KING'S MARK ENVIRONMENTAL REVIEW TEAM

REPORT FOR

BIRCH HILL RUN SUBDIVISION

WASHINGTON,
CONNECTICUT

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

BIRCH HILL RUN SUBDIVISION

WASHINGTON, 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

Washington 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.

MARCH 1990

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:

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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 Beverley Miller, Elaine Luckey, Cynthia Hinckliffe, Linda Potter and Ken Williams, Washington Inland Wetlands Commission, Dorothy Hill, Washington Land Use Secretary, Michael DeLuca, Birch Hill Run Associates, Harry Kabasakalian and Lawrence Gilman, Nexus Engineering, and Tina Suarez-Murias, Environmental Design Associates, for their cooperation and assistance during this environmental review.

EXECUTIVE SUMMARY

Introduction

An environmental review was requested by the Washington Inland Wetlands Commission for Birch Hill Run Subdivision, located in the northeast corner of Washington. The 145-acre site contains mostly second growth hardwood forest with several areas of wetlands and swamp. A small stream drains the swamp in the northern portion of the site and flows off-site to Meeker Swamp. The southern portion of the site contains the steep side slopes of Mount Rat. Archaeological sites have been found in the vicinity along Meeker Swamp.

The developer proposes building 35 houses with lot sizes ranging from 1.5 to 16.48 acres. The proposed road will enter the site across the swamp. The developer has an option to purchase the adjacent property to the south which could provide direct access onto Route 202. This property had been approved for development, but is currently in litigation. There are 2 other wetland crossings proposed and 2 detention basins for stormwater control. Much of the northern wetland system will be protected by a conservation easement. The steep slopes of Mount Rat will be protected from development by a buffer. The development will be served by on-site septic systems and wells.

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 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.

Location, Zoning and Land Use

The site is bounded by wooded, undeveloped land, Wilbur Road and residential properties. Present plans include 35 single-family homes served by on-site septic and wells. Washington has soil based zoning. Therefore, the lots range in size from 1.5 to 16.48 acres. Historically, the area has been used for agriculture and low density residences. There has been a slow decrease in farmland and an increase in residences over time.

Topography

The site encompasses the northern half of Mount Rat. Slopes range from gentle in the northern parts to precipitous near Mount Rat. Elevations range from 730 to 1160 feet above mean sea level. Bedrock is at or near the surface on Mount Rat and in the northern parts of the site. Roads will cross the contours, reducing the amount of land disturbance. Some blasting will be required to remove a small rocky knoll.

Bedrock Geology

Bedrock underlying the site consists of Ratlum Mountain Schist, Amphibolite Unit in Ratlum Mountain Schist, Manhattan Schist and Stockbridge Marble. The contact between the Ratlum Mountain Schist, the Manhattan Schist and the Stockbridge Marble is known as the Camerons Line, an ancient fault zone. The upper few hundred feet of bedrock in this area may be fractured and/or weathered, yielding potentially greater than normal amounts of water to bedrock wells. Exact depth to bedrock is unknown, but probably ranges from zero in outcrop areas to 30 feet.

Surficial Geology

The 2 major surficial geologic deposits that occur on the site are till and stratified drift. The till texture ranges from sandy and loose to silty and compact. Till that is silty and compact (hardpan) usually results in a seasonally high watertable which can hinder septic systems. The sandier variety of till should not hinder development, but may have shallow bedrock which will require blasting. Stratified drift is found in the northwestern parts of the site and primarily contains sand and gravel. Little or no development is planed in these deposits. Regulated wetlands have been mapped on the site. These soils can hinder development because of high watertables and low strength of the organic components.

Blasting Impacts

The rocky knoll near the entrance of the site will be removed to accommodate the road. Any blasting that takes place should proceed with caution and use techniques that will minimize airblast and seismic shock. A pre-blast survey should be considered to establish background data. A geotechnical study can determine the amount of blasting required.

Water Supply

Each lot will be served by a bedrock well. According to well completion reports for Wilbur Road, 2 wells tapping marble rock and 1 tapping gneiss had higher than normal yields. The recharge rates for wells should be adequate. Ideally, each well should be located on a high portion of the lot, away from sources of pollution. The wells for Lots 2 and 3 are located downgradient of the septic systems. All wells must be properly installed and inspected.

The quality of the groundwater should be good. There is a chance that the water is mineralized with iron or manganese. If mineral concentrations are high, the water may need to be treated through filtration. Wells tapping marble may have elevated hardness levels. Water softeners may be used, but discharge of backwash to groundwater is prohibited.

The groundwater in the area is classified GAA, which means it is tributary to a public water supply source and is suitable for drinking without treatment. The State's goal is to maintain this classification. Underground fuel storage tanks

should be prohibited. Blasting on the site may affect wells. There is an equal chance that the yields may increase or decrease. A pre-blast survey can define a baseline and note any changes after blasting.

Aquifer Potential of Meeker Swamp

Meeker Swamp is considered a potential aquifer, although no testing has been done and there are no water supply wells at present. Approximately 114 acres of the site drain to Meeker Swamp. Stratified drift deposits that are coarse-grained, relatively thick and close to a major streamcourse may be favorable for yielding moderate to large amounts of water. Verification of the aquifer potential will require testing.

Sewage Disposal

Extensive exploration has been performed on the site. Available information indicates that sewage disposal systems should be feasible on all lots. Some lots will require engineered systems. Moderate slopes should facilitate the installation of curtain drains. Plans indicate that 7 lots will require pumped systems. This design should be reconsidered, and pumped systems avoided where possible. Gravity feed systems could be accommodated on these lots. Also, downgradient wells should be relocated upgradient, if possible.

Hydrology

The entire site lies within the Shepaug River drainage area. The eastern parts drain directly to the Shepaug River, while the western parts drain to Meeker Swamp, Bee Brook and then the Shepaug River. Surface waters have not been classified but are considered AA. Development on the site will increase the amount of runoff. The main concerns are erosion, sedimentation and flooding. There are 2 detention structures planned outside of the wetlands and 1 stormwater control structure proposed for the large wetland. Overall, the applicant has done a favorable job with stormwater management. All stormwater management work should be done during the summer when conditions are dry. This should minimize transport of sediments to watercourses and wetlands. Because of the till soils and moderate to steep slopes, erosion is a concern. E&S controls should be carefully designed, implemented and inspected.

Comments on Road Construction Via Woodland Associates

The connection of the interior roads between Birch Hill Run and the Woodland Associates property will have obvious benefits and may reduce impacts to the wetlands. Moderate slopes, shallow to bedrock soils and high watertables will hinder road construction and may raise costs.

Soil Resources

The major soil limitations are wetlands, soils that are shallow to bedrock, seasonal high watertables and steep slopes. These limitations do not preclude

development, but indicate the need for precise planning. Septic systems may need to be engineered. The northwest portion of the property is located within the 100-year flood zone. Placement of this line on the plans will serve as future reference for planning. The E&S controls are basically adequate. Suggestions include incorporating the complete E&S controls on the plans, using additional silt fences, maintaining the silt fences until all disturbance is stabilized and properly installing, maintaining and monitoring all E&S controls.

Wetland Considerations

Wetlands on the site are classified as either upland wooded wetlands or lowland scrub-shrub wetlands. The impacts to the wetlands will result directly from filling for the entrance road and indirectly form alteration of water flow and water quality. The entrance road crosses the wetlands on an existing dirt road and crosses at the narrowest point. This will minimize the impacts. The stormwater management plan appears to minimize the impacts of runoff on water quality. It is essential that all E&S controls are implemented throughout the project. Accessing the site through the Woodland Associates property could reduce or eliminate the entrance road. Reducing slopes and using rock retaining walls will minimize road fills.

Wildlife Considerations

Wildlife habitat at the site consists of forest, wetlands and some early stage successional growth maintained along the powerline easement. A variety of wildlife is expected to use this area, including deer, ruffed grouse, weasel, raccoon, beaver, otter, fox, coyote, hawks, owls, songbirds, reptiles and amphibians.

Wetlands are very important to wildlife. Beaver may re-occupy the northwest wetlands at some future time, and the subdivision plans appear to accommodate beaver re-occupation. Placing a fence in front of the cross culvert and weir structure will allow beaver to build dams against the fence and not the weir. Trapping could control beaver population. The road should be designed to accommodate the possibility of higher water levels caused by beaver. Streams are used as travel corridors by many wildlife species. A 100-foot buffer around streams is recommended for protection. A buffer of undisturbed vegetation around wetlands is recommended for wildlife and protection of the wetlands from siltation. Also, this buffer can minimize problems associated with beaver raising the water level.

Several detention basins are proposed for upland sites, which is preferable to placing them in wetlands. As proposed, the basins will have some value to wildlife as opposed to a grassed or rip-rapped basin. Maintaining water in the detention basin should not be at the expense of the natural wetlands. Maintenance and cleaning is important because a silted-in basin has little use as wildlife habitat.

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 houses. 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 cluster development. Setting aside a

combination of habitats for open space is desirable. Open space areas should be connected to provide travel paths. Certain steps can be taken to minimize the effects of development on wildlife. These include buffer strips, natural landscaping techniques, maintaining field borders and early successional stage vegetation and maintaining wildlife requirements.

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.

Archaeological Considerations

Wetlands were often the focus for Native American settlements. The area around Meeker Swamp is an important archaeological resource. Several sites have been recorded in the area, including a series of overlapping prehistoric settlements. Similar archaeological resources may be found on the landforms south and east of Meeker Swamp between the 700- and 850-foot contour intervals. This includes much of the site. Any archaeological resources will be shallow and easily disturbed. Particularly sensitive areas include the large wooded swamp and wetland. Although agriculture has already affected this area, the proposed subdivision will intensify the disturbance. A systematic archaeological survey of the northern section should be conducted. The non-sensitive spaces could then be designated for housing and the sensitive areas preserved as open space.

Planning Considerations

Land use in the area is woods and rural residential. Route 202 is a State collector road which has high speed traffic. The proposed subdivision will be buffered from traffic noise by the wooded strip along Wilbur Road. Approved condominium developments will change the character of the area. The proposed development represents a transitional form which is less dense than the condominiums and more dense than the surrounding rural area.

The site is in the vicinity of 2 important natural areas: Mount Rat and the Shepaug River. Portions of the Shepaug River were recommended for inclusion in the Wild and Scenic Rivers Program. Homes in the subdivision should be buffered so that they are not visible from Mount Rat or the river.

The Traffic Impact Study indicates that the volume of traffic on Wilbur Road will increase 6 times as a result of the subdivision. Because of the stressed condition of the pavement on Wilbur Road, a pavement survey is recommended. The Town should require a performance bond for the pavement and could require upgrading the road as part of the subdivision. Intersection improvement should also be considered for Route 202 and both ends of Wilbur Road. The proposed road length exceeds the 1000 feet permitted in the regulations. The applicant has not clearly demonstrated the feasibility of the road connection with the Woodland Associates property. The Town should require resolution of this question before subdivision approval.

The State Plan designates the site as a Conservation Area because of the wetlands and the public water supply status. The recommended minimum lot size for public water supply watersheds is 2 acres. To be consistent with this recommendation, several lots should be enlarged.

The proposed subdivision is consistent with the Regional Plan, but does not address affordable housing needs. Consistency with the rural character will depend on the density, housing type, extent of vegetation clearing and road width. A narrower road would be more consistent with the rural character. The Town will have to amend the regulations to allow a narrower road. Although a plan with fewer lots would be more consistent with the rural character, the character of the area is changing with the addition of condominiums. Retaining natural vegetative cover, where possible, will increase the rural character.

The Subdivision Regulations allow the Planning and Zoning Commission to require open space. Open space could be requested as buffers along the Shepaug River, around Mount Rat and along the wetlands.

Traffic Considerations

The consultant reports are comprehensive. The subdivision plan emphasizes protection of the wetlands over the ridgeline. It is difficult to protect both. The current design is a reasonable compromise. Wilbur Road is 15 to 18 feet wide with distressed pavement. Road improvements will be required in the future, as well as intersection improvements for Wilbur Road and Route 202. The entrance road will require a rock cut. The plans should be reviewed to see if all the rock needs to be removed or if rock slopes are possible. These rock slopes would complement the design of the subdivision. The curbing should be reviewed, especially in areas where snowmelt can puddle and freeze. A review of the regulations for subgrade and sub-base is appropriate in areas susceptible to frost heave. An additional 6 inches of sub-base may be needed as well as appropriate drainage. The proposed 24-foot wide entrance road is an incongruity with the 18-foot Wilbur Road. A narrower design might be considered. Road drainage should not be allowed to decrease the quality of water flowing into Meeker Swamp. The 18-inch pipe used in the road crossing is adequate, but a 24-inch pipe should be considered for easier maintenance. The proposed wier near this pipe should be reviewed because the jump between the 2 could erode the banks. The pipes connecting the catch basins could be used to drain the subgrade and sub-base if needed. Underdrains should be considered in all areas with saturated soils. Underground utilities should be placed outside of the paved road. All E&S controls should be observed.

All wells on Wilbur Road should have baseline water quality tests. The Town may be responsible for long-term environmental claims, and the developer is responsible for water quality during construction. Stonewalls often direct overland flow and should be left in place. Retaining the historical flow patterns is an important factor in stormwater management. The existing well on Lot 33 should be maintained as a sampling site.

TABLE OF CONTENTS

BIOLOGICAL RESOURCES

ARCHAEOLOGICAL RESOURCES

LAND USE AND PLANNING CONSIDERATIONS

LIST OF APPENDICES

LIST OF FIGURES

INTRODUCTION

INTRODUCTION

An environmental review was requested by the Washington Inland Wetlands Commission for Birch Hill Run, a site proposed for subdivision development. The site is located in the northeast corner of Washington near the Warren, Litchfield and Morris Town Lines. Access is provided by Wilbur Road, a small side street off of Route 202.

The 145-acre site contains mostly second growth hardwood forest with several areas of wetlands and swamp. A small stream drains the swamp in the northern portion of the site and flows off-site to Meeker Swamp. The southern portion of the site contains the steep side slopes of Mount Rat. Archaeological sites have been found in the vicinity along Meeker Swamp.

The developer proposes building 35 houses with lot sizes range from 1.5 to 16.48 acres. The proposed road will enter the site across the swamp. The developer has an option to purchase the adjacent property to the south which could provide direct access onto Route 202. This property had been approved for development, but is currently in litigation. There are 2 other wetland crossings proposed and 2 detention basins for stormwater control. Much of the northern wetland system will be protected by a conservation easement. The steep slopes of Mount Rat will be protected from development by a buffer. The development will be served by on-site septic systems and wells.

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. Specific objectives include:

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

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

3) Discuss soil erosion and sedimentation concerns;

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

5) Assess the impact of development on wildlife, including alternatives for consideration;

6) Assess archaeological issues;

7) Assess planning and land use issues; and

8) Assess traffic and access issues.

THE ERT PROCESS

Through the efforts of the Washington 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);

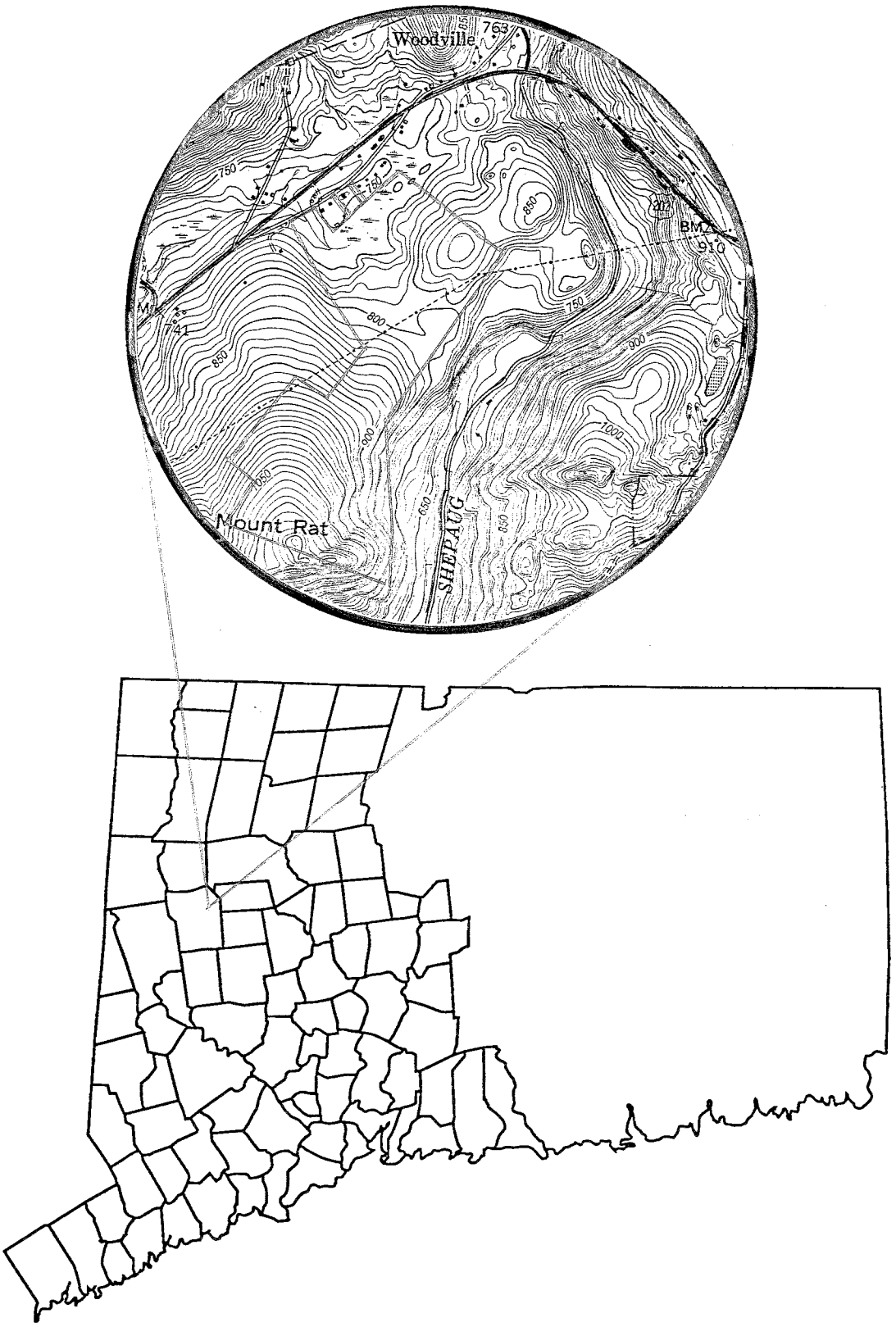
3) Identification of resource problem areas; and

4) Presentation of planning and land use guidelines.

Data collection involved both literature and field research. The ERT field review took place on February 7, 1990. Field review and inspection of the proposed development site proved to be a most valuable component of this phase. 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

Figure 1

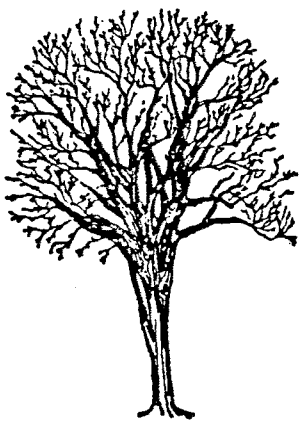
LOCATION OF STUDY SITE



was collected. Being on-site also 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 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.

PHYSICAL CHARACTERISTICS



LOCATION, ZONING AND LAND USE

The approximately 145-acre irregularly shaped site is located in northern Washington. It is bounded on the north, east and south by wooded undeveloped land. Wilbur Road, which will provide the main access to Birch Hill Run, and several residential properties occur northwest of the site. Woodland Associates, an approved residential subdivision that is presently under litigation, abuts the site on the west. Connection of the proposed interior road for Birch Hill Run to Route 202 via Woodland Associates will allow 2 means of egress for the site. This connection will have an obvious benefit for access by emergency vehicles to the residential subdivision and may provide an alternate road layout that will reduce the amount of wetland activity presently proposed for northwest corner of Birch Hill Run.

Present plans indicate the site will be divided into 35 building lots. Each lot will include a single-family home served by an on-site sewage disposal system and an individual water supply well. The Town of Washington utilizes soil based zoning for regulating residential land development. Therefore, the size of the proposed lots, which range from 1.5 to 16.48 acres, is based on a detailed soil survey of the upland soils on the site. This work was conducted for the applicant by Roy Shook of Environmental Resources Associates. The information was used to determine the carrying capacity of the soils on each lot and the soils' ability to accept and renovate septic tank effluent.

A review of air photos from 1934 to the present indicates the site and vicinity have historically been used for agricultural and low density residential purposes. Numerous stonewalls transecting the parcel give testimony to former fields and pastures. Every effort should be made to preserve stonewalls, where possible.

Generally speaking, changes in land use since the 1934 air photo include a decrease in farmland, an increase in wooded land and an increase in residential

densities. The air photos can be reviewed at the Department of Environmental Protection (DEP) Natural Resources Center in Hartford.

TOPOGRAPHY

The parcel encompasses the northern half of Mount Rat, which rises to 1,160 feet above mean sea level at the southern property line. Topographic conditions on the site vary from gentle to precipitous. Precipitous slopes occur in the southern parts primarily on Lots 16, 17 and 19. The present layout indicates that houses and septic systems have been placed between 80 and 100 feet from these precipitous slopes. Gentle slopes are found in the northern parts. The remainder of the site is characterized by moderate slopes. Maximum and minimum elevations on the site are 1,160 feet and 730 feet above mean sea level, respectively (see Figure 3). According to surficial geologic mapping, bedrock is at or near ground surface on the crest of Mount Rat (Surficial Geologic Map of the New Preston Quadrangle Litchfield County, Connecticut, Roger B. Colton, 1969). Additionally, bedrock is inferred to be at or near the ground surface in the northern parts of the site.

Generally, roads have been located to cross slopes and conform to the contours rather than perpendicular to the hills on the site. This layout reduces the amount of "cuts" and "fills" and excessive amounts of land disturbance due to road grading. Also, the Town's 10% road grade requirement will be followed. A rocky knoll located approximately 1,000 feet southeast from the entrance of the proposed road off Wilbur Road must be removed for the construction of a segment of the interior road system. The area is identified as HoC - Chatfield-Hollis-Charlton soils on the plans. Blasting is anticipated and warrants careful examination (see Blasting Impacts section).

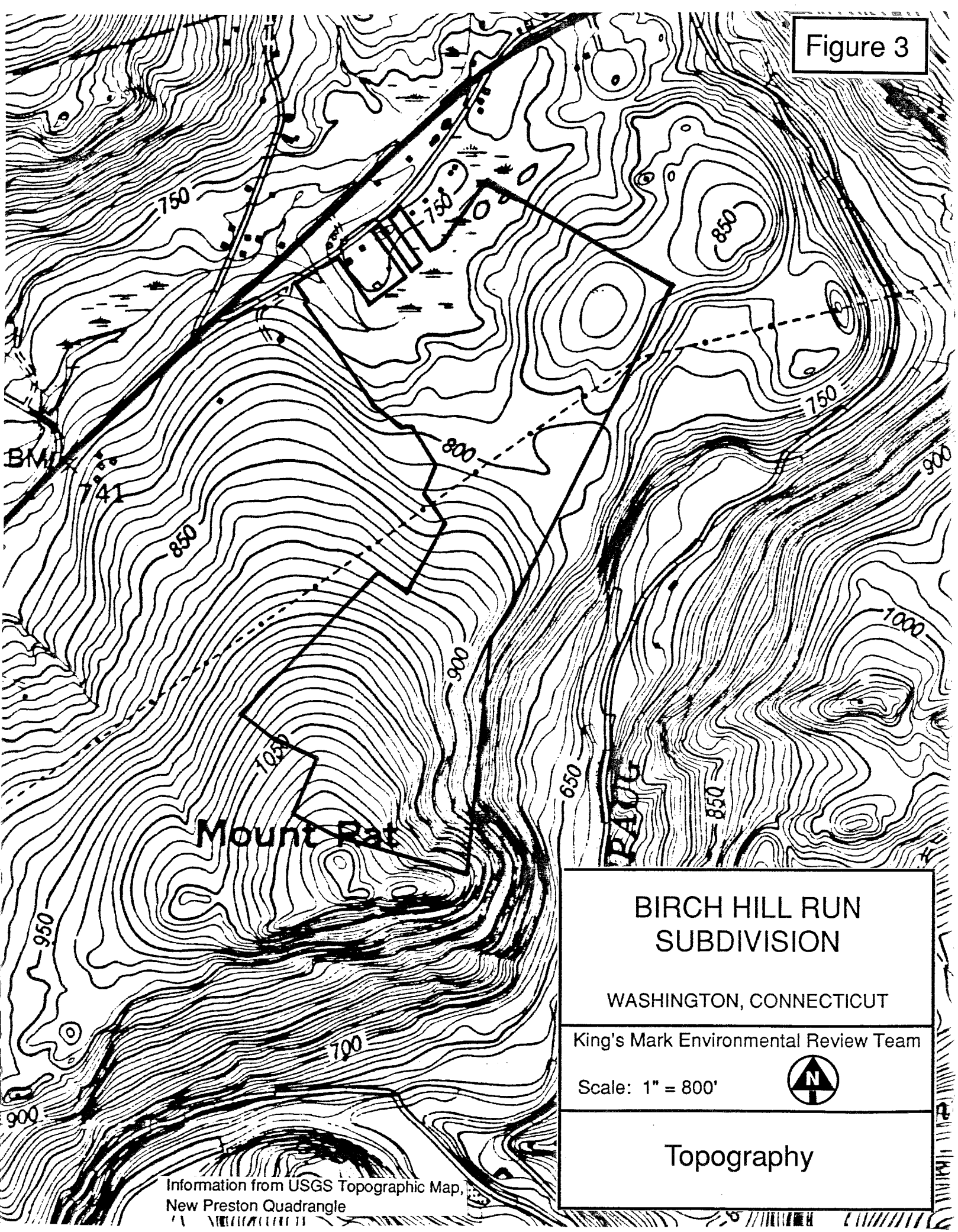


Figure 3
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BIRCH HILL RUN
SUBDIVISION
WASHINGTON, CONNECTICUT
King's Mark Environmental Review Team
Scale: 1" = 800'
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Topography
Information from USGS Topographic Map,
New Preston Quadrangle

BEDROCK GEOLOGY

The site lies entirely in the New Preston topographic quadrangle. A bedrock geologic map (QR-2, Bedrock Geology of the New Preston Quadrangle, Robert M. Gates, 1956) and a surficial geologic map (GQ-782, Surficial Geologic Map of the New Preston Quadrangle, Connecticut, Roger Colton, 1969) for the quadrangle has been published by the Connecticut Geological Survey and U.S. Geological Survey, respectively.

The applicant's technical consultant has described the bedrock geology of the site satisfactorily in the report entitled Birch Hill Run - Environmental Assessment, Combined Preliminary and Supplementary (EDA, January 1990). In general, the bedrock underlying the site consists of:

1) **Ratlum Mountain Schist** - a gray, medium-grained schist and granofels;

2) **Amphibolite Unit in Ratlum Mountain Schist** - a black or mottled, massive amphibolite and hornblende gneiss;

3) **Manhattan Schist** - a dark-gray to silvery, rusty-weathering, coarse-grained schist; and

4) **Stockbridge Marble** - a white to gray dolomitic marble.

Figure 4 shows the approximate distribution of these bedrock formations. The bedrock underlying the site is comprised of metamorphic rocks (rocks which have been altered by high pressures and temperatures).

The EDA report indicates that the contact between Ratlum Mountain Schist and the Manhattan Schist/Stockbridge Marble delineates Camerons Line, an ancient fault zone. The fault in the vicinity of the site is approximately aligned with Route 25. Because of the fault's proximity to the site, the upper few hundred feet of bedrock may be fractured and/or weathered. Therefore, the bedrock aquifer in the vicinity may have good water-bearing capabilities, potentially yielding greater than normal

amounts of water to drilled wells. The underlying metamorphic rock is the source of water for many homes throughout Washington and will be the source of water for the homes in the proposed subdivision (see Water Supply section).

The exact depth to bedrock on the site is unknown, but probably ranges from zero, where it is exposed at ground surface, to 30 feet or more in the southcentral and central parts of the parcel.

SURFICIAL GEOLOGY

The 2 major surficial geologic deposits that occur on the site are till and stratified drift, both of glacial origin (see Figure 5). Till is the predominant deposit covering bedrock. It is composed of rock particles ranging in size from small clay particles to large boulders deposited directly by glacier ice. The textural components of the till are not sorted. For example, fine-grained particles are intermixed with coarse-grained particles. Although the texture of the till may vary, it is commonly sandy, stony and loose in the upper 2 to 3 feet or in shallow to bedrock areas, but becomes siltier and very compact at lower depths. Based on soil mapping data, the site contains both varieties of till.

The presence of a compact soil zone (hardpan) in the till usually results in a seasonally high watertable condition, strong soil mottling (an indicator of high groundwater tables) above the hardpan layer and moderately slow to slow percolation rates. Woodbridge and Paxton soils comprise the compact soils on the site. Seasonally high watertables are an important design constraint for on-site sewage disposal and warrant careful examination. Also, houses constructed on these soils should be protected by footing drains to keep basements dry.

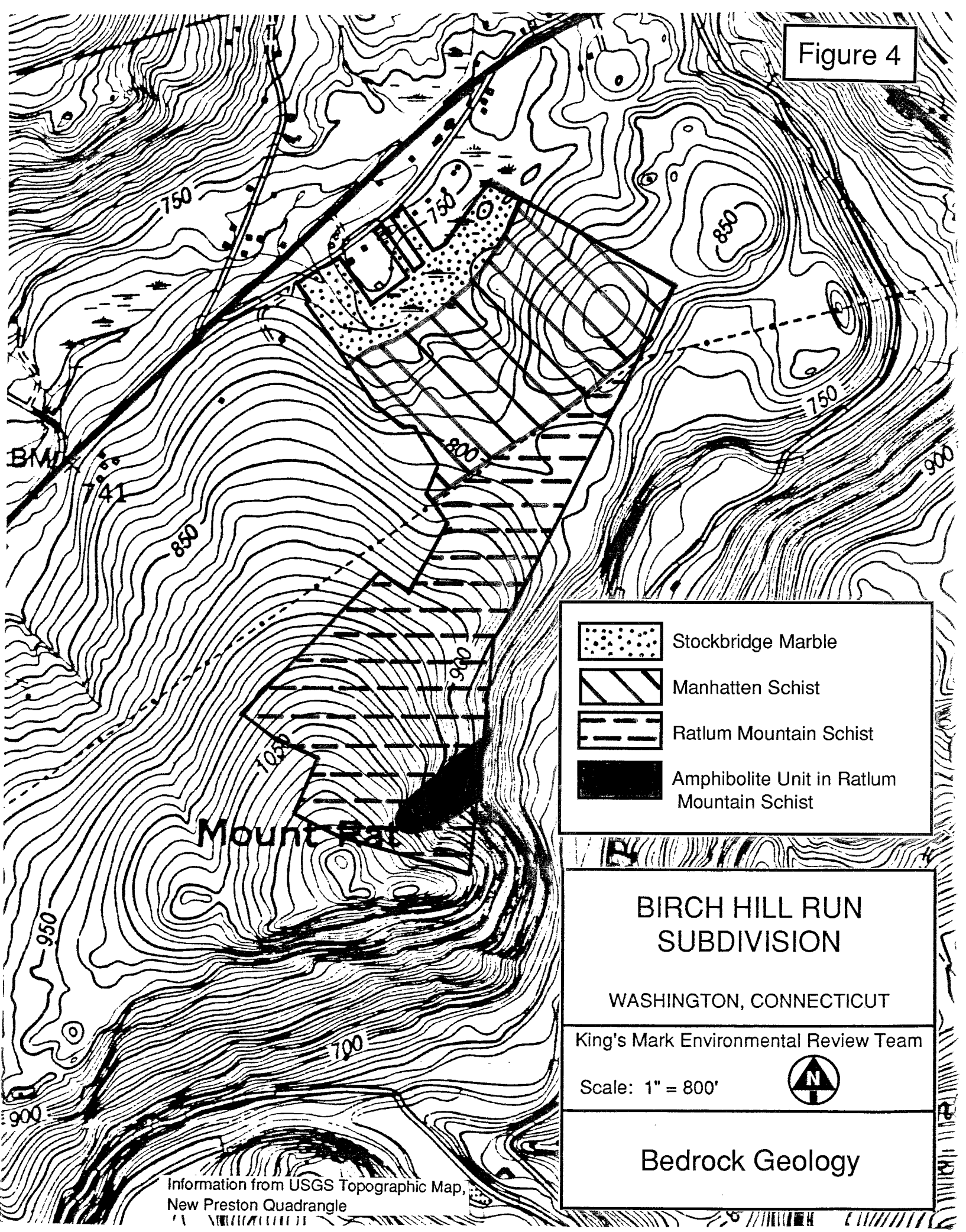
Figure 4
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Stockbridge Marble
Manhatten Schist
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Scale: 1" = 800'
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Bedrock Geology
Information from USGS Topographic Map, New Preston Quadrangle

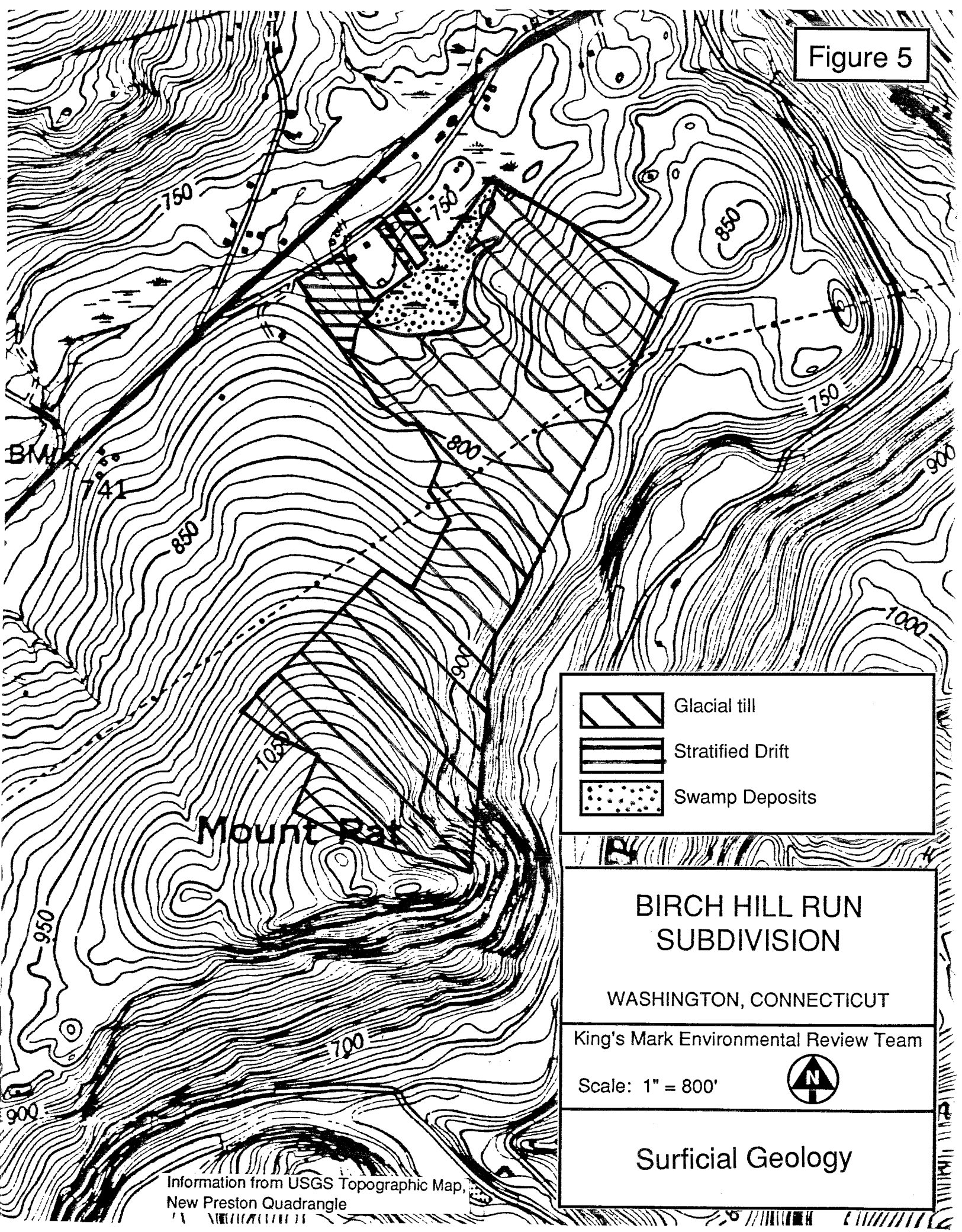
Figure 5
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Glacial till
Stratified Drift
Swamp Deposits
BIRCH HILL RUN
SUBDIVISION
WASHINGTON, CONNECTICUT
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Scale: 1" = 800'
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Surficial Geology
Information from USGS Topographic Map,
New Preston Quadrangle

The sandier (non-compact) variety of till, especially where 8 to 10 feet thick, should not hinder residential development. On the other hand, shallow to bedrock conditions may be found in these areas. Therefore, blasting may be needed, particularly for the placement of roads, driveways and house foundations. Also, the shallow to bedrock soils are a constraint with respect to on-site sewage disposal. A sufficient number of deep test holes are needed in the proposed leaching system areas to insure a good profile of the bedrock surface.

Overlying till and bedrock in the northwest parts is a glacial deposit known as stratified drift. These deposits, which are probably less than 20 feet thick on the site, consist of yellowish-brown stratified sands and coarse gravels. The sediments comprising stratified drift are generally sorted because of their deposition by glacial streams. Sand and gravel are the major components of stratified drift. Except for the entrance of the proposed interior road, little or no development will occur on the stratified drift deposits.

The soil scientist has mapped in detail the regulated wetland soils on the site. According to the soils report, the wetland soils on the site are comprised of Leicester soils (Le), Ridgebury soils (Rg), Whitman soils (Wh) and Palms soils (Pm). The Leicester, Ridgebury and Whitman soils are generally mapped as an undifferentiated unit. However, the soil scientist has mapped them separately. All 3 soils are very deep, loamy soils that formed in glacial till. The Ridgebury and Whitman soils develop in the compact glacial till while the Leicester soils develop in the more friable till. They range from poorly drained (Leicester and Ridgebury) to very poorly drained (Whitman). In general, the Leicester and Ridgebury soils are nearly level or gently sloping soils in drainageways and low-lying positions of till covered uplands. The Whitman soils occur on nearly level to gently sloping depressions and drainageways on till covered uplands.

The major concern of wetland soils from an engineering standpoint is the seasonally high watertable. A high watertable condition is at or near ground surface in the Leicester and Ridgebury soils generally between November and May. In the Whitman soils, a high watertable condition occurs September through June.

The final wetland soil type identified on the site is the Palms soil. It is described as very deep, very poorly drained soil found in organic deposits 15 to 51 inches thick over loamy mineral materials. According to the soil scientist's report, this organic muck soil with a mineral substratum has a high watertable that is at or near the surface most of the year. The areas covered by Palms soil also frequently floods or ponds during wet periods and has very low strength and poor stability due to the organic layers. According to project plans, approximately 150 feet of the Palms soil will need to be crossed by the proposed interior road. This segment of road will be generally aligned with an existing "wood" or old farm road which was constructed over the Palms soil by filling. Because of the potential low strength of the Palms soil and unknown composition of the fill material, the developer should ensure that the natural soils and fill material in this area will not displace or fail due to the weight of vehicular traffic during and after construction.

BLASTING IMPACTS

A rocky knoll (HoC area on the plan) near the proposed subdivision entrance will be removed to accommodate construction of the interior road. This will undoubtedly require blasting of the bedrock. Any blasting that takes place on the site should proceed with caution and under the strict supervision of people experienced with the latest blasting technology. Every effort should be made to use blasting techniques that will minimize the potential for undue seismic shock and airblast.

Undue seismic shock and airblast may damage nearby buildings, adversely affect water quality and quantity to nearby bedrock wells and may make surface water turbid in the immediate blasting area. A pre-blast survey of surrounding properties should be considered to establish background data and minimize unwarranted damage claims. Background data that includes pump tests and water quality tests should be collected for the residential wells on Wilbur Road.

Certain blasting techniques can be used to minimize the environmental effects of blasting in the area, depending upon the blasting requirements and geology of the site. A geotechnical study, including borings to determine the amount of blasting required and the texture and nature of the underlying bedrock, is also recommended.

WATER SUPPLY

The water supply for each lot in the proposed subdivision will be derived from 6-inch diameter drilled wells with steel pipe cased firmly into solid rock and completed as open boreholes in the underlying metamorphic bedrock. A typical well depth for a bedrock well ranges from 150 to 300 feet. Although bedrock is not known to be a prolific aquifer, Water Resources Bulletin No. 21 (Upper Housatonic River Basin) indicates that of 734 wells surveyed which tap crystalline metamorphic bedrock, 90% yielded about 2.0 gallons per minute or more. The report also states that the carbonate (marble) bedrock in the northern parts is more productive than the schistose or gneissic rock that underlies the remainder of the site.

Of 3 well completion reports reviewed for domestic drilled wells on Wilbur Road, 2 wells reportedly tapped marble rock and have yields of 20 gallons per minute. The depths of these wells are 200 feet and 280 feet. The third well reportedly tapped gneissic bedrock and has a yield of 10 gallons per minute and extends to a depth of 140 feet. These yields are considered greater than normal for bedrock wells.

Because lot sizes are relatively large (exceeding 1.5 acres) and because a high portion (approximately 95%) of the renovated domestic wastewater will percolate downward to recharge the underlying bedrock via on-site sewage disposal systems, the annual groundwater usage for the site should not exceed annual recharge. As long as the underlying bedrock is fractured and capable of transmitting water to drilled wells, the bedrock aquifer should adequately meet the water demands of the proposed residential subdivision. For the most part, separating distances of 200 feet or more between neighboring wells was accomplished on each lot. Therefore, each well will have approximately 1 acre of recharge or 595 gallons of water per day. A family of 5 uses approximately 375 gallons per day or 75 gallons per person per day. The computations assume a recharge rate of approximately 8 inches per year for an upland till covered site.

Ideally, each well should be located on a relatively high portion of the lot, properly separated from the sewage disposal system or any other potential pollutant (e.g., storm drains, etc.) and in a direction opposite the expected direction of groundwater movement. The proposed well locations for Lots 2 and 3 are located downgradient and in direct line with the leaching systems serving the lots (see Sewage Disposal section). All wells should be cased with steel pipe into the underlying bedrock and must be properly installed in accordance with all applicable State Public Health Code and Connecticut Well Drilling Board regulations to provide adequate protection of the quality of bedrock water. In addition, the Town sanitarian must inspect and approve well locations.

The natural quality of groundwater should be satisfactory. However, the bedrock on the site has the potential for mineralizing well water with elevated iron, manganese and/or hardness. At elevated levels, these minerals tend to lower the overall water quality of drinking water. If elevated iron and/or manganese levels are present in the water, suitable treatment filters may be necessary. Wells tapping the

marble unit in the northern parts of the site may have elevated hardness levels. Elevated hardness levels in water make it difficult to lather soap and clean effectively, leave insoluble residues in sinks, bathtubs and on clothing and cause scale encrusted water heaters, boilers and pipes, causing a reduction in their capacity and heat transfer properties. If hardness levels are too high, water treatment devices such as water softeners are commonly utilized. Discharge of backwash from home water softeners to septic systems is illegal in Connecticut and should be avoided. When discharged to septic systems, the backwash can raise the sodium content in groundwater to dangerous levels. There are water treatment devices that do not backwash to septic systems which should be used.

According to the Water Quality Classification Map of Connecticut (Murphy, 1987), groundwater on the site is classified by the DEP as GAA which means it is tributary to an existing or potential public water supply reservoir or public water supply well. The site is in the watershed for numerous water supply wells. The groundwater is presumed suitable for direct human consumption. The State's goal is to maintain the GAA classification by banning almost all discharges to groundwater. Because the entire site is classified as GAA and because leakage from underground fuel storage tanks is a frequent cause of groundwater contamination in the State, it is recommended that underground fuel tanks be prohibited in the subdivision.

Blasting on the site may have an impact on local wells. This will obviously depend on the blasting requirements and geology of the site. Bedrock tapping wells are more likely to experience changes in yield from blasting, but there is equal probability that the yield would increase as opposed to decrease. Dug wells that tap the local watertable should not be significantly impacted by blasting. The applicant should consider hiring a hydrogeologic consulting firm to conduct pump tests and water quality tests for the residential wells in the Wilbur Road area. This

information can be used to discern any noticeable changes in well water quality and quantity following blasting that is likely to occur on the site.

AQUIFER POTENTIAL OF MEEKER SWAMP

Meeker Swamp is located approximately 1 mile west of the site. It is considered to be a potential aquifer. An aquifer is any geologic formation capable of yielding large volumes of water to individual wells. Approximately 114 acres in the western parts of the site ultimately drain to Meeker Swamp. However, according to map GQ-782 (Surficial Geologic Map of the New Preston Quadrangle, by Roger B. Colton, 1969), the stratified drift deposits that occur at the northern parts of the site are not physically connected to the stratified drift deposits in Meeker Swamp, although they have similar textures and origin.

According to a map entitled Ground Water Availability in Connecticut (D.B. Meade, 1978), the surficial geologic deposits of Meeker Swamp are thought to be coarse-grained, but hydrogeologic data is incomplete and verification requires further investigation. Where saturated, relatively thick (usually 40 feet or more) and close to a major streamcourse, coarse-grained deposits (sand and gravel) may be favorable for yielding moderate to large amounts of water to individual wells (50 to 2,000 gallons per minute). Further investigation, including test holes and test wells, is required to determine the exact aquifer potential of Meeker Swamp. Currently, there are no water supply wells tapping the sand and gravel aquifer in Meeker Swamp.

SEWAGE DISPOSAL

Extensive exploration for subsurface sewage disposal has been conducted on the site by Nexus Engineering Associates. Also, high intensity mapping of upland (till) soils on the site was conducted by Roy Shook of Environmental Resource Associates. Soil testing, which was conducted during June, November and December of 1989, included the excavation of 159 deep test holes throughout the subdivision site, percolation tests on each lot and hydraulic analyses on 5 lots bordering the wetland in the northern parts. The soil testing was performed to ensure that adequate soil capacity exists on Lots 1, 2, 5, 6 and 33 for on-site sewage disposal without adversely impacting the abutting wetlands.

A review of the deep test hole information and the proposed lot layout indicates on-site sewage disposal should be feasible on all lots. A leaching area (primary and reserve) approximately 100 square feet was identified on each lot. Due to a seasonal high groundwater table, shallow to bedrock soils or slow percolation rates, detailed plans prepared by a registered professional engineer will be required on Lots 1, 5, 20-26 and 33. Filled and raised septic systems will be required on several lots. The moderate slopes that characterize the site should facilitate installation of groundwater control drains where conditions warrant. Curtain drains are installed to assure that the seasonal high watertable does not rise up into the leaching field and interfere with its hydraulic capacity.

The present lot layout indicates that 7 lots (Lots 1, 2, 3, 5, 6, 8 and 28) will require the installation of pumping chambers to raise wastewater to areas which are higher than the discharge level at the home. The reason for this arrangement is unknown, except perhaps maintaining greater separating distances from the wetlands. Reconsideration should be given to this design choice on these lots. While septic systems that utilize pumping chambers may be the proper design choice in some

situations (usually where no alternatives exist, especially for septic system repairs), they should be avoided when possible. Gravity fed septic systems may be accommodated on each of these lots and maintain the prescribed 100 foot setback from regulated soils. To overcome the pump system design, houses must be moved closer to the proposed interior roads. Moving the houses will take advantage of drainage improvements for the road and footing drains for the houses. Footing drains should protect the leaching fields serving these homes from seasonally high watertables. Also, the wells on some of the lots can be located upgradient from septic systems rather than downgradient, thereby decreasing the risk of well contamination by septic tank effluent. Additional soil testing will be necessary on these affected lots if the design is changed.

A properly sited and designed gravity fed system should not fail or wear out. In addition, little maintenance is required (pumped out every 3 to 5 years), withstanding both abuse and shockloading with few problems. On the other hand, the sewage pumps require maintenance and will probably be more costly to install because of the mechanical components. For these reasons, every effort should be made to locate gravity fed septic systems on Lots 1, 2, 3, 5, 6, 8 and 28. The discharge of approximately 400 gallons a day of domestic sewage from each of the proposed lots should not adversely affect water quality in nearby streams or wetlands. The proposed density of this subdivision allows for adequate dilution of nitrates in the soils, and proper construction of individual subsurface sewage disposal systems should provide sufficient treatment for bacteria and viruses. Phosphates should also be readily absorbed by the soil. Fertilizers applied to individual lawns and road salt typically used during the winter months will have more impact on water quality than the combined effects of properly constructed septic systems.

HYDROLOGY

The entire site lies within the Shepaug River drainage area. The eastern parts of the site, which comprise approximately 63 acres, flow directly eastward via sheetflow and drainageways to Shepaug River. The remainder of the site (approximately 114 acres) drains towards Route 25 where it is intercepted by unnamed streamcourses that ultimately route the water to the Meeker Swamp feeder stream (see Figure 6). The outlet stream for Meeker Swamp flows into Bee Brook, a Shepaug River tributary. At its mouth, Shepaug River drains an area of 156 square miles or approximately 100,000 acres. The site represents less than 1% of the river's watershed.

Surface water resources on the site have not been classified by the DEP, but are considered AA water resources by default. The designated uses for a Class AA streamcourse include existing or proposed drinking water supply, fish and wildlife habitat, recreational use, agricultural and industrial supply and other purposes (recreational uses may be restricted).

Development of the site for approximately 35 single-family homes is expected to raise post-development runoff conditions. These increases will arise from the creation of impervious surfaces such as roads, driveways, rooftops, sidewalks and patios.

The 2 major concerns with increased runoff are the potential for flooding and streambank erosion/sedimentation problems. From a flooding standpoint, the applicant has indicated on the site plan that 2 detention control structures (basins) will be utilized to maintain post-development flows at pre-development flow rates. Both detention basins will be located outside of wetland areas. Additional stormwater detention measures will occur primarily in the wetlands located in the northwest corner. These measures are explained in detail on page 27 of the EDA

report, including placing new or modifying existing physical structures such as weirs, cross culverts, berms and stonewalls at various points along a streamcourse that flows into and out of the wetland in the northwestern parts. Overall, the applicant has done a favorable job with handling stormwater management on the site and complying with the Town's zero increase in runoff requirements. The stormwater management work should be done during summer months when conditions are typically dry. This should minimize adverse environmental impacts such as sediment transport to wetlands and streamcourses on- and off-site. The Town's consulting engineer should review the final stormwater management plan and hydrologic calculations prepared by the applicant's technical staff.

Because of the presence of till soils, which may contain silt, fine sand and clay sized particles, the potential for gullying and streambank erosion is apparent. Areas of moderate to steep slopes will exacerbate erosion problems.

Conscientious construction practices should be employed so that water quality problems do not arise in streamcourses on- and off-site. Stormwater discharge points should outlet outside of wetland areas, preferably to well-protected, shallow basins. These outlet control structures should be designed so that flow rates are minimized and peak volumes decreased. Also, these basins can provide a sediment retention function and should be so designed.

Silt fences, haybales, temporary sediment basins, and anit-tracking devices are necessary to minimize the potential for environmental damage to wetlands and watercourses on- and off-site. A carefully designed and detailed erosion and sediment (E&S) control plan should be developed, closely followed and periodically policed by Town officials to minimize erosion problems and surface water quality degradation.

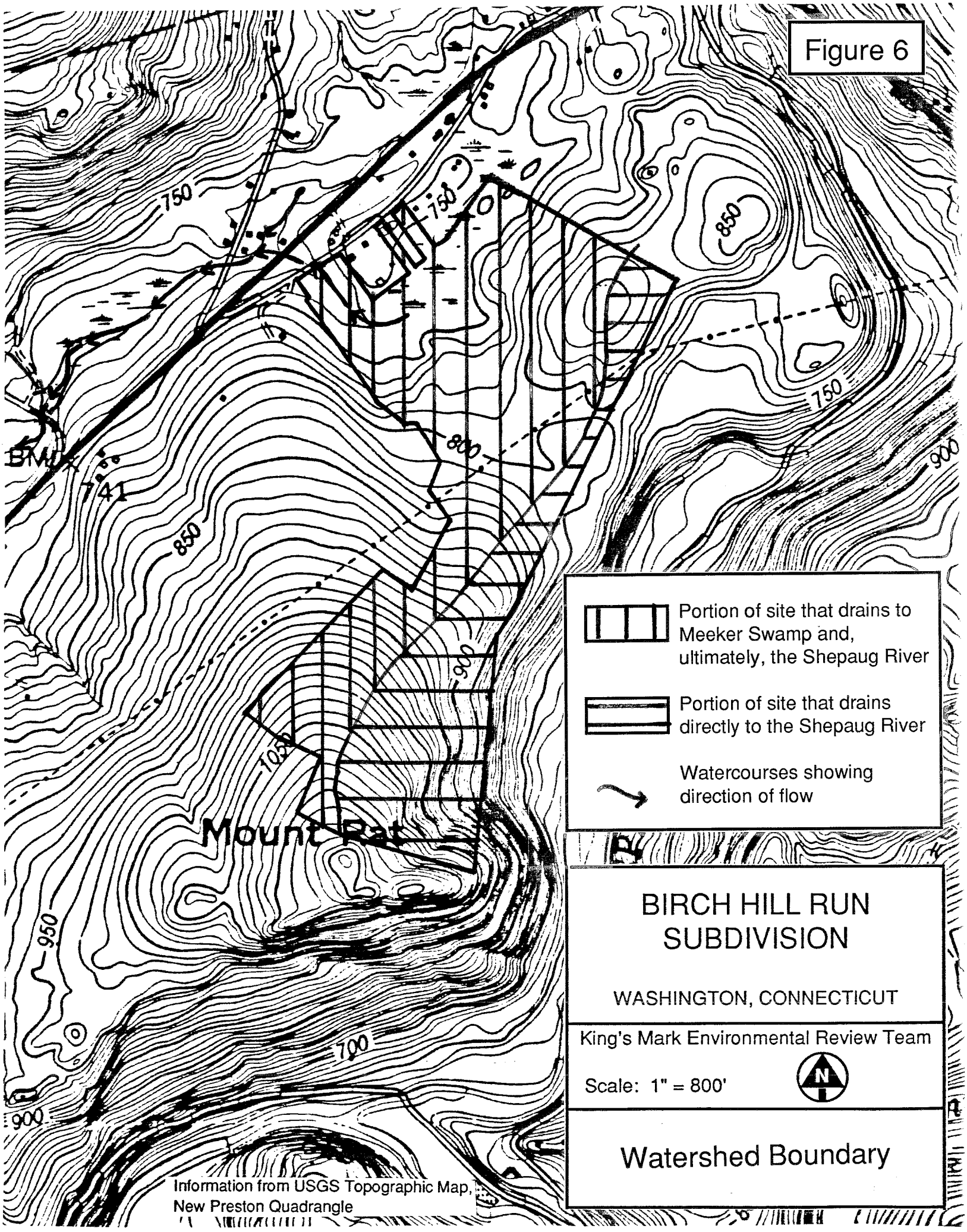
Figure 6
750
750
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900
BM
741
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700
900
Mount Pat
Portion of site that drains to Meeker Swamp and, ultimately, the Shepaug River
Portion of site that drains directly to the Shepaug River
Watercourses showing direction of flow
BIRCH HILL RUN SUBDIVISION
WASHINGTON, CONNECTICUT
King's Mark Environmental Review Team
Scale: 1" = 800'
N
Watershed Boundary
Information from USGS Topographic Map, New Preston Quadrangle

COMMENTS ON ROAD CONSTRUCTION VIA WOODLAND ASSOCIATES

From a traffic standpoint, connection of the proposed interior road serving Woodland Associates to the Birch Hill Run Subdivision will have obvious benefits. Also, this connection may reduce the amount of wetland disturbances presently proposed for the northwest parts of the site.

Although Team members did not have detailed plans for the Woodland Associates project, soil mapping data indicates that moderately steep slopes (15% or more), shallow to bedrock soils and high watertables will be the major hindrance for road construction to Birch Hill Run via Woodland Associates property. Road cuts may encounter bedrock which requires blasting and high groundwater tables that require extensive road drainage measures. While this work may be accomplishable, it will undoubtedly raise the cost of site development.

SOIL RESOURCES

The soils within the proposed Birch Hill Run Subdivision include Charlton, Hollis, Leicester, Paxton, Muck, Ridgebury, Sutton, Whitman and Woodbridge. These soils are described below:

1) Leicester soils (Le) are inland wetland soils. Wetness and frost action are the major limitations for development.

2) Muck soils (Pm) are inland wetland soils. Wetness, ponding (standing water), subsiding (settling) and low strength are the major limitations for development.

3) Ridgebury soils (Rg) are inland wetland soils. Wetness, slow percolation and frost action are major limitations for development.

4) Whitman soils (Wp) are inland wetland soils. Wetness, poor filtration, caving of cut banks and frost action are the major limitations for development.

5) Charlton soils (ChB, ChC, ChD, CxC) are deep, well-drained soils. Permeability is moderate to moderately rapid in the surface layer and subsoil. Runoff is a hazard on this soil. Slope is the major limitation for development.

6) Hollis soils (HoC, HrE) are well-drained or excessively drained, steep and very shallow to shallow over bedrock. Slope and shallow depth to bedrock are the major limitations for development.

7) Paxton soils (PdB, PdC, PdD) are well-drained with a dense layer (hardpan) at approximately 24 inches in depth. This hardpan layer can cause engineering limitations for, but not limited to, septic systems. Wetness, slow percolation, frost action, slope and hardpan are the major limitations for development. Cut slopes are likely to have seeps flowing out during wet periods, and subsurface drainage may be required.

8) Sutton soils (SwA, SwB) are very deep and moderately well-drained. Permeability is moderate. This soil has a seasonally high watertable within 1.5 to 2.5 feet of the surface in the late fall to early spring. Wetness and frost action are the major limitations for development.

9) Woodbridge soils (WyA, WyB, WyC) are moderately well-drained with a dense layer (hardpan) at approximately 24 inches in depth. This hardpan layer can cause engineering limitations for, but not limited to, septic systems. Wetness, slow percolation, frost action and slope are the major limitations for development. Cut slopes are likely to have seeps flowing out during wet periods, and subsurface drainage may be required.

Additional information for these soils is available within the Soil Survey for Litchfield County (1970), Tables 1, 2 and 3 of Appendix A and the EDA report.

The soil limitations which are identified do not preclude development. However, they do indicate the need for precise planning and review of proposed project components. In some cases, the cost may greatly exceed the benefits.

Septic systems, and in particular septic tank absorption fields, may require precise engineering plans to function properly within the proposed locations. This is especially important in areas with conditions such as, but not limited to, slopes of 15% and greater, percolation rates exceeding 30 minutes per inch, a seasonal high watertable less than 3 feet below the soil surface, depth to bedrock less than 72 inches and soils which flood frequently as a result of streams or watercourses overflowing

their banks. Frequently is defined as at least once every 2 years. Periodic field inspection and documentation during construction may be necessary to insure compliance and project success.

Flood Hazard Area

The northwestern portion of the site is located within Zone A of a 100-year flood hazard area. The base flood elevations for this zone have not been determined. The placement of this flood hazard area directly onto the plan will serve as current and future reference for planning considerations.

Erosion and Sediment Control

The E&S control plan associated with this subdivision is basically adequate. However, the following additional comments and recommendations should be considered:

1) The complete E&S control plan should be incorporated **directly** onto the site plan. The E&S plan for this subdivision is contained within a separate environmental assessment document. Separate documents may not always accompany on-site inspections to monitor compliance of E&S measures.

2) Provide **additional** silt fencing at the following locations associated with wetlands or wetland crossings:

   a) Along proposed road between Lots 1 and 33;

   b) Along proposed road between Lots 1 and 34; and

   c) Around Detention Basins 1 and 3 and adjacent wetlands.

3) Retain and maintain silt fencing adjacent to and within wetlands until all construction activities within these areas are completed and the disturbance has been completely stabilized.

4) Indicate **directly** onto the plan items such as, but not limited to:

   a) Construction entrances;

   b) Locations of stockpiled topsoil;

c) Seeding information such as seed mixture, lime and fertilizer requirements, mulch quantities and techniques and seeding dates; and

d) Person(s) responsible for implementing and maintaining E&S plans.

E&S control plan must be consistent with information contained within the Connecticut Guidelines for Soil Erosion and Sediment Control (1985; revision 1988).

5) The recommended dates for establishing **permanent** vegetation include:

April 15 through June 15
August 15 through September 15

6) The key to successful E&S control is proper installation and maintenance. This is extremely important when considering the existing or potential E&S hazards associated with steep slopes and wetlands protection.

The soil E&S control plan for the Birch Hill Run Subdivision is basically adequate. However, construction activities such as, but not limited to, those associated with steep slopes or wetlands must be carefully monitored to protect the soil resources from E&S damage.

BIOLOGICAL RESOURCES

WETLAND CONSIDERATIONS

Site Description and Proposed Activity

The wetlands on the site comprise approximately 26 acres of the 145-acre parcel. The proposed direct disturbance to regulated wetlands as result of the proposed development will be limited to 0.35 acres and is confined to the roadway construction for access to building sites.

The wetlands on site fall into 2 major categories:

1) Upland wooded wetlands (areas defined as Leicester, Whitman and Ridgebury Soils on the site plans) - These wetlands are classified as PFO1E under the National Wetlands Inventory of the U.S. Fish and Wildlife Service. They are characterized by broad leaved deciduous (predominantly wooded forest) vegetation which is subject to seasonal soil saturation.

2) The lowland scrub-shrub wetland (areas defined as Palms soils on the site) - These wetlands are classified as $P\frac{SS1}{EM}E$ under the National Wetlands Inventory of the U.S. Fish and Wildlife Service. They are characterized by scrub-shrub deciduous broad leaved and emergent vegetation, seasonally saturated. This area is also the site of recent beaver activity which has obstructed flow somewhat in the area of the farm road

The character and functions of these wetland areas are described in the EDA report.

Impacts

The primary anticipated impacts to the on-site wetlands and watercourses will occur as a result of direct filling of 0.35 acres of wetland for roadway construction and indirect impacts resulting from modification of water quality and flow regimes as a result of development of homesites and roadways. The access roadway will cross the lowland wetland on the existing fill, which was probably placed to serve agricultural or logging purposes. The proposed roadway will cross the lowland wetland at a relatively narrow point. This, in conjunction with the existing fill

roadway, should minimize the impact of the construction, although placement of additional fill will be required to create a road which meets Town standards.

The stormwater management scheme presently proposed appears to minimize the impact of post-development runoff on water quality. The treatment of stormwater by the proposed detention/retention and filtration basins, together with the water quality renovation and energy dissipation offered by the on-site wetlands, will minimize off-site impacts to wetlands and water resources. However, it is essential that all appropriate measures to control erosion and other construction related impacts are implemented and maintained throughout the project duration.

Alternatives

Certain alternatives, if appropriate, could be implemented to further reduce wetland/watercourse disturbance. The first alternative is achieving access through adjacent properties (i.e., the Woodland Associates property). This approach may not prove feasible due to other municipal regulations (i.e., planning, zoning or subdivision requirements). If a variance to such requirements is available as an option, it would be prudent to explore this alternative. Considerable savings in roadway building costs could be realized, and virtually all of the potential wetland impact could be eliminated by this approach.

Another option available (and offered in the EDA report) to minimize roadway fills in the most critical areas of wetlands is reducing slopes by utilizing rock retaining walls and roadside guide rails. The proposed "porous" roadway detail is a desirable alternative design to mitigate wetland impact.

In conclusion, the development appears to have been designed with avoidance of wetland impacts in mind. Certain options for design of roadway crossing of wetlands and watercourses provide opportunities for minor reduction of impacts and enhancement of the post development wetland conditions. Culvert treatments, buffer

plantings and in-stream controls, if carefully built, can be implemented without adverse wetland impact.

WILDLIFE CONSIDERATIONS

Description of Area/Habitats

The 145-acre site proposed for development contains hardwood forest, several areas of wetlands and some early successional stage growth (herbaceous/shrub) areas located along the powerline. Several small streams drain into and through the wetland complex located in the northern half of the property. With the exception of the very steep portion of Mount Rat that is contained on the southeastern portion of the site, the area contains varying wooded slopes. The proposed development includes 35 houses with lot sizes ranging from 1.5 to 16.48 acres. The majority of the lots are 1 to 4 acres in size.

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. The variety of habitats is limited, but the wetlands on the site increase the value to wildlife. The site contains fair to good wildlife habitat. Because the site is located in an area of the State where development has been minimal and the surrounding land offers a variety of habitats, the site's value to wildlife is probably increased.

A wide variety of wildlife is expected to utilize this area 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, beaver, otter, fox, coyote, hawks, owls, catbirds, sparrows, juncos, chickadees and a variety of reptiles and amphibians.

A very detailed description of the vegetation/wildlife habitat and wildlife use is found within the EDA report. Because the EDA report has thoroughly described existing vegetation and habitat, comments will be limited primarily to wildlife habitat use and probable impacts of the proposed development to wildlife habitat and wildlife in general.

Forestland: Much of the site is covered by second growth mixed hardwoods characterized by beech, birch and maple, along with various other species. Forested areas provide nesting sites, shelter and escape cover, denning sites and roosting sites. Forestland also provides food in the form of nuts, berries, buds, catkins, etc.

Forests with a well-developed understory or which contain vegetation of varying heights tend to be the most attractive to wildlife, especially songbirds. Because of the past history of much of this forestland, the canopy has become very closed in many areas and has resulted in a poor understory. Many of the larger trees that have been left to grow have limited value for wildlife, because they are not important food producers. Despite the less than ideal structural diversity within the forest, it does provide wildlife habitat for a number of species.

There are some areas that have grown in with shrubs and vines due to the greatly increased sunlight coming in when a tree or several trees were cut or fell down. These areas provide cover for wildlife and also a source of food in the form of berries, buds, leaves, etc.

The snag trees (dead trees) on the site are a source of insects which serve as food for many species such as woodpeckers and chickadees. Den trees (trees with cavities) can serve as a nesting or denning place for animals, including squirrels and raccoons.

Powerline Easement: The 50-foot wide utility easement provides a variety of herbaceous plants, shrubs and small trees for wildlife use. Because of the variety of vegetation, these areas provide important habitat for a variety of species. Shrubs

provide both cover and food. The herbaceous plants provide food in the form of seeds and browse. The thick growth provides good cover and nesting sites.

Wetlands: Because wetlands increase the habitat diversity of an area 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.

There are several small areas of wetlands occurring on the site in addition to the fairly extensive wetland area contained in the northern half of the property. All the wetlands on the site are important because they diversify the habitat, but the larger area of wetlands is most important in terms of providing wildlife habitat for a variety of species. The wetlands offer approximately 25 acres of deciduous tree/shrub wetland habitat. The variety of vegetation, along with varying amounts of standing water and several streamcourses, provides habitat for many species. These wetlands offer food, cover, nesting, breeding and feeding areas to a variety of wildlife. These types of areas are especially important to a number of reptile and amphibian species, who require wetlands with standing water as part of their habitat. Wetlands can be especially important in providing breeding habitat for amphibians.

Re-occupation of the wetland area noted in the EDA report as the wooded/shrub/scrub wetland by beaver is likely. This site provides desirable beaver habitat because it contains a slow moving brook in a low-lying area where food (trees and shrubs) is available. Beaver are abundant in Connecticut, and because of their ability to dam and their feeding habits, there are many complaints concerning them. However, beaver are a wildlife resource, and it is preferable to prevent a potential problem before it occurs through wise planning and land use.

Some allowance should be made for the time when beaver might re-occupy this site (specifically the area northwest of the farm road) and raise water levels. If beaver try to plug the proposed wier structure and culvert, it is recommended that a fence be installed out in front of the cross culvert. Ideally, beaver build their dam against this and the culvert is left to function normally, carrying off water as it spills over the dam. This will result in higher water levels in general, but should preserve most of the other functions of the wetland. This scheme to prevent plugging of the culvert should be used in conjunction with some trapping effort during the regulated season to maintain beaver populations at a manageable level. More information on beaver management and management of problems caused by beaver can be obtained through the DEP Wildlife Division. Schemes to deal with higher water levels on culvert plugging caused by beaver are not always 100% successful.

Also, some accommodation should be made in the road bed to withstand these potentially higher water levels caused by beaver. Allowing beaver to occupy this area at times will enhance wetland wildlife habitat, because the natural flooding and subsequent die off and cutting down of trees will set back succession, diversify the habitat and start the process of regrowth.

Stream Corridors: Streams tend to be used as travel corridors for many species of wildlife. Ideally, a buffer of undisturbed vegetation should be left all along the stream corridor. A minimum of 100 feet of undisturbed vegetation left along a stream is recommended.

A buffer of undisturbed vegetation should be left all around the perimeter of the wetland areas to preserve the integrity of the wetlands and their value as wildlife habitat. The buffer should be a minimum of 100 feet wide where possible. In some cases this minimizes potential problems caused by fluctuating water levels caused by beaver in wetlands that would support their activities.

Detention Basins

Several detention basins are proposed. These detention basins are proposed for upland sites, which is preferable to placing them in wetlands. By placing the detention basins in upland areas, the limited wetland habitat will be conserved.

A basin planted with a variety of facultative wetland vegetation is preferable to a shallow grassed-in basin or a completely rip-rapped basin. As proposed, the detention basins will probably have some value to wildlife because they will be designed or can be designed to hold some water and will be planted with a variety of wetland-type plants. Ideally, they should hold water even during dry periods of the year to be most valuable. Wetland-type detention basins may offer something to some species of wildlife, but typically they will not duplicate the function of a naturally created wetland with its own unique hydrology and vegetational diversity. Maintaining water in the detention basins should not come at the expense of drying out any naturally occurring wetlands. Maintenance of the detention basins is important following installation and should be provided for. If allowed to silt-in, their function and value as wildlife habitat will be reduced.

The existing wetlands should be protected from sedimentation. Sediment deposition in a wetland can degrade the habitat and markedly change the value of that wetland to wildlife. Wetlands should not receive runoff water of questionable quality that might contain lawn fertilizer and road salts.

Wetlands require protection after development as well as before. Activities such as pasturing animals in a wetland or filling them in for extra lawn and/or garden should be restricted. Additionally, a buffer of 100 feet of undisturbed vegetation around a wetland can preserve the usefulness of a wetland after the site has been developed.

Additional Wildlife Habitat Considerations

As with any development, the impact on wildlife habitat in general will be negative and long-lasting. A sizeable area will be broken-up and lost with the construction of roads, driveways, walkways, parking areas and homes. Habitat will be lost where cover is cleared for lawns and landscaping. Another impact is the increased human presence, vehicular traffic and a number of free roaming dogs and cats. This could drive the less tolerant species from the site, even in areas where there has been no physical change. The value of the area for wildlife habitat correspondingly decreases as the amount of development in the area 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.

Deer will probably be a common occurrence in the area and in the backyards of residents. New residents should understand that successfully growing gardens or certain ornamental shrubs will probably require repellents, which have only limited effectiveness, and fencing, which can be unsightly.

Development Design

The design of this development which contains medium-sized lots (ranging from 1 to 6 acres) will probably augment the negative impacts to wildlife habitat. Large houselots of 10 acres or more can lessen the impact of development, because more habitat is preserved. Alternatively, clustering houses (providing density is not significantly increased) on suitable land well away from wetlands will also leave more habitat undisturbed.

The opportunity for deer/landowner conflicts is present. Conventional development with small houselots does not lend itself to wildlife management. The best opportunity for control through hunting is not practical with small houselots

(because shooting near houses is restricted). Hunting could be permitted in larger open space areas.

Open Space Areas

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

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.

Ways To Minimize Some Development Effects

In planning and constructing a development, there are steps 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 a site. These measures include:

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

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

3) Stone walls, shrubs and trees should be 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, 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) Brush debris from tree clearing should be piled to provide cover for small mammals, birds, amphibians and reptiles.

   e) Shrubs, vines and trees which produce fruit 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,). See Appendix B for a list of suggested shrub and tree species that can be encouraged and/or planted to benefit wildlife.

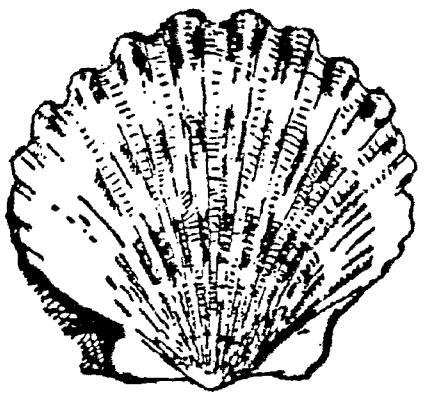
THREATENED AND ENDANGERED PLANT AND ANIMAL SPECIES

According to the Natural Diversity Data Base, there are no known extant populations of Connecticut "Species of Special Concern" or Federal Endangered and Threatened Species that occur 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 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. New information is incorporated into the Data Base as it becomes available.

ARCHAEOLOGICAL RESOURCES



ARCHAEOLOGICAL RESOURCES

Of all the Towns in Litchfield County, Washington's prehistoric archaeological resources are some of the best known. For more than a decade, archaeologists from the American Indian Archaeological Institute (AIAI) have conducted surveys and limited excavations throughout the drainage basin of the Shepaug River, as well as around Lake Waramaug. Much has been learned concerning long-term patterns of prehistoric land use - how these landscapes were settled and used by Native Americans during the past 10,000 years.

Some of this work has explored the archaeological richness and research significance of landforms adjacent to wetlands such as Meeker Swamp. Initial findings, confirmed by similar studies around Robbins Swamp (Canaan, Connecticut) and Bantam Lake (Morris and Litchfield, Connecticut), indicate wetlands were often a focus for Native American settlement over thousands of years. Algonkian Indian peoples periodically occupied lands within and around wetlands. Each successive wigwam settlement overlapped the ones which preceded it. Through time, the archaeological record became a continuous site complex of artifacts and associated features such as hearths, house floors and storage pits. The result is that landforms surrounding wetlands predictably contain rich and significant complexes of prehistoric archaeological sites.

The area around Meeker Swamp, from Bee Brook at its western edge to its easternmost margin at Woodville, is an important archaeological resource. The several sites or site complexes which have been recorded to date undoubtedly represent only a fraction of what is still present and intact. Only 50 acres of approximately 350 have ever been systematically surveyed in this area. Most of this work was focused on the knolls south of Meeker Swamp between Bee Brook and Route 202, approximately 2 miles west of the proposed development. Several site complexes

were identified in this location, each consisting of a series of overlapping prehistoric settlements between 6,000 and 2,500 years old. There is some evidence indicating the earliest period of use may have occurred more than 7,000 years ago (details in Archaeological Explorations of the Wells Farm Complex, Washington, Connecticut, a 1987 research report available from the AIAI).

Similar archaeological resources are probably present along the landforms south and east of Meeker Swamp and east of Route 47, between the 850- and 700-foot contours. This sensitive area includes much of the 145-acre parcel proposed for development. Although no archaeological sites are recorded within the limits of Birch Hill Run, its proximity to Meeker Swamp suggests that prehistoric site complexes could be discovered during intensive field surveys.

Any archaeological resources present will be shallow, situated in the upper 20 centimeters of soil and will easily be disturbed by activities such as land clearing and the construction of roads, houses, drainage features and septic systems. Particularly sensitive areas include the lands surrounding the large wooded swamp and wetland in the northern section of the parcel (Lots 1-14 and 30-35). Although unimproved dirt roads and historic agricultural activities already have affected potential sites here, the proposed development intensifies the earlier scale of land disturbance. Still-unknown archaeological resources on these lots will be disturbed and destroyed if the planned development is undertaken.

A systematic archaeological survey of the northern section, some 50 acres in extent, should be conducted. The results from field studies could be used to identify and map the boundaries of prehistoric complexes, as well as any non-sensitive spaces. Then specific lots could be mapped and designated for housing development, while others would be preserved as open space.

Together with the Office of State Archaeology (State Museum of Natural History, University of Connecticut at Storrs) and the Connecticut Historical Commission

(Hartford), the AIAI can cooperate with involved landowners, developers and local commissions to prepare a research and preservation plan for the parcel.

LAND USE AND PLANNING CONSIDERATIONS

PLANNING CONSIDERATIONS

Current Land Use

The site is currently wooded and contains no structures other than a well. The site is accessed by Wilbur Road, a narrow (15- to 18-foot travel width) Town road with pavement in poor condition. This type of roadway is fairly common in the Northwest Region's less developed areas. There are approximately 10 homes and a kennel on Wilbur Road. The undeveloped portions of the property along Wilbur Road are a mix of wooded areas, fields and overgrown pasture land. The road and its land use are rural residential in character and density.

Wilbur Road intersects with Route 202, a State collector connecting Washington with New Milford to the southwest and Litchfield to the northeast. Traffic moves at high speeds along Route 202, but the proposed subdivision will be fairly well buffered from traffic noise by the wooded section of land between Wilbur Road and Route 202.

Although both sides of Route 202 are currently sparsely developed as rural residential, approved condominiums at Washington Glen and the Woodland Associates property will significantly change the character of that portion of the roadway once developed. The Birch Hill Run Subdivision represents a transitional form of development - less dense than adjacent condominiums and more dense than most of the existing residential development on Wilbur Road.

Planning Considerations

General planning considerations which should be considered include:

1) Buffering Mount Rat and the Shepaug River;

2) Making improvements to Wilbur Road, including its 2 intersections with Route 202 and protecting the Town against undue damage to Wilbur Road by heavy construction equipment;

3) Addressing minimum lot sizes in a potential public water supply watershed;

4) Ensuring a development of a scale and layout that reflects the rural character of Washington; and

5) Using the open space guidelines in the Washington Subdivision Regulations to protect sensitive resources identified on the site and adjacent to it.

Buffering Mount Rat and the Shepaug River

The site is in the vicinity of 2 important natural areas: Mount Rat and the Shepaug River. Portions of the Shepaug River, including the segment near the site, were recommended for inclusion in the Federal Wild and Scenic Rivers Program following a "Wild and Scenic Rivers Study" in 1979 by the U.S. National Park Service. The Shepaug-Bantam River Protection Commission, which includes representatives from the Town of Washington, is preparing a comprehensive river management plan to address protection of important river resources in the corridor. The overall goal of the Commission as stated in its draft plan is:

> "To protect, preserve and enhance the Corridor of the Shepaug-Bantam Rivers. And to promote a coordinated management approach to the rivers' resources to avoid and deter any temporary or permanent adverse impacts of any activities on the river corridors and their outstanding and unique qualities." (p.10)

Homes in the proposed subdivision plan could be screened so they are not visually intrusive when viewed from the Shepaug River or from Mount Rat. Articles III.10 and IV.2.a. of the Washington Subdivision Regulations may be used to require a buffer of natural vegetation and to restrict lawns and clear-cutting, particularly on Lots 9-17, 19 and 20. This buffer would retain the scenic and natural view of the slopes as seen from the river and Mount Rat and would minimize erosion into the river.

Traffic Improvements

The traffic impact study estimates a traffic volume of approximately 350 trips per day from the Birch Hill Run Subdivision. Assuming the current volume on Wilbur Road is approximately 50 trips per day (according to Harry Siebert, ConnDOT), the proposed subdivision will add approximately 6 times the traffic to Wilbur Road. Considering the pavement's stressed condition and the anticipated heavy construction equipment traffic during site development and construction, the Town should require a pavement survey to be conducted prior to site development and construction. The Town should require a sufficient performance bond to reconstruct the road to pre-existing conditions if damaged. In addition, the Town could require pavement and sub-base improvements to Wilbur Road as part of its subdivision approval. Intersection improvements at both ends of Wilbur Road with Route 202 should be required. The Town could request the applicant to bear the cost of the required improvements.

The present road plan length exceeds the 1000 feet permitted in Article IV.5.f of the Washington Subdivision Regulations concerning dead end streets. The applicant has not clearly demonstrated the feasibility of future road extension onto the Woodland Associates property. There may be environmental advantages to redesigning the road system using the Woodland Associates property (see Geology and Wetland Considerations sections). The Town should require resolution of the road questions prior to subdivision approval.

Minimum Lot Sizes for Water Supply Watersheds

The State Policies Plan for the Conservation and Development of Connecticut 1987-1992 designates the site as a Conservation Area due to the presence of wetlands (approximately 18% of the site) and lands classified as potential public water supply sources. The State Plan action strategy for Conservation Areas is to:

> "Plan and manage for the long term public benefit the lands contributing to the state's need for food, fiber, water and other resources, open space, recreation and environmental quality, and insure that changes in use are compatible with the identified conservation values."

Groundwater on the site is classified as GAA, and surface water is classified as AA. In both cases, the State goal is to preserve water quality for use as potential public water supplies. The recommended minimum lot size in public water supply watersheds is 2 acres for homes served by individual on-site wells and septic disposal systems (report for the Blue Ribbon Commission on Housing, "On the Land Required to Support Residential Development in CT," DEP, May 1989). To be consistent with this recommendation, Lots 3, 4, 7, 8, 11-15, 29, 30, 31 and 35 should be enlarged to 2 acres.

Rural Character Consistency

Northwestern Connecticut's Regional Plan of Development, "Land Use: Rural Areas Goal" is:

> "To preserve and conserve areas within the region that are of environmental, historic, archaeologic, and cultural significance and to encourage development occurring outside of village centers to be environmentally sound and consistent with the region's rural landscape." (p. 18)

The Regional Plan's "Objective: Environmentally Sound Development in Rural Areas" states:

> "To encourage adoption of local regulations, local programs and state programs that promote environmentally sound land use, development at a density that reflects the region's soil system and is consistent with the region's rural character." (p. 19)

The Regional Plan's "Housing Goal" is:

> "To conserve the region's existing housing and to attain residential development that is consistent with the region's housing needs, rural character and environmental quality." (p. 23)

The proposed subdivision will not eliminate any existing housing and will result in a development of low density single-family homes. This is consistent with the first part of the Regional Plan's "Housing Goal." The home prices are not expected to address the Town's documented need for affordable housing units. This is due to the probability that the price of building lots alone will put the homes beyond the range of a family earning $46,095. (State Statute defines affordable units as those costing no more than 30% of the annual income of a family at or below the median family income, which for Washington is estimated by the CT Department of Housing to be $46,095 in 1989.)

Consistency of the proposed subdivision with the Region's rural character depends upon its density of development, housing type, extent of natural vegetation clearance and street design. Permitting a narrower road width than the proposed 24 feet would be more consistent with the rural character of the area and more consistent with the current width of Wilbur Road. The Town will have to amend the Subdivision Regulations to permit narrower pavement widths. Although a plan with far fewer lots would be more consistent with rural character, the present size and number of lots generally complies with Town Zoning Regulations. Also, committed development in the Route 202 corridor will change the surrounding land use pattern. Retaining natural vegetation cover wherever possible and the buffer proposed for lots facing the Shepaug River corridor and Mount Rat will also retain a rural character in the proposed subdivision.

Open Space Guidelines

Article III.10 in the Washington Subdivision Regulations enables the Planning Commission to require open space or recreation space "in amount and locations it considers proper and reasonable." This open space could be requested as buffers to lots facing the Shepaug River and Mount Rat and/or as a buffer to protect the largest wetland on the site. The Planning Commission may want to identify which open

spaces will meet the definitions of "public," "quasi-public" and "private" open space, since all 3 types are provided for in the Subdivision Regulations and each has different management and ownership implications.

TRAFFIC CONSIDERATIONS

The consultant reports prepared for this development (i.e., Traffic Impact, Environmental Assessment and Engineering) are comprehensive and discuss most land modifications fairly. The overall site design incorporates concerns and recommendations noted in the reports. A summary document incorporating the significant recommendations of each document might assist the Commission.

The subdivision plan emphasizes protection of natural drainage features over ridge/upland features. It is difficult to protect both types of features in a large lot subdivision. The present road design is a reasonable compromise, but requires additional roadway extensions. Roadway maintenance and traffic operations are not sufficiently detailed in the reports. The traffic impact study addresses traffic volumes, capacity and reviews Route 202 traffic operations.

Wilbur Road

Wilbur Road is approximately 15 to 18 feet wide and without shoulders. The pavement is distressed with longitudinal cracking off the center line. A pavement survey should be made prior to construction to determine the baseline conditions prior to site development. Roadway improvements will be required in the future even if the proposed subdivision is not completed. Drainage and subgrade will require at least partial reconstruction. If the proposed subdivision is not served by a school bus, then a bus turn-in should be constructed on Wilbur Road in close proximity to the entrance road.

Existing intersections of Wilbur Road and Route 202 should be improved to facilitate turning movements by increasing sight distance and turning radii. This may be accomplished by squaring up the intersection, removing vegetation and possibly adjusting the slopes. These actions would improve sightline conditions and clearly define the "stop bar" location on Wilbur Road.

Development Roads

The area of rock excavation should be reviewed to determine if the cut should be daylighted (all rock removed even if out of section) or rock slopes made. Artificial slope control methods are not needed because an irregular rock slope which reflects the natural configuration of the bedrock will complement the overall design.

The need for curbing the roadway from ST 1+00 to ST 8+00 should be reviewed. Other roadway sections have a slope that may allow for the elimination of curbing. Curbing can create a winter icing condition by allowing snowmelt to flow across the roadway during the late evening or night and freeze. Curbing requirements should be reviewed by the Town staff, boards and commissioners.

A review of the Town specifications, relative to both subgrade and sub-base is appropriate based upon the soil data from test holes which indicate certain soils are susceptible to frost action. The sub-base depth should be increased by 6 inches in these areas and should utilize the appropriate geotechnical fabric tied into the roadway drainage.

The proposed paved roadway width of 24 feet for the development road that intersects Wilbur Road, which is approximately 15 to 18 feet wide, appears to be an incongruity. The new road is greater in width than the existing road. Design standards exist to provide safe and efficient travel for motor vehicles and no parking. The ADT (Average Daily Traffic) is exceedingly low on both the subdivision roads and Wilbur Road. The following should be considered:

1) Disturbance of the land surface will be minimized by reducing the roadway width.

2) Although the 24-foot roadway will provide for some on-street parking, where parking is a consideration, a 30-foot roadway is preferred. The long driveways should provide adequate off-street parking for each proposed lot.

3) The narrower roadway is more compatible with the "spread out" site design.

Roadway Drainage

A water balance should be realized, based on the design, since the same approximate volume will flow into Meeker Swamp. Water flowing into Meeker Swamp should not be decreased in quality, with chemicals such as sodium chloride. Baseline surface water quality measurements should be taken at both low and high flow conditions. Measurements will clearly determine the impact on future conditions.

The crossing of a small watercourse in the vicinity of STA 8+80 with an 18-inch RCP pipe is adequate. A 24-inch pipe should be considered if long-term maintenance is a concern, because the larger pipe could be sleeved without substantially altering the pipe's capacity. The optimum pipe elevation and headwall may require review, because of surface water retention. The proposed upstream weir will compliment the surface water management design, but may produce a "hydraulic jump" between the weir and pipe. In certain storm events, scour and/or debris could create a turbulent flow, causing the bank to erode even if protected by rip-rap. A box culvert is not appropriate in this location, because the pipe will accommodate the flow of the watercourse and a box culvert is a long-term maintenance concern.

Longitudinal storm drainage pipes (RCP) connecting catch basins should be reviewed to determine if a slotted pipe is needed to drain the subgrade and sub-base. Underdrains should be considered in roadway sections where partially saturated soil conditions may occur.

If other infrastructure facilities such as Cable TV and electric lines will occupy the roadway right-of-way, their location should be reviewed. Underground facilities should be placed outside the paved roadway. Any excavation to accommodate such facilities, even if performed by others, must be monitored to ensure compliance with E&S controls.

Other Considerations

All wells located on Wilbur Road should have baseline measurements made by a State approved laboratory. Tests should include biologic, metals and organic compounds. Currently there is no definite regulation concerning who should make the tests, the developer or a governmental authority. If the Town approves the development and the roads are accepted, in all probability, any claims relative to long-term environmental damage may rest with the Town. During the actual development phase of the site, the owner and/or agents, are responsible for water quality monitoring. Where possible, baseline water quality testing should be made a part of the application fee charged by the Town.

Existing stonewalls should be left in place to minimize disturbance, improve aesthetics and preserve natural drainage preserved. Stonewalls, over time, create an impervious section at the wall base that directs overland surface water movement into a defined area. Maintaining the historical patterns of surface water movement is an important aspect of site design.

The existing well on Lot 33 should be maintained as a water sampling site, if possible. Rarely does an opportunity exist to test water quality annually, over a long period of time. A local commission or board member should be responsible for the well. Additionally, it will provide an educational resource for local study or high school science classes.

APPENDICIES

Appendix A: Soil Limitations Chart

TABLE 1: SOIL SYMBOLS AND MAPPING UNIT NAMES

Soil Symbol	Soil Mapping Unit Name
ChB	Charlton stony fine sandy loam, 3-8% slopes
ChC	Charlton stony fine sandy loam, 8-15% slopes
ChD	Charlton stony fine sandy loam, 15-25% slopes
HoC	Hollis rocky fine sandy loam, 3-15% slopes
HrE	Hollis very rocky fine sandy loam, 15-35% slopes
Le	Leicester stony fine sandy loam
PdB	Paxton stony fine sandy loam, 3-8% slopes
PdC	Paxton stony fine sandy loam, 8-15% slopes
PdD	Paxton stony fine sandy loam, 15-25% slopes
Pm	Muck, shallow
Rg	Ridgebury stony fine sandy loam
SwA	Sutton stony fine sandy loam, 0-3% slopes
SwB	Sutton stony fine sandy loam, 3-8% slopes
Wp	Whitman stony fine sandy loam
WyA	Woodbridge stony fine sandy loam, 0-3% slopes
WyB	Woodbridge stony fine sandy loam, 3-8% slopes
WyC	Woodbridge stony fine sandy loam, 8-15% 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
ChB	0.6-6.0	0.20	low	high	none	>6.0	---	---	>60	low
ChC	0.6-6.0	0.20	low	high	none	>6.0	---	---	>60	low
ChD	0.6-6.0	0.20	low	high	none	>6.0	---	---	>60	low
HoC	0.6-6.0	0.17	low	high	none	>6.0	---	---	10-2	mod
HrE	0.6-6.0	0.17	low	high	none	>6.0	---	---	10-2	mod
Le	0.6-6.0	0.20	low	high	none	0-1.5	apparent	Nov-May	>60	high
PdB	0.6-6.0	0.20	low	mod	none	1.5-2.5	perched	Feb-Apr	>60	mod
PdC	0.6-6.0	0.20	low	mod	none	1.5-2.5	perched	Feb-Apr	>60	mod
PdD	0.6-6.0	0.20	low	mod	none	1.5-2.5	perched	Feb-Apr	>60	mod
Pm	0.2-6.0	-0-	high	mod	none	+1.0-1.0	apparent	Nov-May	>60	high
Rg	0.6-6.0	0.20	high	high	none	0-1.5	perched	Nov-May	>60	high
SwA	0.6-6.0	0.20	low	high	none	1.5-2.5	apparent	Nov-Apr	>60	high
SwB	0.6-6.0	0.20	low	high	none	1.5-2.5	apparent	Nov-Apr	>60	mod
Wp	0.6-6.0	0.28	high	high	none	+1.0-0.5	perched	Sep-Jun	>60	high
WyA	0.6-2.0	0.20	low	mod	none	1.5-2.5	perched	Nov-May	>60	high
WyB	0.6-2.0	0.20	low	mod	none	1.5-2.5	perched	Nov-May	>60	high
WyC	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
ChB	A	A	A	A	B-9	A	B-16	A	C-11
ChC	B-9	B-9	B-9	B-9	C-9	B-9	B-16,9	A	C-11
ChD	C-9	C-9	C-9	C-9	C-9	C-9	C-9	C-9	C-11
HoC	C-15	C-15	C-15	C-15	C-15	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
Le	C-2	C-2	C-2	C-2	C-2	C-2,8	C-2	C-2	B-18
PdB	C-6	C-13,2	B-2	B-2	B-2,9	B-2,8	B-16	A	C-11
PdC	C-6	C-13,2,9	B-2,9	B-2,9	C-9	B-2,9,8	B-16,9	A	C-11
PdD	C-6,9	C-9	C-9	C-9	C-9	C-9	C-96	B-9	C-11
Pm	C-12,4	C-14,12	C-12,4,10	C-12,4,10	C-12,4,10	C-4,8,12	C-4,14	C-2	C-18
Rg	C-6,2	C-2	C-2	C-2	C-2	C-2,8	C-2	C-2	C-11
SwA	C-2	C-2	B-2	C-2	B-2	C-8	B-16,2	B-2	B-18
SwB	C-2	C-2	B-2	C-2	B-2,9	C-8	B-16,2	B-2	B-18
Wp	C-6,4	C-4	C-4	C-4	C-4	C-4,8	C-4	C-2	C-11
WyA	C-2,6	C-2	B-2	C-2	B-2	C-8	B-16,2	B-2	C-11
WyB	C-2,6	C-2	B-2	C-2	B-2,9	C-8	B-16,2	B-2	C-11
WyC	C-2,6	C-2	B-2,9	C-2	C-9	C-8	B-16,2,9	B-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	

Appendix B: 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 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.