achieve 80% Total Suspended Solids removal as required by the construction general permit, a swirl concentrator type device such as Vortech, Stormceptor, Stormtreat or similar will need to be installed. The installation of such measures as stormwater detention ponds or retention ponds is also acceptable in order to meet this requirement.
- The DEP strongly recommends a buffer area exist between the basins and the wetlands areas. Should the basins fail due to inadequate design, lack of maintenance, etc., the absence of a buffer area would result in the immediate contamination of the wetland areas with sediment. A discharge of sediment to a wetland or watercourse without a permit would be a violation of Section 22a-42a(c)(1) of the Connecticut General Statutes and may require remedial action.
- In order to reduce erosion potential, DEP recommends that construction activities be phased to the maximum extent possible so that unstable areas are minimized. The construction general permit also requires that any inactive area left disturbed for over 7 days be temporarily stabilized. Areas (including soil stockpiles) left disturbed over 30 days must be temporarily seeded.

- If dewatering is necessary on lower portions of this site, the PCP must address how dewatering wastewaters generated onsite will be managed in accordance with Section 6(b)(5)(C)(ii) of the construction general permit.
- Any areas left disturbed beyond the planting season must be stabilized for the winter. Stabilization should be in the form of properly selected erosion control matting or a spray-on "soil cement" type of armor mulch.
- For slopes such as those on Lots 43 and 46 which are steeper than 4 horizontal to 1 vertical, DEP strongly recommends the use of erosion control matting to provide slope stabilization.
- Since the addition of a significant amount of fill may be necessary for the construction of on-site septic systems, particular attention will need to be given to the installation, inspection, and maintenance of erosion and sediment controls.
- The Typical Lot Soil Erosion and Sediment Control Plan should be modified to specify the installation of antitracking pads on driveways.
- A detail of the grassed swale and level spreader shown on Lot 46 must be included.

On-Site Subsurface Sewage Disposal Comments

This section of the ERT report is to confirm comments made verbally at the ERT site visit meeting and in subsequent phone conversations with the project engineer and town building official/health agent concerning the CT Department of Public Health - Environmental Engineering Section's recommendations concerning shallow to ledge rock lots.

Public Health Code (PHC) Section 19-13-B103e stipulates the procedures and conditions for the issuance of permits and approvals for subsurface sewage disposal systems. Subsection (a) of this regulation designates instances where no permit or approval shall be issued. No permit or approval can be issued for any new subsurface sewage disposal system where the soil conditions in the area of the leaching system are unsuitable for sewage disposal purposes at the time of the site investigation. Unsuitable soil conditions are identified in subsection (a). In respect to ledge rock it notes that unsuitable conditions exist where there is less than four feet depth of suitable existing soil over ledge rock, two feet of which is naturally occurring soil. Lots not meeting these criteria would be designated as unsuitable.

Although the Public Health Code does not specifically address subdivision reviews, the CT Department of Public Health (CT DPH) has recommended to local health departments that they advise their planning and zoning commissions to only approve lots with suitable soils for subsurface sewage disposal. The CT DPH recommendation is that no building lot be created if the soil conditions are unsuitable for sewage disposal purposes.

Some of the lots in the preliminary layout of the proposed subdivision contain unsuitable soil conditions in the proposed leaching system areas. It is the Team sanitary engineer's understanding that some of the lot layouts are to be re-

evaluated. It is the CT DPH's recommendation that all proposed lots be such that primary leaching areas meet the above noted 4 feet to ledge rock requirement.

This CT DPH Environmental Engineering Section is available to comment on the proposed subsurface sewage disposal system layout once revised plans are generated.

The Natural Diversity Data Base

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

It should be noted that a State Endangered plant is known to occur along the shoreline of Foster Pond. Any indirect affects resulting from proposed subdivision construction that may affect the lake should be avoided. Such activities would include: runoff, storm water discharge, erosion and siltation. If any such activities are anticipated please contact Nancy Murray at the DEP (860-424-3589) with specific details.

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 & 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.

Archaeological Review

A review of the State of Connecticut Archaeological Site files and Maps show a series of historic stone ruins associated with early Euro-American farmsteads in the project area. These sites date to the early settler's use of the land in the 18th and 19th centuries. Field reviews conducted in association with an earlier proposal for this development project indicated a complex network of stonewalls, cairns and foundations situated throughout the project area. However, a concentrated area of historic ruins has been located in the center portion of the project area that Thomas A. Stevens & Associates Inc. has designated as open space in order to preserve these historic features. In addition proposed Lots 39, 51, and 53 have stone piles and walls that should also be avoided in the development plans.

Recent archaeological investigations into stone piles in Salem, Connecticut, suggest that some mounds of rocks piles in an oval shape are similar to burial markers in Guinea, West Africa, and that they may represent burial sites of African/African American captives, who worked many large farms in historic New England. These studies suggest that African burials consist of small stones, and low-lying mounds, oriented to compass points. The stone cairns within the project area are high mounds with large stones often placed on outcroppings of bedrock, or large boulders, and, do not appear to conform morphologically to the mounds discovered in Salem.

Nonetheless, although creative design plans have attempted to avoid these historic resources and the stone cairns do not appear to represent slave burials, the Office of State Archaeology (OAS) strongly recommends an archaeological survey to locate and identify all historic cultural resources and determine their significance. Many of these stone walls and cairns represent some of the best examples the Office of State Archeology has encountered in Connecticut, and, the

OAS urges their preservation. It is recommended that archaeological testing determine if some of these piles represent slave burials.

Any stone walls and other ruins that will be impacted by construction activities should be mapped and photo-documented prior to removal. This survey should also include a complete historical review of the property, tracing land deeds and other documents back to the colonial period.

In addition, sub-surface archaeological testing is recommended for the eastern extremes of the project area, which appear most sensitive for Native American sites. The recommended archaeological survey should be conducted in accordance with the Connecticut Historical Commission's *Environmental Review Primer for Connecticut's Archaeological Resources*. The Office of State Archaeology is prepared to provide any technical assistance in conducting the recommended survey, including providing a list of qualified archaeological consultants.

Planning Review

Description of the Property

The Ridges at Deer Lake Subdivision, Phase III is the third phase of a multiple phase subdivision located off Green Hill Road to the southwest of the Killingworth traffic circle. The existing portion of the development is accessed by Buell Hill and Beaver Dam Roads, both temporary cul-de-sacs. Currently, the developed portion (Phases I and II) includes approximately 30 residential lots. Addition of the 32 lots included within Phase III would bring the development total to more than 60 residential lots. The site, located on Buell Hill, is characterized by wetlands and hilly terrain with bedrock outcroppings and moderate to steep slopes. Hundreds of linear feet of stone walls and numerous archaeologically significant "cairns" are scattered about the 172 acre site.

The crest of Buell Hill, which is developed with a somewhat sprawling single family home with a paddock, is relatively open, whereas the majority of the remainder of the parcel is covered by trees. Runoff of surface drainage from the crest of Buell Hill flows to wetlands and ponds to the northwest, south and east. Runoff draining to the northwest eventually flows to the Hammonasset River via site wetlands and nearby Deer Lake.

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Comments

During the presentation and the succeeding site walk, it became clear that two issues appear to be at the core of concern with the proposed subdivision expansion. First and most significant, the location of the proposed Beaver Dam Road continuation may potentially impact wetland quality, preservation of significant archaeological artifacts, and overall soil erosion and sediment control efforts for this phase of the subdivision. Second, concern has been raised about

the form of dedication of some of the proposed open space within the proposed subdivision. Comments regarding these issues are as follows:

A. Proposed Alignment of Beaver Dam Road

The extension of Beaver Dam Road is proposed to be oriented in a northerly direction just off to the east of the crest of Buell Hill. The location was originally delineated in a collective effort to preserve historical site features as well as to preserve the number of proposed lots that flank it to the east and west.

Movement of the road center either east or west would apparently upset the lot layout to the point of reducing several lots below minimum zoning standards and thereby eliminating some of the lots. The proposed location of Beaver Dam Road raises several issues including its direct and indirect impacts upon nearby inland wetlands and watercourses, several archaeologically significant artifacts, and on overall soil erosion and sediment control efforts.

- **Wetland Impacts**

Concern has been raised with respect to the proximity of proposed Beaver Dam Road to the wetland system down slope and to the east, this because of the rather steep slope that separates the roadway from that wetland system in the area of Lots 50, 51 and 52. As a result of this question of proximity and steep slopes, the Commission should request that the applicant make every attempt to relocate Beaver Dam Road as far away from the easterly wetlands as possible, especially in the area of proposed Lots 50, 51 and 52. Whether or not the road can be moved to the west, the applicant should be required to place at least two rows of silt fencing to the east of the roadway during construction, leaving the fencing in place until the road and its embankments are completely stabilized. The Commission should require that a representative of the applicant inspect the silt fencing weekly and immediately repair any deficient areas. Provisions should also be made for removal of accumulated erosion products if and when silt fences are "filled".

- **Archaeological Impacts - Stone Walls**

Although the applicant is proposing to preserve significant portions of the stone walls that exist on site, it is unclear whether or not realignment of Beaver Dam Road would preserve even more of these features. It is not clear from review of the submitted application materials whether the impacted walls will simply be destroyed, or if they will be dismantled and rebuilt adjacent to the new road. If the applicant is not proposing to rebuild lengths of wall that are impacted by the proposed road layout, the Commission should consider modifying any approval to require as such.

- **Archaeological Impacts - Cairns**

Several archaeologically significant features known as "cairns" are located throughout the site. Several of the more significant cairns are located quite close to the path of proposed Beaver Dam Road. The applicant has designed the road to preserve a cairn opposite the northwestern corner of Lot 51 that would have been destroyed while several others are immediately adjacent to the proposed road locations and protected by conservation easements. Care should be taken during construction to be sure that the cairns are not damaged. It would also be a wonderful accommodation for the applicant to offer to have a sign or signs made to put up next to one or more of the cairns (perhaps the one near Lot 51) to explain their significance. The Commission should consider requiring the protective open space dedications to be made in fee rather than as easements (See Open Space section below).

- **Soil Erosion & Sediment Control Measures**

Concern has been raised over potential soil erosion and sediment control difficulties expected at the site, this as a result of the steep slopes off the crest of Buell Hill and the proximity of Beaver Dam Road to wetlands off to the east. Concern has also been raised with respect to the potential erosion and wetland

sedimentation that may occur as a result of washout of steep driveways and the cuts necessary to construct them.

Inspection of the site during the January 15, 2002 revealed that an erosion problem already exists where minimal site disturbance has taken place, this even without any substantial work having occurred as of yet. Three suggestions that the applicant should consider include:

1. Staged Clearing of Lots for Construction. As result of the potential for surface erosion, the Commission should consider modifying any approval to only allow for the clearing of several lots at a time, with such lots being stabilized before moving on to additional lot clearing.
2. Minimized Site Clearing. An effort should be made to minimize the amount of site clearing that will occur on each lot and in road construction in general. The Commission should consider modifying any approval to require the retention of vegetative cover as a buffer along the frontage of lots abutting proposed roads as much as is practical. Only enough clearing to allow for construction of the driveway and placement of the house and septic system should be considered, especially in areas in close proximity to steep slopes and wetlands.
3. Double Silt Fences/Weekly Inspections. Again, extra care will have to be taken to insure the stability of the site, especially in areas of steep slopes and close proximity to wetlands. Double rows of silt fence (and more in especially sensitive areas) and a rigorous inspection program will likely be necessary.

- **Open Space**

Of the approximately 172 acres included within The Ridges at Deer Lake Subdivision (Phase III), the applicant has offered a total of 39.77 acres with two additional conservation easement areas. The history of the open space offering includes past discussions and negotiations with the Killingworth Land

Conservation Trust and Killingworth Planning & Zoning Commission. Concern has been expressed by the Trust that dedication of portions of open space in the form of easements rather than fee will create enforcement difficulties that the Trust would find unmanageable. Specifically, proposed Lots 38, 40, 41 and 42 include conservation easements over the back half of the properties (Conservation Easement "A"). The conservation area is demarcated by an historically significant stone wall that crosses those proposed lots. Concern is raised that enforcement of those easements and preservation of that wall will be difficult if the preserved area is not owned in fee by the Trust. A similar concern is raised for easements proposed for protection of the "cairn" on Lot 50.

The Trust has indicated in an October, 2001 letter that the open space would be accepted based upon several conditions. Those conditions include requirements (1) that the pinning of every corner of each parcel occur prior to property transfer to the Trust, (2) that all parcels must be certified free of encumbrances including extinguishing the easement dedicated to the Town, and Lot 9, (3) for the transference in fee of conservation easements on Lots 38, 40, 41, 42 and 50, and (4) for the review and acceptance of open space documentation by Trust counsel.

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, elderly housing, recreation/open space projects, watershed studies and resource inventories.

Reviews are conducted in the interest of providing information and analysis that will assist towns and developers in environmentally sound decision-making. This is done through identifying the natural resource base of the project site and highlighting opportunities and limitations for the proposed land use.

REQUESTING A REVIEW

Environmental reviews may be requested by the chief elected official of a municipality or the chairman of town commissions such as planning and zoning, conservation, inland wetlands, parks and recreation or economic development. Requests should be directed to the chairman of your local Soil and Water Conservation District and the ERT Coordinator. A request form should be completely filled out and should include the required materials. When this request is approved by the local Soil and Water Conservation District and the Eastern Connecticut RC&D Executive Council, the Team will undertake the review on a priority basis.

For additional information and request forms regarding the Environmental Review Team please contact the ERT Coordinator: 860-345-3977, Eastern Connecticut RC&D Area, P.O. Box 70, Haddam, Connecticut 06438.