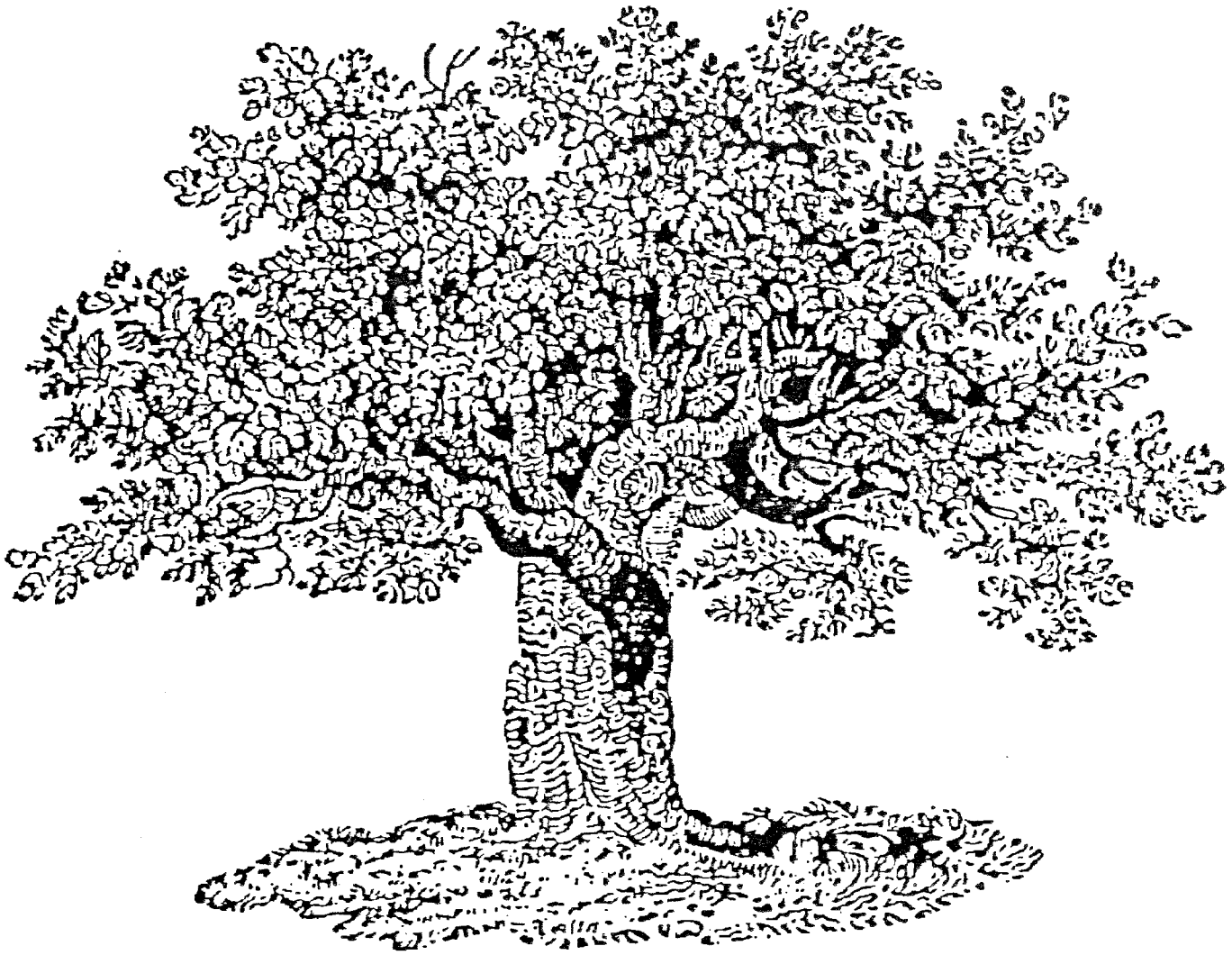
KING'S MARK ENVIRONMENTAL REVIEW TEAM



REPORT FOR

LITCHFIELD AFFORDABLE HOUSING PROJECT

LITCHFIELD,
CONNECTICUT

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

LITCHFIELD AFFORDABLE HOUSING PROJECT

LITCHFIELD, 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

Litchfield 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.

AUGUST 1989

ACKNOWLEDGMENTS

The King's Mark Environmental Review Team Coordinator, Nancy Ferlow, would like to thank and gratefully acknowledge the following Team members whose professionalism and expertise were invaluable to the completion of this study:

* William Warzecha, Hydrogeologist
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I would also like to thank Susan Anderson, Secretary of the King's Mark Environmental Review Team for assisting in the completion of this report.

Finally, special thanks to Ned Lancaster of the Litchfield Conservation Commission, Craig Minor, Town of Litchfield, Cleve Fuessenich, Litchfield Housing Commission, Geri Nebor Litchfield County Soil and Water Conservation District and Clifford Cooper, architect for the trust, for their cooperation and assistance during this environmental review.

EXECUTIVE SUMMARY

Introduction

The Litchfield Inland Wetlands Commission has requested that an environmental review be conducted on the Litchfield Affordable Housing Project. The site is 34 acres in size. According to the plans, much of the site contains wetlands. Upland soils are shallow and very stony. Tannery Brook crosses the western border and forms a small marshy pond. Several small drainageways cross the site and enter Tannery Brook.

The proposed subdivision includes 20 single-family homes and 10 duplex units to be permanent affordable housing. The units will be served by 2 cul-de-sacs. The site is served by sewer and water. The sewer and water right-of-way will be the bed for the cul-de-sacs. The remainder of the site will be left as open space. A number of nature trails are proposed. The small pond is currently proposed for a skating pond.

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. The major findings of the ERT are presented below:

Location, Zoning and Land Use

The site is bounded by Russell Street, Woodruff Street, Gallows Lane and private, undeveloped land. The vicinity is characterized by medium density residences. The Litchfield Public Works garage is located on the west. The site is located in a R-20 zone, which allows single-family residential uses. Any other use will require a special exception.

Topography

Slopes on the site are gentle. Elevations range from 910 to 1000 feet above mean sea level.

Geology

The bedrock underlying the site has been mapped as Ratlum Mountain Schist. Depth to bedrock is unknown, but would be closest to the surface in the central portions of the site. Glacial till overlays the bedrock on the site. The texture of the till ranges from sandy, stony and loose to silty and compact. Stratified drift may underlie the floodplain soils on the site. Borings will be needed for verification. Wetland soils have been mapped as Ridgebury fine sandy loam and Limerick silt loam. Approximately 72% of the site contains wetland soils.

Geologic Development Concerns

Water and sewer lines exist on the site to serve the project. There is a moratorium on water hookups at the present time. Water and sewer availability should ameliorate many of the hydrogeologic concerns; however there are several areas of concern.

Geologic limitations to development include shallow to bedrock areas, hardpan soils with high water tables and regulated wetland soils. Shallow bedrock may require blasting. Blasting should be done under the supervision of persons familiar with the latest blasting techniques. Because of the close proximity of residential neighborhoods, a pre-blast survey should be conducted. Consideration should be given to completing all blasting prior to construction. Hardpan soils are characterized by a seasonal perched water table. In order to prevent wet basements, footing drains will be needed. Any cuts that occur in hardpan soils are difficult to stabilize due to seepage and erosion. Construction of a curtain drain would be effective in lowering the water table. Changes in groundwater levels may affect the wetlands and will require a permit. The present plan calls for several crossings of the wetlands. Driveways and houses may also affect the wetlands. Alternatives suggested include moving the roads and clustering the houses to reduce the impact to the wetlands.

Water Supply

There are 3 potential aquifers on the site if the project is unable to tie into the public water system. The glacial till is an unreliable aquifer particularly in the summer and fall months. The stratified drift is probably too thin and insufficient in size to serve the development. The most reliable aquifer on the site is the bedrock. It is difficult to predict the yield of any given well until it is drilled. Statistically, only 20% of the wells surveyed produced more than 11 gallons per minute (enough to meet the needs of the proposed project). More than a single well may be needed. When the final plans are made, a water budget can be developed and the applicant can determine whether the bedrock aquifer is capable of serving the project. The groundwater on the site is classified as GA which is suitable for private drinking water supplies. Ideally, the wells should be located on a high portion of the site, away from any sources of pollution. All wells should be installed according to the regulations and be inspected by the local sanitarian.

Hydrology

Drainage from the site flows into Tannery Brook. Development of the property will cause increases in runoff. When the final plans are developed, a hydrologic study should be presented to the Town. The study should show that no adverse impacts such as flooding or erosion are anticipated. The downstream culverts should be checked for adequacy. A detailed erosion and sediment control plan should be developed and implemented.

Soil Resources

The major soil limitations on the site are inland wetlands, seasonal high water tables and shallow soils. Disturbance of inland wetland soils require permits. Seasonal high water tables increase the chances for frost heave and wet basements. Shallow soils will require blasting for development.

The preliminary plans show developing the shallow pond on Russell Street for skating. The pond contains high value aquatic and emergent habitat and also provides a sediment trap for Tannery Brook. The pond should not be disturbed. A skating pond could be built on the Rd soils with the proper permits, if desired.

An Erosion and Sediment Control Plan is required to help control erosion. Special concerns include sediment barriers between the development and wetlands and downslope property owners, properly sizing and stabilizing road crossings, culverts and cut slopes, subsurface drains outletted properly and conservation easements on the remaining open land to protect it from future filling.

An alternative to the public water supply is on-site wells. All sources should be identified and water quality in local wells tested. Potential sources of pollution include salts from the Town garage, hydrocarbons from homes and local gas stations and fertilizers and pesticides from lawn maintenance.

Wetland Considerations

The wetlands found on-site are associated with drainageways and swales. Wetland functions include water conveyance and water renovation. The wetlands range from fair to good in quality and good to excellent in functional value because they protect downstream areas.

Due to the preliminary nature of the plan, direct impacts are difficult to evaluate. The wetlands run east to west and any development will run north to south. This will make some impacts inevitable. There is evidence of erosion in some of the swales. A stormwater management plan will be needed to insure that the development does not add to flooding and sedimentation in Tannery Brook. Additional constraints include the potential for frost heaving and wet basements. Using the pond on Tannery Brook as a skating pond may be the largest impact on the wetlands for the project. Recommendations include developing a complete stormwater management plan, making provisions for handling surface and subsurface waters around the buildings and discouraging major disturbances to the wetland systems along Tannery Brook.

Threatened and Endangered Plant and Animal Species

According to the DEP - Natural Diversity Database, there are no Federally listed Endangered Species or Connecticut "Species of Special Concern"on the site. Downstream from the site at Little Pond there is habitat for 3 "Species of Special Concern," the Hooded Merganser, the Common Moorhen and the Blue-winged Teal.

Planning Considerations

The State Policies Plan for the Conservation and Development of Connecticut identifies the site as a rural community center. The project is consistent with the State Plan which also places a high priority on the development of affordable housing. The LHCEO supports the zoning of multi-family housing based on municipal characteristics and encourages higher density development close to community services. The project is consistent with this goal, provided care is taken to minimize the disturbance to wetlands and water quality. The Litchfield Plan of Development defines the site as an area where multi-family housing should be permitted. Since the site is located in the historic district, the Litchfield Historic Commission will also need to approve the project.

The site is zoned R-20H which allows single-family development, but duplexes are permitted only as a special exception. The surrounding land is also zoned R-20H except for a BH zone at the northwest corner. The project appears to be consistent with the surrounding land uses. Maintenance of a vegetative buffer as planned will soften the impacts on the neighbors. Provisions should be made to protect the open space in perpetuity. The Litchfield Zoning Regulations have no provisions for cluster housing. If the property is not divided according to the existing regulations, the property could be re-zoned to RMF-160 or cluster housing regulations could be adopted.

It is desirable to integrate the new construction with the existing Town character. Narrow roads and colonial architecture should be encouraged. Parking for the multi-family units can be located at the rear of the buildings to reduce visual impacts. Vegetative screening should be considered for parking and waste areas. Trees along the roadside should be left to maintain the rural character. A walking path connecting the cul-de-sacs would create a better neighborhood effect. Building and road construction should respect the wetlands. Clustering the houses to avoid the wetlands is recommended to minimize disturbance.

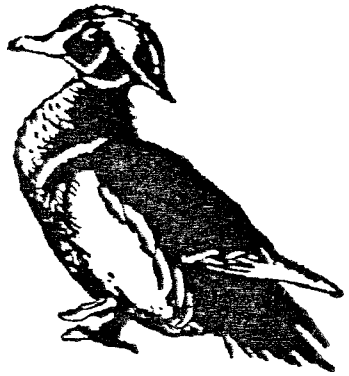
TABLE OF CONTENTS

LAND USE AND PLANNING CONSIDERATIONS

LIST OF APPENDICES

LIST OF FIGURES

INTRODUCTION



7) Assess planning and land use issues.

THE ERT PROCESS

Through the efforts of the Litchfield Inland Wetlands Commission, the developer's representative and the King's Mark 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 12, 1989. Field review and inspection of the proposed development 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 also allowed Team members to check and confirm mapped information and identify other resources.

Once the Team members had assimilated an adequate data base, they were able to analyze and interpret their findings. The results of this analysis enabled the Team members to arrive at an informed assessment of the site's natural resource development 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

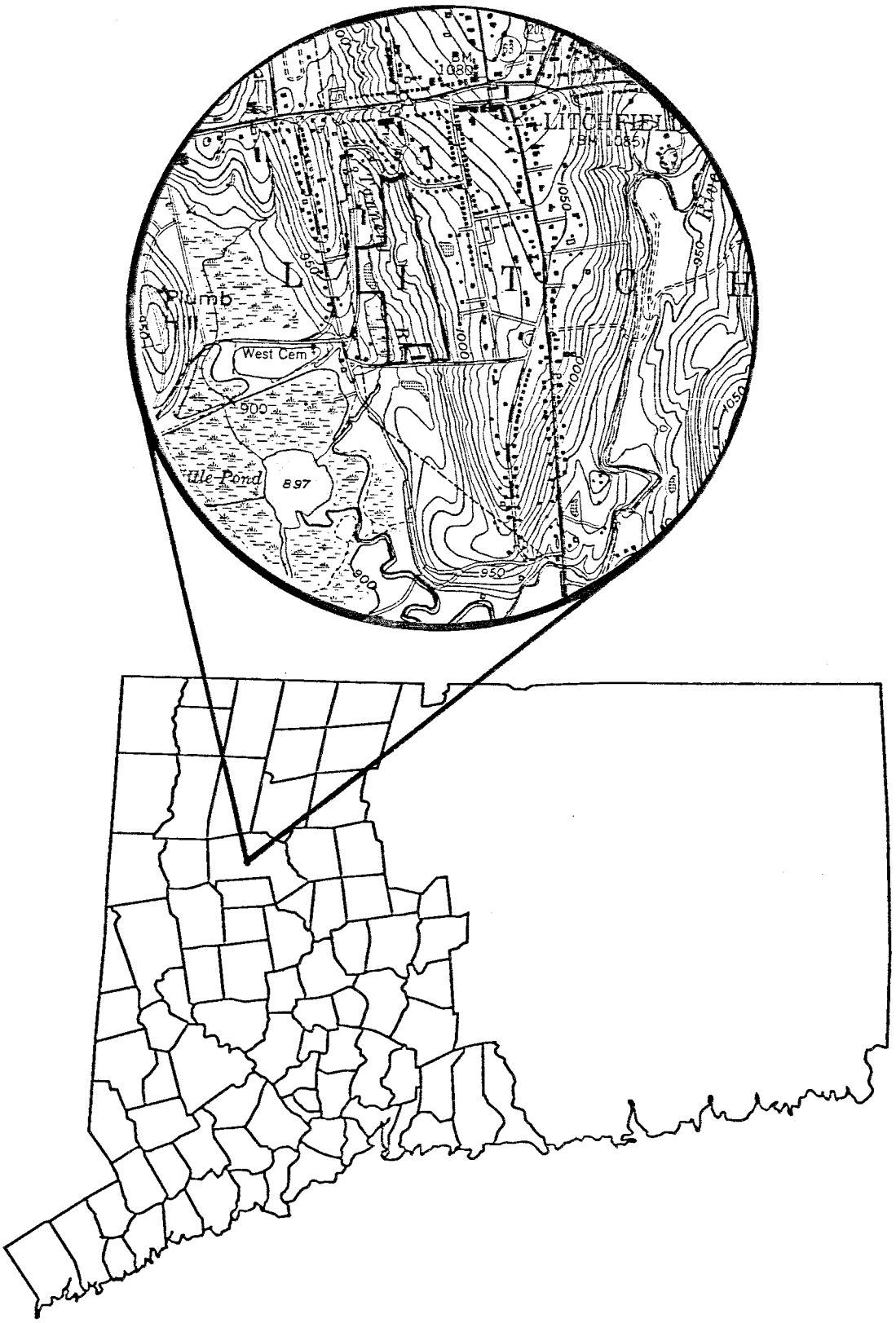
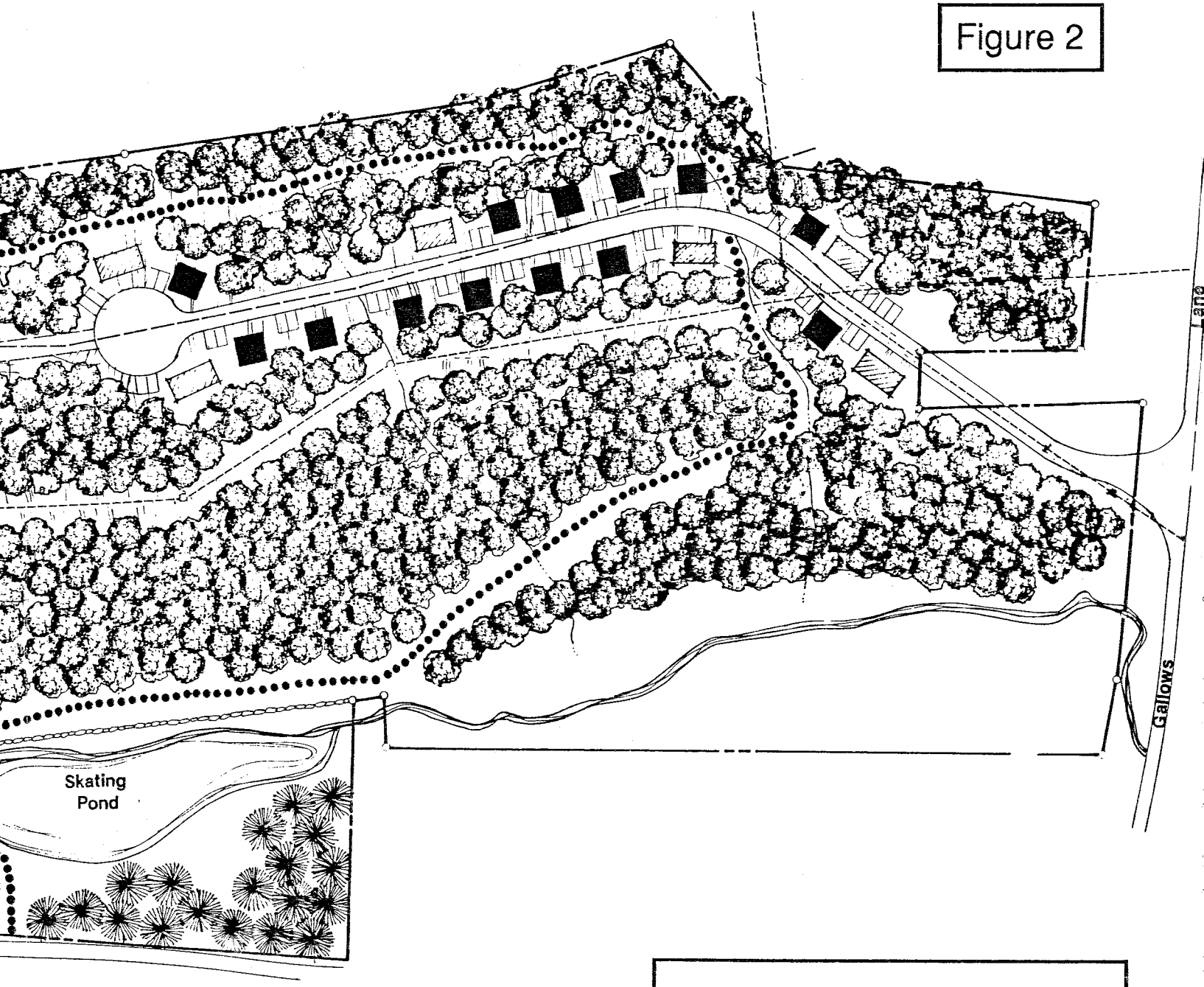


Figure 2



EXISTING WATER

EXISTING SEWER

PROPOSED NATURE TRAILS

SINGLE FAMILY UNIT

DUPLEX UNIT

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LITCHFIELD, CONNECTICUT

King's Mark Environmental Review Team

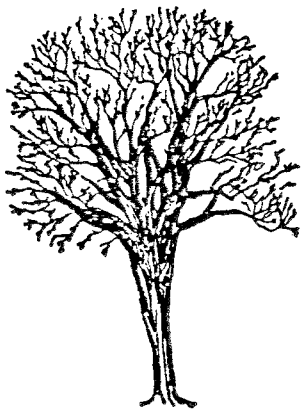
Scale: 1" = 160'

N

Conceptual Site Plan

Information fromLitchfield Housing Trust
PreliminarySite Plan

NATURAL RESOURCE CHARACTERISTICS



TOPOGRAPHY

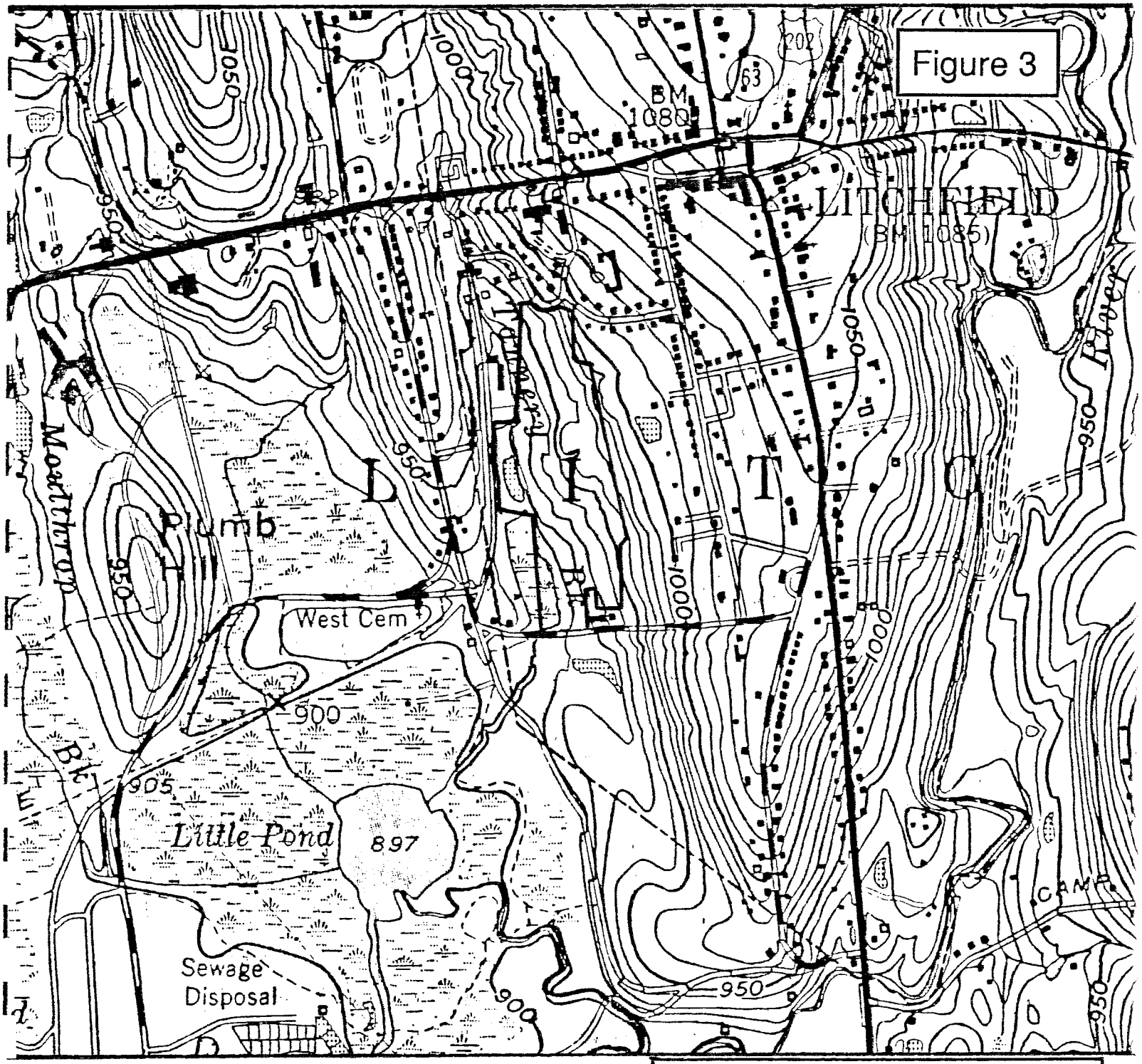
Land surface on the site slopes gently (about 10%) to Tannery Brook. The topography of the site is controlled by the underlying bedrock which is near the ground surface in the central parts. Site elevations range from approximately 1,000 feet above mean sea level at the eastern limits to about 910 feet above mean sea level represented by Tannery Brook Valley (see Figure 3).

GEOLOGY

The subdivision site is located entirely within the Litchfield topographic quadrangle. A surficial geologic map (GQ-84 by Charles P. Warren, 1970) and a bedrock geologic map (QR-1 by R.M. Gates, 1951) have been published for the quadrangle. Also referenced was John Rodgers' Bedrock Geological Map of Connecticut, 1985. These maps are available at the Natural Resources Center in Hartford.

Bedrock in the vicinity of the site consists primarily of gray, medium-grained schist and granofels known as Ratlum Mountain Schist (see Figure 4). Schists are generally cleavable rocks with layering (foliation) defined by parallel arrangement of platy or flaky minerals such as biotite and muscovite. Granofels is rock which is generally light to dark colored, medium- to coarse-grained with little or no foliation (layering) or lineation. The exact depth to bedrock on the site is unknown. It is probably at or near the ground surface in the central parts of the site and probably does not exceed 10 feet in most other places.

A north-south trending fault zone that is aligned with Tannery Brook is located west of the site (Rodgers, 1985). Because of its close proximity to the fault, the bedrock beneath the site may be fractured and slightly to moderately weathered. The fault is



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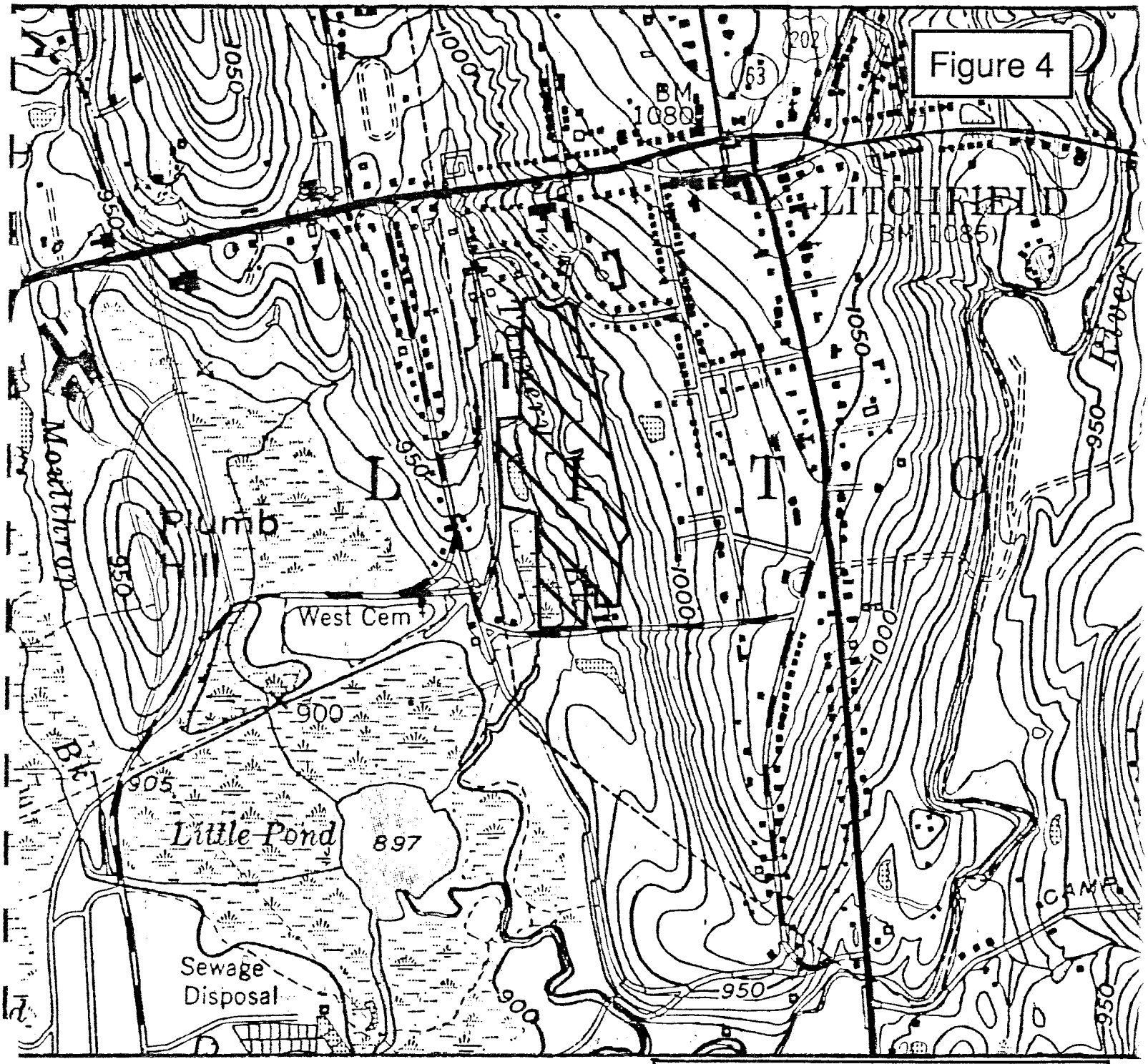
LITCHFIELD, CONNECTICUT

King's Mark Environmental Review Team

Scale: 1" = 1000'

Topography

Information from USGS Topographic Maps, Litchfield Quadrangle



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LITCHFIELD, CONNECTICUT

King's Mark Environmental Review Team

Scale: 1" = 1000'

Bedrock Geology

Information from USGS Topographic Maps, Litchfield Quadrangle

a structural feature that formed during the geologic past but is no longer experiencing active movement. If the bedrock is highly fractured and saturated with groundwater, it may be a favorable aquifer to tap for drinking water supply purposes.

Overlying bedrock across the site is a glacial sediment called till (see Figure 5). In general, the till consists of a grayish brown mixture of sediments that range in size from clay to boulders, but primarily contains sand and silt. The till covering the majority of the site is fine-grained (high silt content). It is characterized by a seasonally high water table, resulting from a firm soil zone that is generally encountered 1.5 feet below ground surface. The presence of this hardpan layer impedes the downward movement of percolating groundwater resulting in a seasonally high water table. These soils are delineated by the symbol Wx (Woodbridge fine sand loam). The till in the central parts of the site is sandy and moderately loose. Additionally, the bedrock surface is inferred to be within 20 inches of the ground surface in this area.

The till sediments were deposited directly by glacial ice onto the bedrock surface as it moved north to south-southeast through the region. Streamlined hills (drumlins) in the area, such as Plum Hill, Barney Hill and Windmill Hill, have main axes paralleling the direction of ice movement, testifying to glacial activity.

Sand and gravel deposits (stratified drift) may underlie the floodplain deposits (Lm soils on the soils map) in the western parts, but soil borings are needed for verification. The sand and gravel was deposited by retreating glacial ice. A pocket of gravel was excavated from the site in the area of the skating pond.

According to the preliminary plans, regulated inland-wetland areas are widespread throughout the site. The wetland soils were identified in the field by a certified soil scientist, and their boundaries were superimposed onto the subdivision plan. They consist of Rd (Ridgebury fine sandy loam, 0-3% slopes) and Lm (Limerick silt loam, 0-3% slopes). The Ridgebury fine sandy loam consists of poorly drained

soils that occur in drainageways and depressions on glacial uplands. Slopes are generally flat. The water table is at or near the surface during winter and spring. The presence of a shallow hardpan soil zone impedes the downward movement of water. The major obstacles of the Rd soils are the presence of seasonally high water tables and a hardpan layer about 1.5 feet below ground surface.

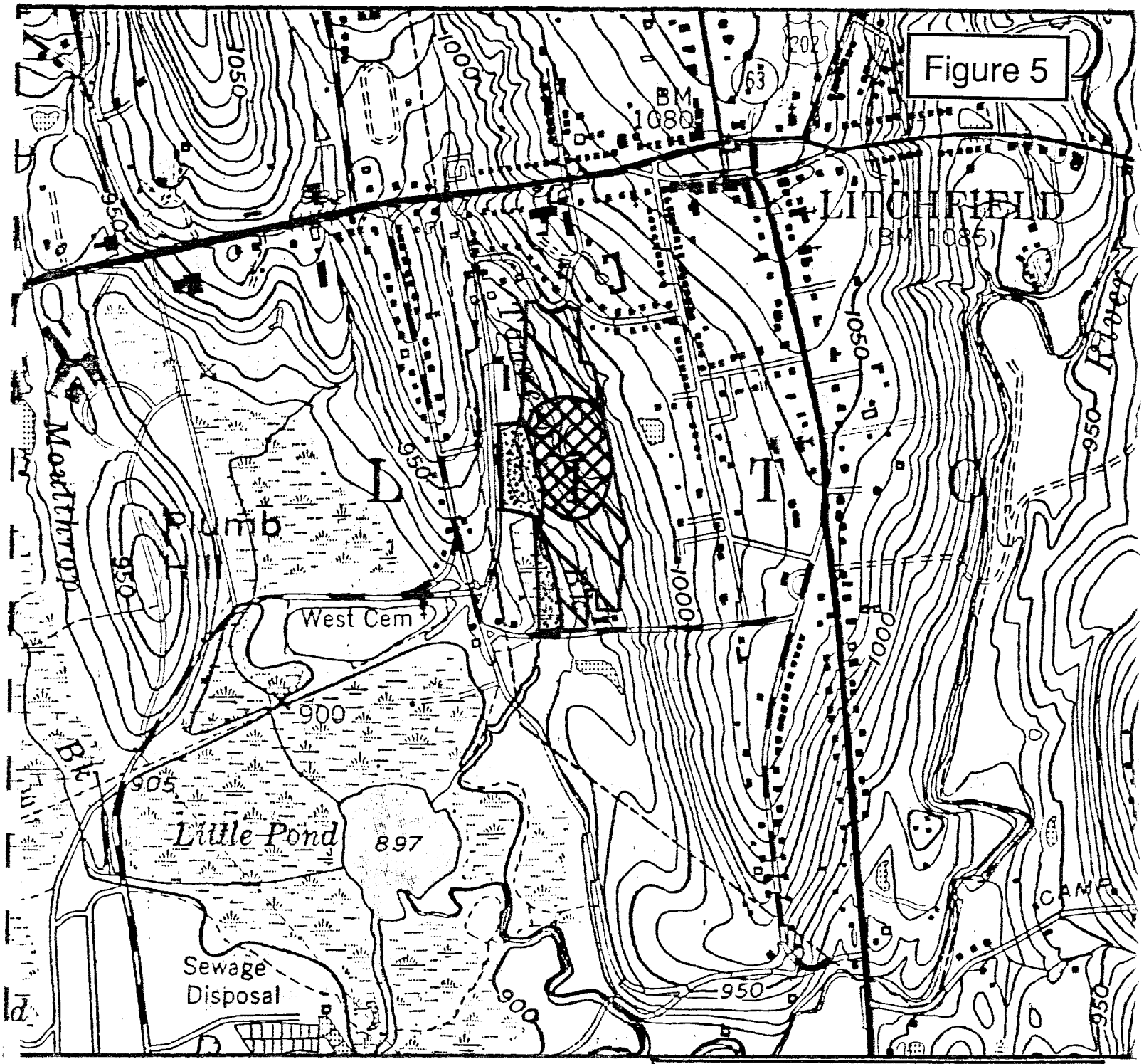
The Limerick fine silt loam consists of poorly drained soils that developed on flood plains along Tannery Brook. Because the water table is at or near the surface much of the year and because of frequent flooding, the area covered by Lm soils have very low potential for development purposes.

Using a digitized planimeter, it is estimated that 72% of the 34-acre site constitutes regulated wetland soils. Present plans indicate that housing units would be constructed on the Rd soils. Additionally, it is likely that grading for access roads would infringe on wetlands.

GEOLOGIC DEVELOPMENT CONCERNS

The proposed subdivision site would be served by public water from Bridgeport Hydraulic Company, Litchfield Division - Litchfield System and by public sewers tied into the Litchfield municipal system. These utilities exist on-site. However, there is a moratorium on water service hook-ups at the present time. Therefore, the potential for the development of individual on-site wells for the project was investigated (see Water Supply section).

Despite the availability of public sewers and water mains, which allay the principal hydrogeologic concerns, there are concerns about potential hydrogeologic impacts of the proposed project with regard to wetlands, seasonally wet soils and shallow to bedrock conditions. Potential erosion and siltation problems which arise



Glacial till

Alluvium (sand and gravel may underlie these deposits)

Shallow to bedrock areas

Information from USGS Topographic Maps, Litchfield Quadrangle

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LITCHFIELD, CONNECTICUT

King's Mark Environmental Review Team

Scale: 1" = 1000'

Surficial Geology

3) Wetland soils on the site have been flagged by a certified soil scientist, and their boundaries superimposed on the site plan. These soils are regulated under Connecticut's Inland Wetland and Watercourses Act, Connecticut General Statutes Section 22a36 through 22a-45, inclusive (see Wetland Considerations section).

   Based on the site plan, the present road layout would result in several crossings of the wetlands on the site. There is evidence of past wetland disturbances on-site. Depending on the final layout, driveways and grading may also affect wetlands. In addition, several houses would be placed on regulated wetlands soils under the present proposal. There appears to be some flexibility for the realignment of roads, which would result in less of an impact on the wetlands within the site. It is strongly suggested that these alternative routes be considered. There also appears to be some flexibility for clustering homes on non-wetland soils, perhaps at higher densities, especially with the availability of municipal sewers, thereby reducing the number of houses on wetland soils.

Some homes are proposed on the Rd soils where the watertable is at or near ground surface for at least 6 months during the year (November to May). The presence of seasonally high water tables in these areas is an engineering concern in terms of constructing homes. If houses are constructed on the Rd soils, a geotechnical engineer should investigate the potential of these soils to support houses. Soil testing in the wetland areas is warranted to determine soil textures, composition, depth to the water table and to determine the loading rate of the soil. If homes are permitted on the wetland soils, all foundations should have both exterior footing drains and an interior underdrain system. Water stops should be placed between walls and footings. This should keep basements dry. Instead of basements, homes could be constructed slab on grade. Even with the potential engineering measures mentioned, the construction of buildings on wetland soils should be discouraged. The destruction of a wetland due to grading and filling will take away any of the natural hydrological or ecological functions that it may be presently performing in the drainage area. Every effort should be made to ensure that each dwelling unit has adequate amounts of dry, usable yard space.

WATER SUPPLY

The proposed development should tie into the public water mains available on the site. However, since there is a moratorium on hook-ups to the system at present, the potential for developing an on-site water supply well or wells was investigated.

Because of its low hydraulic conductivity, the till covering the site would have low potential for groundwater development. Additionally, the water table fluctuates significantly in the till, making it unreliable as a water supply source, particularly in the summer and fall months.

The sand and gravel deposits that may underlie the western parts are probably too thin and not of sufficient area extent for groundwater development. Also, because of their proximity to the public works facility where there is an active road salt storage pile and where oil and chemical spills and leaks have occurred in the past and, because of their susceptibility to groundwater contamination, there is a great risk to groundwater quality.

The most dependable aquifer found on the site, which is suitable for water supply purposes, is the underlying bedrock (schists and granofels). The crystalline, metamorphic rock underlying the site responds to geologic forces such as faulting, folding and uplift by fracturing and forming seams, fractures and cracks in the rock. The solid part of the rock underlying the site is impermeable for the most part. Water that saturates the cracks, seams or fractures in the rock provides a potential water supply for drilled wells that intersect these openings. In general the fractures, seams or cracks are found in the upper 200-300 feet of the bedrock surface.

The random nature of the fractures and seams prevents prediction of well yields in bedrock except on a statistical basis. For this reason, it is extremely difficult to predict the yield of a bedrock well prior to drilling. Water Resources Bulletin No. 21 (Upper Housatonic River Basin) indicates that of 734 wells surveyed in the region that

tapped a rock type similar to the type underlying the site, 90% yielded 1 gallon per minute or more, 50% yielded just under 5 gallons per minute or more and 20% yielded about 11 gallons per minute or more.

Based on present plans, the proposed residential development would include 20 single-family homes and 10 duplex units. If the water demand for the project is estimated to be about 12,000 gallons per day (75 gallons of water/capita/day), a well pumping about 11 gallons per minute (an 18-hour pumping period) would be required to serve the residential subdivision. According to Water Resources Bulletin No. 21 only 20% of 734 wells surveyed yielded 11 gallons per minute or more. Therefore, it is likely that more than a single well may be necessary to adequately meet the water demands of the project.

Once the water budget for the proposed development is known and other hydrogeologic investigations of the bedrock are made, the applicant will be able to determine whether or not the bedrock can provide an adequate amount of water to the development. Of the 3 potential aquifers on the site, the underlying bedrock has the highest potential for serving the project.

The development of an on-site well or wells first requires approval by the State Department of Health Services (Public Water Supply Section) and the Department of Public Utilities Control.

Information on projected needs of the development for water quantity, water quality testing and plans for pumpage, storage, treatment (if necessary) and the distribution system would also be necessary for a community water supply. Consideration should be given in advance to providing for proper operation and maintenance of the community water supply system (i.e., takeover by a private or municipal water supply company).

According to the Department of Environmental Protection (DEP) Water Quality Classification Map of Connecticut (Murphy, 1987), groundwater on the site is

classified as GA, which means that it is suitable for private drinking water supplies without treatment. The natural quality of the groundwater is expected to be generally good, although it may contain iron and/or manganese minerals which could lower the over all quality.

Ideally, the well or wells should be located on a relatively high portion of the site, properly separated from the sewage disposal system(s) or any other potential pollutants (e.g., road drainage, curtain drain) and in a direction opposite the expected direction of groundwater movement. They should all be cased with steel pipe into the underlying bedrock.

In order to provide adequate protection of the quality of bedrock water, all wells will need to be properly installed in accordance with all applicable State Public Health Code and Connecticut Well Drilling Board regulations. In addition, the local sanitarian will need to inspect and approve well location(s).

HYDROLOGY

The proposed subdivision site lies entirely within the Tannery Brook watershed. Tannery Brook flows through the western parts of the site in a southerly direction enroute to Little Pond.

Development of the site for residential purposes is expected to increase the amount of runoff during periods of rainfall. These increases would result from soil compaction, removal of vegetation, modification of wetlands and placement of impervious surfaces such as rooftops, parking areas, roads, driveways, etc. over the soil.

No hydrologic review has not been prepared to date. Once subdivision plans are certain, a hydrologic study that includes a summary report should be prepared for the Town. The report should demonstrate that no adverse impacts such as flooding

or erosion (streambank) are anticipated from increased runoff conditions. All downstream culverts, including existing culverts on the site should be checked for adequacy. Connecticut's Guidelines for Soil Erosion and Sediment Control (1985) should be closely followed.

A detailed and site specific soil erosion and sediment control plan should be developed and implemented for the development. Areas of concern include the proposed roadway crossing of the streamcourses on the site and their accompanying wetlands, storm drain outlets into wetlands and stabilization of the cuts and fills that may be necessary to construct roads and driveways. The plan should be developed using the criteria contained in the Connecticut Guidelines for Soil Erosion and Sediment Control (1985) and enforced by the Town.

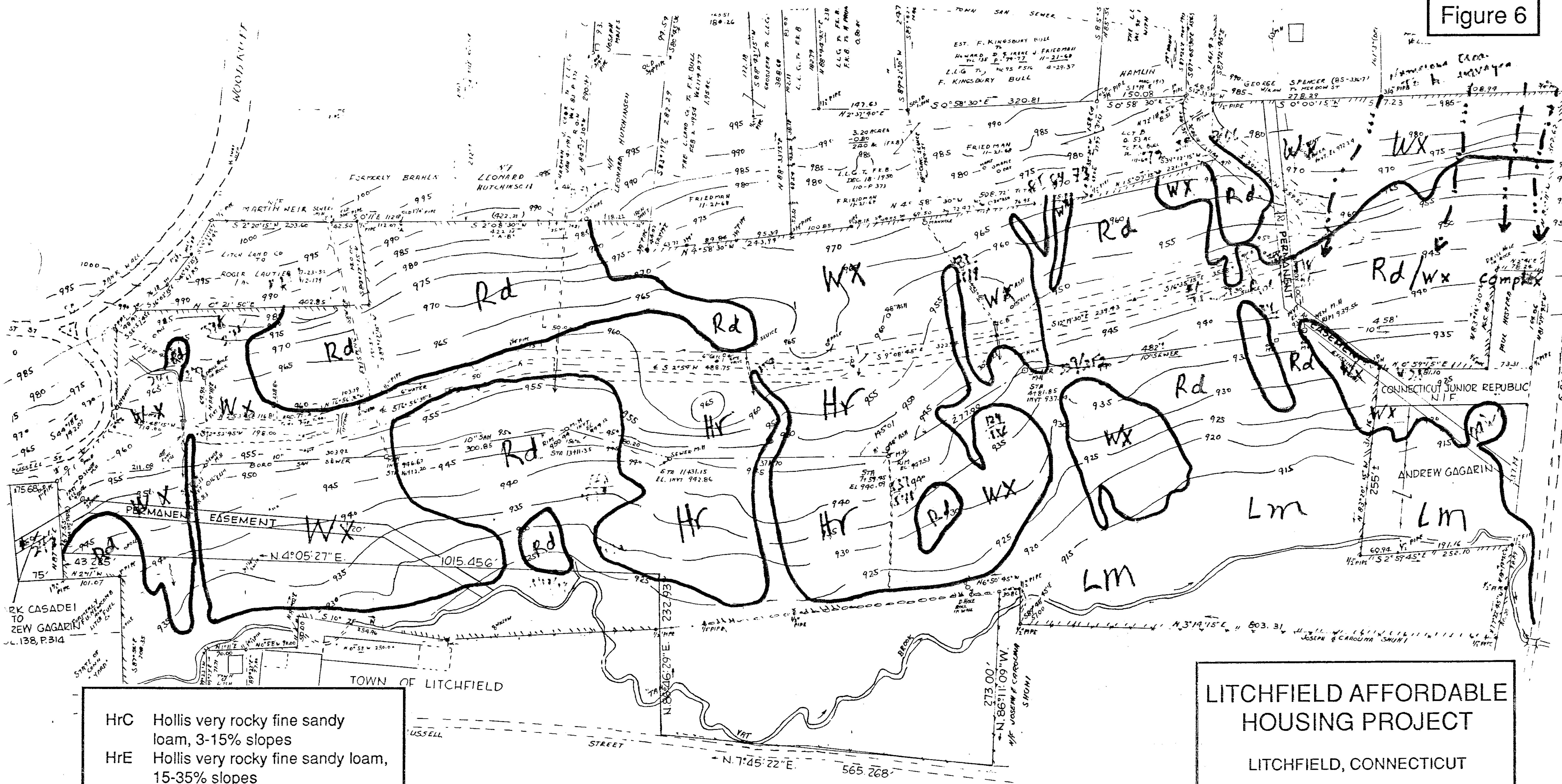
SOIL RESOURCES

The soils on the property have been mapped and described by Soil Science and Environmental Services, Inc. (see Figure 6). The boundary between the Lm and Rd soil is unclear on this map and should be clarified. These soils are further described in the Soil Survey of Litchfield County (1970) and in Tables 1-3 in Appendix A. The following comments address the limitations of these soils for construction.

1) Limerick Silt Loam (Lm) - This soil is generally considered unbuildable because it is an inland wetland and a flood prone area. This area has a very high value as preserved open space because of its excellent wetland wildlife habitat and floodwater storage capabilities. While walking trails are not recommended within this soil, trails adjacent to this soil type can provide good nature study opportunities.

2) Ridgebury fine sandy loam (Rd) - The Rd soil is an inland wetland soil but not a floodplain soil. With careful engineering it is possible to construct roads and buildings on this soil type, however it is not recommended. Construction is not recommended because all inland wetland soils in Connecticut are considered equally important for protection because so

Figure 6



HrC	Hollis very rocky fine sandy loam, 3-15% slopes
HrE	Hollis very rocky fine sandy loam, 15-35% slopes
Lm	Limerick silt loam
Ma	Made land
Rd	Ridgebury fine sandy loam
WxA	Woodbridge fine sandy loam, 0-3% slopes
WxB	Woodbridge fine sandy loam, 3-8% slopes
WxC	Woodbridge fine sandy loam, 8-15% slopes

Information fromSoils Map by Soil Science and Environmental Services, Inc.

LITCHFIELD AFFORDABLE HOUSING PROJECT

LITCHFIELD, CONNECTICUT

King's Mark Environmental Review Team

Scale: 1" = 160'

Soils

Skating Pond Construction

The preliminary site plans show the shallow pond on Russell Street to be used as a skating pond. This pond area currently provides a high value shallow water/ emergent aquatic vegetation habitat for wildlife that is somewhat unique in the area. The shallow pond also serves as a sediment retention area for sediment in Tannery Brook. For these reasons, the pond should not be disturbed.

If a pond is desired on the property for skating or fire protection, it may be possible to construct one in the Rd soil type. The source of water for this pond would be the seasonal high water table. Locating a pond in one of the numerous drainageways on the site would increase water flow into the pond. Some areas of Rd soils are wetter than others. The pond should be located in the wetter range of this soil.

For the construction of an excavated pond, a Litchfield Inland Wetland Permit would be required. If an embankment pond is designed, both the local wetland permit and a DEP Dam Safety Permit are required. If a large flow of water is diverted for the pond construction a DEP Water Diversion Permit may also be required.

Pond construction recommendations are given in Appendix B of this report.

Erosion and Sediment Control Plan

An Erosion and Sediment (E&S) Control Plan is required for this development. The Guidelines for Soil Erosion and Sediment Control, (Rev. 1988) should be followed in developing this plan.

Special concerns for E&S control on the site include:

1) Sediment barriers are needed between inland wetlands or watercourses and construction.

2) Sediment barriers are needed between adjacent downslope property owners and construction.

3) Properly sized and stabilized road crossings of all watercourses are needed. Care is needed in designing the road system so that roads do not act as watercourse dams.

4) Road culvert outlets should be stabilized and not outlet on steep slopes unless in a stabilized watercourse.

5) Cut or fill slopes must be properly stabilized.

6) Subsurface drainage system outlets should be planned to prevent problems for neighboring properties.

7) Conservation Easements on remaining open space lands, especially inland wetlands would help prevent future filling or altering of these areas by future residents.

Water Quality

An alternative to using the public water supply is installing on-site wells. Potential sources of pollution should be investigated if this option is considered. Water quality in wells located in the surrounding neighborhoods would give insight into the potential water quality of wells on-site. Some potential sources of pollution for well water could be: (1) salt from roads or the Town Garage on Russell Street; (2) hydrocarbons from home spills or local gas stations; and (3) nutrients or pesticide from landscaping maintenance.

WETLAND CONSIDERATIONS

Wetland Classification and Functions

The proposed development contains 20 single-family residential homes and 10 duplex units on approximately 34 acres of land. The site will be accessed by cul-de-sacs off of Woodruff Street to the north and Gallows Lane to the south. The preliminary design indicates that all structures will be served by Town water and sewer systems. The wetland systems which have been delineated on-site are primarily drainageways and swales which cross the site from east to west. Tannery

Brook and an adjacent man-made pond/emergent system are located along the western border of the property. As defined by the U.S. Fish and Wildlife Service, the wetlands found on site are classified as follows:

PFOlE	Palustrine, forested, broad leaved deciduous, seasonally saturated.
PSSlE	Palustrine, scrub/shrub, broad leaved deciduous, seasonally saturated.
PEMlE	Palustrine, emergent, persistent, seasonally saturated.

The habitat value of the wetlands on-site is fair due to their size and the surrounding land uses. The primary functions of the wetlands are water conveyance and water renovation. The larger wetland areas along the western border of the property (pond and shrub swamp), have been significantly impacted from sedimentation and debris, but are still quite valuable in renovating water and trapping sediments which helps to maintain wetland and water quality downstream from the site (i.e., a higher quality shrub/emergent system enhanced by beaver activity). Additionally, this area also has some capacity to detain floodwaters during storm events. Overall, the wetlands and watercourses on and adjacent to the site are of fair to good quality, but have good to excellent functional value when put into the context of the surrounding wetland and watercourse system.

Development Impacts

Due to the preliminary nature of the plans, definite wetland impacts cannot be commented upon. However, observation of the site's character indicated that regardless of the ultimate design, wetland constraints and impacts must be considered. Due to the orientation which any development will have to take, (north-south), the crossing of the wetland swales and drainageways is inevitable. There is evidence from the amount of erosion which has taken place within some of the

swales, that flow rates during storm events are significant. A thorough hydraulic analysis is needed to ensure the design of an adequate stormwater management system which would not create or add to any existing flooding or sedimentation problems within the Tannery Brook corridor. There are additional constraints involving the suitability of the site for deep foundations and/or basements. Due to the soil types present and their drainage characteristics (shallow to bedrock and hardpan), the construction of foundations may require blasting, as well as the installation of permanent curtain drains to prevent complications with the integrity of foundations and/or slabs from moisture and frost heaves.

Using the man-made pond on the western border of the property as a future skating area would require a substantial alteration/modification to the existing conditions including the removal of vegetation, earth moving and possible changes to the hydrology. This activity could result in the largest impact by the development.

The site contains several constraints for the development of roads and homes. Due to the preliminary nature of the plans, any conclusion concerning the full impact or risks to the water resources would be premature.

Comments and Recommendations

1) For the proper design and construction of any development on this site, a thorough hydraulic analysis will be needed. A stormwater management system must be designed which will not only pass the anticipated flows, but make provision to replace the water renovation and sediment trapping functions which will be lost to the development.

2) Provisions for the controlling and handling of surface and subsurface water/runoff (curtain drains, under drains, etc.) around proposed building sites should be made. Due to the nature of the soils on-site and the hydraulic conditions observed, these precautions will be needed to ensure foundation and roadway integrity.

3) Any disturbances to the Tannery Brook corridor and pond area should be discouraged. Although this area has been significantly impacted by sedimentation and other debris, it still functions as a valuable water renovation and sediment trapping area. However, if the applicant wished to

improve the quality of this wetland area through restoration efforts, either as part of the stormwater management plan or to enhance the nature trail system, such efforts should be encouraged, if they do not involve significant alterations.

THREATENED AND ENDANGERED PLANT AND ANIMAL SPECIES

According to the Natural Diversity Data Base, there are no Federal Endangered and Threatened Species or Connecticut "Species of Special Concern" that occur at the area . However, downstream from the site, Tannery Brook flows into Little Pond, a significant habitat for a number of bird Species of "Special Concern" including Hooded Merganser (Lophodytes cucullatus), Common Moorhen (Gallinula chloropus) and Blue-winged Teal (Anas discors).

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 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. 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. Such new information is incorporated into the Data Base as it becomes available.

LAND USE AND PLANNING CONSIDERATIONS

and recreation areas with future residential development and specifically encourages the development of more affordable housing The proposed project is consistent with the goals of LHCEO's preliminary housing policy provided care is taken to minimize disturbance to wetlands and water quality with project implementation. The need for additional affordable housing units in Litchfield and throughout the Litchfield Hills Region is addressed in a LHCEO Regional Planning Bulletin entitled "Housing Needs Assessment" (3/88).

The 1984 Litchfield Plan of Development establishes a number of housing policies and goals. These include protection of historic districts, development of a housing mix (particularly for senior citizens and young couples or individuals) and the use of the sewer corridor area to achieve the housing mix. The subject site is specifically defined in the plan as an area where multi-family development should be permitted. Since the site is located within a historic district, it should be noted that the project will also require approval by the Litchfield Historic Commission in addition to land use regulatory commissions.

To conclude, the proposed project is generally consistent with State, regional and local land use plans provided care is taken to minimize disturbance to wetlands and water quality with project implementation.

Zoning and Compatibility of Proposed Project with Surrounding Land Uses

The site is zoned R-20H (Historic Residence District) which allows single-family dwellings by right and duplexes by special exception. Minimum lot area is 20,000 square feet with a minimum lot width of 100 feet. In regard to duplexes, each-single family dwelling unit is required to have a minimum of 800 square feet of habitable floor area. Single-family dwellings also have an 800 square foot minimum habitable floor area requirement. All interior lots in R-20H zones are required to be at least 40,000 square feet.

The land surrounding the site is also zoned R-20H except for a BH (Business Historic District) zone at the northwestern corner of the property. Existing land use in the vicinity is characterized by moderate density residential development to the north and east, undeveloped woodland and wetland to the south and the Town garage with scattered residential development to the west. The proposed project appears to be compatible with adjacent land uses or zoning. Maintenance of a vegetative buffer around the periphery of the property, proposed under the conceptual plan, will serve to soften the transition between the proposed project and adjacent residential development. Provisions should be made through conservation easements or other controls to protect designated open space in perpetuity.

Litchfield Zoning Regulations have no provisions for cluster housing. It is not clear whether the conceptual development plan conforms to the height, yard and area requirements of the R-20H zone. If the property is not to be subdivided according to existing zoning and subdivision regulations, then it will be necessary to either re-zone the site to RMF-160 which permits multi-family residential development or develop and adopt new regulations (e.g. a cluster housing provision) to support the project.

Design Considerations

Litchfield possesses a rich legacy of historic, cultural and scenic resources. It is desirable to integrate any new construction into the traditional townscape and rural landscape. Narrow roads should be encouraged along with a colonial architectural style for the buildings.

Parking: For multi-family units, parking areas can be located at the side or rear of the buildings. The visual impact of parking areas can be easily reduced through landscaped buffers. Parking areas can also be screened along lot lines. Screening should consist of a landscaped area at least 6 feet wide, densely planted with a mixture of deciduous and evergreen trees and shrubs. All trees should be a

minimum of 2" caliper (trunk diameter) when planted. Native trees and shrubs should be planted wherever possible, in order to capture the "spirit of the locale" through indigenous species. Screening should also be considered to lessen the effect on adjoining lots.

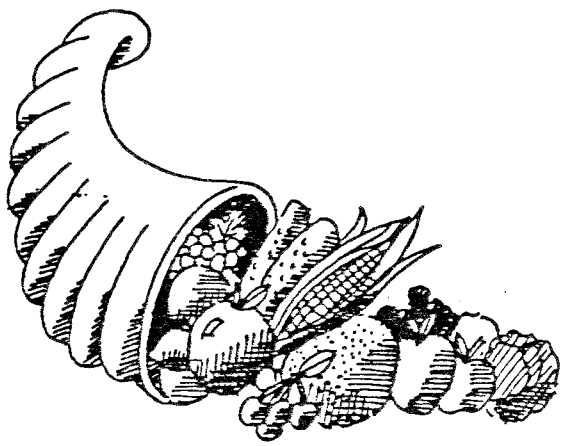
Waste Areas: Areas used for the storage and collection of rubbish, should be visually screened from roads and surrounding land uses. Suitable types of screening include opaque wood fences and dense evergreen hedges of 5 feet or more in height. Where evergreen hedges are proposed, a temporary fence should be built to provide screening until the evergreens are of sufficient height.

Trees: Because roadside trees are extremely important to the character of any Town, removal of trees over 5" in diameter (at breast height) should be minimized, especially along the roadway. Removal of existing trees can be lessened by shifting the site of the building, parking lot or the entrance/exit drive. In addition, planting of new or replacement trees every 30 feet along side the road is encouraged, to reinforce rural character. Such trees should be deciduous hardwoods, such as maple, oak, linden, sycamore, etc., (not conifers or flowering ornamentals), in order that a stately atmosphere may ultimately be created.

Path: If 2 cul-de-sacs are created, a walking path to join them would create a better neighborhood effect along with other walking paths on the property.

Building and Road Placement: It is very important that final plans for buildings and roads on this site respect the extensive wetland areas. An estimated 72% of the site consists of regulated wetland soils. The conceptual plan for the property infringes substantially on these wetland areas. A conscientious attempt to locate housing units in non-wetland areas is recommended. Cluster housing is an alternative which the community may wish to consider in order to minimize disturbance to wetland soils.

APPENDICIES



Appendix A: Soil Limitations Chart

TABLE 1: Soil Symbols and Mapping Unit Names

Soil Symbol	Soil Mapping Unit Name
HrC	Hollis very rocky fine sandy loam, 3-15% slopes
HrE	Hollis very rocky fine sandy loam, 15-35% slopes
Lm	Limerick silt loam
Ma	Made land
Rd	Ridgebury fine sandy loam
WxA	Woodbridge fine sandy loam, 0-3% slopes
WxB	Woodbridge fine sandy loam, 3-8% slopes
WxC	Woodbridge fine sandy loam, 8-15% slopes

TABLE 2: Soil Characteristics Important to Development

Soil Symbol	Permeability (in/hr) Action	K	Corrosivity to Steel	Conc.	Flooding	Water Table Depth (ft.)	Water Table Kind	High Water Months	Depth to Rock (in.)	Frost
HrC	0.6-6.0	0.17	low	high	none	>6.0	---	---	10-20	mod
HrE	0.6-6.0	0.17	low	high	none	>6.0	---	---	10-20	mod
Lm	0.6-2.0	0.49	high	low	freq	0-1.5	apparent	Nov-Jun	>60	high
Ma	---	-0-	---	---	---	---	---	---	---	---
Rd	0.6-6.0	0.24	high	high	none	0-1.5	perched	Nov-May	>60	high
WxA	0.6-2.0	0.24	low	mod	none	1.5-2.5	perched	Nov-May	>60	high
WxB	0.6-2.0	0.24	low	mod	none	1.5-2.5	perched	Nov-May	>60	high
WxC	0.6-2.0	0.24	low	mod	none	1.5-2.5	perched	Nov-May	>60	high

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

Flooding Classes
None
Occasional
Common
Frequent

---no data available

TABLE 3: Major Soil Limitations for Development

Soil Symbol	Septic Systems	Excavations	Dwellings	Basements	Commercial	Roads	Lawns	Fill	Ponds
HrC	C-15	C-15	C-15	C-15	C-15,9	C-15	C-15	C-23,15	C-11
HrE	C-15,9	C-15,9	C-9,15	C-15,9	C-9,15	C-15,9	C-9,15	C-23,15,9	C-11
Lm	C-7,2	C-2	C-7,2	C-7,2	C-7,2	C-7,2,8	C-7,2	C-2	B-18
Ma	---	---	---	---	---	---	---	---	---
Rd	C-6,2	C-2	C-2	C-2	C-2	C-2,8	C-2	C-2	C-11
WxA	C-2,6	C-2	B-2	C-2	B-2	C-8	B-2	B-2	C-2
WxB	C-2,6	C-2	B-2	C-2	B-2,9	C-8	B-2	B-2	C-2
WxC	C-2,6	C-2	B-2,9	C-2	C-9	C-8	B-2,9	B-2	C-2

Degree of Limitation:
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 costs,and possible increased maintenance are required.

Types of Limitations:

1 Seepage	2 Wetness	3 Poor Filtration	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.Lrg.Stone	17 Sm.Stones	18 Slow Refill	19 Piping	20 Dam Seepage
21 Erosion	22 Droughty	23 Area Reclaim		

Appendix B: Pond Construction Information

J.S.D.A. Soil Conservation Service

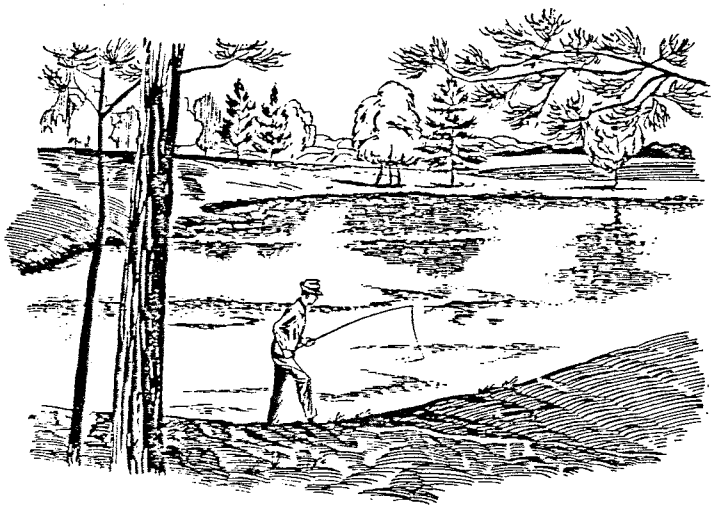
Conservation Information #1
May 1977

Pond Construction

A permit is required prior to work in all wetland areas. Contact your town wetland commission for permit approval.

This guide applies to the construction or reconstruction of both embankment ponds and excavated ponds. Included are items every landowner should know before pond construction.

Embankment ponds, where water is to be impounded more than 3 feet above the original water level, will require a permit from the Water Resources Unit of the Department of Environmental Protection, State Office Building, Hartford, CT.



I. Sequence of Construction:

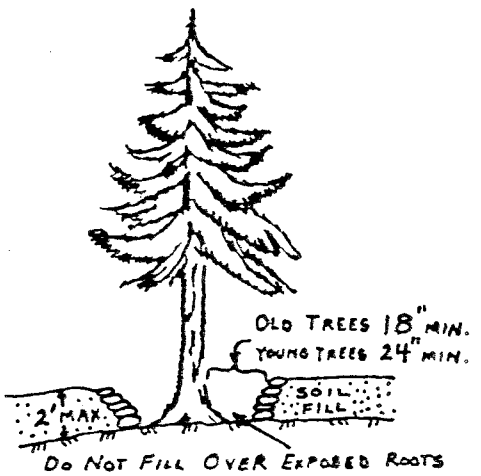
1. Strip and stockpile topsoil before grading the sites.
2. Divert surface water away from the site with furrows or diversions.
3. Construct pond to specifications given in pond plan and to those below.
4. Vegetate all disturbed areas after construction according to the SCS "Pond Area Planting Guide" available in the local Conservation District office.

II. Clearing and Vegetation:

1. It will be necessary to remove most of the trees and shrubs on and near the pond site, dam and spillway sites, and areas where fill is to be placed. Areas to be cleared will be marked by SCS technicians.

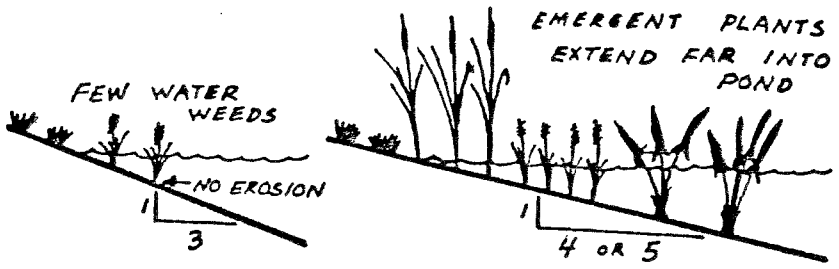
2. Any large or unique trees which are to be retained should be marked. It is the landowner's responsibility to inform the contractor and equipment operators that marked trees are not to be damaged. Trees or shrubs and low branches or exposed roots should be clearly marked by small fences or other means.

3. Trees cannot survive when soil is filled around their bases. Even one-half foot of fill can be fatal. If fill must be placed, build stone wells around trees during construction (See diagram at right).



III. Side Slopes:

Pond side slopes should not be steeper than 2 horizontal to 1 vertical. Steeper slopes usually erode at the water's edge. Side slopes of 3:1 are generally recommended for recreation and maintenance areas where fishing, hiking, or mowing will take place.



3:1 Recommended for Fish, Recreation, or Fire Ponds.

4:1 or 5:1 Recommended for Wildlife Ponds or Marshes.

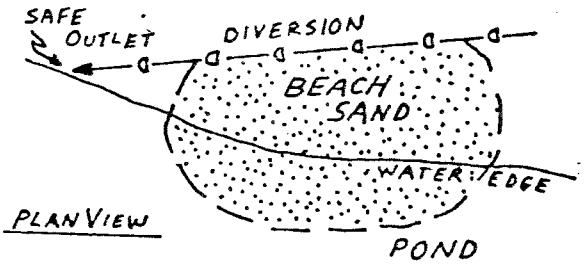
IV. Pond Depth:

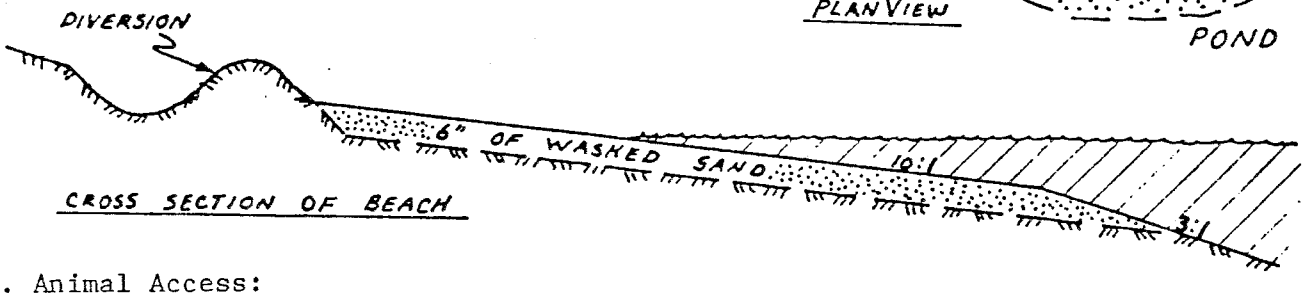
Pond depths are influenced by natural topography, side slopes, and intended uses. Some recommended depths for one-fourth acre ponds are:

1. Swimming Pond. . . . . 6 - 8' minimum in center.
2. Trout Pond . . . . . 8' min. over one-fourth of pond area.
3. Warm Water Fish Pond . . . . 6' min. over one-third of pond area.
4. Wildlife Marsh or Pond . . . 3 - 5' deep with one-third of pond 1' deep.
5. Fire Pond. . . . . 6', 2' deeper at the hydrant inlet.

V. Swimming Beach:

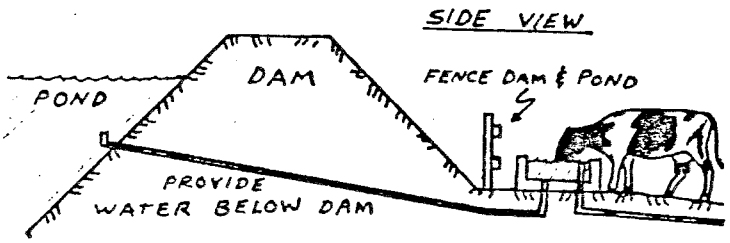
A beach can be established by following this construction sequence: (1) Prepare side slopes of beach area at a 10:1 slope. (2) Construct a diversion ditch just above the beach. (See diagram) (3) Place washed sand on beach area.





VI. Animal Access:

Water quality will be reduced if livestock is allowed access to a pond. Hoofs cause erosion around a pond's edge and manure adds unwanted fertility to the water. When it is necessary to use pond water for a livestock watering facility, consider this method:



The recommended method to use is shown to the left. Detailed plans are available from the Soil Conservation Service.

Prepared by: Alan Horwath, Soil Conservation Service, Connecticut.

FIRE PROTECTION

The fire protection pond should be located reasonably near the buildings to be protected. A centrifugal pump with power unit attached and a length of hose sufficient to reach all sides of the farthest building should be provided. It is good practice in areas subject to freezing to provide for one or more dry hydrants similar to the one shown in Figure 11-2.

A satisfactory fire stream should not be less than 250 gallons per minute with a pressure at the nozzle of no less than 50 pounds per square inch. Fire nozzles usually range from 1 to 1½ inches in diameter. Good quality rubber-lined fire hose, 2½ to 3 inches in diameter, should be used. The length of the hose should preferably not exceed 600 feet.

A typical example of a fire hose line is one consisting of 500 feet of 3-inch hose to which a 1-1/8-inch smooth nozzle is attached. A centrifugal pump, operated at 85 p.s.i. will provide a stream of 265 g.p.m. with a nozzle pressure of 50 p.s.i. Such a stream running for 5 hours would require 1/4 acre foot of water. Local dealers in pumps, engines, and similar equipment should be able to furnish the data required regarding pump capacities and engine horsepower.

A fire protection pond may also serve as a source of supply for local fire departments when accessible to large tank trucks. These trucks are heavy with a maximum capacity of about 1,000 gallons. They normally carry about 20 feet of suction hose and generally must operate from all-weather roads. These points should be considered in location of dry hydrants. When used for this purpose, hydrant fittings should be designed to fit local fire company equipment. To make best use of these installations the fire department should be kept up to date on the location of installations accessible to their equipment.

4-26467 Rev. 12-68

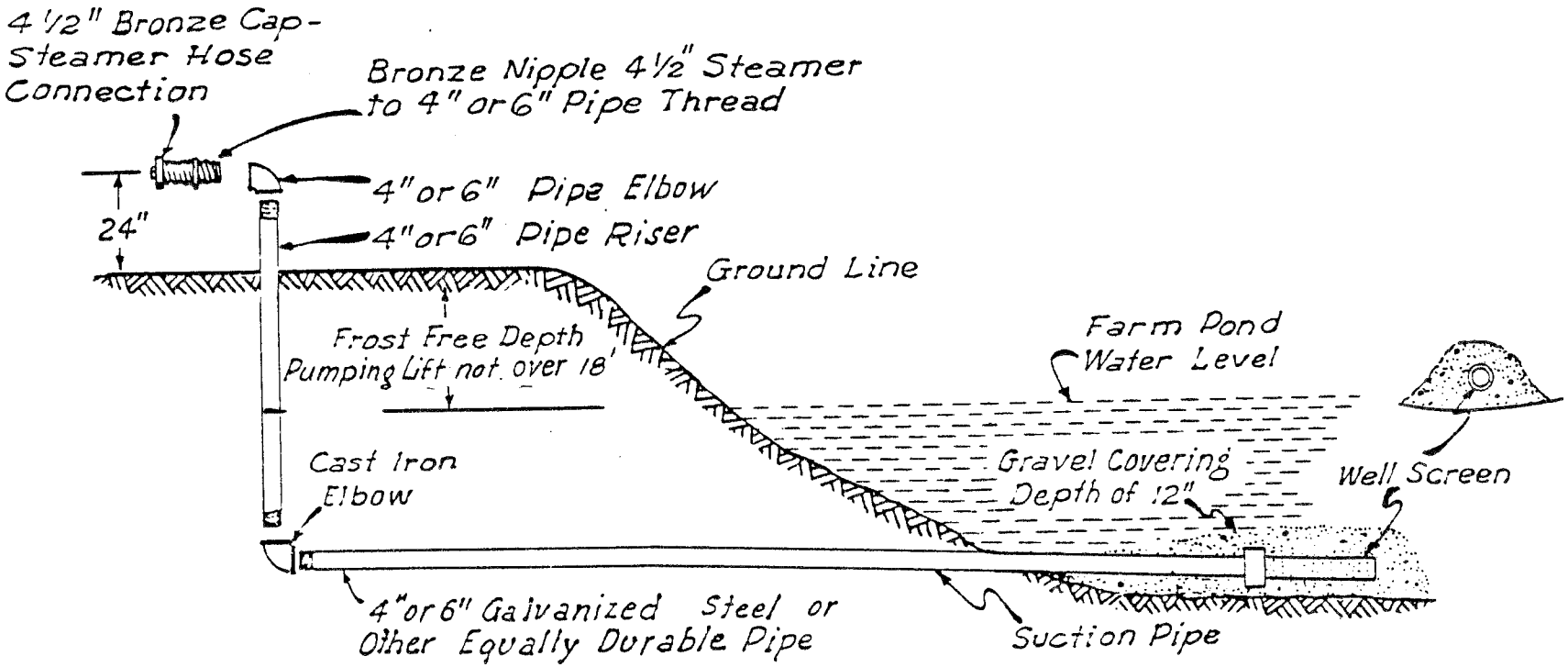


Figure 11–2 Details of dry hydrant installation.

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 Nancy Ferlow, 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.