KING'S MARK ENVIRONMENTAL REVIEW TEAM

REPORT FOR

CLEARWOOD DEVELOPMENT

HARWINTON,
CONNECTICUT

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

CLEARWOOD DEVELOPMENT

HARWINTON, CONNECTICUT

Environmental Review Team Report

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

Wallingford, Connecticut

for the

Harwinton Inland Wetlands Commission

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

SEPTEMBER 1991

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* Dr. Norman Gray, Geologist
  University of Connecticut Department of Geology and Geophysics
  486-4434

* Kathy Johnson, District Conservationist
  USDA - Soil Conservation Service
  567-8288

* Carla Guerra, Wetland Specialist
  Department of Environmental Protection - Water Resources Unit
  566-7280

* Judy Wilson, Wildlife Biologist
  Department of Environmental Protection - Western District
  485-0226

* Brian Murphy, Fisheries Biologist
  Department of Environmental Protection - Eastern District
  295-9523

* Richard Lynn, Regional Planner
  Litchfield Hills Council of Elected Officials
  491-9884

* Harold J. Geysen, Transportation Planner
  Department of Transportation
  566-2113

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Finally, special thanks to Francis A. Paul of Paul Associates, Robert Jontos of Land-Tech Consultants, Robert Orciari of Harwinton Inland Wetlands and Meg Enkler of Litchfield S&WCS for their assistance during this environmental review.

EXECUTIVE SUMMARY

Introduction

An environmental review was requested by the Harwinton Inland Wetland Commission for the Clearwood Development, located in the western corner of Harwinton. The 77-acre site is comprised of many stands of deciduous and coniferous trees, wetlands and 2 ponds. Topographically, the western portion of the site is typified by moderate slopes, and the entire site lies on a western slope of a drumlin.

The cluster development includes 114 detached condominium dwellings, of which 20 units will be affordable housing units. The site will be serviced by public water and gravity sewers. The first phase of development will consist of the construction of the main road, connecting Clearview Avenue to Weingart Road. The condominium units will be built in 4 separate groupings of no more than 30 units.

The purpose of this review is to inventory and assess existing natural resources, particularly wetland and water resources, and discuss the impacts of development. This environmental information will be used to assist the Town in guiding conservation and development in this area.

The ERT Process

The review process consisted of 4 phases: (1) inventory of the site's natural resources; (2) assessment of these resources; (3) identification of resource problem areas; and (4) presentation of planning and land use guidelines. Based on the review process, specific resources, areas of concern, development limitations and development opportunities were identified.

Topography and General Setting

The site is situated on a topographic terrace on the eastern side of the Naugatuck River Valley. A small south/southwestern trending stream incised into the terrace surface crosses the central portion of the site. Other than the steep walls along the incised portion of the stream, slopes are generally less than 10:1.

Bedrock Geology

Bedrock does not outcrop on the site. Bedrock is probably within 10 to 20 feet of the surface. The site is underlain by fine-grained muscovite-biotite-feldspar-quartz schists and gneisses referred to as the Ratlum Mountain schist.

Surficial Geology

The site is blanketed with a loose sandy ablation till characterized by abundant, large, well-rounded boulders of a mixed assortment of gneiss and schists.

Soil Resources

The Paxton very stony fine sandy loam soils are the dominant upland soil type. The moderately well-drained Woodbridge very stony fine sandy loam and Charlton stony fine sandy loam are also found in the uplands. The wetland soil is Leicester, Ridgebury and Whitman very stony fine sandy loams. Limitations for development include steep slopes, seasonal wetness and erosion.

Erosion and Sediment Control

E&S control is a major concern for this development. The E&S control plan should be developed and properly installed, and the installations should be periodically monitored and maintained. The Inland Wetland Commission should thoroughly review all E&S control plans for adequacy in protecting wetlands and watercourses. Most of the soils on the site fall into the moderate erodibility class.

Hydrology

The development proposal has changed significantly since the conceptual drainage plan was done. A more detailed stormwater management plan and additional calculations are needed. Particular attention must be given to the proposed outlets of the detention structures so that roads and buildings are adequately protected. Cleaning and maintenance of any detention basins should be performed in a manner consistent with maintaining a healthy stand of vegetation. Stormwater management systems must also be properly maintained. In-stream basins are not recommended, and open water-type basins may cause temperature increases in streams.

Wetland Considerations

Wetland soils encompass approximately 19 acres of the site. The wetlands are best described as a forested deciduous swamp, dominated by red maples with a shrub understory. The wetland habitat types include PFO1E, PSS1F, Seasonally Saturated and POWHh. The most significant function the wetlands is providing water quality renovation. Preservation of the wetlands is critical for maintaining the quality of the ponds and stream on the site. The wetlands also provide habitat for wildlife.

The site plans concentrate all of the actual dwelling units outside of any wetlands. The main intrusion into the wetlands is the main road A2. The other road alternatives do not seem feasible. Approval of the road crossing should emphasize the need for properly installed and regularly maintained E&S controls. The stormwater plan only includes plans for soft drainage systems. The DEP encourages alternative designs for the management of stormwater. There is concern that the proposed system will not handle larger storm events.

Wildlife Considerations

Wildlife habitat at the site consists of hardwood and softwood forest, wetlands, 2 early successional stage areas, 2 small ponds and a stream. A variety of wildlife is

expected to use the site, including deer, ruffed grouse, weasel, raccoon, otter, fox, coyote, hawks, owls, ducks, wading birds, warblers, woodpeckers, sparrows, reptiles and amphibians.

Forests and the early successional stage areas are important to wildlife, providing cover, food, nesting, denning sites and roosting places. Wetlands are also very important to wildlife and should be protected because they increase the habitat diversity and offer a variety of food and cover. The stream serves as an important travel corridor for wildlife. A minimum 100-foot buffer of undisturbed vegetation should be left around the wetlands and all waterbodies.

As with any development, the impact on wildlife will be negative and long-lasting. The area will be broken-up and lost to roads, driveways, lawns and condominiums. Increased numbers of humans, dogs, cats and cars will also affect wildlife. Certain species which adapt well can become a nuisance. Alternative designs which can protect wildlife habitat include large lots and a lower density cluster development. Setting aside a combination of habitats for open space is desirable. The proposed open space is either close to proposed homes or is unbuildable wetlands. Open space areas should be connected to provide travel corridors. Measures to minimize the effects of development on wildlife include buffer strips, natural landscaping techniques, maintaining field borders and early successional stage vegetation and maintaining wildlife requirements.

Fisheries Resources

The unnamed northernmost pond is currently the only pond on the site that supports fish. Bluegill sunfish was the only fish observed. However, other warmwater species such as largemouth bass, pumpkinseed sunfish and brown bullhead are expected to inhabit the pond. Proper mitigation controls must be implemented to avoid impacts on fishery resources. E&S control plans must be used to avoid excessive siltation, and the influx of stormwater drainage containing pollutants must be limited. A 100-foot buffer zone should be maintained along the edge of all waterbodies, and the ponds should be maintained. Additionally, the amount of open space could be increased.

Threatened and Endangered Plant and Animal Species

According to the Natural Diversity Data Base, there are no Threatened or Endangered Species or Connecticut "Species of Special Concern" at the site.

Planning Considerations

The site was recently rezoned from Town Residential to Planned Residential, which allows by Special Permit up to 3.5 dwellings per usable acre when both public water and sewers are available. Of the total 114 units, no more than 34 are to be 3-bedroom units, with the balance being 2-bedroom units. The surrounding land is zoned Town Residential.

Consideration should be given to developing an open space and recreation plan for the project, including a community house that can be used for recreation. A loop trail could be developed around the principle pond, and a picnic area could be set up.

The Clearwood Development is to provide 20 affordable housing units dispersed throughout the development. It is essential to ensure that these units remain affordable over the long-term.

Traffic Considerations

It appears that the traffic generated by the development will not adversely impact the local road system or the area's highways. Roadway alternate A appears to be the best option because it would have less impact on the wetlands and is not affected by the severe slopes.

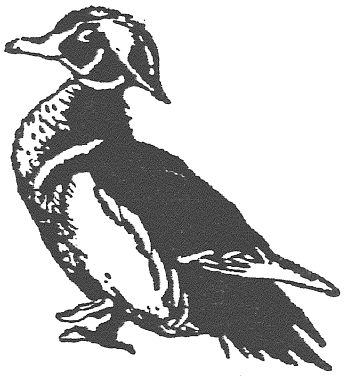
TABLE OF CONTENTS

LAND USE AND PLANNING CONSIDERATIONS

LIST OF APPENDICES

LIST OF FIGURES

INTRODUCTION



INTRODUCTION

An environmental review was requested by the Harwinton Inland Wetland Commission for the proposed Clearwood Development, a cluster development consisting of 114 detached condominium dwellings. The development site is located in Harwinton near the Torrington City Line. Access is provided by Clearview Avenue and Breezey Hill Road.

The 77-acre site is comprised of many stands of deciduous and coniferous trees, wetlands and 2 ponds. Topographically, the western portion of the site is typified by moderate slopes, and the entire site lies on a western slope of a drumlin. The site will be serviced by public water and gravity sewers. The first phase of development includes construction of the main road which connects Clearview Avenue to Weingart Road. The condominiums will be built in 4 separate groupings of no more than 30 units. There are 5 wetland impacts proposed.

The purpose of this review is to inventory and assess existing natural resources and discuss development opportunities, erosion and sediment (E&S) controls and the maintenance and regulatory activities necessary to assist the Town in guiding conservation and development in the area. Specific objectives include:

1) Assessing the hydrological and geological characteristics of the site, including geological development limitations and opportunities;

2) Determining the suitability of existing soils to support planned development;

3) Discussing soil erosion and sedimentation concerns;

4) Assessing the impact of development on the wetlands and watercourses;

5) Assessing the impact of development on wildlife;

6) Assessing the impact of development on fisheries;

7) Assessing planning and land use issues; and

8) Assessing the impact of development on traffic.

THE ENVIRONMENTAL REVIEW TEAM PROCESS

Through the efforts of the Harwinton Inland Wetland Commission and the King's Mark Environmental Review Team (ERT), this environmental review and report was prepared for the Town. This report primarily provides a description of on-site natural resources and presents planning and land use guidelines. The review process consisted of 4 phases:

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

The data collection phase involved both literature and field research. The ERT field review took place on July 3, 1991. Field review and inspection of the site proved to be a most valuable component of this phase. The emphasis of the field review was on the exchange of ideas, concerns or alternatives. Mapped data or technical reports were also perused, and specific information concerning the site was collected. Being on-site allowed Team members to check and confirm mapped information and identify other resources.

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

Figure 1

LOCATION OF STUDY SITE

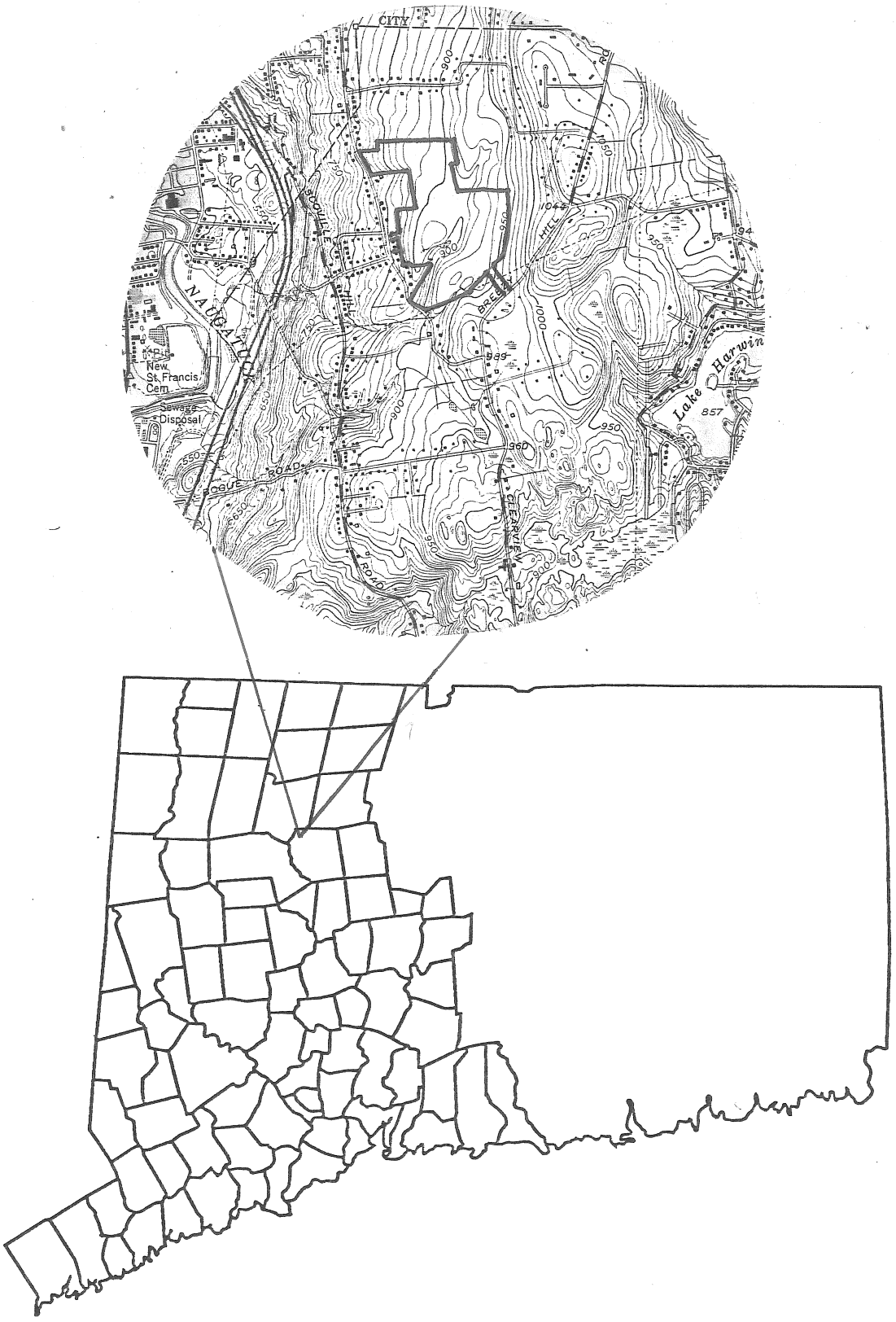
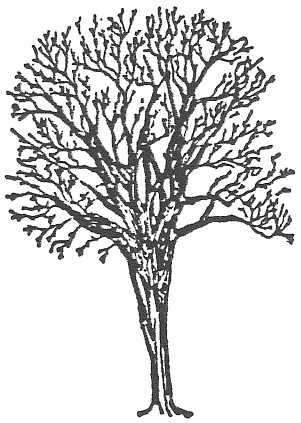


Figure 2 Site Plans

PHYSICAL CHARACTERISTICS



TOPOGRAPHY AND SETTING

The Clearwood Development site is situated on a topographic terrace on the eastern side of the Naugatuck River Valley (see Figure 3). A small south/ southwestern trending stream incised into the terrace surface crosses the central portion of the site. The stream carries runoff from an area of 125 acres, of which 105 acres lie northeast/east of the development site on the western flank of a drumlinoid hill. A 0.8-acre pond is impounded by an earthwork dam across the stream at its southernmost end. The natural runoff from the western 1/2 of the site flows into small drainage courses cut directly down the eastern slope of the Naugatuck River Valley. Other than the steep (i.e., up to 40:1) walls along the incised portion of the stream, slopes in the site are generally less than 10:1, and the drainage is poor in places. Wetlands constitute 19 acres of the 77-acre site.

BEDROCK GEOLOGY

Bedrock does not outcrop at the site. Although the depth of the overburden is unknown, bedrock is probably within 10 to 20 feet of the surface. The Bedrock Geology of the Torrington Quadrangle, CT (Martin, 1970) inferred the site to be underlain by fine-grained muscovite-biotite-feldspar-quartz schists and gneisses which are referred to as the Ratlum Mountain schist on the Geologic Map of Connecticut (Rodgers, 1985).

SURFICIAL GEOLOGY

The surficial materials of the Torrington quadrangle were mapped by Colton (1971) on the Surficial Geology of the Torrington Quadrangle (Map GQ-939).

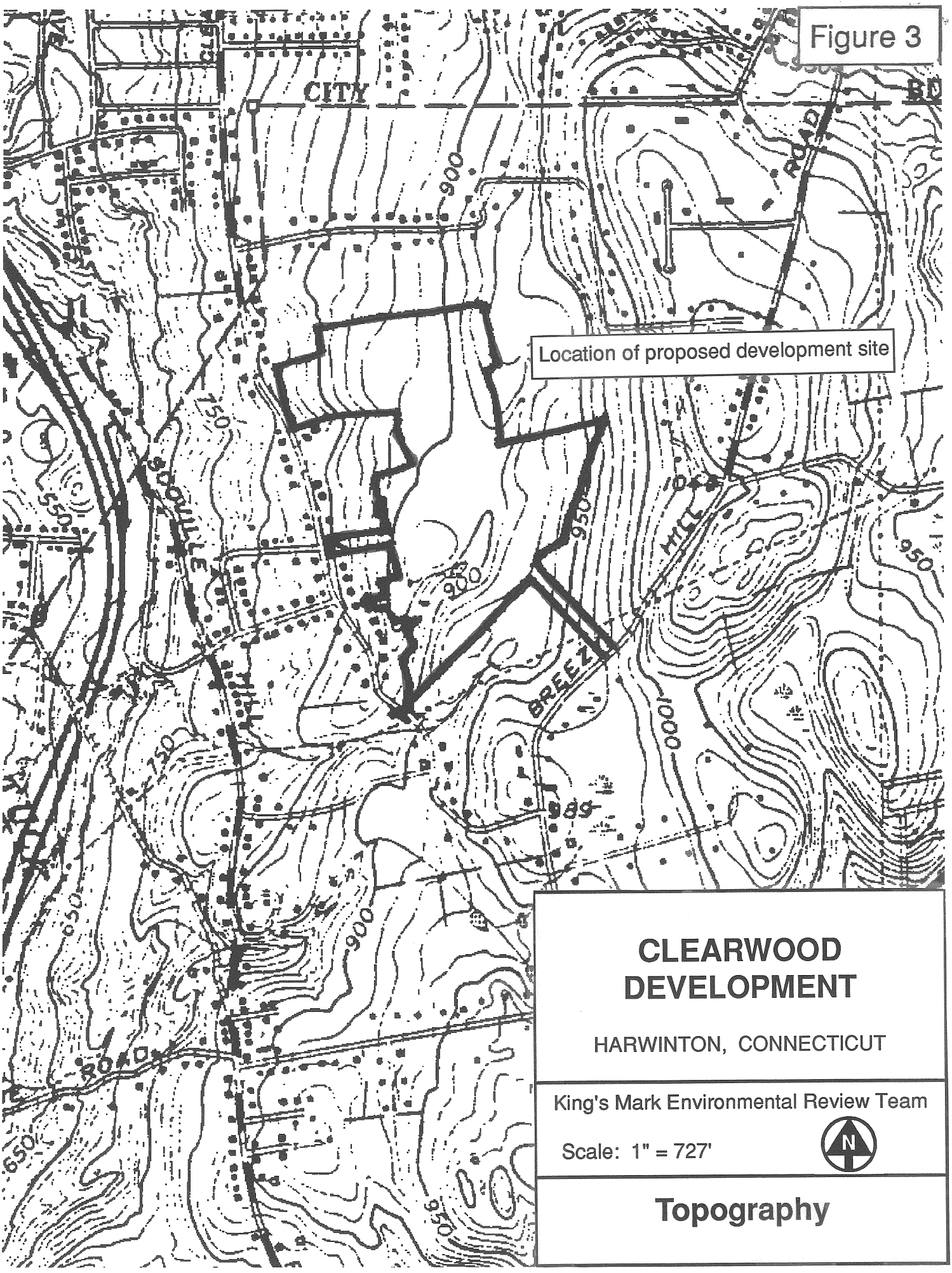
According to this map, the site is blanketed with a veneer of loose sandy ablation till characterized, at least at the surface, by abundant, large (i.e., 1 to 4 feet in diameter), well-rounded boulders of a mixed assortment of gneisses and schists. The abundance, size and rounding of the boulders suggest the crude terrace on which the site is located was cut into previously deposited glacial till by rapidly flowing subglacial or marginal meltwaters during the deglaciation of the Naugatuck River Valley. Later, the less voluminous, slower flowing meltwaters from local upland ice remnants eroded the valley of the incised stream and its small tributaries. Because these waters were only able to transport sand and gravel sized material, large boulders carried by the earlier meltwaters were left behind. As a result, the streamcourses, followed by meltwater in the final stages of deglaciation, in the area are marked by distinctive "boulder trains" or linear surface concentrations of large round boulders.

Excavation and landscaping of the site will probably be complicated by the abundance of large round boulders in the surface materials. The developer must decide how to dispose of these boulders. There are too many to be utilized as accents in landscaping, and the obvious solution of burial will probably generate ground settling problems.

SOIL RESOURCES

The soils of the Clearwood Development site are mapped and described in the Soil Survey of Litchfield County, CT (1970) (see Figure 4). On-site flagging of the inland wetland soils has been completed by a private consulting soil scientist at a scale suitable for planning a development. The soils are briefly described below and in Appendix A, Tables 1-4.

Figure 3



CLEARWOOD DEVELOPMENT

HARWINTON, CONNECTICUT

King's Mark Environmental Review Team

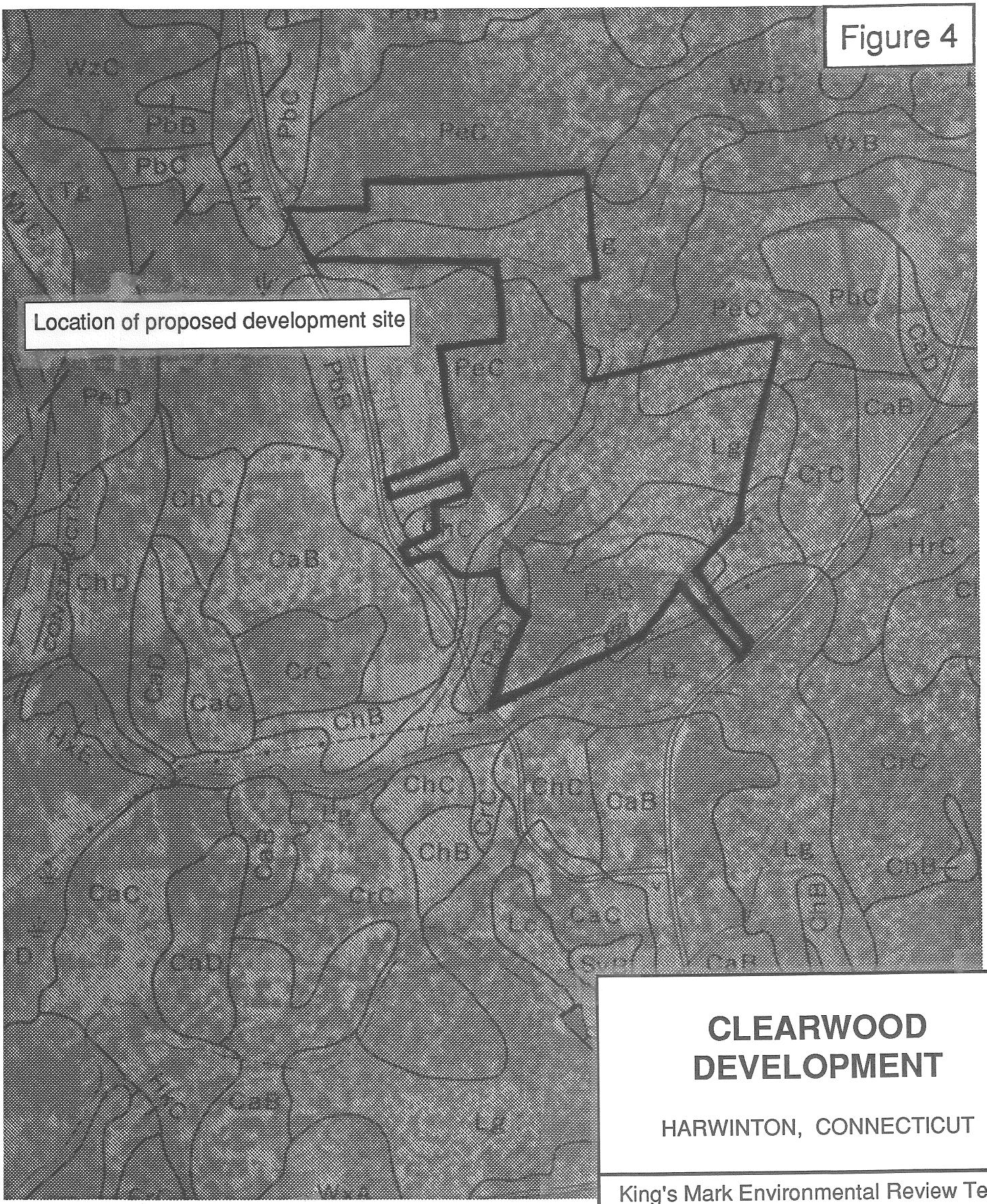
Scale: 1" = 727'

N

Topography

Figure 3 Topography

Figure 4



see Appendix A for mapping units

CLEARWOOD DEVELOPMENT

HARWINTON, CONNECTICUT

King's Mark Environmental Review Team

Scale: 1" = 640'

N

Soils

Figure 4 Soils

The **Paxton** very stony fine sandy loam soils (PeC, PeD) are the dominant upland soil type as mapped by the Soil Survey. Paxton soils are well-drained and are generally good soils for construction. However, steep slopes are a limitation on this site. The Paxton soils have a hardpan layer at approximately 24 inches in depth. The hardpan layer can hold water (a perched water table) during wet seasons. Seepage of cut slopes during construction can cause erosion problems, and drainage may be needed.

The moderately well-drained **Woodbridge** very stony fine sandy loam (WzC) is similar to the Paxton, but has a seasonal high water table. Seasonal wetness and slope are limitations to development on this soil type. Drainage should be planned around buildings, basements, driveways and roads. Cut banks will probably seep, which can cause erosion problems.

Charlton stony fine sandy loam (ChC) is a deep, well-drained soil. Slope is the only severe limitation to development.

The wetland soil mapped on-site is **Leicester, Ridgebury and Whitman** very stony fine sandy loams (Lg). This soil is regulated under the Connecticut Inland Wetland and Watercourses Act. Permits are required for any disturbance within the wetland boundary. The Town of Harwinton does not currently have regulated setback areas from inland wetlands. The Inland Wetland Commission should investigate the potential for regulated setback areas in the Town.

EROSION AND SEDIMENT CONTROL

E&S control is a major concern for this development. An E&S control plan should be developed per Public Act No. 83-388. The plan should be properly installed, and the installations should be periodically monitored and maintained.

The E&S control plan should consist of:

1) A **narrative** describing the project, the conservation measures planned, the sequence of installation and the maintenance plan;

2) A **map** locating the conservation measures proposed and adequately showing the natural land features and proposed activities; and

3) **E&S details** which show how each measure is to be installed.

The checklist from Chapter 4 of the Guidelines for Erosion and Sediment Control (revised 1989) is found in Appendix B and should be followed when reviewing an E&S control plan. All planned E&S control measures should follow the planning and design techniques in the Guidelines.

The Harwinton Subdivision Regulations give specific details concerning when an E&S control plan is required. This plan must be certified by the Planning and Zoning Commission. The Inland Wetland Commission should thoroughly review all E&S control plans for adequacy in protecting wetlands and watercourses because E&S controls can have a significant impact on inland wetland areas.

The application package (April 30, 1991) for the Army Corps of Engineers 404 permit for the wetland crossings shows silt fence along both sides of road wetland crossings and riprap at culvert inlets and outlets. This is not an acceptable E&S control plan for the entire project. Once the entire E&S plan is prepared, the Town may request assistance reviewing the E&S plan from the Litchfield County Soil & Water Conservation District.

The erodibility of the soils at the site varies. The erodibility class is given in Appendix A, Table 2. Most of the soils fall into the moderate erodibility class which does not consider slope percent or slope length. The erosion potential is greatly increased on long, steep slopes.

The hazard of water pollution due to sedimentation is greatly increased in areas close to water, making the soils adjacent to inland wetlands and watercourses

critical erosion control areas. The most common erosion control measures which should be used include:

1) Limited land clearing with tree/vegetation protection barriers;
2) Phased construction;
3) Temporary and permanent vegetation on all disturbed land;
4) Mulching and jute net or similar material on sloping disturbed land;
5) Structural bank stabilization on steep wet slopes; and
6) Water diversions and other stabilized concentrated water areas.

Sediment controls are needed when erosion controls fail. The most common sediment control measures which should be utilized include:

1) Temporary silt barriers such as haybales, filter fabric or rock berms; and
2) Sediment detention basins.

The use of haybales rather than filter fabric supports the agricultural community, and haybales are a renewable biodegradable resource. However, the life expectancy of haybale silt barriers is only approximately 60 days. On long-term projects, it may be more effective to use the plastic filter fence which as a life expectancy of 1 to 2 years.

HYDROLOGY

A stormwater management system controls excess runoff caused by construction operations, changes in land use or other land disturbances. This system is used to regulate the rate and amount of runoff and sediment from development sites during and after construction operations and to minimize undesirable effects such as flooding, erosion and sedimentation. Components may

include, but are not limited to, dams, excavated basins, infiltration trenches, parking lot storage, rooftop storage and underground tanks.

The conceptual drainage plan (dated July 3, 1991) shows 5 linear stormwater detention channels and 2 detention ponds. Both detention ponds are shown in wetland soil types. The Conceptual Drainage Study prepared by Wilbur Smith Associates (November 1989) shows the need for stormwater retention in at least 4 locations, with 6 subwatersheds showing increases in runoff after development. However, the proposal has changed significantly since the Smith study was prepared, and the current stormwater management system does not match that described in this study. No calculations were provided to demonstrate that the linear stormwater retention channels and ponds will adequately accomplish this stormwater management need. These calculations and a more detailed stormwater management plan are needed. Particular attention must be given to the proposed outlets of the detention structures so that roads and buildings are adequately protected.

The Soil Survey map shows a watercourse flowing out of the wetland just east of the Dahlen property. The conceptual drainage plan shows this as the location of the basin outlet. No provision is shown for this flow of water downhill from the outlet. This should be clarified on the site plans. If basins are excavated in wetland soils, they will probably fill with groundwater and not have the additional capacity required to handle surface water storage. This should be considered in the design. The design of the proposed detention channels and basins should be in accordance with the Detention Basin Standard contained in Chapter 8 of the Guidelines for Erosion and Sediment Control (1985, as amended) and checked by an engineer.

If the primary purpose of the stormwater management system is to minimize flooding, the peak discharge from the 2-year, 10-year and 100-year frequency, 24-hour duration, type III distribution storms should be analyzed. No increase in peak flow

from these storms should be allowed unless downstream increases are compatible with the overall floodplain management system. Items to consider include:

1) Timing of peak flows from the subwatersheds;

2) Increased duration of high flow rates which may cause streambank erosion;

3) Stability of the downstream channels; and

4) Distance downstream that the peak discharges are increased.

Cleaning and maintenance of detention basins should be done in a manner consistent with maintaining a healthy stand of wetland vegetation. A sediment storage area (i.e., sediment forebay) is recommended at the inlet of the basin to trap sediment and act as a clean-out point. Sediment removal and plant harvest will remove pollutants from the basins. Care should be taken in the disposal of this material.

Open water-type basins may cause temperature increases in streams. This can have a negative impact on aquatic life. In-stream basins are not recommended. Shade trees left or replanted around basins can prevent water warming. In some cases, water can be outletted from the basin bottom where water temperatures may be cooler.

Stormwater management systems must be properly maintained to be effective over the design life. A plan of operation and maintenance should be prepared for use by the owner or others responsible for the system to ensure that each component functions properly. This plan should provide requirements for inspection, operation and maintenance of individual components, including outlets. The plan should be prepared before the system is installed and should specify maintenance responsibility. Adequate rights-of-way must be provided for maintenance access. The minimum recommended width for an access right-of-way is 10 feet, and the

maximum recommended slope is 15%. A minimum 25-foot maintenance right-of-way is recommended around the perimeter of stormwater detention basins. The maintenance access should not be in wetland soils to prevent wetland disturbance and the difficulty of working in wet soil conditions.

Components of a runoff management system such as dams, excavated basins, infiltration trenches, parking lot storage and tanks should be owned by a unit of government that accepts responsibility for the component and can obtain the money necessary for operation and maintenance. Maintenance by individuals or homeowners associations may be limited by financial reserves and technical expertise. There should be a legally binding and easily enforceable document or statement attached to the stormwater management system plan requiring the owner to operate and maintain the system so that benefits to the public are received over its intended life.

Appropriate safety features and devices should be installed around basins and dams to protect humans and animals from accidents such as falling or drowning. Temporary fencing can be used until barrier plantings are established. Protective measures such as guardrails and fences should be used on spillways and impoundments as needed. A 3:1 slope or flatter is recommended for public safety because steeper slopes may be difficult to climb.

BIOLOGICAL RESOURCES

WETLAND CONSIDERATIONS

Present Site Conditions

The Clearwood Development site is located in the northwest corner of Harwinton on the eastern side of Clearview Avenue. Wetland soils encompass approximately 19 acres of the 77-acre site. The Soil Survey of Litchfield County, CT has mapped the wetland soils as Leicester, Ridgebury and Whitman very stony fine sandy loams (Lg). This soil unit is comprised of poorly drained Leicester and Ridgebury soils and a very poorly drained Whitman soil. The wetlands can best be described as forested deciduous swamps, dominated by red maples with a shrub understory. A smaller, more level wetland exists on the northern site boundary, and an even smaller wetland pocket is situated in the northcentral portion of the site. The National Wetlands Inventory recognizes a number of wetland habitat types on this site, including:

1) **PFOlE**: Palustrine - Forested - Broad-leaved Deciduous - Seasonally Saturated (the majority of the wetlands on this site);

2) **PSSlF**: Palustrine - Scrub/Shrub - Broad-leaved Deciduous - Semipermanent (the southeastern pond);

3) Seasonally Saturated (mapped in areas south of the ponds); and

4) **POWHh**: Palustrine - Open Water - Permanent - Diked or Impounded (the ponds themselves).

Wetland Functions

The most significant function of the wetlands is providing water quality renovation. Much of the overland runoff through the eastern wetlands is conveyed to 1 of the 2 ponds in the southeast portion of the site, then outlets into a watercourse. Because wetlands have been shown to provide natural treatment of stormwater, preservation of wetlands is important for maintaining the quality of the watercourse.

This function becomes increasingly important upon the introduction of impervious surfaces such as roads and rooftops.

The wetlands also provide habitat wildlife. While many species do not use forested wetlands for their permanent homes, they frequent wetlands in times of drought and cold to seek water and shelter. Open water/marsh areas attract resident and migratory waterfowl as well as many species of amphibians. Generally, the more diverse the vegetative communities, the greater the wildlife species diversity expected. This site contains an assemblage of different wetland types. The combination of upland, forested wetland, open water and shrub wetland results in the utilization of these habitats by a wide array of wildlife species.

Wetland Impacts

The current proposal concentrates all of the actual dwelling units outside of wetlands. The major intrusion into the wetlands is the main road A2 that winds through the site, connecting Weingart Road and Clearview Avenue. The road crosses the wetland in 4 locations and the watercourse in 2 locations, resulting in approximately 0.54 acres of impact. Several alternative road layouts are discussed in a May 9, 1991 letter from Land-Tech Consultants, Inc. to Philip Nimeskern of the U.S. Army Corps of Engineers. However, the diagram depicting these alternatives was not attached. Nevertheless, the amount and depth of fill required to locate the road elsewhere in the vicinity along with the slope constraints may not be feasible. Still, any approval of the road crossings should emphasize the need for properly installed and regularly maintained E&S controls.

For stormwater management, the plans depict a series of "infiltration trenches" and vegetated detention basins. The soft drainage system appears to be the only stormwater management system proposed because the plans do not include a detailed stormwater collection system. If all runoff is to be managed through the overland soft drainage system, there is a danger of erosion and sedimentation

occurring during the construction phase. The Department of Environmental Protection (DEP) encourages alternative designs for the management of stormwater. However, due to the density of the development and the amount of impervious surface, there is concern that the proposed stormwater management system will be inadequate to handle larger storm events.

Additionally, a retention basin is proposed within the small wetland pocket in the northcentral portion of the site. No details were provided regarding the construction of this basin (i.e., whether or not any excavation will occur or what type of vegetation will be introduced, if any). Furthermore, there appears to be an outlet from this basin as indicated by a directional arrow on the plans. When the utilization of wetlands to manage stormwater runoff is contemplated, these strategies should be implemented:

1) The excavation of wetlands or disturbance of vegetative cover to provide for detention or storage should be avoided or minimized.

2) The discharge of stormwaters to wetlands should be accomplished in a fashion which utilizes best available techniques to minimize erosion, siltation, water quality degradation and disruption of natural habitats.

3) The period of inundation of a wetland should be analyzed for its potential impact upon the wetland flora and fauna and the ability of the wetland to support desirable biological life. This is particularly important if a retention basin is considered.

4) Alternatives which provide commensurate stormwater management value without impacting directly upon wetlands or which can be accomplished while increasing the wetland resource base should be given serious consideration.

This application presents an attempt to avoid direct wetland impact. Potential negative impacts to the wetlands are related to the roadway construction, the stormwater management system and E&S controls during construction. All engineering data regarding the stormwater management system should be carefully reviewed by the Town engineer to demonstrate that the system will be adequate to

handle large storm events. Most importantly, all E&S controls should be properly installed and maintained on a regular basis to reduce the potential for pollution into the wetlands and watercourses on the site.

WILDLIFE CONSIDERATIONS

Description of Area/Habitats

The 77-acre site contains hardwood and softwood forestland, wetlands, 2 early successional stage areas, 2 small ponds, a stream and numerous intermittent drainages. A clustered development of 114 detached condominiums is planned.

Wildlife habitat is the complex of vegetative and physical characteristics that provide for all the requirements of wildlife, including food, shelter, resting, nesting and escape cover, water and space. Generally, the greater the habitat diversity and degree of interspersion of various habitat types, the greater the variety of wildlife there is using an area. Because of the variety of habitats on the site and the presence of wetlands and a stream, the site provides good to excellent wildlife habitat. The areas south and east of this site contain light to moderately developed areas, a farmland and forestland. Although the site is fairly small, neighboring habitat offers good to excellent wildlife habitat, thereby increasing the value of the habitat on the site.

A wide variety of wildlife species could utilize the site to serve all their needs, while many other species find it a place to meet some requirements. These species include deer, ruffed grouse, weasel, raccoon, otter, fox, coyote, hawks, owls, ducks, wading birds, warblers, woodpeckers, sparrows, reptiles and amphibians.

Forestland: The majority of the site is covered by forest which is an important habitat type. Forests, both hardwood and conifer, provide many things to wildlife, including cover, food, nesting places, denning sites and roosting places. Hardwood

trees provide an abundance of food in the form of nuts, catkins, buds, browse and insects that live on and in the trees. There are several large softwood stands mixed in with the hardwood forest. A large area of white pine is located just north of the powerline, and a stand of white pine and hemlock is located to the west and north of the ponds. Stands of softwood or coniferous trees provide food and shelter, and mature conifer cover provides roosting sites for grouse, turkey and mourning dove. Pine and hemlock cone seeds provide food for red squirrel, pine siskin and chickadee. In addition, there is fairly thick regeneration of pine and hemlock which provides cover for various mammals. The snag trees (i.e., dead trees) are a source of insects which serve as food for many species, including woodpeckers and chickadees. Den trees (i.e., trees with cavities) can serve as nesting or denning places for animals such as squirrels and raccoons.

Powerline/Early Successional Stage Shrub Habitat: The area under the powerline is maintained in early successional stage type habitat, containing small trees, shrubs and herbaceous plants. It is probably maintained in this stage by a combination of cutting and herbiciding. Because of the vegetational diversity, the powerline area provides abundant food and cover for a variety of mammals and birds. The shrubs provide berries, catkins and browse. Dense growth provides good cover.

Wetlands: Several different types of wetlands are found on the site, including palustrine forested wetland, open water, emergent marsh and riparian type wetland habitat. This diversity of wetland types increases the attractiveness of the site to wildlife. There are 2 small ponds located along the stream that runs through the site. The stream is characterized by a rocky boulder-type bottom, and it appears that the stream comes out of its banks on a regular basis. The riparian zone or zone along the stream is characterized by an overstory of red maple, yellow birch, black birch and hop hornbeam. Understory species include witch hazel, black alder,

elderberry and ash. Ground cover consists of a variety of plants adapted to wet conditions including jewelweed, sensitive fern and poison ivy. While cover along the stream can be described as moderate, some cover and food are provided by the variety of species and vegetational structure of the species there. The ponds are surrounded by mature forest dominated by hemlocks which provide excellent cover. The larger of the 2 ponds has a shrub/weed edge which provides food and cover for a variety of birds, small mammals, frogs and turtles. The smaller pond is more of a marsh which supports some emergent growth of plants (i.e., arrow weed). The ponds may provide a resting place for an occasional mallard or Canada goose, but their usefulness is limited by their small size.

Streams and their associated riparian zones provide important habitat for a number of species, including reptiles, amphibians and birds. Species such as the song sparrow, catbird and yellow warbler feed and nest in riparian habitat where cover is provided. Streams also serve as important travel corridors for a variety of wildlife species to travel within the site and to and from the site. Streams are often easier to travel along, especially in the winter. Streams also offer a variety of food items such as fish and various invertebrates. Mammals such as mink, otter, fox and coyote often travel along streams because they offer an abundant source.of prey. Smaller forms of wildlife such as amphibians and reptiles may travel in and along streams to feed and breed.

The small pond or marsh near the powerline is dominated by emergents and surrounded by shrubs, providing habitat for reptiles and amphibians. Some wading birds (i.e., great blue heron) and mammals (i.e., raccoon) probably use this area to hunt in. Because the small marshy area is very close to the powerline, a tremendous variety of food and cover is provided. This small area of marsh increases the variety of habitats available on the site, making it more useable for wildlife.

Palustrine deciduous type wetlands comprise a considerable portion of the overall wetlands found on the site. These wetlands have an overstory of deciduous trees and understory of trees and shrubs, providing nesting and feeding places for birds and cover and feeding places for mammals. Although the evaluation for these types of wetlands may not be as "high" as for some other types of wetlands such as marsh or emergent type habitat, they are sensitive areas and are important to wildlife. Because they are viewed as "less valuable," allowances are often made that impact these wetlands. Many times these areas are used to build ponds or construct detention/retention basins, resulting in a net loss of habitat and degradation of remaining habitat.

Wildlife/Habitat Recommendations

As with any development, the impact on wildlife habitat will be negative. The impact at this site will be fairly extensive because of the density of the proposed development, addition of roads and proximity to wetlands. Large portions of the site will be broken-up and lost in the construction of homes, roads, parking lots and walkways. Habitat will be lost where cover is cleared for lawns and landscaping. Another impact is the increased human presence, vehicular traffic and number of free roaming children, dogs and cats. This could drive the less tolerant species from the immediate area of development and from areas where there has been no physical change. The value of the site for wildlife habitat correspondingly decreases as the amount of development increases. Certain species which are adaptable to man's activities may increase due to his presence, and associated nuisances may occur. Typical species which can become a nuisance include pigeons, starlings and raccoons. Species sensitive to man's presence or the changes made at the site will either move away or perish.

Development Design: The design of developments can have a dramatic effect on the habitat quantity and quality remaining after construction. Ideally, a design

which leaves maximum open space for use as wildlife habitat is best. Clustering homes on suitable land well away from wetlands usually leaves the most habitat undisturbed. However, this is only achieved if the homes are not crowded together. The density of this development is great with 1 home per 0.6 acres. Although the development is described as "clustered," very little open land is left with the exception of the wetland area in the eastern section of the site. Clustering homes so that 1/2 the land is left as open space (or a density of 1 home per 2 acres) would leave more open space along with a variety of habitats and would be more useful to wildlife. Houselots of 10 acres or more can lessen the impact of development because more habitat is preserved.

Wetlands: Because wetlands increase the habitat diversity of a site and offer a variety of food and cover to wildlife, they are important areas to consider for protection. Acre for acre, wetlands and their associated riparian zones exceed all other land types in wildlife productivity. In addition to their value as wildlife habitat, wetlands serve other valuable functions, including water recharge, sediment filtering, flood storage, etc. For these reasons, the development of, filling in and/or crossing of wetlands should be avoided or limited whenever possible.

Ideally, a buffer of undisturbed vegetation should be left around all waterbodies and wetlands. A minimum 100 feet of undisturbed vegetation left along the stream/ riparian zone and around the perimeter of wetlands is recommended to preserve the usefulness of the stream or riparian habitat for wildlife.

The proposed site plans include 4 wetland crossings which require filling to place culverts. Although these fillings are not substantial, this represents a loss of wetlands. More importantly, wetland crossings can alter water flow and cause vegetational changes. Bridges are preferable to culverts if a wetland must be crossed, because bridges require less filling and maintain a natural substrate bottom

and flow of water, even during low flow periods. This creates fewer changes in the wetland and maintains pre-development conditions.

There are 12 detention basins planned along with 1 retention basin. Little detail was given concerning their specific design. It is always preferable to locate detention basins out of wetland areas to avoid wetlands destruction. Currently, none of the detention basins are planned to be constructed in the wetlands, although several are close to wetlands. It is essential that detention basins are properly designed and maintained (i.e., sediments removed on a regular basis) so that the water coming from the detention basin into the wetland is of good quality. The stormwater generated from a development will probably be of questionable quality. Runoff contains oil from driveways, road salts and lawn fertilizers. These pollutants along with the sediments that are not settled out in the detention basin can negatively impact wetland vegetation and food chains in the wetland.

As proposed, detention basins, riprap channels, berms and pump house will not be located within wetlands for the most part. In general, it is never preferable to excavate detention basins or construct pump stations in wetlands because it results in a net loss of wetlands, represents a long-term change/disturbance to the wetlands and can alter wetland vegetation, not so much by the fluctuating water levels caused, but by the addition of pollutants that are contained in the runoff.

Retention basins may or may not have wildlife value, depending on their design, size, etc. It is not preferable to destroy an existing wetland to create a retention basin as is planned for this development. Retention basins can be created next to existing wetlands, only if the creation does not negatively impact the hydrology of the existing wetland. If a retention basin is going to have value for wildlife, it should be designed so that it contains water on a year-round basis, contains useful emergent vegetation and shrubs around its perimeter and does not become filled up with sediment.

Simple, grassed-in retention basins have little wildlife value because they do not provide food and cover.

Maintaining good water quality in wetlands is important for humans as well as wildlife. Street drains should be fitted with oil separators so that oil can be prevented from entering the wetlands. Silts and oils from runoff can smother invertebrate life forms, thereby effecting the food chain. An observable effect of siltation is the change in vegetation. Road salts and oils can alter water chemistry and the types of wildlife which ultimately utilize a wetland area. All precautions should be taken to insure that all water entering the wetlands during and after development is of good quality. Additionally, proper E&S controls should be maintained throughout construction. Degradation can occur during and after construction.

Open Space Areas: Whatever combination of types of areas set aside as open space, setting aside an "island of open space" surrounded by development is the least desirable for wildlife. Open space areas should be connected and, ideally, connected with open space areas outside of the development site. The open space area should have natural travel pathways (i.e., streams, valleys and ridgetops) for wildlife to enter and exit to other open space areas outside the development. Open space areas are more valuable to wildlife if not traversed by roads which may impede the movement of wildlife. Setting aside a combination of habitat types in conjunction with wetlands is desirable.

Much of the open space proposed is close to proposed homes, except for the wetland area in the east. This area is approximately 10 acres in size and has limited value as wildlife habitat because of its small size and proximity to dense development. Much of the open space set aside is unbuildable wetlands. Open space is much more valuable if it contains a variety of habitats.

Ending the road in a cul-de-sac at the first wetland crossing coming off of Clearview Road and leaving the upland area along with the variety of wetland areas

undeveloped would provide open space of much greater value to wildlife. The open space area would be larger, contain a variety of habitats, including wetlands, uplands and early successional stage vegetation, and be somewhat buffered from the new development. An argument can be made that upland habitat exists on neighboring land, but that land could also be developed.

Additional Considerations

In a small but heavily developed and populated State like Connecticut, where available habitat continues to decline on a daily basis, it is critical to maintain and enhance, where possible, existing wildlife habitat.

In planning and constructing a development, there are measures that should be considered to minimize adverse impacts on wildlife. Despite these measures, wildlife habitat will increasingly be adversely impacted as the amount of development increases on the site. These measures include:

1) Maintain a 100-foot (minimum) wide buffer zone of natural vegetation around all wetland/riparian areas to filter and trap silt and sediments and to provide some habitant for wildlife.

2) Utilize natural landscaping techniques (avoiding lawns and chemical runoff) to lessen acreage of habitat lost and possible wetland contamination.

3) Stonewalls, shrubs and trees should he maintained along field borders.

4) Early successional stage vegetation (i.e., field) is an important habitat type and should be maintained if possible.

5) During land clearing, care should be taken to maintain certain forest wildlife requirements:

    a) Encourage mast producing trees (i.e., oak, hickory and beech). A minimum of 5 oaks per acre, 14 inches dbh or greater, should remain.

    b) Leave 5 to 7 snag/den trees per acre because they are used by birds and mammals for nesting, roosting and feeding.

    c) Exceptionally tall trees, used by raptors as perching and nesting sites, should be encouraged.

d) Trees with vines (i.e., fruit producers) should be encouraged or can be planted as part of the landscaping in conjunction with the development, especially those that produce fruit which persists through the winter (i.e., winterberry). Appendix C contains a list of suggested shrub and tree species that can be encouraged and/or planted to benefit wildlife.

e) Brush debris from tree clearing should be piled to provide cover for small mammals, birds, amphibians and reptiles.

FISHERIES RESOURCES

Fisheries Resources

The northernmost pond, an impoundment of an unnamed tributary to the Naugatuck River, is currently the only pond on the site that supports fish. This pond has a very shallow sediment laden upper section which the developer proposes to dredge. During the day of the field review, the pond was undergoing an unicellular algae bloom which turned the water brown. The lower section of pond contains suitable habitat necessary for the survival of warmwater fish. Warmwater fisheries are resident freshwater finfish populations which can reproduce and survive in an aquatic environment where water temperatures exceed 75° F. for extended periods. Bluegill sunfish was the only species observed at the field review. However, other warmwater species expected to inhabit the pond include largemouth bass, pumpkinseed sunfish and brown bullhead. The outlet stream of the pond contains suitable habitat to support small stream fish. A population of minnows, tentatively identified as either bluntnose or fathead minnows, was observed throughout this stream from the dam down to the Clearview Avenue road crossing. The DEP Inland Fisheries Division is in the process of validating fish identification. The stream may also periodically house warmwater pond species that emigrate downstream during flood events.

Impacts

These impacts on fisheries resources can be expected if proper mitigation controls are not implemented:

1) Construction site soil erosion and sedimentation will occur through increased runoff from unvegetated areas. Portions of this high density development will be constructed on and adjacent to steep slopes that drain into aquatic ecosystems. During construction of homes and the road, topsoil within the site will be exposed and susceptible to runoff events. Erosion and sedimentation due to construction is a major cause of aquatic habitat degradation. The inlet watercourse to the northernmost pond contains sediment from past runoff events that have occurred within the upper portion of this watershed. Pond eutrophication can be accelerated by excessive erosion and sedimentation and seriously impact resident fish, water quality and overall pond recreational value. In particular, excessive siltation will cause these impacts:

   a) The amount of usable fish habitat used for spawning purposes will be reduced. Preferred substrate that becomes compacted with silt is no longer available for spawning. Fish will be forced to disperse to other areas not affected by siltation.

   b) Fish egg survival will be reduced. Water free of sediment particles is required for egg respiration (biological process of extracting oxygen from water) and successful hatching. Silt deposits will smother eggs.

   c) Aquatic insect production will be reduced. Sediment-free water is also required for successful aquatic insect egg respiration and hatching. Aquatic insects are the primary food source of young and adult fishes. Reduced insect levels will adversely affect fish growth during their early growth period. Ultimately, this will lead to reduced growth rates and negatively impact fish survival.

   d) Water depth will be reduced. Excessive siltation will result in a reduction of usable fish habitat.

   e) Oxygen will be depleted. Organic matter associated with soil particles is decomposed by microorganisms, contributing to the depletion of oxygen in waters overlying sediments.

   f) "Gill" function will be adversely affected, and feeding activities will be impaired. Studies have documented that high sediment concentrations and turbidity disturb fish respiration and gill function.

   g) Growth of rooted aquatic plants along the pond shoreline will be encouraged and precipitate dense algae blooms. Eroded soils contain plant nutrients such as nitrates and phosphorous. Although these

plants require nutrients for growth, most ponds and streams contain very limited amounts. Consequently, these nutrients act as fertilizers once they are introduced into aquatic habitats, resulting in accelerated plant growth. Extensive algae blooms may turn the water a pea-soup or soupy brown color. Fish kills due to oxygen depletion in the summer called "summerkill" may occur in ponds when algal populations die. Dead algae are rapidly decomposed by bacteria in the summer, sometimes causing low oxygen levels. Unfortunately, summer lake dissolved oxygen levels are naturally at their lowest, and the introduction of nutrients only makes a bad situation critical.

2) The influx of stormwater drainage may cause aquatic habitat degradation in streams. Stormwaters from the site will outlet into a series of grassed swales or detention basins which eventually outlet into wetlands and ponds. Stormwaters from the road system may contain a variety of pollutants that are detrimental to aquatic organisms. Pollutants commonly found in stormwaters include hydrocarbons (i.e., gasoline and oil), herbicides, heavy metals, road salt, fine silts and coarse sediment. Nutrients in stormwater runoff can fertilize stream waters, causing water quality degradation. Additionally, fine silts in stormwaters that remain in suspension for prolonged periods of time often cannot be effectively removed from roadway catch basins and/or stormwater detention basins. Accidentally spilled petroleum based chemicals or other toxicants can precipitate partial or complete fish kills if introduced in high concentrations.

3) Runoff and leaching of nutrients from lawn fertilizers will stimulate aquatic weed and algal growth in ponds/streams and degrade water quality. Introduction of lawn herbicides may result in fish kills and water quality degradation.

Recommendations

These recommendations should be considered by Harwinton Land Use Commissions to mitigate impacts to local aquatic resources:

1) Maintain a minimum 100-foot open space buffer zone along the edge of the northernmost pond and its associated watercourse. No construction or alteration of natural vegetative habitat should be allowed in this zone. Research has shown that 100-foot buffer zones prevent damage to aquatic ecosystems that support diverse fish and aquatic insect life. These buffers absorb surface runoff and other pollutants before they enter wetlands and aquatic habitats.

2) Maintain the pond. The upper section of pond is filled with sediment from past runoff events. The developer proposes to dredge approximately 1 foot of material for a total of 370 cubic yards. If this area is to benefit existing pond fisheries, the area should be dredged to an average water depth of 3 feet. Consideration should also be given to constructing a sediment basin to

collect sediment from future storm events. This effort will ensure that nutrient loading to the pond is minimized. A sediment basin will be easier to maintain periodically than the pond. Maintaining the natural character of the pond shoreline and associated vegetation should be a major objective. Developing a footpath around the pond and keeping an area open for direct shoreline access at the dam and along the area proposed for dredging would improve access. Fish stocking does not appear necessary at present. If fish stocking is considered in the future, contact the DEP Inland Fisheries Division at 203/485-0226 for additional information.

3) Develop an aggressive and effective E&S control plan. Proper installation and maintenance of these devices is critical, including such mitigative measures as filter fabric barrier fences, staked haybales and sediment catch basins. Land disturbance and clearing should be minimized, and all disturbed areas should be restabilized as soon as possible. Exposed, unvegetated areas should be protected from storm events. The applicant and the Inland Wetland Commission are responsible for checking this development very frequently to ensure that all soil E&S controls are maintained. In addition, the applicant should post a performance bond with the Town to protect against future soil erosion violations. Past stream siltation disturbances in Connecticut associated with sand/gravel developments have occurred when individual contractors either improperly deployed mitigation devices or failed to maintain these devices on a regular basis.

4) The developers should submit detailed stormwater management plans for review. The effective management of stormwaters and roadway runoff can only be accomplished through proper design, location and maintenance of stormwater basins. The soft stormwater design is preferred. However, more detailed plans are required for a thorough evaluation. When possible, stormwaters should only be outletted into non-wetland habitat, avoiding direct contact with wetlands. Timely maintenance of catch basins is critical. Roadway catch basins should be regularly maintained to minimize adverse impacts to aquatic habitats. The use of road salt to de-ice roads should be minimized.

5) It is recommended that local land use commissions investigate increasing the amount of open space by reducing areas of development. Appropriate locations for open space acquired for the purpose of environmental protection include areas adjacent to streams and wetlands and areas of steep slopes such as those east of the main pond. The acquisition of open space should be well thought out and coordinated to maximize corridors between individual parcels.

6) All in-stream work and land grading/filling near aquatic habitats and wetlands should take place during low flow periods. This will minimize the impact to aquatic resources. Reduced streamflows and rainfall during the summer and early fall provide the least hazardous conditions in which to work near sensitive aquatic environments.

7) Limit liming, fertilization and the introduction of chemicals to lawns. This will abate the amount of additional nutrients to the pond and stream environments. Nonphosphorus lawn fertilizers are currently available from various lawn care distribution centers.

THREATENED AND ENDANGERED PLANT AND ANIMAL SPECIES

According to Natural Diversity Data Base maps and files, there are no known extant populations of Federally Endangered and Threatened species or Connecticut "Species of Special Concern" occurring at the site.

Natural Diversity Data Base information includes all information regarding critical biologic resources available at the time of the request. This information is a compilation of data collected over the years by the Natural Resources Center's Geologic 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. Consultation 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. New information is incorporated into the Data Base as it becomes available.

LAND USE AND PLANNING CONSIDERATIONS

PLANNING CONSIDERATIONS

Zoning and Surrounding Land Uses

The Clearwood Development site was recently rezoned from Town Residential (i.e., minimum lot area of 65,000 square feet) to Planned Residential which allows by Special Permit up to 3.5 dwelling units per usable acre when both public water and sewer services are available. According to the applicant's engineer, litigation has resulted in the maximum density for the site being established at 114 units. No more than 34 of these units are to be 3-bedroom units with the balance being 2-bedroom units. Public sewers and water supply are available to service the entire site.

The land surrounding the site is zoned Town Residential. Land use in this adjacent area consists predominantly of single-family residences to the west, and undeveloped woodland with occasional residential development to the north, east and south. The planting plan required under the Planned Residential regulations will result in the establishment of a visual screen of plantings at least 15 feet deep along the side and rear boundaries and at least 20 feet deep along the front boundary of the site. This landscaped buffer and its associated setback will provide an important transitional area between the proposed development and the adjacent, less intensively developed land uses.

Open Space and Recreation Considerations

Recreation and accessory structures associated with Planned Residential projects are permitted under Harwinton's regulations, provided such facilities are limited to the use of the residents. The conceptual plan for the proposed development includes a community house in the northeastern corner of the site. However, according to the applicant, this building will be used solely for administration and meetings of the homeowners association and not for any form of recreational use. The conceptual plan for the development shows general open space areas, but there

are no specific provisions to foster access to or use of these areas. Since the Planned Residential regulations call for a site plan which sets forth the proposed development for the **entire** Planned Residential zone, consideration should be given to developing an open space and recreation plan for the development.

At a minimum, consideration should be given to developing a loop trail around the principal pond on the site. Access to this loop trail could be provided off the major road servicing the site. The select stand of trees located in the vicinity of this access point could be developed into a picnic area, and this use could be integrated with the loop trail. This is a comparatively low cost and low maintenance project and would enhance use and enjoyment of this attractive area of the site. Creation of additional trail networks on the remaining open space areas of the site could be implemented at a later date based on the interest of the homeowners association.

Due to the comparatively high density of the proposed development, some consideration should be given to providing active recreational facilities (e.g., tennis courts, softball field and playground). Reserving some land for future active recreational use should be considered so that if the homeowners association decides to pursue such a project, suitable land will be readily available. Setting aside some land in the vicinity of the proposed Community House for future active recreational use is encouraged. The land could serve passive recreational purposes until interest develops in using the area for active recreation.

Affordable Housing

The development of more affordable housing in the region is a major housing goal of the Litchfield Hills Council of Elected Officials. The proposed Clearwood Development will provide 20 affordable housing units dispersed throughout the development. Some mechanism should be adopted to ensure that these units remain affordable over the long-term. As stated in the recently released "Housing Opportunities Handbook: Land Use and Housing Strategies for Promoting

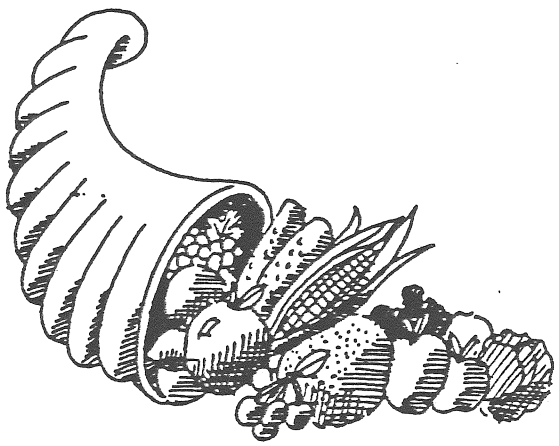
Affordable Housing" (Department of Housing, 1991), where such restrictions are lacking, financial benefits, including subsidies and windfall profits, apply only to the first home buyers or renters. Ultimately, the units return to the market rate sector, and there has been no overall net gain in affordable units. According to the Handbook, legal mechanisms for preserving restrictions include deed restrictions, recorded mortgage liens, common interest community declarations and use of a long-term ground lease. The specific content of affordability restrictions is also discussed in the Handbook. For purposes of either monitoring and/or administering the provisions of any long-term affordability controls, the Handbook recommends that a nonprofit Town agency, housing authority or other party be designated in the affordability documents.

TRAFFIC CONSIDERATIONS

Traffic generated by the proposed Clearwood Development should not adversely impact the adjacent local road system or the area's State highways, as deduced from an analysis of traffic conditions conducted by Wilbur Smith Associates. The alternative selected for the on-site roadway which will connect Clearview Avenue and Weingart Road should conform to Harwinton design standards. A review of the proposed site plan indicates all of the roadway options have common touchdown points at Clearview Avenue and at Weingart Road. The roadway should be constructed to intersect these 2 roads at points of minimal changes in grade, so it will not adversely affect ingress and egress of vehicles. All safety and operational measures suggested for the roadway in the Smith report should be implemented, particularly at the road intersects. Within the development, roadway Alternate A appears to be the best option because it will have less of an impact (if any) on the

wetland area in Parcel A and because it offers a better solution to transgressing the sloping area in Parcel B.

APPENDICIES



Appendix A: Soil Limitations Chart

TABLE 1: SOIL SYMBOLS AND MAPPING UNIT NAMES

Soil Symbol	Soil Mapping Unit Name
ChC	Charlton stony fine sandy loam, 8-15% slopes
Lg	Leicester, Ridgebury and Whitman very stony fine sandy loam
PeC	Paxton very stony fine sandy loam, 3-15% slopes
PeD	Paxton very stony fine sandy loam, 15-35% slopes
WzC	Woodbridge very stony fine sandy loam, 3-15% slopes

TABLE 2: SOIL CHARACTERISTICS IMPORTANT TO DEVELOPMENT

Soil Symbol	Permeability (in/hr)	K	Corrosivity to Steel	Corrosivity to Concrete	Flooding	Water Table Depth (ft)	Water Table Kind	High Water Months	Depth to Rock (in)	Frost Action
ChC	0.6-6.0	0.20	low	high	none	>6.0	---	---	>60	low
Lg	0.6-6.0	0.20	low	high	none	0-1.5	apparent	Nov-May	>60	high
PeC	0.6-6.0	0.21	low	mod	none	1.5-2.5	perched	Feb-Apr	>60	mod
PeD	0.6-6.0	0.20	low	mod	none	1.5-2.5	perched	Feb-Apr	>60	mod
WzC	0.6-2.0	0.20	low	mod	none	1.5-2.5	perched	Nov-May	>60	high

--- no data available

K - Erodibility Factor
.10-.24 - Low Erodibility
.28-.37 - Medium Erodibility
.43-.64 - High Erodibility

Flooding Classes
None
Occasional
Common
Frequent

TABLE 3: MAJOR SOIL LIMITATIONS FOR DEVELOPMENT

Soil Symbol	Septic System	Excavations	Dwellings	Basements	Commercial	Roads	Lawns	Fill	Ponds
ChC	B-9	B-9	B-9	B-9	C-9	B-9	B-16,9	A	C-11
Lg	C-2	C-2	C-2	C-2	C-2	C-2,8	C-2	C-2	B-18
PeC	C-6	B-13,2,9	B-2,9	B-2,9	C-9	B-2,9,8	B-16,9	A	C-11
PeD	C-6,9	C-9	C-9	C-9	C-9	C-9	C-9	C-9	C-11
WzC	C-2,6	C-2	B-2,9	C-2	C-9	C-8	B-16,2,9	C-2	C-11

--- no data available

Degree of Limitations

A - Soil properties and site features are generally favorable for indicated use, and limitations are easily overcome.

B - Soil properties are not favorable for indicated use, and special planning, design or maintenance is needed.

C - Soil properties or site features are so unfavorable to overcome that special design, increases in cost and possibly increased maintenance are required.

Types of Limitations

1 Seepage	2 Wetness	3 Poor Filter	4 Ponding	5 Banks Cave	6 Slow Perc
7 Flooding	8 Frost Action	9 Slope	10 Low Strength	11 No Water	12 Subsides
13 Dense Layer	14 Humus	15 Shallow Depth	16 Large Stone	17 Small Stone	18 Slow Refill
19 Piping	20 Dam Seepage	21 Erosion	22 Droughty	23 Area Reclaim	

TABLE 4: TECHNICAL SOIL GROUPINGS

Soil Symbol	CT Regulated Wetland or Floodplain	Cropland Erodibility Rating	Farmland Rating
ChC	---	---	---
Lg	H	---	---
PeC	---	---	---
PeD	---	---	---
WzC	---	---	---

F - Floodplain soil type
HEL - Highly erodible land
I - Farmland of Statewide Importance
H - Hydric soil type
PEL - Potentially highly erodible land
P - Prime Farmland

Appendix B: Chapter 4 - Guidelines for Erosion and Sediment Control

Chapter 4

REQUIREMENTS FOR SOIL EROSION AND SEDIMENT CONTROL PLANS

Chapter 4 - REQUIREMENTS FOR SOIL EROSION AND SEDIMENT CONTROL PLANS

A. DEFINITION OF PLAN

An erosion and sediment control plan is a document which explains and illustrates the measures which will be taken to control erosion and sediment problems on construction sites. The plan has a written portion known as a narrative and an illustrative portion known as a map or site plan.

A plan is defined in PA 83-388 of 1983 as follows:

> Sec. 3 (5) "Soil erosion and sediment control plan" means a scheme that minimizes soil erosion and sedimentation and includes but is not limited to a map and narrative. The map shall show topography, cleared and graded areas, proposed area alterations and the location of and detailed information concerning erosion and sediment measures and facilities. The narrative shall describe the project, the schedule of major activities on the land, the application of conservation practices, design criteria, construction details and the maintenance program for any erosion and sediment control facilities that are installed;"

B. PLAN FORMAT

The soil erosion and sediment control plan should be an integral part of the overall site plan. However, it needs to be consolidated, so it can be separated from the site plan for review and certification.

To facilitate plan review, certification and implementation, and the construction inspection process, the following format is suggested:

1. The information needed for construction should be on the construction drawings and not in the design calculations or background information.

2. The construction drawings should all be the same size sheets.

3. The soil erosion and sediment control measure construction drawings should be a part of the overall construction drawings for the project.

4. The construction details for measures should be shown on a separate sheet from the plan view sheets.

5. The stages of development, sequence of major operations on the land, and maintenance program during construction are in the narrative portion of the plan but also should be on the construction drawings.

6. General information about the project and design calculations should be in the narrative portion with the exception of a small, simple plan.

7. The design calculations should be in the narrative separate from the construction drawings. Design calculations are normally not needed for inspection, but design calculations need to be available in case revisions are necessary during construction.

8. The background information should be in the narrative separate from the construction drawings.

C. PLAN OUTLINE

The plan must include the items required by the law as given above. The items following include those required by the law and other items that should be considered when developing the plan and included in the plan if appropriate.

This plan outline should not be used as a basis for plan approval. It is intended to be of assistance in preparing and approving erosion and sediment control plans, and to be a reminder of major items that usually need to be considered when developing a plan.

1. VICINITY MAP

a. Project location
b. Roads, streets
c. North arrow
d. Scale
e. Major drainageways
f. Major land uses of surrounding areas

2. PROJECT FEATURES

a. Property lines
b. Limit and acreage of development application
c. Limit and acreage of disturbed area
d. North arrow
e. Scale
f. Legend
g. Planned and existing roads and buildings with their location and elevations
h. Land use of surrounding areas
i. Access roads; temporary and permanent

3. NATURAL FEATURES

a. Soils
b. Rock outcrops
c. Seeps, springs
d. Inland and coastal wetlands
e. Floodplains
f. Streams, lakes, ponds, drainageways, dams
g. Existing vegetation
h. Natural features of adjacent areas

4. TOPOGRAPHIC FEATURES

a. Contours; present and planned (normally 2 foot intervals)
b. Areas of cut or fill
c. Planned grades and slope steepness

5. DRAINAGE SYSTEM

a. Existing and planned drainage pattern
b. Existing and planned drainage area map (include off-site areas that drain through project)
c. Size of drainage areas
d. Size and location of culverts and storm sewers
e. Design calculations and construction details for culverts, storm sewers, etc.
f. Size and locations of existing and planned channels or waterways with design calculations and construction details to control erosion of the channel or waterway
g. Existing peak flows with calculations
h. Planned peak flows with calculations
i. Changes in peak flows
j. Off-site effects of increased peak flows or volumes
k. Measures with design calculations and construction details to control off-site erosion caused by the project
l. Survey and soil information below culverts and storm sewer outlets
m. Measures with design calculations and construction details to control erosion below culverts and storm sewer outlets
n. Measures with design calculations and construction details to control groundwater, i.e. seeps, high water table, etc.

6. UTILITY SYSTEM

a. Location of existing and planned septic systems
b. Location and size of existing and planned sanitary sewers
c. Location of other existing and planned utilities, telephone, electric, gas, etc.

7. CLEARING, GRADING, VEGETATIVE STABILIZATION

a. Areas to be cleared, staging and sequence of clearing
b. Disposal of cleared material
c. Areas to be graded, staging and sequence of grading
d. Areas and acreage to be vegetatively stabilized
e. Planned vegetation with details of plants, seed, mulch, fertilizer, planting dates, etc.
f. Temporary erosion protection of disturbed areas
g. Temporary erosion protection when time of year or weather prohibit establishment of permanent vegetative cover

8. EROSION CONTROL MEASURES

a. Construction drawings and details for temporary and permanent measures
b. Design calculations
c. Maintenance requirements of measures during construction of project
d. Person responsible for maintenance during construction of project
e. Maintenance requirements of permanent measures when project is complete
f. Organization or person responsible for maintenance of permanent measures when project is complete

9. NARRATIVE

a. Nature, purpose and description of project
b. Potentially serious erosion or sediment problems
c. The stages of development if more than one stage is planned
d. The sequence of major operations on the land, such as installation of erosion control measures, clearing, grading, temporary stabilization, road base, road paving, building construction, permanent stabilization, removal of temporary erosion control measures
e. The time required for the major operations identified in the sequence
f. The planned dates for the project. These are often subject to change depending on markets, financing and permit approvals, therefore the sequence of all major operations and time required for major operations is more important in minimizing erosion and sediment problems.

Appendix C: Suitable Planting Materials for Wildlife Food and Cover

SUITABLE PLANTING MATERIALS FOR WILDLIFE FOOD AND COVER

Herbaceous/Vines	Shrubs	Small Trees
Panicgrass	Sumac	Hawthorn
Timothy	Dogwood	Cherry
Trumpet creeper	Elderberry	Serviceberry
Grape	Winterberry	Cedar
Birdsfoot trefoil	Autumn olive	Crabapple
Virginia creeper	Blackberry	
Switchgrass	Raspberry	
Lespedeza	Honeysuckle	
Bittersweet	Cranberrybush	
Boston ivy		

NOTES

ABOUT THE TEAM

The King's Mark Environmental Review Team (ERT) is a group of environmental professionals drawn together from a variety of federal, state and regional agencies. Specialists on the Team include geologists, biologists, soil scientists, foresters, climatologists, landscape architects, recreational specialists, engineers and planners. The ERT operates with state funding under the aegis of the King's Mark Resource Conservation and Development (RC&D) Area - an 83-town area serving western Connecticut.

As a public service activity, the Team is available to serve towns and/or developers within the King's Mark RC&D Area - free of charge.

Purpose of the Environmental Review Team

The Environmental Review Team is available to assist towns and/or developers in the review of sites proposed for major land use activities. For example, the ERT has been involved in the review of a wide range of significant land use activities including subdivisions, sanitary landfills, commercial and industrial developments and recreational/open space projects.

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 site and highlighting opportunities and limitations for the proposed land use.

Requesting an Environmental Review

Environmental Reviews may be requested by the chief elected official of a municipality or the chairman of an administrative agency such as planning and zoning, conservation or inland wetlands. Environmental Review Request Forms are available at your local Soil and Water Conservation District and through the King's Mark ERT Coordinator. This request form must include a summary of the proposed project, a location map of the project site, written permission from the land owner/ developer allowing the Team to enter the property for purposes of review and a statement identifying the specific areas of concern the Team should investigate. When this request is approved by the local Soil and Water Conservation District and King's Mark RC&D Executive Committee, the Team will undertake the review. At present, the ERT can undertake approximately two (2) reviews per month.

For additional information regarding the Environmental Review Team, please contact your local Soil and Water Conservation District or Sue Ferrarotti, ERT Coordinator, King's Mark Environmental Review Team, King's Mark RC&D Area, 322 North Main Street, Wallingford, Connecticut 06492. King's Mark ERT phone number is 265-6695.