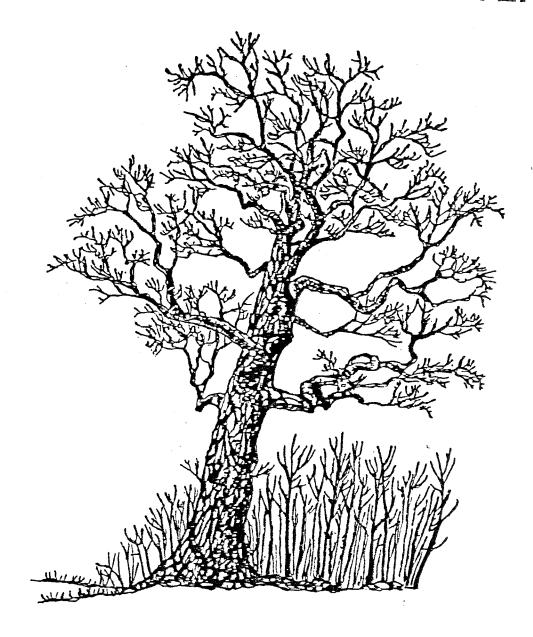
KING'S MARK ENVIRONMENTAL REVIEW TEAM



REPORT FOR
Gleason Hills Subdivision
Plymouth, Connecticut

GLEASON HILLS SUBDIVISION

PLYMOUTH, 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

Plymouth 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.

<u>ACKNOWLEDGMENTS</u>

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

- * William Warzecha, Hydrogeologist
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- * Mark Phillips, Traffic Planner
 Department of Transportation

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 Edward Yale and Louise Lake of the Plymouth Inland Wetlands Commission and Russell Fransen, developer for their cooperation and assistance during this environmental review.

EXECUTIVE SUMMARY

Introduction

The Plymouth Inland Wetlands Commission has requested that an environmental review be conducted on Gleason Hills, an approximately 64-acre site proposed for a subdivision development. The site is located in the central section of Plymouth. 1/2 mile south of Route 6, on a hillside. It drains across Todd Hollow Road into Todd Hollow Brook, Masterbone Pond and Pratt Pond. The site is a former farm and is characterized by second growth, mixed hardwood forest, old fields, several areas of steep slopes, stream corridors and wetlands. A CL&P right-of-way forms the southern border. The wildlife populations are enhanced by the varied habitats (wetlands, open fields, forested land). Gleason Road is a single lane unimproved road which is currently used by the the existing house as a driveway. Todd Hollow Road is a narrow, winding road which runs along Todd Hollow Brook. Surrounding land uses include single-family homes and agricultural land.

The proposed subdivision would encompass 39 house lots ranging in size from 1 to 5 acres. Several roads are proposed to serve the subdivision. From the plans, it appears that Gleason Road will not be used to serve the development. The subdivision would rely upon on-site septic and water systems.

The Town was primarily concerned with the potential impact that the proposed development would have on: (1) existing wetland corridors; (2) effects of erosion and sedimentation; (3) wildlife habitat; and (4) site design compatibility. Therefore the Town asked the ERT to inventory on-site resources and determine their suitability for the proposed development.

The review process consisted of four 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. Using the review process, specific resources, areas of concern, development limitations and development opportunities were identified. The major findings of the ERT are presented below:

<u>Setting</u>. <u>Land Use and Topography</u>

The property is zoned RA-1, approximately one-acre lots. Maximum and minimum elevations range from 810 to 600 feet above sea level, respectively. The steepest slopes occur in the western parts. The slopes are controlled by the underlying bedrock.

Geology

The bedrock that underlies the site consists of silvery to gray, medium to coarse grained schist. According to deep test holes, the depth to bedrock is generally seven feet or less. The top portion of the bedrock appears to be weathered, which will allow a backhoe to remove it with relative ease. This weathering also forms a "caving zone" around wells. Precautions should be taken when drilling wells to prevent materials falling into the wells. The bedrock will be the likely source of water for the site. Overlying the bedrock on the site is a glacial sediment known as till. The texture of the till is generally loose and sandy but has some compact materials at lower depths.

Overlying the till on parts of the site are regulated inland wetland soils. The boundaries have been delineated by a certified soil scientist. Based on the plans, the wetland will be crossed by roads in three places. One of the crossings is not shown on the plans. It is suggested that the soil scientist reinvestigate and delineate the outlet stream for the large central wetland.

Geologic Development Concerns

Geologic limitations on the site include: (1) lots with shallow to bedrock conditions; (2) lots with moderate to steep slopes; (3) till soils with a seasonal high water table; and (4) regulated inland wetland soils. These will limit the ability to provide subsurface sewage disposal. In addition they may be a hindrance to road construction, foundation and basement maintenance. Special engineered septic system design plans will be needed to overcome the limitations. The plans should be submitted to the local health department for approval before the final lot configurations are approved.

Areas with seasonal high water tables will require curtain drains to lower the groundwater so it will not interfere with the septic systems functions. Minimum separating distances between septic systems and curtain drains are crucial. The concern is that untreated effluent may flow into the drain and cause health problems. Curtain drains may be combined with building footing drains which will be needed to prevent wet basements.

Leaching systems on lots will need to be large due to slow percolation rates. They should be spread out along the contours to further lateral dispersal into the soil. In cut areas, separating distances between the cuts and septic systems is important to prevent untreated effluent from bleeding out of the embankments.

The presence of bedrock at shallow depths suggests that blasting will be required for driveways, foundations, roads and utility lines. The top part of the bedrock appears weathered and may be removed by machinery to minimize the need for blasting. All blasting should be done carefully and under the strict supervision of experienced personnel. A pre-blast survey should minimize the chance for damage claims.

Based on the plans, wetlands will be crossed twice. A third wetland crossing seems likely although it is not shown on the plans. Wetland crossings are feasible provided they are properly designed. Any construction in the wetlands should be done during the dry time of the year. Detailed plans for all crossings should be provided and reviewed by the Town. Approved activities in wetlands should be closely monitored by the Town.

Water Supply

The underlying bedrock is the likely source of water for the subdivision. Water from any given well is dependent on the number of fractures in the rock that the well intersects. The availability of water from the bedrock should be sufficient for domestic use. The initial quality of the ground water should be good. The chance for effluent contamination is possible. Proper well construction and separating distances should allow for adequate protection of the bedrock aquifer. There may be a chance of elevated iron and manganese levels which may necessitate appropriate treatment systems.

Hydrology

Drainage from the site flows into Todd Hollow Brook. Development of the site will result in increased runoff. The amount of increase will depend upon the extent of the development. Concerns include the potential for flooding, erosion and sedimentation. Runoff calculations and drainage plans were not submitted for review. It is suggested that calculations and plans be developed and submitted to the Town. The <u>Guidelines for Erosion and Sediment Control.</u> 1985 should be followed. The road drainage will be collected and discharged to the wetlands. Plunge pools should be developed for the outlets. It is suggested that the pools be located out of the wetlands. A comprehensive erosion and sediment control plan should be developed. Consideration should be given to developing temporary sediment pools during construction. Uncontrolled runoff presently may be affecting Masterbone Pond's water quality. This stresses the need for enforcement of erosion and sediment controls.

Soil Resources

The site is dominated by deep to shallow glacial till soils. A few areas may have a firm dense substratum. High areas and steep slopes are well drained. Concave side slopes and drainageways are moderately well drained to poorly drained. Small areas of rock outcrops are found on the site. Some additional concerns include: the possibility of additional wetlands and water courses, engineering limitations from seeps in the soil, culverts not shown on the plans, septic systems located on the old road bed, a house site located in a swale, erosion hazards of site work on steep slopes and extensive cutting and filling.

<u>Erosion</u> and <u>Sediment</u> <u>Control</u>

An adequate erosion and sediment control plan is required for the site. The plan as submitted is not complete. Additional comments and suggestions include: the need for additional write-up and details, more sediment barriers, further planning for subsurface drainage, planning for bank stabilization and a hydraulic study for the post-development runoff.

Wetland Considerations

The majority of wetlands are drainage swales and intermittent watercourses. They are forested with a brushy understory. The plans include two wetland crossings and one crossing of a watercourse. The total wetland area lost would be less than one-half acre and of low functional value. Consideration might be given to installing a culvert for the crossing at the northwest portion of Gleason Lane. Hydraulic calculations for the site need to be provided, as well as further erosion and sediment control measures, a setback to protect the wetlands and deed restrictions or conservation easements on the wetlands to protect them as open space.

Wildlife Considerations

The site contains mixed hardwood forest, old fields, open field areas and wetlands. The area is surrounded by relatively undeveloped land and offers good wildlife habitat. The wetlands increase the habitat diversity and are important areas to preserve. Setting aside an "island of open space" whether wetlands or not, is least desirable for wildlife. Natural travelways are needed for wildlife to pass from one habitat area to the next.

As with any development, the impact on wildlife habitat will be negative. Wildlife habitat will be broken up and lost with the construction of roads, driveways, walkways, parking areas and homes. Other impacts include the creation of lawns and the presence of humans, traffic, dogs and cats.

There are many steps that can be taken in order to make the area more suitable for wildlife. These include buffer strips, natural landscaping techniques, maintaining forest wildlife requirements and providing nesting boxes for birds. Large lots would help to minimize the impacts on wildlife as would cluster development.

Threatened and Endangered Plant and Animal Species

According to the DEP - Natural Diversity Database there are no Federally listed Endangered Species or Connecticut "Species of Special Concern" found within the study area.

<u>Planning Considerations</u>

The site is located in a residential zone. The surrounding land is also zoned for residential development. A federal style farm house is located on the property. The lots as proposed appear to meet the minimum zoning requirements. According to the subdivision regulations the roads for the subdivision should coordinate with the existing roads. The subdivision will require new roads. The open space proposed also meets the requirements. It might be desirable to link the open space with an internal pathway, possibly following the wetlands, to separate pedestrian and vehicular traffic.

The Town Plan is outdated. The Regional Plan has designated this area for residential use. The Plan emphasizes careful treatment in environmentally sensitive areas such as this.

Traffic Considerations

The traffic generated by the subdivision should not have a major impact. Some consideration might be given to extending Elaine Drive and creating a four way intersection with Todd Road and Todd Hollow Road. This might have better sight lines than the proposed Gleason Lane. If this is not possible, a flatter grade at the end of Gleason Lane should be considered. This will be important in inclement weather conditions. Similar considerations should be given to all the roads. The driveway for Lots 28, 29 and 30 is very steep. It is suggested that the grades be reduced. A review by the Town engineer seems appropriate. The road drainage should also be reviewed to prevent icy conditions during the winter. Erosion control should be given careful attention.

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INTRODUCTION



THE ERT PROCESS

Through the efforts of the Plymouth 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 four phases:

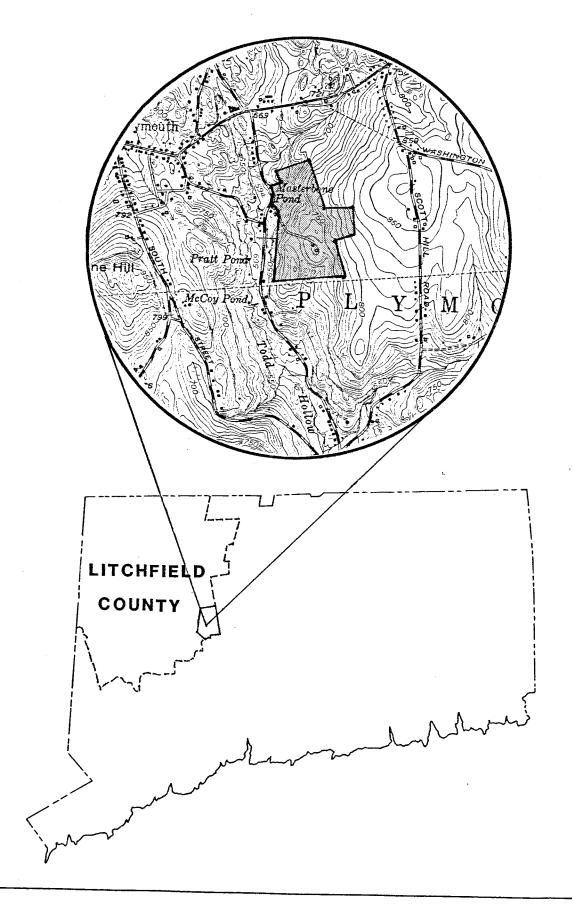
- 1) Inventory of the site's natural resources (collection of data):
- 2) Assessment of these resources (analysis of data):
- 3) Identification of resource problem areas; and
- 4) Presentation of planning and land use guidelines.

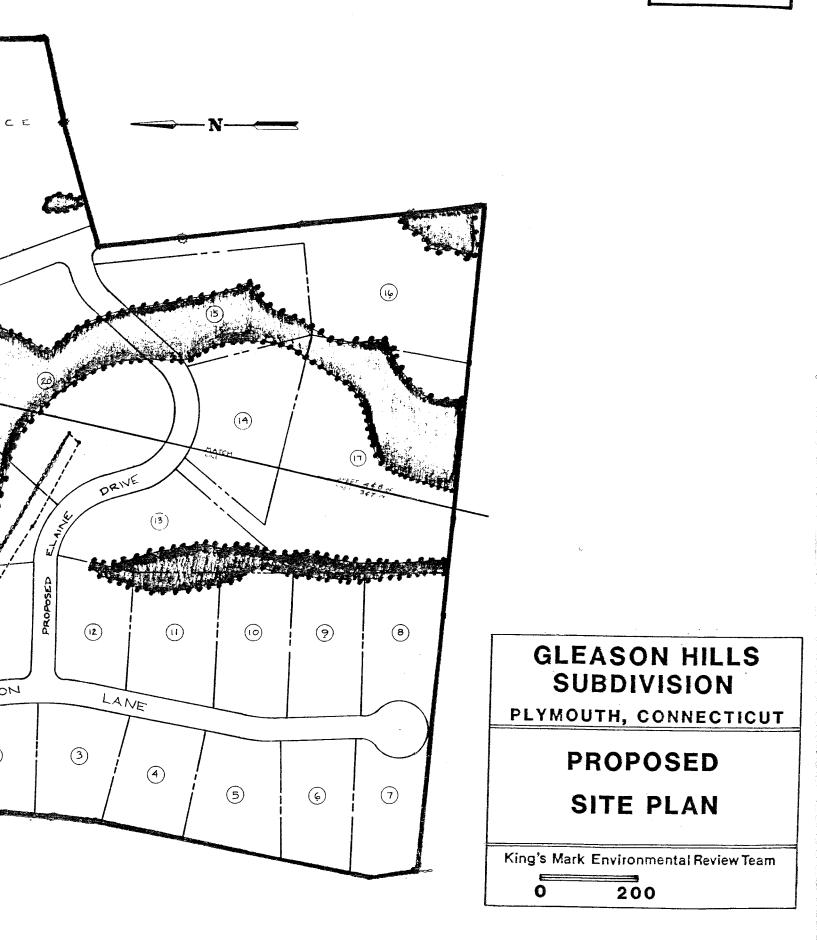
The data collection phase involved both literature and field research. The ERT field review took place on July 19, 1988. Field review and inspection of the proposed development site proved to be a most valuable component of this phase. The emphasis of the field review was on the exchange of ideas, concerns or alternatives. Mapped data or technical reports were also perused, and specific information concerning the site was collected. Being on site also allowed Team members to check and confirm mapped information and identify other resources.

Once the Team members had assimilated an adequate data base, it was then necessary to analyze and interpret their findings. The results of this analyses enabled the Team members to arrive at an informed assessment of the site's natural resource development opportunities and limitations. Individual Team members then prepared and submitted their reports to the ERT Coordinator for compilation into the final ERT report.

Figure 1

LOCATION OF STUDY SITE



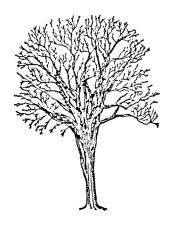


Information from Fransen Consultants, Inc. Index Map

The primary goal of this ERT is to inventory and assess existing natural resources occurring on the site as well as providing planning and traffic/access information. Specific objectives include:

- 1) Assessment of the geological characteristics of the site, including geological development limitations and opportunities for roads and houses:
- 2) Assessment of the hydrological characteristics of the site, including wetland hydrology and stormwater drainage;
- 3) Determination of the suitability of existing soils to support the proposed development;
- 4) Discussion of soil erosion and sedimentation concerns:
- 5) Assessment of the impact of the development on the wetlands and streams;
- 6) Assessment of the impact of the development on the wildlife/habitat;
- 7) Discussion of the suitability of the site to support on-site septic and water facilities, and;
- 8) Assessment of planning and land use issues, including open space and traffic and access.

PHYSICAL CHARACTERISTICS



SETTING. LAND USE AND TOPOGRAPHY

The proposed subdivision site, approximately 65 acres, is located in central Plymouth. The property, which is located on the east side of Todd Hollow Road, was once a farm. Gleason Road, an unimproved road off Todd Hollow Road, extends to the former farmhouse in the central parts of the site.

Boundaries for the site include Todd Hollow Road and residential properties on the west, a Connecticut Light and Power Company right-of-way on the south and private undeveloped land on the east and north. Land use in the area includes residential and agricultural land.

The applicant wishes to construct approximately 39 house lots to be served by on-site sewage disposal systems and individual wells. The access road to the site will be provided by a newly relocated Gleason Lane via Todd Hollow Road. A loop road system with two cul-de-sacs is currently proposed. The property is located in an RA-1 zone. Permitted uses of the land would include residential development with minimum lot sizes of 40,000 square feet (about one acre). It is understood that the Town regulations require a 25 foot setback for dwelling and septic systems from regulated wetland areas.

Except for some old farm fields in the vicinity of the farmhouse, the site is mostly wooded. The land surface rises steeply eastward from Todd Hollow Road to the central portions of the site. The remainder of the site contains gentle to moderate slopes. Steepest slopes occur along the western parts. The slopes on most of the site are controlled by the underlying bedrock. Maximum and minimum elevations are about 810 feet above mean sea level and 600 feet above mean sea level, respectively (see Figure 3).

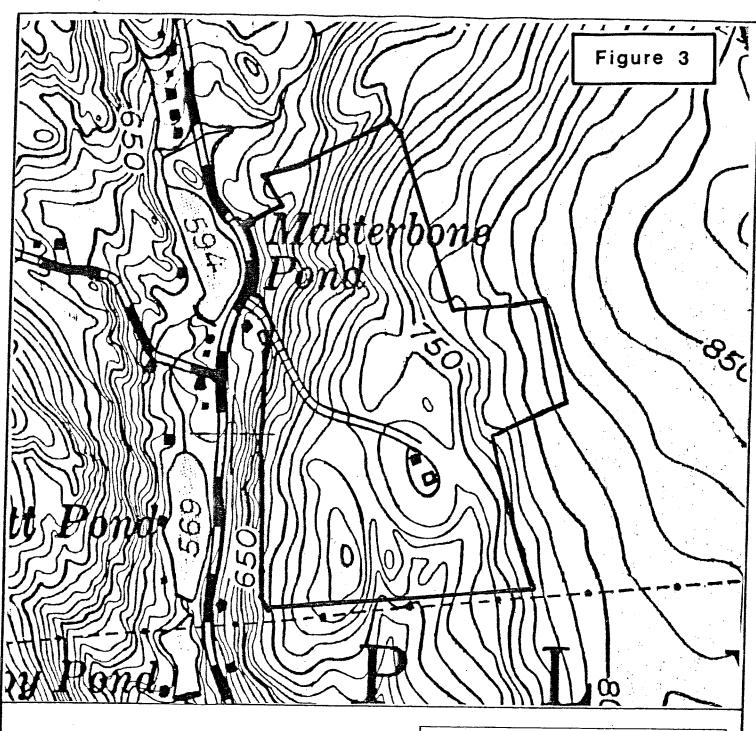
GEOLOGY

Bedrock in the vicinity of the site consists of a silvery to gray, medium to coarse grained schist (Rodgers, 1985) (see Figure 4). The site lies within an area where bedrock is at or near ground surface. According to deep test hole information for subsurface sewage disposal systems, the bedrock surface was encountered at depths generally less than 7 feet.

Based on visual observations made of remnant material near deep test holes on the review day, it appears that the bedrock surface is probably slightly to moderately weathered, which will allow a back-hoe to peel it with relative ease. It should be noted that a well completion report for a residential bedrock well drilled on Todd Hollow Road revealed a "caving zone" in the uppermost parts of the bedrock. The "caving zone" refers to the section of wall in an open bore hole that is subject to collapse or "cave-in" because the materials are weathered and unstable. Unless this unstable zone is properly cased with impervious, durable pipe, the weathered rock or other earth materials may fall into the well rendering it unusable.

The underlying bedrock is a source of water to many homes in Plymouth and will be the likely source of domestic water to the site (see <u>Water Supply</u> section).

The entire site is covered by a blanket of glacial sediment called till (see Figure 5). The till consists of a mixture of sediments that range from clay size particles to large boulders. Based on deep test hole data and soil mapping data, the texture of the till on the site is generally sandy and loose. However, some test holes revealed the presence of silt sized material that was tightly compacted mostly at deeper depths. The till sediments were deposited by glacial ice as it moved across the bedrock surface from north to south-southeast. It is ten feet thick or less in most places on the site.



GLEASON HILLS SUBDIVISION

PLYMOUTH, CONNECTICUT

TOPOGRAPHY

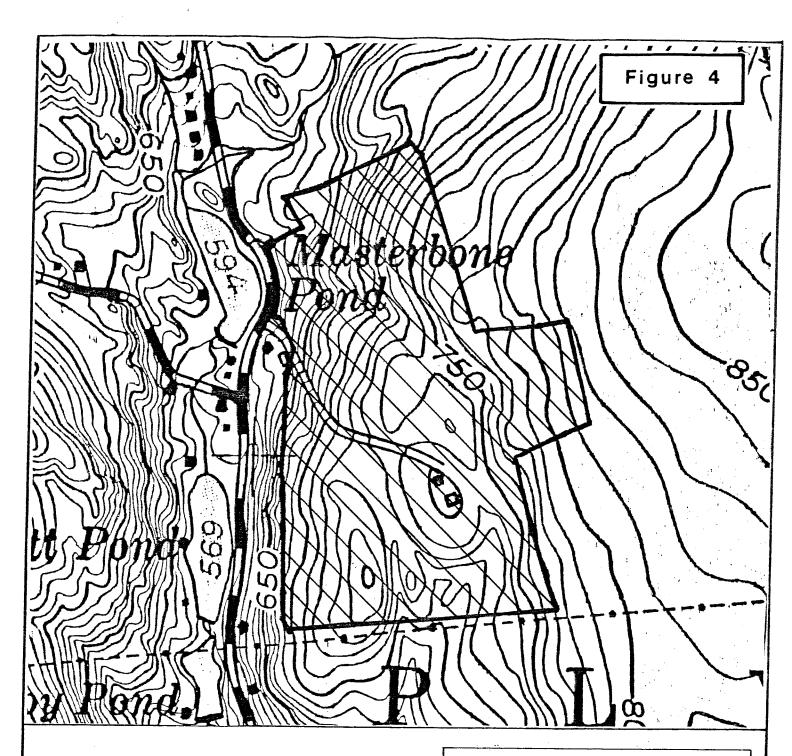
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Information from USGS Topographic Sheet Thomaston Quadrangle





Silvery to gray, medium to coarse grained shist

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BEDROCK GEOLOGY

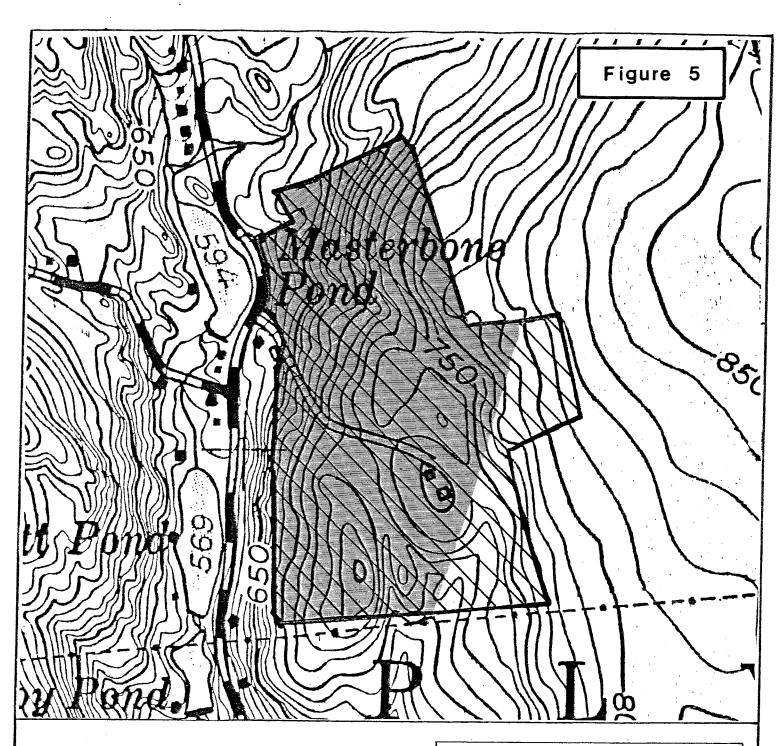
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Information from USGS Topographic Sheet Thomaston Quadrangle





Glacial Till



Areas where bedrock is at or near ground surface

SURFICIAL

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SUBDIVISION

GEOLOGY

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Information from USGS Topographic Sheet Thomaston Quadrangle

Overlying the till sediments principally in the southeast and northwest corner, are regulated inland wetland soils. Except for large wetland depressions north of the existing farmhouse, the regulated soils generally parallel drainage swales on the site. These soils developed after the retreat of glacial ice. Their boundaries have been delineated by a certified soil scientist and transferred to the subdivision map by survey methods. Based on the site plan distributed to Team members, the proposed roads will cross the wetlands in 3 places. One of these crossings (Gleason Lane, east of Lot 1) does not show on the plan. It is suggested that the applicant's soil scientist reinvestigate and delineate the outlet stream for the large wetland occupying Lots 19-21. It seems likely that the stream would flow westerly under the proposed Gleason Lane enroute to Todd Hollow Brook.

GEOLOGIC DEVELOPMENT CONCERNS

In terms of the proposed subdivision, the major geological limitations occurring on the parcel include:

- 1) Areas where bedrock is at or near ground surface (generally 7 feet or less);
- 2) Areas of moderate to steep slopes, which occur mainly along the western limits of the site;
- 3) The presence of till soils, which are characterized by seasonally high water tables as indicated by observed water table or soil mottling and which have slow percolation rates (30 minutes per inch or slower); and
- 4) Areas of seasonal or permanent wetness (regulated wetland soils).

These geologic limitations will weigh heaviest in the ability to provide adequate subsurface sewage disposal systems serving homes constructed in the subdivision. In addition, they may also be a hindrance in terms of road construction, foundation placement and basement maintenance.

The presence of shallow bedrock, seasonally high water tables and slow percolation rates indicates that most or all of the property constitutes an area of special concern as deemed by the State Public Health Code. As a result, plans for the design of the subsurface sewage disposal system (along with the placement of each on-site well water supply) must be prepared by a professional engineer who is registered in state and submitted to the local health department for review and approval by their certified staff. The final configuration of lots should not be approved until it can be demonstrated that each lot meets all of the State Health Code requirements.

A limiting factor on many lots is the presence of shallow soil mottling (36 inches or less), which is indicative of seasonally high water tables. Depending upon the topographic conditions and lot layout, certain lots may be suited for installation of groundwater intercepting drains (curtain drains). If a lot requires a curtain drain, the separation distance between the septic systems on adjacent properties and the drain becomes critical. The concern is that untreated effluent from upslope septic systems may flow into the curtain drain and be outletted to the stormwater system or other drainageways. This could cause health problems. A minimum of 50 feet is needed to separate the down slope curtain drain and the septic systems. The design engineer should address where each of the curtain drains would be located and where they will be discharged prior to subdivision approval. Curtain drains may be combined with building footing drains. Building footing drains should be installed around homes to help prevent wet basements. In addition, many areas may need elevated leaching systems, partially or entirely in fill. The latter would also be applicable in the shallow to bedrock areas.

In addition to placing selected fill material. leaching systems serving most lots in the proposed subdivision will need to be relatively large due to the moderately slow to slow percolation rates. They will also need to be

spread out along the contours to further lateral disposal into the naturally occurring soil. In cut areas (e.g., driveways) which are prone to high water tables resulting from a restrictive soil zone (hardpan), special care must be taken to ensure that septic systems are not located too close to the embankment. If they are too close, untreated effluent may bleed out along the embankment causing a public health hazard.

Since deep test holes on most lots revealed bedrock at depths of 7 feet or less, it is suggested that several deep test holes be excavated on the lots so that an accurate profile of the bedrock surface is determined. The upper few feet of the bedrock surface appears to be weathered or rotted. It is suggested that this weathered zone be treated as consolidated rock rather than unconsolidated material for design purposes.

The presence of bedrock at shallow depths on the parcel also suggests that blasting may be required in order to place driveways, foundations, septic tanks, distribution lines and water lines. Any blasting that takes place on the site should be done very carefully and only under the strict supervision of people experienced with the newest technology in blasting techniques. This should reduce the chance for undue seismic shock and potential damage claims. In this regard, it is also wise to conduct a pre-blast survey of the area. Generally speaking, it is only when blasting is conducted without regard to seismic shock or air-blast impacts that there are problems on surrounding properties. Since the upper few feet of the bedrock surface is weathered or rotted, heavy equipment may be able to peel the bedrock in some places and minimize the need for blasting.

Project plans submitted to Team Members indicate that the interior road system will cross wetlands in two areas. One, which is about 150 feet in length, will occur on the proposed Elaine Drive between Lots 15 and 20. The

other, which is about 40 feet in length, will occur on Gleason Lane between Lots 25 and 28. Although it is not shown on the plan, it seems likely that a third wetland road crossing would be required east of Lot 1 on Gleason Lane.

Wetland and driveway crossings can be feasible provided they are properly designed (e.g., culverts are properly sized and installed and permeable road base fill material is used). The roads should be constructed at least 1.5 feet and preferably 2 feet above the surface elevation of the wetlands. This will allow better drainage of the roads and decrease the frost heaving potential. The best time for road construction through wetland areas is during the dry time of the year with adequate provisions for effective erosion and sediment control. Detailed plans for all road crossing through wetlands should be shown on the subdivision plan and carefully reviewed by Town Officials.

Inland wetland soils are regulated under Chapter 440 of the General Statutes. Any activity which involves modification, filling, removal of soils, etc., will require a permit and ultimate approval by the Town's Inland Wetland Commission. In reviewing a proposal, the Commission needs to determine the impact that the proposed activity will have on the wetlands. If the Commission determines that the wetland is serving an important hydrological or ecological function and that the impact of the proposed activity will be significant, they may deny the activity altogether or, at least, require measures that would minimize the impact.

WATER SUPPLY

Since public water mains are not presently available to this site, the principal source of water to homes in the proposed subdivision is the underlying, crystalline metamorphic bedrock. Obtaining water from any given

bedrock is dependent upon the number and size of water transmitting fractures that are encountered by the well. The crystalline, metamorphic rock underlying the site responds to geologic forces by fracturing, folding and forming distinct open joints. The schistose rock beneath the site is characterized by an abundance and parallel orientation of platy or flaky (mica) minerals and by the ease of parting into thin layers. They respond to the geologic forces by slipping and folding along foliation or layered planes. As a result, the joint openings that develop in the schists are generally smaller and discontinuous compared to other crystalline rock types found in upland areas of Connecticut. If the underlying rock contains continuous and interconnected fractures and joints, then the availability of groundwater for domestic uses should be good.

The yields of a bedrock well cannot be predicted prior to drilling since the size and degree of interconnecting fractures in the rock below the site are unknown. However, experience has shown that the best yields are obtained in the top 200-300 feet of the bedrock surface. In general, well yields decrease with increased depth.

Connecticut Resources Bulletin No. 19 (Lower Housatonic River Basin) indicates of 68 wells surveyed that tapped schistose rock, 80 percent yielded about 2 gallons per minute or more. Generally speaking, a yield of 2-3 gallons per minute is satisfactory for domestic purposes. A review of well completion reports for homes along Todd Hollow Road revealed yields ranging from 3 gallons per minute to 9 gallons per minute at depths of about 180 feet.

In general, private wells should be located to the high side of lots with proper separating distance from on-site sewage disposal systems and other potential sources of pollution, particularly buried fuel storage tanks. Wells must also be properly separated from water impoundments, watercourses and drains and be protected from surface runoff and erosion problems. Proper well

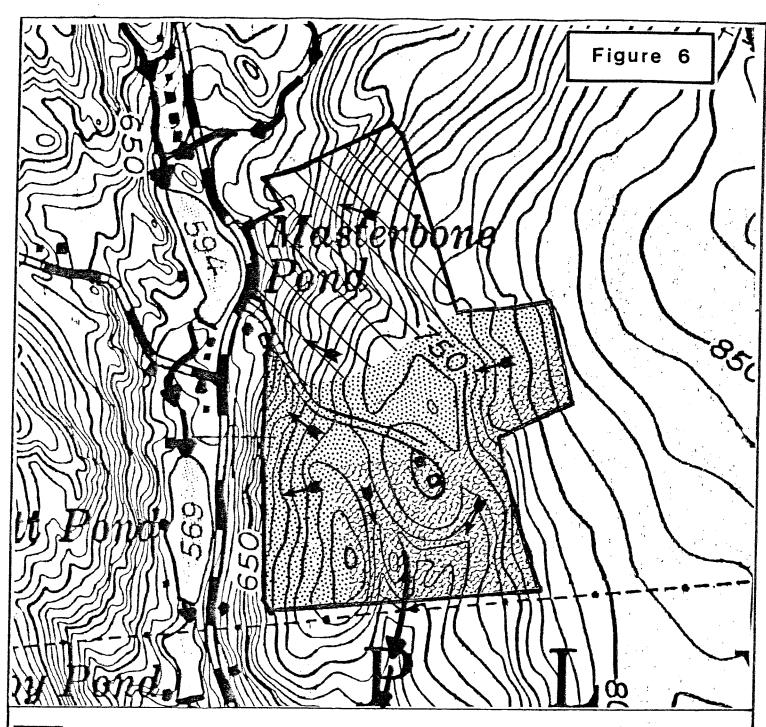
construction and separating distances in accordance with State Public Health Code. Connecticut Well Drilling Board and any town regulations, will allow for adequate protection of the quality of bedrock aguifer.

Properly constructed drilled wells cased firmly with steel pipe generally afford the greatest degree of protection against possible sources of pollution. They will also usually allow for more flexibility in actual site placement compared to shallow dug wells. All types of wells should be constructed by persons who are state licensed for this profession. Proposed well sites should be inspected by the Town sanitarian before the issuance of a permit of approval to actually construct such well(s). The sanitarian must insure that provisions of the State Public Health Code, State Well Drilling Board and local ordinances have been followed.

The natural quality of groundwater should be good. Groundwater in the area is classified by the DEP as GA, which means that it is suitable for private drinking water supplies without treatment. However, in many locations certain rock formations alter the quality of water that comes in contact with it. Two of the most common components produced are elevated levels of iron and/or manganese which may affect water quality. There is a good chance that both constituents may occur in the schistose rock underlying the site. As a result, it may be necessary to install appropriate water treatment systems in order to reduce concentration to non-objectionable levels.

HYDROLOGY

The site lies entirely within the Todd Hollow Brook drainage area. It can be further broken down into three subdrainage areas (see Figure 6). Surface runoff arising at the southeast corner of the site is drained to the mapped



Subdrainage A

Subdrainage B

Subdrainage C

Direction of surface flow

Watercourses showing direction of flow

Information from USGS Topographic Sheet Thomaston Quadrangle

GLEASON HILLS SUBDIVISION

PLYMOUTH, CONNECTICUT

WATERSHED HYDROLOGY

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Based on present plans, road drainage will be artificially collected in catch basins and discharged directly to wetland areas on the site. The applicant should develop a plunge pool design for stormwater pipe outlets and show them on the subdivision plans. It is suggested that the plunge pools not be located in the regulated wetland areas. (See Wetland Considerations section.)

Another concern with increased runoff is the potential for streambank erosion and gulleying. In view of the moderate to steep slopes, silty soils and downstream surface water bodies, the potential for erosion related problems is expected to be high, especially if a comprehensive erosion and sediment control plan is not developed for the subdivision.

In order to protect the quality of water in drainageways on the site and receiving surface water bodies downstream, consideration should be given to the installation of a temporary sediment pool(s) during construction phases. If a sediment pool is constructed, it should be located on upland soils rather than wetland soils. This will help to minimize wetland disturbances. If the primary purpose of detention basins is to minimize erosion and sedimentation, the peak discharge from a 2-year and 10-year frequency, 24 hour duration. Type III distribution storms should be analyzed. The presence of turbid, silt-laden water at Masterbone Pond was noteworthy on the review day. Based on a cursory inspection of the area, it appears that uncontrolled runoff from developments in the Todd Hollow Brook watershed may be affecting the Pond's water quality. This stresses the need for enforcement of erosion and sediment control plans by Town Officials or their designated agents.

SOIL RESOURCES

The landscapes of the Gleason Hills Subdivision are dominated by deep to shallow, gently sloping to steep glacial till soils with loose friable substratums. A few areas on the eastern side and center of the property may have a firm dense substratum (hardpan). High convex areas and steep slopes are well drained; concave sideslopes and drainageways are moderately well drained to very poorly drained. Small areas of rock outcrop are intermingled in a complex pattern with shallow to deep soils.

The soil map (Figure 7) has been created from on-site investigation, air photo interpretation and information provided by the consulting Soil Scientist. This map can be used for a general discussion of soil limitations on the parcel. All discussions about inland wetland locations and boundaries should use wetland boundaries as mapped by the consulting Soil Scientist. A chart of important soil features and interpretations has been prepared (Appendix A). Many of the map unit symbols and names are unique to this report and cannot be used in other areas. Below is listed some additional soils information and concerns:

- Many of the map units dominated by Charlton soils may be shallower to bedrock (₹72 inches) than is typical for the series. Also included are areas with a firm dense substratum.
- 2) Included in areas mapped CrE and CrC are areas of soils moderately deep (20 to 40 inches) to bedrock.
- 3) Wetland boundaries do not match between plan sheets 6 of 16 and 9 of 16.
- 4) Additional wetland soil areas and watercourses are on Lots 21, 22 and 28. These should be investigated and mapped by the soil scientist.
- 5) Numerous side hill seeps and possibly additional wetlands and/or watercourses are in the vicinity of the intersection of David Drive and Elaine Drive.

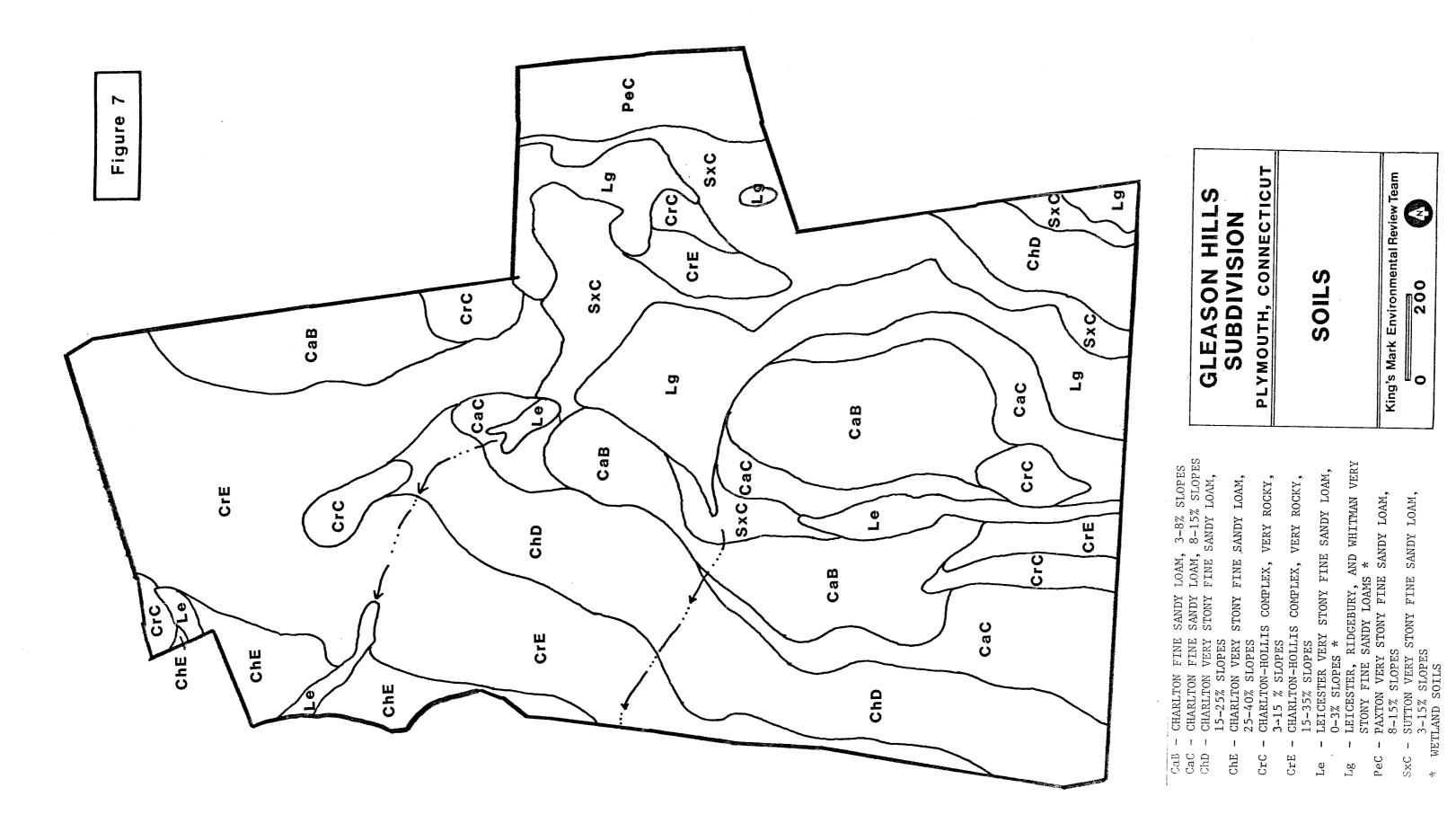
- 6) Numerous side hill seeps are in the area south of Lot 39 and will present engineering limitations. A number of these seeps appear to coalesce into a watercourse that is not shown on the plans.
- 7) No culverts are shown for the wetland crossing between Lots 25 and 28.
- 8) No culverts are shown for the wetland crossing of Elaine Drive between Lots 15 and 20.
- 9) Portions of the primary septic system for Lot 18 are on the old access road. These compacted and disturbed materials may not be suitable for the leach field.
- 10) The home for Lot 28 is located in the topographic low-watercourse. This is unacceptable. The septic system is on the sideslope of the "swale" and is too close to the cutslope.
- 11) The home for Lot 8 is proposed too close to the top of the steep slope. Site work could impact the slope and create an erosion hazard.
- 12) Extensive cutting and filling is proposed for many roads and driveways. Portions of Heather Drive, Gleason Lane and Lots 28, 29 and 30 will result in steep sideslopes that will be difficult to stabilize and maintain. A road layout and common drive layout that better follows the contours of the slope should be considered.

EROSION AND SEDIMENT CONTROL

An adequate erosion and sediment (E&S) control plan for the subdivision is required by the Connecticut Soil Erosion and Sediment Control Act (Public Act 83-388). The erosion controls currently shown on the site plans include: filter fabric sediment fences downslope from house/septic construction sites, a gabion retaining wall, rip-rap at outlets of some storm drainage pipes and a rip-rapped swale. These features are shown on sheets 6-9 of 16.

The E&S control plan as submitted is not complete. The following information or additional measures are needed:

- 1) A narrative should describe the project. E&S controls and other mitigating measures proposed.
- 2) A sequence of construction events is needed.



GLEASON HILLS SUBDIVISION PLYMOUTH, CONNECTICUT

SOILS

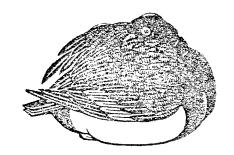
King's Mark Environmental Review Team

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- 14) Design details and hydraulics are not supplied for the rip-rapped swale on Lot 39 and the open space parcel. These should be reviewed by a professional engineer.
- 15) If the E&S controls fail during construction of this development sediment may be deposited in Masterbone Pond, west of Todd Hollow Road. The water in this pond appeared to be turbid the day of the site review. Road sand is apparent along Todd Hollow Road and Gleason Road and may be adding to the existing turbidity problem in Masterbone Pond.
- 16) A hydraulic study should be prepared and reviewed by a professional engineer showing that all proposed pipes on the property and across Todd Hollow Road are adequate to handle the post development runoff from this site.

BIOLOGICAL RESOURCES



runoff drain into the wetland which runs north to south off of the property. This alternative could lead to less wetland disturbance, provide more efficient drainage for the site and avoid any potential for flooding on the lower portion of the wetland swale. A full review of the existing and proposed hydrologic calculations will be necessary to determine the validity of this alternative. If the rerouting of this drainage does not occur, then the proposed modified rip-rap ditch should be pulled back out of the wetland boundaries. This will guard against any short and long term impacts to this wetland swale.

- 3) Sediment and erosion control measures should be taken on the downhill side of all areas of earth moving activities.
- 4) The commission should consider the use of a 50 foot minimum setback or buffer from all wetland areas. This measure will help to reduce impacts during construction as well as provide for future protection of the wetlands from residential activities.
- 5) All wetlands on site should be designated as open space by either conservation easement and/or deed restriction. Whichever avenue is taken by the commission, the use of field markers for the delineation of wetland boundaries is highly recommended to reduce confusion for all future property owners.

WILDLIFE CONSIDERATIONS

Description of Area/Habitats

The 64-acre site currently contains a variety of habitat types including mixed hardwood forest, old field areas, open field areas and areas of wetlands, some associated with the intermittent brooks. There is one existing house on the property, and the property is surrounded by relatively undeveloped land which contributes to the value of this area as wildlife habitat. Approximately six acres are proposed to be set aside as open space.

Generally, the greater the habitat diversity and degree of interspersion of various habitat types, the greater the variety of wildlife there will be using an area. The area offers a good variety of habitats and also offers some degree of interspersion of these habitat types. Because of this the area currently offers good wildlife habitat.

Forest: The mixed hardwood forest contains oak, ash, beech, hickory, red maple, black birch and a variety of other species. In addition to providing cover, nesting and roosting places, the oak and beech provide a valuable food source in the form of mast. Parts of the forest have a fairly heavy understory of trees and various shrubs, valuable as a cover to mammals and birds. Many of the shrubs produce berries used as food by many species of wildlife.

Because so much of the site was pasture and has since grown into pole size stands of red maple and birch, snag and den trees did not appear to be abundant, as would be expected in an older forest. Snag trees (dead trees) provide insects for a variety of wildlife such as woodpeckers, chickadees and other insect eating birds. The den trees (trees with holes) found scattered throughout the property, provide cavities for nesting owls, swallows, etc. The cavities also provide denning sites for raccoons, etc. Because of their value to wildlife, an effort should be made to preserve those snag and den trees present.

Old Fields/Open Fields: The old fields provide early successional stage habitat. It is an important type of habitat because it contains a variety of plant communities from grass and herbaceous plants to shrubs and young trees. The abundant growth of blueberry, honeysuckle, juniper, cherry and aspen provide abundant cover and a food source for a variety of wildlife.

The open field areas contain grasses and sedges which provide food and cover to a variety of wildlife. Small mammals make extensive use of these types of areas. Because of this, birds of prey often utilize areas like this to hunt.

These areas not only increase the overall diversity of the area, they also increase the "edge" or "edge effect." Edge effect is the phenomena that occurs where vegetational types meet with a high degree of interspersion, and vegetational diversity or richness is achieved. Because of this, the needs of a wide variety of wildlife can best be met.

<u>Wetlands</u>: 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 as open space areas. Acre for acre wetlands and their associated riparian zones exceed all other land types in wildlife productivity. Wetlands also serve other valuable functions including water recharge, sediment filtering, flood storage, etc. For these reasons the development of, filling in and/or crossing should be avoided or limited whenever possible.

The wetlands found on this site are mainly the deciduous type. There are forested areas with intermittent streams which contain mainly red maple and various shrubs, and areas with standing water for part of the year which support luxuriant shrub growth (spice bush, blueberry, etc.). Although these deciduous type wetlands may not be as "valuable" to birds and mammals because of lower vegetative diversity, they can be especially valuable to reptiles and amphibians for breeding and some year round use.

Wetland areas are limited in quantity in the state and continue to dwindle on an almost daily basis, another important factor in considering their preservation. Their value increases as the quantity of the resource diminishes. A buffer of at least 100 feet is recommended around any wetland to preserve its value and use by wildlife.

Open Space: 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. The area should have natural travel pathways for wildlife (such as 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. Other habitat types in conjunction with wetlands are desirable for open space.

Wildlife Resources/Recommendations

As with any development the impact on wildlife habitat in general will be negative. A sizeable area will be broken up and lost with the construction of roads, driveways, walkways, parking areas and homes. Another impact is the loss of habitat where cover is cleared for lawns and landscaping. A third 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.

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.

The design of this development which contains many small lots (approximately one acre in size) probably increases the negative impacts to wildlife habitat.

If large house lots cannot be provided for. cluster housing should be considered. By clustering the homes together. less land is disturbed and built on, and therefore more remains to be utilized for wildlife habitat.

Not only should the disturbance to wetlands be minimized before development, but afterwards as well. Post development homeowner activity in the wetlands should be avoided. If possible, through a conservation easement or deed restriction, such activities as pasturing animals in a wetland or filling in for extra lawn and/or garden should be restricted.

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

In planning and constructing a development there are steps that should be considered that may help somewhat to minimize the adverse impacts on wildlife.

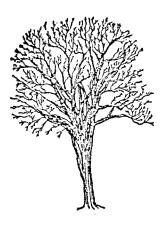
- 1) Maintain a 100 foot (minimum) wide buffer zone of natural vegetation around all wetland/riparian areas to filter and trap silt and sediments and to provide some habitat for wildlife.
- 2) Utilize natural landscaping techniques (avoiding lawns and chemical runoff) to lessen acreage of habitat lost 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 a 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 five oaks, 14 inches dbh or greater should remain.
 - b) Leave 5 to 7 snag/den trees per acre as they are used by birds and mammals for nesting, roosting and feeding.
 - c) Exceptionally tall trees, used by raptors as perching and nesting sites, should be encouraged.
 - d) Trees with vines (i.e. fruit producers) should be encouraged.
 - e) Brush debris from tree clearing should be piled to provide cover for small mammals, birds, amphibians and reptiles.
 - f) Shrubs 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 (winterberry, autumn olive). See Appendix B for a list of suggested shrub and tree species that can be encouraged and/or planted to benefit wildlife.
- 6) Nesting sites can be provided for a great variety of birds with placement of artificial nest boxes.

Large houselots and implementation of the suggested guidelines may help to minimize the adverse impacts to local wildlife populations. Implementation of backyard wildlife habitat management practices should be encouraged. Such activities include providing food, water, cover and nesting areas.

THREATENED AND ENDANGERED PLANT AND ANIMAL SPECIES

According to the DEP - Natural Diversity Database there are no Federally listed Endangered Species or Connecticut "Species of Special Concern" that occur within the study area. The Natural Diversity Data Base contains the most current biologic data concerning endangered or threatened plant or animal species. On-going research continues to locate additional populations of species or locations of habitats of concern as well as updating existing data.

LAND USE AND PLANNING CONSIDERATIONS



PLANNING CONSIDERATIONS

Introduction

The Gleason Hills Subdivision is located one-half mile south of Route 6 and is reached via Todd Hollow Road. There are 39 proposed lots on this 64 acre site. At present, the site consists of a federal style farm house (Circa 1800) surrounded by mixed hardwood forest, open fields, tributary streams, wetlands and areas with steep slopes.

Surrounding Land Uses

The community of Plymouth is characterized as rural in many areas. The population density for Plymouth is approximately 510 persons per square mile. the second lowest in the Central Connecticut region.

Immediately surrounding Plymouth's Gentral Business District (CBD) is low to medium residential, commercial, public and quasi public uses. Outside the CBD, low density residential and agricultural uses dominate the landscape with small pockets of manufacturing and medium density residential uses.

Zoning and Subdivision Review

The site of the proposed subdivision and adjoining properties are zoned residential A-1 (RA-1). According to the Town of Plymouth's Zoning Regulations, a permitted use by right in RA-1 is single-family detached units on a lot no less than 40,000 square feet. The proposed lots in the subdivision appear to meet this minimum requirement. There should be no problems in meeting the yard setbacks as outlined in the Zoning Regulations, Section 3.12.

Under the subdivision regulations for the Town of Plymouth, the arrangement of the streets shall be coordinated with the existing roadways. This subdivision will require all new roads. The existing access road, Gleason Road, will be replaced with a new roadway to improve access in and out of the

subdivision via Todd Hollow Road. The internal circulation within the subdivision creates a loop with two cul-de-sacs, each serving the opposite ends of the site. These cul-de-sacs make it possible for further extensions into the undeveloped adjoining properties. All roadways appear to meet the minimum widths of 50 feet for minor local streets and 60 feet for secondary local streets.

The subdivision regulations also require the developer to reserve land for public use. The minimum requirement is at a proportionate rate of one acre per ten acres to be subdivided. The Gleason Hills Subdivision meets this requirement with a total of 6.47 acres of reserved open space. Even though the open space will have direct access to a public street, it would appear desirable to link the open space with an internal "pathway," possibly following the wetlands. This would allow for greater accessibility for all residents and would separate the vehicular and pedestrian traffic.

Plan of Development

The Town of Plymouth's Plan of Development is outdated. A new one should soon be in progress. Plymouth is a member town of the Central Connecticut Regional Planning Agency. The Regional Development Plan (1985) has the proposed site designated for residential use. However, the Central Connecticut Regional Planning Agency's Development Plan does emphasize careful treatment in developing environmentally sensitive areas such as the Gleason Hills Subdivision.

TRAFFIC CONSIDERATIONS

The number of trips likely to be generated by a 39 unit subdivision (about 400 daily and 25 peak hour) should not be a major traffic impact. The ADT on Route 6 between Route 262 and the east junction with Harwinton Road was 11,500 in 1987 and 10,900 in 1985.

It is suggested that consideration be given to the idea of extending Elaine Drive to Todd Hollow Road, possibly creating a four way intersection with Todd Road as the main access road. This proposal would appear to provide better sight lines at Todd Hollow Road than would proposed Gleason Lane, as well as more efficient vehicle storage on Elaine Drive.

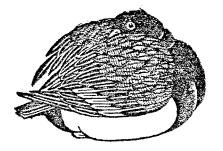
If that is not possible, the proposed grade on Gleason Lane should be flattened as it curves down to Todd Hollow Road to accommodate the vehicle storage required with a traffic control sign. That is of particular importance during inclement conditions. Signing for traffic control should be reviewed for this entire intersection. Similar consideration should be given to the grades of the internal roadway intersections. Grades at landings of 3% to 5% are proposed, and it is recommended that they be as close to 3% as possible for ease of braking and turning, particularly in inclement conditions.

The driveway off Gleason Lane which provides access to Lots 28, 29 and 30 appears to be very steep (about 15%). It is suggested that this be reduced to a 10% maximum grade. A review by the Town engineer of all steep driveway grades, as well as the proposed use of common driveways, seems appropriate.

The proposed roadway drainage appears reasonable as shown, but it is suggested that the engineer review it again to insure ice free winter conditions. Gleason Lane is the focal point for runoff (e.g. from Elaine Drive), and given the steep grades, water could skip the catch basin openings. Due to the severe grades, strict attention should be paid to erosion control during construction. A review of temporary and permanent stabilization measures by the Town engineer would be appropriate.

As it is proposed by the developer that the Town assume responsibility for the roads, it is suggested that the consulting engineer certify that all town road standards, and recommendations by the Town Engineer, were adhered to during construction.

APPENDICES



Appendix A: Soil Limitations Chart

MAP UNIT NAME *	GENERAL SOIL PROPERTIES	DRAINAGE CLASS AND DEPTH TO SEASONAL HIGH WATER TABLE	MAJOR LIMITATIC HOMES WITH BASEMENTS	MAJOR LIMITATIONS TO THE DEVELOPMENT OF: HOMES WITH ON-SITE SEPTIC ROADS AN BASEMENTS SYSTEMS STREETS	PMENT OF: ROADS AND STREETS
<pre>CaB - Charlton fine sandy loam, 3-8% slopes</pre>	Glacial till soils formed in loose loamy materials	Well drained >4.0 ft.	None	None	None
CaC - Charlton fine sandy loam, 8-15% slopes	Glacial till soils formed in loose loamy materials	Well drained >4.0 ft.	None	None	Slope
ChD - Charlton very stony fine sandy loam, 15-25% slopes	Glacial till soils formed in loose loamy materials	Well drained >4.0 ft.	Slpoe	Slope	Slope
<pre>ChE - Charlton very stony fine sandy loam, 25-40% slopes</pre>	Glacial till soils formed in loose loamy materials	Well drained >4.0 ft.	Slope	Slope	Slope
<pre>CrC - Charlton-Hollis Complex, very rocky, 3-15% slopes</pre>	Complex of glacial till soils from deep to shallow over bedrock. Formed in loamy materials	Well drained to excessively drained >4.0 ft.	Variable depth to bedrock	Variable depth to bedrock	Depth to bedrock
<pre>CrE - Charlton-Hollis Complex, very rocky, 15-35% slopes</pre>	Complex of glacial till soils from deep to shallow over bedrock. Formed in loamy materials	Well drained to excessively drained 74.0 ft.	Variable depth to bedrock, slope	Variable depth to bedrock, slope	Depth to bedrock, slope
Le - Leicester very stony fine sandy loam, 0-3% slopes	Glacial till soils formed in loose loamy materials	Poorly drained 0.5-1.5 ft.	Wetness	Wetness	Wetness, subject to frost action
Lg - Leicester, Ridgebury, and Whitman very stony fine sandy loams	Undifferentiated unit of glacial till soils formed in dense loamy materials	Poorly to very poorly drained 0-1.5 ft.	Wetness	Wetness	Wetness, subject to frost action

MAP UNIT NAME *	GENERAL SOIL PROPERTIES	DRAINAGE CLASS AND DEPTH TO SEASONAL HIGH WATER TABLE	MAJOR LIMITATI HOMES WITH BASEMENTS	MAJOR LIMITATIONS TO THE DEVELOPMENT OF: HOMES WITH ON-SITE SEPTIC ROADS AND BASEMENTS SYSTEMS STREETS	PPMENT OF: ROADS AND STREETS
Pec - Paxton very stony fine sandy loam, 8-15% slopes	Glacial till soils formed in dense loamy materials	Well drained >4.0 ft.	Seasonal wetness	Substratum perca slowly	Slope if > 8%
<pre>SxC - Sutton very stony fine sandy loam, 3-15% slopes</pre>	Glacial till soils formed in loose loamy materials	Moderately well drained 1.5-2.5 ft.	Seasonal wetness	Wetness	Subject to frost action, slope if >8%

^{*} Many of the map unit names and symbols used in this report are unique and may differ from the Litchfield County Soil Survey Report (1970) legend and text.

Appendix B: Suitable Planting Materials for Wildlife Food and Cover

SUITABLE PLANTING MATERIALS FOR WILDLIFE FOOD AND COVER

<u>Herbaceous/Vines</u>	<u>Shrubs</u>	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 4	
Boston ivy		

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 - a 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 - <u>free</u> of <u>charge</u>.

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 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 landowner/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 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 Resource Conservation and Development Area, 322 North Main Street, Wallingford, Connecticut 06492. King's Mark ERT phone number is 265-6695.