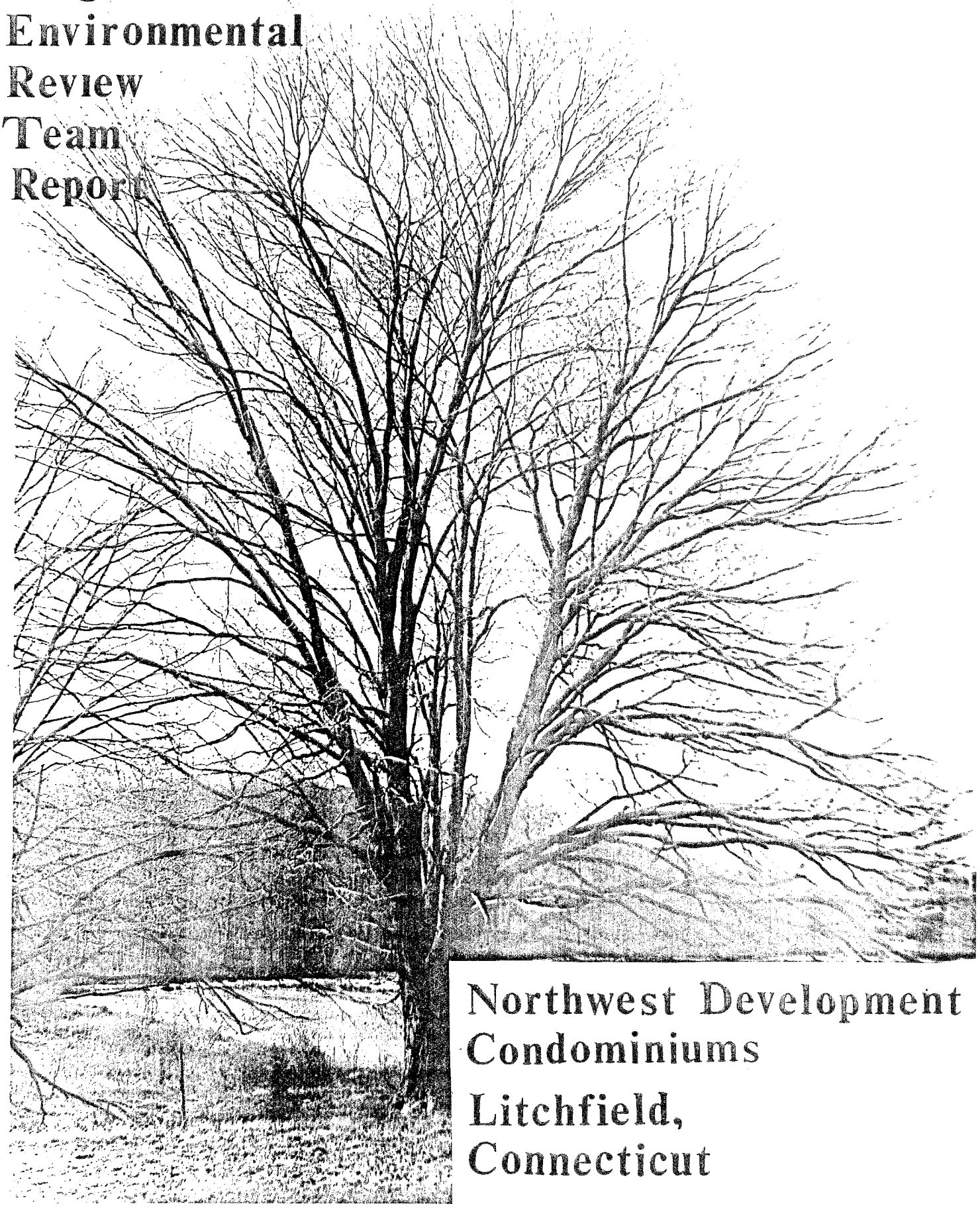
King's Mark Environmental Review Team Report



Northwest Development Condominiums

Litchfield, Connecticut

NORTHWEST DEVELOPMENT CONDOMINIUMS

LITCHFIELD, CONNECTICUT

Environmental Review Team Report

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

Wallingford, Connecticut

for the

Litchfield Planning and Zoning 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 Planning and Zoning 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.

JANUARY 1988

ACKNOWLEDGMENTS

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

* William Warzecha, Hydrogeologist
  Department of Environmental Protection - Natural Resource Center

* Kathy Hanford, District Conservationist
  USDA - Soil Conservation Service

* Kenneth Metzler, Wetland Specialist
  Department of Environmental Protection - Natural Resource Center

* Russell Handsman, Archaeologist
  American Indian Archaeological Institute

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

* Harry Siebert, Transportation Planner
  Department of Transportation

I would also like to thank Susan Anderson, Secretary, and Janet Jerolman, Cartographer of the King's Mark Environmental Review Team for assisting in the completion of this report.

Finally, special thanks to David Thompson, Town Engineer, Thomas McGowen, Town Planner and Luis Silva, owner/developer, Steven Hyman, engineer for the developer, and Willian Johnson, landscape architect and planner for the developer, for their cooperation and assistance during this environmental review.

EXECUTIVE SUMMARY

Introduction

The Litchfield Planning and Zoning Commission has requested that an environmental review be conducted on Northwest Development Condominiums, a site proposed for a condominium development. The site is located in the southwestern corner of town, bordering the town of Torrington. A small portion of the site is located in Torrington. Access is provided via Clark Road, a road off Route 202.

The 77-acre site is characterized by second growth, mixed hardwood forest, wetlands, and former agricultural lands. The proposed development would consist of approximately 228 condominium units. Most of the development is proposed in the upland areas south and west of the existing wetland communities. Since the wetlands are near the proposed access road, wetland crossings will be necessary to provide access. In order to minimize the potential developmental impacts to the wetlands, the developer is following a 75-foot setback guideline in these areas.

The Town was primarily concerned with the potential impact that the proposed development would have on: (1) existing natural resources; (2) existing wetland corridors; (3) effects of erosion and sedimentation; (4) stormwater drainage; and (5) 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; (4) presentation of planning and land use guidelines. Based on the review process, specific resources, areas of concern and development limitations and opportunities were identified. The major findings of the ERT are presented below:

Topography, Setting and Geology

The site contains slopes that range from gentle to steep. The land surface slopes towards the central streamcourse and northern wetland. The slopes appear to be controlled by the underlying bedrock, which is at or near the surface in the western parts of the site. The bedrock is classified as the Hartland Formation which is very old, metamorphic rock. It is a source of water to many homes in the region.

The surficial geologic materials are classified as glacial till and post glacial swamp deposits and alluvium. The till on most of the site should be a loose, sandy variety. In the northwest corner there is a possibility of the siltier, more compact variety. Thickness of the till is probably not more than 10 feet in most parts of the site and thinnest in the west. The swamp deposits consist of sand, silt and clay mixed with organic matter and deposited in poorly drained areas. Alluvium, sand, gravel and silt laid down by a stream, parallels the streamcourse.

Geologic Development Concerns

As the proposed development will be served by municipal water and sewers, many of the hydrogeologic concerns are allayed. The major hydrogeologic impacts from construction include the presence of (1) shallow soils in the central sections, (2) moderate to steep slopes and (3) alluvial and inland wetland soils.

The reshaping and regrading of the upland knoll may require blasting. If proper precautions are not taken, there is a chance that blasting could lead to: (1) increased turbidity levels in surface water and groundwater at least in the immediate vicinity of activity; (2) increased number of fractures or openings in the solid bedrock at least in the immediate vicinity, which may or may not impact nearby wells which rely on the underlying bedrock as a water source; (3) possible damage to nearby structures and foundations. A pre-blast survey should probably be considered to reduce unwarranted damage claims.

Blasting may cause erosion on moderate to steep slopes. A detailed and enforceable erosion and sediment control plan should be developed for this construction phase. Consideration should be given to constructing at least a temporary sediment basin to remove silty material from runoff before discharging into the stream or wetland.

Wetlands are regulated under Chapter 440 and the Connecticut General Statutes. Any activity such as filling, grading and/or modification must be approved by the Litchfield Inland Wetlands Commission. The present plans require two wetland crossings. Considering the distribution of the wetlands, it appears that the best crossing locations have been chosen. Although undesirable, wetland road crossings are feasible, provided they are properly engineered. The other potential disturbance to the wetlands will be the three detention basins planned for the central wetland/streamcourse. Because the wetland areas already have some natural detention capabilities consideration should be given to locating the detentions on upland soils. This would greatly reduce the amount of disturbance to the wetlands.

Hydrology

Most of the surface runoff flows downslope to the unnamed streamcourse. The remaining runoff flows directly to the wetlands which parallel Gulf Stream. Because of the high density of units proposed, development of the site would be expected to substantially increase the amount of runoff during periods of rainfall. It is suggested that the town require a stormwater management plan. The plan and calculations should be carefully reviewed. It appears that the post development runoff can be handled by the detention basins and the large wetland without causing major flooding problems. This can be determined once the calculations have been prepared and the Gulf Stream watershed analyzed.

Another concern associated with the increase in runoff is the potential for siltation. It is important that the wetlands and watercourses on the site be protected from silt, sand and parking lot debris. A comprehensive erosion and sediment control plan and stormwater management plan are recommended. Plans for the maintenance of catch basins and detention/sedimentation basins are also recommended.

According to the "Ground Water Availability in Connecticut" map the area under the northern wetlands has the potential to supply large volumes of water to individual wells. Verification would require further testing. Every effort should be made to protect this potential aquifer from silt, road runoff and road salt. In regards to road salt, calcium chloride should be considered as an alternative to sodium chloride.

Soil Resources

The soils occurring on the site are generally mapped in the "Soil Survey of Litchfield County, Connecticut". Soils with seasonal high water tables can cause problems as cut slopes can have water seeps which makes stabilization difficult. Retaining walls are difficult to maintain due to water pressure behind the walls and roads and driveways may have frost heaving problems. These problems may be overcome by installing drainage pipe or by land grading. Paxton soils, which are well drained, may also have seepage problems because of a dense layer at 24 inches in depth.

Soils on steep slopes have greater erosion hazards. Filled soil areas erode more easily than similarly sloped natural soils. Cut or fill slopes that are stabilized with vegetation should not be steeper than 3:1 slopes to control erosion.

Two road crossings and three ponds are planned for the regulated wetland soils. These may require permits from the Inland Wetlands Commission and the Army Corps of Engineers. The soil in the area proposed for the ponds should have ample surface and ground water to keep the ponds full. There may be excessive surface water flowing into the pond for the size, which would cause sediment buildup. This is most likely to occur in the upper pond, which may require periodic dredging. If water is impounded greater than 3 feet above the natural ground elevation, a DEP Dam Permit may be required. If the water depth is less than 6 feet, aquatic vegetation is likely to develop on the bottom.

Sand salt and oil inputs to the wetland are likely from road runoff. Properly designed and maintained catch basins can significantly reduce pollution of the wetlands from this source. Since the development may be near a potential aquifer, surface discharge of stormwater may be better than subsurface discharge because it would help keep potential pollutants out of the groundwater supply.

A complete erosion and sediment control plan has not been submitted. The "Connecticut Guidelines for Soil Erosion and Sediment Control" should be used as a guide for this plan. Limiting the disturbed area by marking the trees for clearing, using tree protection methods and phasing construction will help to control erosion. Proper grading, water control and grade stabilization are also needed. The sediment barrier which is planned around the development would trap sediment prior to its leaving the uplands or the property boundaries. If phased construction is used, sediment barriers should be used to keep sediment within the disturbed area of each phase. Sediment barriers are critical along wetland crossings, culvert outlets and during any pond construction.

The volume of storm water is likely to increase due to the development. Care should be taken to insure that the increase will not erode or exceed the capacity of the natural drainage system. The Soil Conservation Service recommends analyzing the 2, 10 and 100 year storm events in designing detention basins to control flooding.

Wetland Considerations

The large wetland adjacent to Gulf Stream (Wetland A) is a complex area with a variety of soils and vegetation. This makes the wetland valuable as wildlife habitat, for flood water retention and for ground water maintenance. The wetland along the stream (Wetland B) drains a small wet basin and has a strongly fluctuating water table.

The proposed development is designed to minimize environmental impacts to the wetlands. Wetland A will not be directly influenced by the project and an adequate setback has been proposed. Wetland B will receive the storm water discharge from the site and three detention basins/ponds are planned in the wetland area. Further impacts will be caused by road crossings. It is recommended that the detention basins be located on upland sites to facilitate the filtering of pollutants and to minimize wetland disturbance. It is also recommended that a plan and profile of the roadway crossings be submitted so that adequate culvert size and amount of fill can be addressed.

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.

Archaeological Sensitivity and the Impact of Northwest Development Condominiums

The northeastern section of Litchfield has never been systematically surveyed for prehistoric archaeological sites. A preliminary survey of Spruce Brook and data gathered by local archaeologists do provide sufficient information to characterize the potential impact of the development.

Artifacts, representative of prehistoric sites between 6000 and 3000 years old, have been reported from several locations along Richards Road between Newberry Corner and Route 118. Other materials also have been found on the landforms north of Gulf Stream including the formerly cultivated fields along Wilson Road in Litchfield. The drainages of Spruce Brook and Gulf Stream clearly were the focus for periodic native settlement and use for several thousand years. Systematic archaeological surveys in several towns in Litchfield County have indicated that wetlands were an important focus for native Indian settlement throughout prehistory, perhaps more important even that river valleys. Thus, archaeological resources are expected on many of the lands surrounding the wetland system along Gulf Stream.

Although no archaeological sites have been recorded from the project area, there is evidence that indicates important sites once existed to the west of Hart Drive, between the road and the wetland. These sites have been destroyed by the stripping of topsoil and the removal of gravel from the area. The known archaeological evidence suggests that these lands were used periodically for campsites as early as 5000 years ago. There is some indication that more

permanent villages may have been built there some time in the last ten centuries.

The same prehistoric land use probably incorporated the space east of Hart Drive. This area has not been extensively developed or disturbed and prehistoric sites there are still intact. Some of the more sensitive areas include the lands below the 920 foot contour interval and the level pasture lot situated along the western border. Both of these areas are to be disturbed by the construction of condominiums.

By identifying and mapping critically important archaeological areas, and protecting these areas as open space, some of these sites could be preserved for future research. A systematic and intensive archaeological survey would be needed. An alternative might be to reduce the scale of construction in the sections west of the streamcourse to the lands above the 920 foot contour. This would preserve any sites situated in the zone adjacent to the wetlands.

Planning Considerations

The site is zoned RMF-160 to allow the construction of garden apartments at a density not to exceed eight units per 40,000 square feet of usable site area. The land surrounding the site in Litchfield was recently rezoned to R-80, requiring a minimum of two acres per lot. The land in Torrington is zoned R-10 (10,000 sq. ft. minimum). The abutting land in Torrington is owned by the applicant and is to be protected as open space under the proposed project. The project is not inconsistent with the zoning in Torrington and is not incompatible with adjacent land use in Litchfield.

Zoning regulations require a 60 foot rear yard setback with a 15 foot wide buffer strip of evergreen and deciduous plants. This will serve to soften the transition between the proposed project and adjacent development in Litchfield.

The project is generally compatible with the intensity of development proposed in the State Policies Plan and local zoning regulations. The project is not consistent with Litchfield's Plan of Development Map which calls for development at a lower density in this area of town. The town will need to address this point. To the extent that the project may exacerbate the effective treatment of sewage at the Torrington Sewage Treatment Plant, it is inconsistent with the spirit of the State Plan to protect the quality of the resources.

The Bridgeport Hydraulic Company has the public water supply franchise for the Town of Litchfield. The Connecticut Department of Health Services considers the Bridgeport Hydraulic System marginally adequate and is restricting new connections to the system until such time as the water supply service is improved. The water company may be interested in developing a new water supply to service the site. However, the existing water mains extend only a few hundred feet down Route 202 from Litchfield Center towards Torrington. Extension of the current system to the project site may not be economically feasible. An alternative would be for Bridgeport Hydraulic to authorize the provision of water to the site by the Torrington Water Company, which has water mains much closer to the project site. The Torrington Water Company is capable of providing water to the proposed project. It is estimated that the project would require 45,600 gallons of water per day, which is less than 5% of the available capacity of the Water Company.

Due to the density of the proposed project, connection to the Torrington sewer system will be necessary. The Torrington Sewage Treatment Plant is regularly exceeding its design capacity. This means that the wastewater is not treated properly and is reducing the water quality in the Naugatuck River. Stormwater infiltration and illegal hookups are the major concerns. Torrington is attempting to address these problems. An existing 8" sewer line is available for the project. According to the City's consulting engineer, certain sections of this line may not be able to handle the sewage from the project. This may cause sewage to backup into the residences or cause manholes to overflow. The town needs to be assured that adequate sewer facilities are available before the project is approved. These should include both the sewer pipes and capacities of the sewage treatment plant. It would be judicious for both Litchfield and Torrington to cooperate in planning the sewer line improvement in this area based on the development potential of the entire area to be served by the line.

The hammerhead cul-de-sacs used in the project are frequently preferred by snow plowers as they facilitate the removal of snow. The dimensions of the cul-de-sacs will need to be reviewed with firefighting personnel to ensure that they do not pose a problem with regard to firefighting capabilities.

For safety reasons, the proximity of the recreation facilities to the pond is of concern. Alternatives could be to fence in the ponds or to move the facilities. The establishment of several small playgrounds should be encouraged due to the lack of such facilities in the area. Consideration might also be given to the inclusion of passive solar design in the project.

Based on the site plans, it appears that a number of units and cul-de-sacs may infringe on the 60-foot rear lot setback. This should be checked on the plans and during construction so that the potential impacts from the development will be minimized.

Traffic Considerations

Sightline distances on Clark Road and Roads A and I might be reconsidered to provide sightline distances of 600 feet in each direction. Traffic is fast moving in this area. Distances could be achieved by clearing vegetation and some regrading of the slopes along the side of the road.

Traffic in the area of Route 202 has had average increases over the years. Traffic at Route 118 has not increased significantly. The additional traffic from the proposed development should not have a major impact on either of these roads, although the traffic control on Route 202 should be reviewed to see if any modifications are needed. A State Traffic Commission certificate will be needed for the proposed development.

The internal road network might be adjusted to improve traffic circulation even though steep slope conditions exist. Some suggestions are: (1) review Roads I, K, and J to see if a loop road could be used in place of a cul-de-sac; (2) shift Road I to the southwest to see if site lines for the intersections improve; and (3) review Roads A, C and D to see if C and D could be matched to a common intersection. An unpaved/grass access road to the detention basins should be provided for maintenance. Underdrains to protect the pavement from frost heaving could be incorporated into the design.

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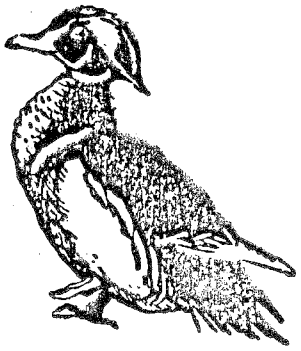


The review process consisted of four phases:

(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.

(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 November 20, 1987. 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 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.

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) assess the hydrological and geological characteristics of the site, including geological development limitations and opportunities, natural drainage patterns, postdevelopment stormwater runoff potential, and flooding;

Figure 1

LOCATION OF STUDY SITE

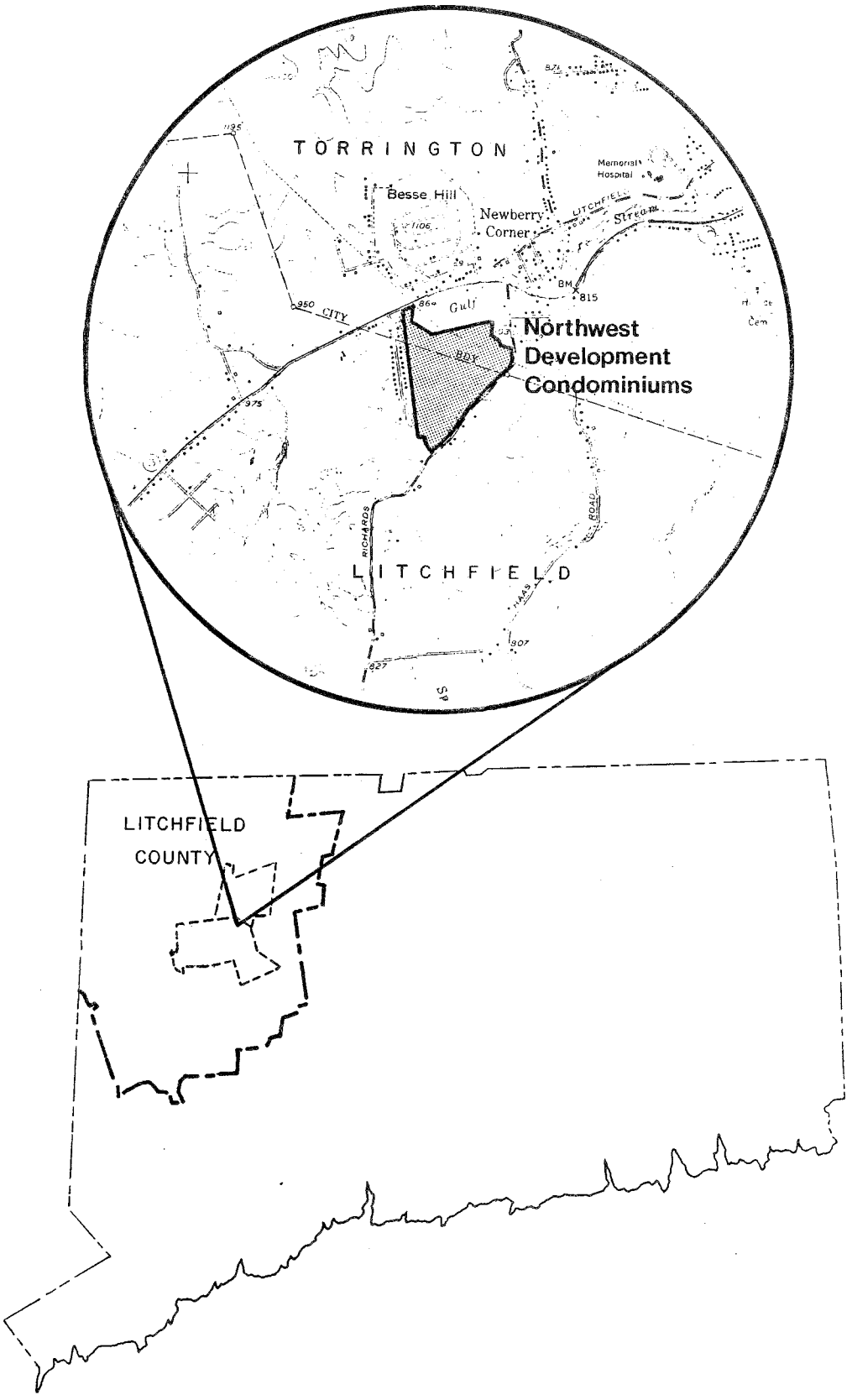


Figure 2

NORTHWEST DEVELOPMENT
CONDOMINIUMS
LITCHFIELD, CONNECTICUT

PROPOSED SITE PLAN

King's Mark Environmental Review Team

0 250'

(2) determine the suitability of existing soils to support the proposed development;

(3) discuss soil erosion and sedimentation concerns;

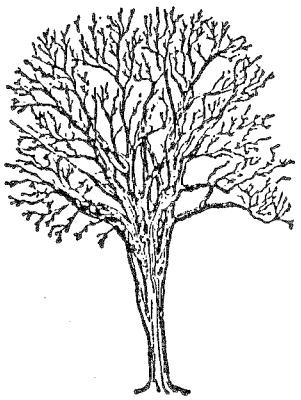
(4) assess the impact of the development on the wetlands;

(5) assess the impact of the development on the archaeological resources;

(6) evaluate traffic and access concerns, and;

(7) assess planning and land use issues.

PHYSICAL CHARACTERISTICS



TOPOGRAPHY, SETTING AND GEOLOGY

Topography and Setting

Thirty five percent or approximately 27 acres of the site is located in the City of Torrington. The latter land area comprises the major wetland in the northeastern parts. The remaining 50 acres is located in northeastern Litchfield. Access is provided via Clark Road, a road off of Route 202. Except for three open areas in the western, central and eastern parts, the site is comprised largely of wooded land.

The site contains slopes that range from gentle to steep (Figure 3). Land surface slopes mainly towards the north-flowing streamcourse bisecting the site and the wetlands in the northeast parts. Steep slopes characterize the central parts. Based on visual observations, it appears that these slopes are controlled by the underlying bedrock. Present plans call for the construction of condominiums, interior roads and recreational facilities in this area.

Bedrock Geology

The proposed condominium development is located within the West Torrington topographic quadrangle. A bedrock geologic map (QR-17, by R.M. Gates) for the quadrangle has been published by the Connecticut Geological and Natural History Survey (Figure 4).

The bedrock surface appears to be at or near ground surface in the western parts of the site. Gates classifies the bedrock underlying the site as very old metamorphic rocks called the Hartland Formation. These rocks are identified as a light-grey, fine to medium grained granulite comprised of the minerals quartz, mica and plagioclase. The term "granulite" refers to a rock which is metamorphic (geologically altered by high heat and pressure) and which is composed of even-sized interlocking granular materials.

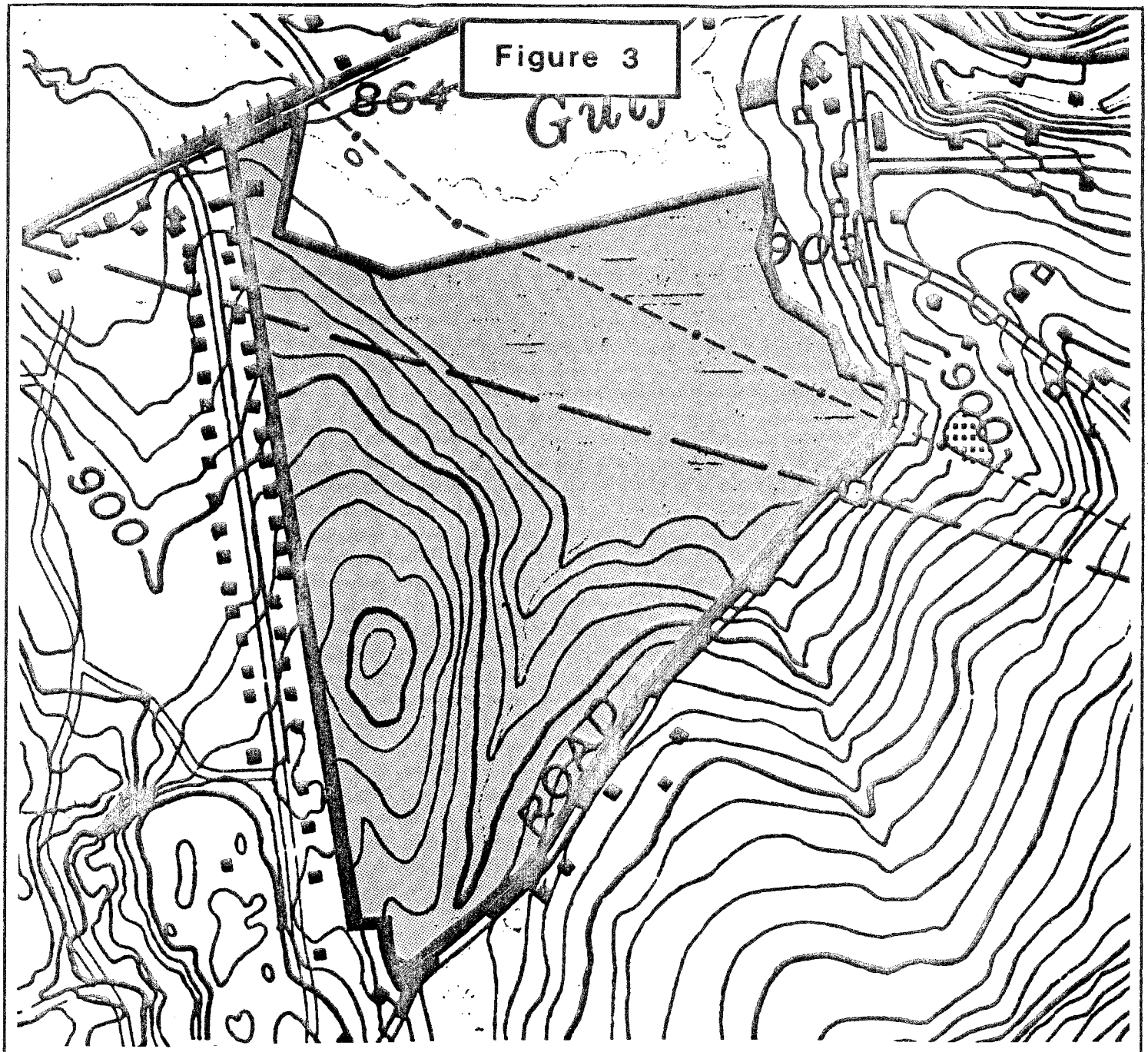
The underlying bedrock is the source of water to many homes in the region. It is understood that the condominium project would be served by the Torrington Water Company and the Torrington municipal sewer system (see Planning Considerations section).

Surficial Geology

A surficial geologic map (GQ-727 by Roger Colton) for the West Torrington quadrangle has been published by the U.S. Geological Survey (Figure 5). According to Colton's map, a glacial sediment called till was plastered onto the crystalline bedrock underlying the site by moving glacial ice . Till consists of ground up rock material which may range in size from clay to boulders or any combination of these intermediate sizes. Because the ice moved the particles without regard to their sizes or shapes, till textures may be locally quite variable. Two types of till have been identified in Connecticut. One is fairly loose and sandy, while the other is typically silty, crudely layered and compact. Based on soils mapping information supplied to Team members, it appears that the sandier, looser variety of till covers most of the site. Soil testing would be required to verify this, however. According to the soils map (Figure 6), a small portion of the site in the northwest corner comprises the siltier, compact variety.

Thickness of the till varies throughout the site. It is probably not much more than 10 feet in most places. It appears to be thinnest in the western parts.

Overlying glacial till in the northeast parts are post-glacial sediments called swamp deposits. Swamp deposits consists of sand, silt, and clay mixed with organic material and deposited in poorly-drained areas. Based on the soil mapping data, these sediments are quite mucky and contain a high percentage of



NORTHWEST DEVELOPMENT CONDOMINIUMS

LITCHFIELD, CONNECTICUT

TOPOGRAPHY

King's Mark Environmental Review Team

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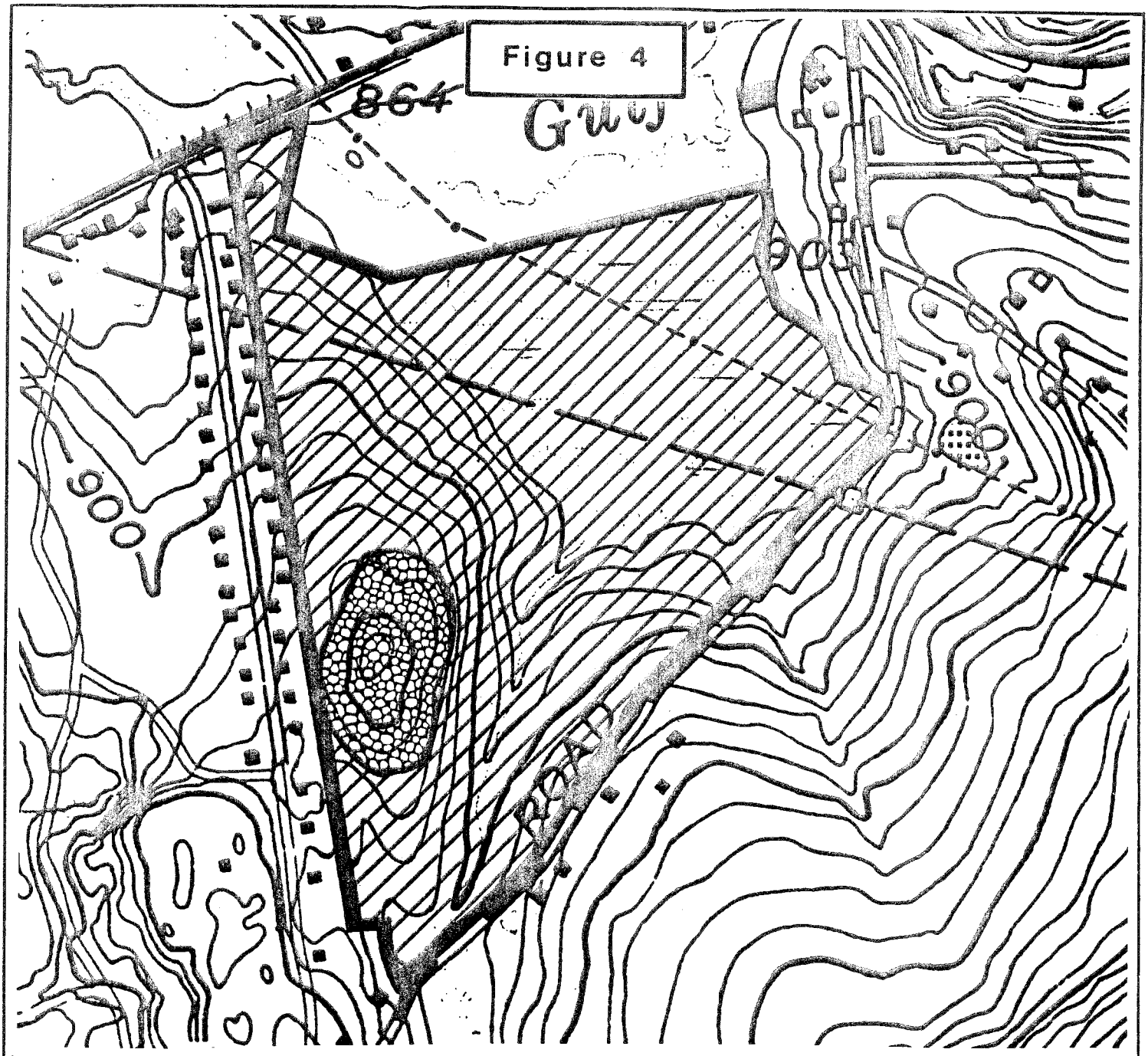

HARTLAND FORMATION

AREA WHERE BEDROCK IS AT OR NEAR GROUND SURFACE

NORTHWEST DEVELOPMENT CONDOMINIUMS

LITCHFIELD, CONNECTICUT

BEDROCK GEOLOGY

King's Mark Environmental Review Team

0 500'

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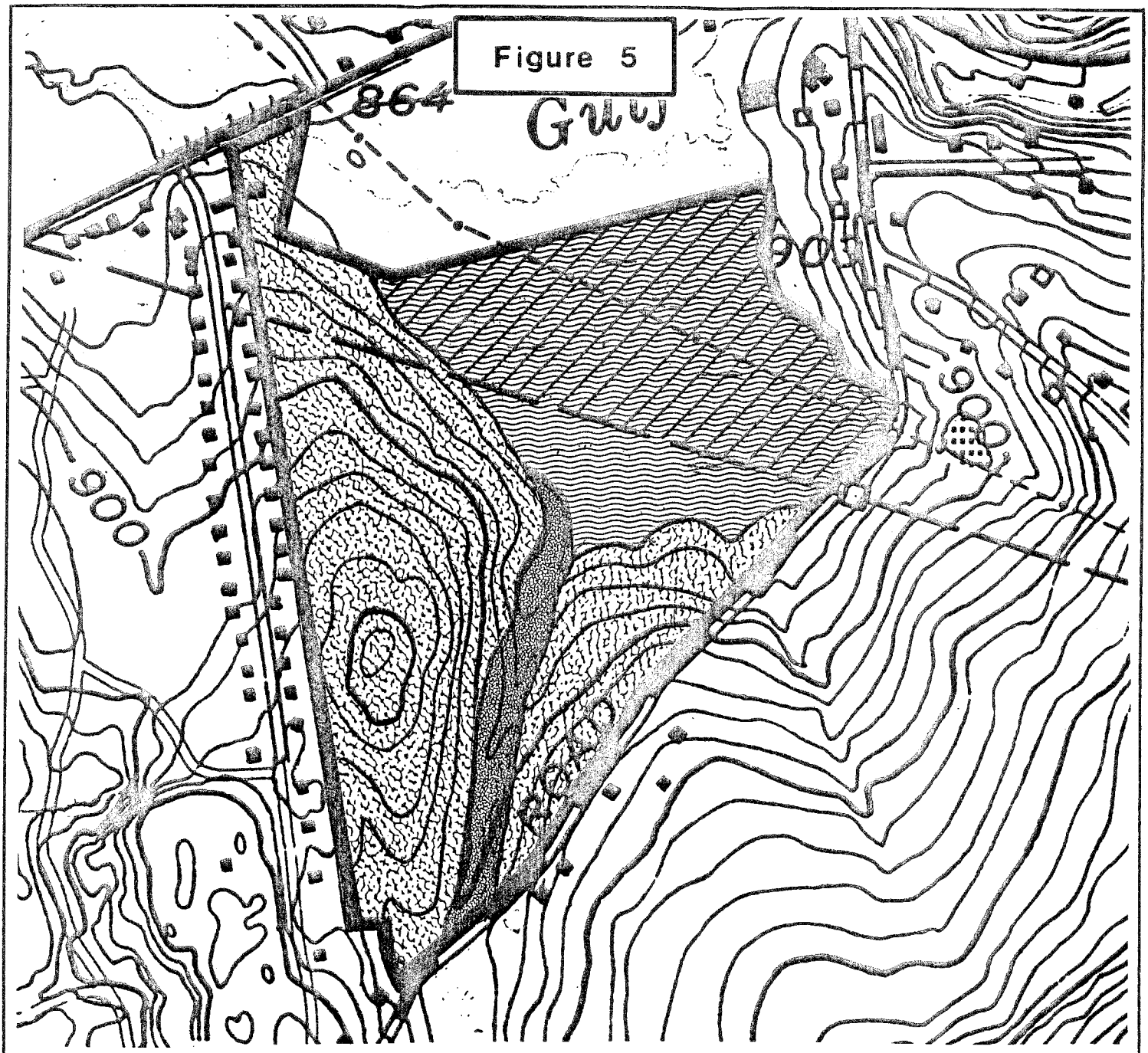
Figure 5



TILL

SWAMP DEPOSITS

ALLUVIUM

AREA WHICH MAY BE UNDERLAIN BY STRATIFIED SAND AND GRAVEL

NORTHWEST DEVELOPMENT CONDOMINIUMS

LITCHFIELD, CONNECTICUT

SURFICIAL GEOLOGY

King's Mark Environmental Review Team

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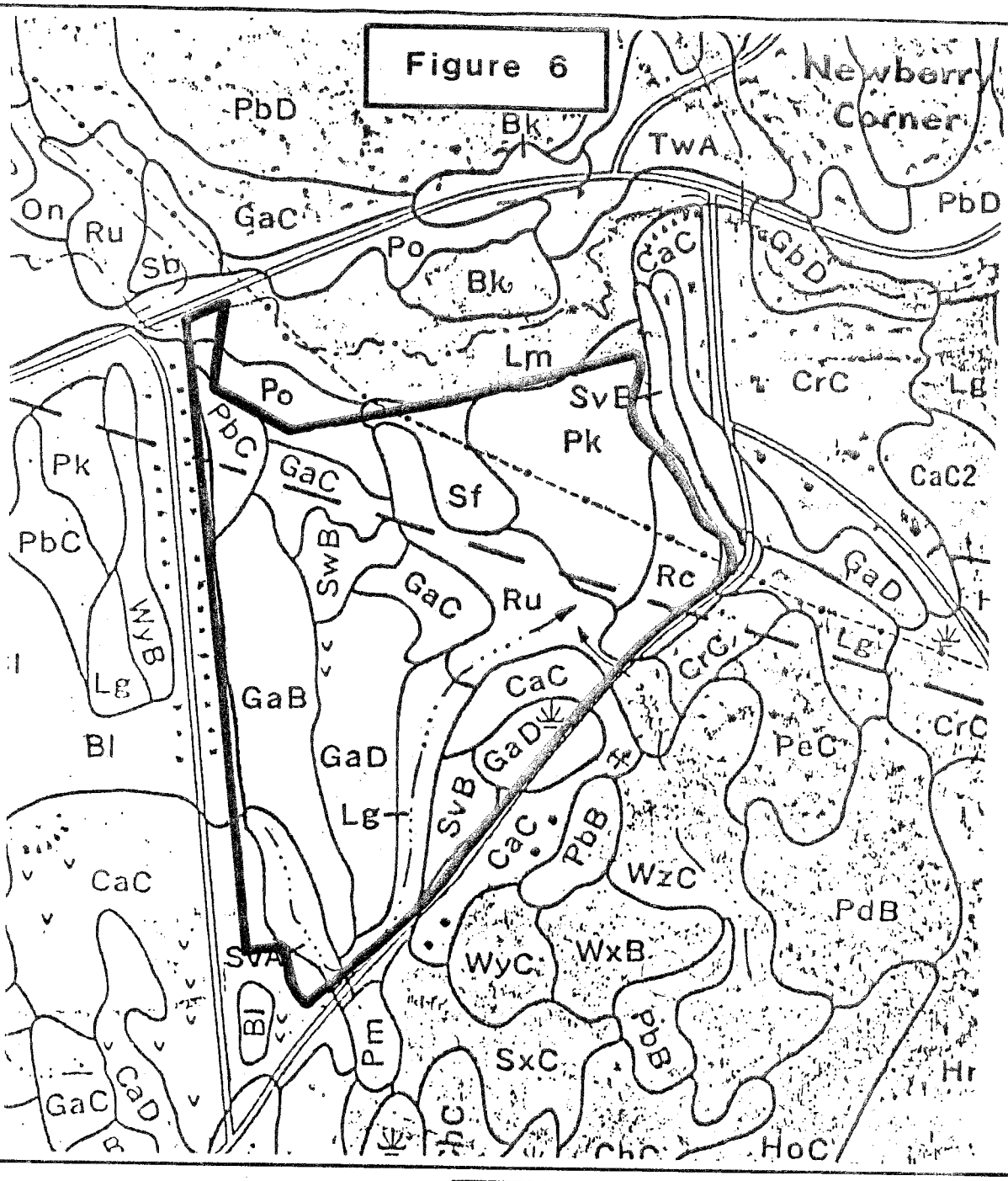


WETLAND SOILS

Lg	Leicester, Ridgebury and Whitman very stony fine sandy loams
Lm	Limerick silt loam
Po	Podunk fine sandy loam
Pk	Peat and Muck
Rc	Raynham silt loam
Ru	Rumney fine sandy loam
Sf	Scarboro loamy fine sand

UPLAND SOILS

Bl	Borrow and fill land, loamy material
CaC	Charlton fine sandy loam, 8 to 15% slopes
GaB	Gloucester sandy loam, 3 to 8 % slopes
GaC	Gloucester sandy loam, 8 to 15 % slopes
GaD	Gloucester sandy loam, 15 to 25 % slopes
PbC	Paxton fine sandy loam, 8 to 15 % slopes
SvA	Sutton fine sandy loam, 0 to 3 % slopes
SvB	Sutton fine sandy loam, 3 to 8 % slopes
SwB	Sutton stony fine sandy loam, 3 to 8 % slopes

NORTHWEST DEVELOPMENT CONDOMINIUMS

LITCHFIELD, CONNECTICUT

SOILS

King's Mark Environmental Review Team

0 660'

organic material. Alluvium, which is another type of post-glacial sediment, parallels the northflowing streamcourse on the site. These deposits are composed of sand, gravel and silt laid down by the stream in its floodplain.

GEOLOGIC DEVELOPMENT CONCERNS

As mentioned earlier, the proposed condominium project would be tied into the Torrington Water Company system and Torrington municipal sewer system. As such, the major hydrogeologic impacts commonly affiliated with residential development are moot, and only those effects arising from construction and residential use of the land are at question.

For the purpose of this report, the major hydrogeologic impacts occurring during the post-development construction includes (1) the presence of shallow soils in the central parts; (2) the presence of moderate to steep slopes; and (3) the presence of alluvial and inland wetland soils.

It appears that reshaping and regrading of the upland knoll (for road or building construction and placement of utilities) on the west side may require some blasting. If proper precautions are not taken, there is a chance that blasting could lead to:

(1) Increased turbidity levels in surface water and groundwater at least in the immediate vicinity of activity.

(2) Increase the number of fractures or openings in the solid bedrock at least in the immediate vicinity, which may or may not impact nearby wells which rely on the underlying bedrock as a water source.

(3) Possibly cause damage to nearby structures and foundations.

In regard to the possibility of damage, a pre-blast survey of surrounding properties should probably be considered to reduce unwarranted damage claims. Any blasting activity which takes place on the site should be under the strict

supervision of persons experienced with state-of-the-art blasting techniques. This should reduce the chance of unnecessary seismic shock or possible damage claims.

Another water quality concern associated with blasting of bedrock on the site is the presence of moderate steep slopes, most of which occur in the areas where blasting will most likely be necessary. Because blasting may mobilize fine grained soil particles into drainageways, a detailed and enforceable soil erosion and sediment control plan should be developed for this construction phase. Consideration should probably be given to constructing at least a temporary sediment basin to remove potential silty material from runoff prior to discharging to the unnamed watercourse on the site.

In order to determine a profile of the bedrock surface, it might be worthwhile to excavate deep test pits in the upland area sections of the site in the western parts.

The regulated wetlands, alluvium and watercourses on the site have been flagged in the field by a certified soil scientist and their boundaries superimposed onto the subdivision plan. This will greatly aid land use decision makers in reviewing the project. It is understood that the applicant proposes to maintain an approximately 75 foot buffer between regulated wetlands and development.

According to present plans, the project will require the traverse of two regulated areas; (1) an approximately 30 foot crossing at the intersection of Clark Road and Road "I" and (2) an approximately 40 foot crossing on Road "A" in the central parts.

Since both of the above areas are considered regulated areas under Chapter 440 and the Connecticut General Statutes, any activity such as filling, grading and/or modification must be approved by the Litchfield Inland Wetland

Commission. In reviewing a proposal, the Commission will need to determine the impact that the proposed activity will have on the wetlands. If the Commission feels that the regulated area is serving an important hydrologic or ecologic function and that the impact of the proposed activity will be severe, they may deny the activity altogether or, at least, require measures that would minimize the impact.

Considering the distribution of wetlands on the site (see Inland Wetlands section), it appears that the applicant's technical staff have chosen the most appropriate locations of disturbance. Although undesirable, wetland road crossings are feasible, provided they are properly engineered. The road should be constructed adequately above surface elevation of the wetlands. This will allow for better drainage of the road and also decrease the frost heaving potential of the road. All unstable material should be replaced by proper road base fill. Ideally, road construction through the wetlands should be done at a dry time of the year. The proposed wetland crossings are in locations where erosion control efforts will be paramount so that the wetland/watercourse system is adequately protected from silt. Wetland fill lines should be clearly shown on the subdivision plan so that areas of disturbance are clearly delineated. Also, the amount of fill material should be determined and made available to Commission members. Finally, culverts should be properly sized and located so as not to alter the water levels in the wetlands or cause flooding problems.

The other potential disturbance to wetlands will be the construction of the three proposed detention basins in the wetland/streamcourse in the central parts. They would be located in series.

Because these wetland areas already have some natural detention capabilities, consideration should be given to locating the detention basins on

upland soils. This will greatly help to reduce the amount of disturbance to wetlands on the site.

HYDROLOGY

Most of the surface runoff from the site flows downslope to the unnamed, northflowing stream that bisects the east-central parts. The remaining parts, most of which are in the northern portions, flow directly into the wetlands that parallel Gulf Stream. At its point of outflow to Naugatuck River, Gulf Stream drains an area of about 4.25 square miles or 2700 acres.

Because of the high density of units presently proposed, development of the site would be expected to substantially increase the amount of runoff during periods of rainfall. These increases would result from soil compaction, removal of vegetation and placement of impervious surfaces (roof tops, parking areas, etc.) over otherwise pervious soils. As a result, it is strongly suggested that the Town require the applicant to submit a stormwater management plan, which includes pre and post development runoff calculations. The plan and calculations should be carefully reviewed by the Town engineer and appropriate Town officials.

Considering the proposed detention basins and the large wetland area in the northern parts, it appears that post development runoff conditions can be adequately handled without causing major flooding problems. As indicated earlier, this can be determined once drainage calculations have been prepared and the Gulf Stream watershed thoroughly analyzed.

The other concern associated with increase to post development runoff is the potential for siltation problems. As such, the protection of watercourses and wetlands on the site from silt, sand and parking lot debris is most

important. In this regard, it is recommended that a comprehensive erosion and sediment control plan be submitted for the proposed development, particularly in view of the moderate to steep slopes and silty soils. The applicant's engineer should show in the stormwater management plans where road and parking lot runoff will be outletted. Ideally, it should be outletted to a sediment basin on the site rather than directly to watercourses. Consideration for the maintenance of catch basins and detention/sediment basins on a regular basis is also recommended.

According to a map entitled the Ground Water Availability in Connecticut (Meade, 1978), the wetland area in the northern parts (in Torrington) is underlain by sandy, gravelly materials. Depending on the texture of these materials, thickness of the saturated zone, proximity to surface water bodies as well as other hydrogeologic factors, these materials may be capable of supplying large volumes of water to individual wells, i.e., 50-2000 gallons per minute. The hydrogeologic characteristics of the deposits underlying the wetlands is unknown. Verification would require further testing such as borings and test wells. Every effort should be made to protect this potential aquifer from silt, road runoff (sand and automobile residue) and road salt. In regards to the latter, the Town of Litchfield should consider the use of calcium chloride as opposed to sodium chloride.

SOIL RESOURCES

Soils

The soils occurring in Northwest Development Corporation's proposed condominium complex property are generally described and mapped in the Soil Survey of Litchfield County, Connecticut, 1970 (map scale 1:15840) (see Figure 6).

The Soils Limitation Chart included in Appendix A of this report, lists the soils occurring on the property and important soil characteristics which influence development. The scale of mapping of the upland soils is too small to adequately describe the property for detailed planning and design. The soil survey map does give you an idea where these soils are likely, however, so that potential problems can be anticipated and planned for.

The soils with seasonal high water tables (SvA, SvB, SwB, Po) can cause potential problems both during and after construction. Cut slopes can have water seeps which make slopes difficult to stabilize. Water seepage can make it difficult to maintain retaining walls due to water pressure behind the walls. Paved driveways and roads may have frost heaving problems. These drainage related problems might be able to be overcome by installing drainage pipe or by land grading. Drainage pipe needs an outlet such as a storm drainage system or stream channel.

The Paxton (PbC) soils are well drained and have a dense soil layer at about 24 inches in depth. Water flows over this dense layer and can seep out if the dense layer is intercepted by a cut caused by land grading. The seeps in Paxton soils typically occur less frequently than seeps in the moderately well drained soils, however, the Paxton soils can also have some bank stabilization problems due to seepage.

The property is gently rolling to steep in slope. A few soils are very steep and are likely to cause special problems for development. These areas can be seen on the Slope Analysis Sheet L-2 (July 27, 1987). The areas with steep slopes are also noted by the slope class in the soil name (see Soil Limitation Chart). Extensive land grading may be needed in these areas. Cut or fill slopes that are stabilized with vegetation should not be steeper that

3:1 slopes. Erosion and sediment controls become more critical as slopes become steeper, because the erosion hazard is greater. Filled soil areas also erode more easily than similar natural soils.

Many wetland and floodplain soils (as described in Public Act 87-338 and Public Act 87-533) are on the property. These include Pk, Po, Rc, Ru, and Sf soils. These soils are regulated by State law and may require Litchfield Inland Wetland Commission and Army Corps/EPA 404 permits for the planned work. Two road crossings of wetland areas are planned. The stormwater drainage system will also affect wetland areas. Three ponds are proposed in wetlands and the storm drainage system will outlet into wetland areas.

The two road crossings are at fairly narrow sections of the inland wetland areas. Fill for roads should be kept to the minimum needed.

The soils in the area of the ponds is mapped as Lg (Leicester, Ridgebury and Whitman complex). There is likely to be ample surface and ground water to keep these ponds full. There may be excessive surface water flowing into the ponds for the pond sizes, causing sediment buildup. Sediment buildup is most likely to occur in the upper pond, which may require continued periodic dredging. If water is impounded greater than 3 feet above the natural ground elevation, a Connecticut Department of Environmental Protection Dam Permit may be required. If water depth is planned to be less than 6 feet, aquatic vegetation is likely to develop along the pond bottom.

Sand, salt and oil inputs to the wetland are likely from road runoff. Properly designed and maintained catch basins can significantly reduce pollution of the wetlands from this source. Since the development may be located adjacent to an aquifer area, surface discharge of road water may be better than subsurface discharge into permeable soils (Alternative 1 of Environmental Assessment by Art Cross). Surface discharge would help keep potential pollutants out of the groundwater supply.

Erosion and Sediment Control

An adequate erosion and sediment control plan for this development is required by the Connecticut Soil Erosion and Sediment Control Act (PA 83-388). A complete erosion and sediment control plan has not been submitted. The "Connecticut Guidelines for Soil Erosion and Sediment Control" should be used as a guide to developing this plan. A check list of items necessary to prepare this plan is shown in Appendix B of this report.

Limiting the disturbed area by marking trees for clearing, using tree protection measures, and phasing construction will significantly help control erosion. The 4 phases described in the environmental assessment by Art Cross (8/26/87) are well suited to the site. Proper grading, water control and grade stabilization (such as seeding, mulching, rip-rap or walls, etc.) are also needed. As a further protection, the sediment barrier which is planned around the development (Sheet S1 of 3, 10/19/87) would trap sediment prior to its leaving the upland areas or property boundaries.

If phased construction is used, sediment barriers should be designed to keep sediment within the disturbed area of each phase. Sediment barriers are also critical along wetland crossings, at culvert outlets, and during any pond construction.

Storm Drainage System

The total volume of stormwater runoff is likely to increase in the watershed due to the impervious areas in this development. Care should be taken to insure that increased runoff from the site will not erode or exceed the capacity of the existing natural drainage system. Every effort should be made to keep post development runoff rates equal to or less than predevelopment rates by use of on-site detention.

Figure 9-1 of the "Guidelines for Erosion and Sediment Control" (1985) (Appendix C) lists appropriate methods for calculating runoff based on the size of the watershed and output requirement. The USDA Soil Conservation Service recommends analyzing the 2, 10 and 100 year, 24 hour storm events in designing detention basins to control flooding. It is recommended that all hydrologic and hydraulic calculations pertaining to this site be submitted to the town, and reviewed by a professional engineer, familiar with the methods used.

WETLAND CONSIDERATIONS

Wetland Characteristics

The wetlands on site can be best described as two separate areas, the large wetland adjacent to Gulf Stream (Wetland A) and a smaller streamside wetland draining into the larger one (Wetland B). The general characteristics of these two areas are described below:

Wetland A is a large complex area with a variety of soils and vegetation development. Most of the wetland is either forested or mixed forested/ scrub-shrub and is bisected by a utility right-of-way. The soils are a combination of alluvium, hydric sands and gravel, and organic peats and mucks. This combination makes this wetland valuable as Wildlife habitat, for flood water retention, and for groundwater maintenance. In addition, this wetland overlies a potential groundwater aquifer as mapped by the DEP Natural Resources Center and the United States Geologic Survey.

Wetland B, in contrast, is a narrow drainageway that has a strongly fluctuating water table. The area is primarily forested with a well defined stream and adjacent hydric glacial till. This wetland drains a small wet basin that is due south of the site, directly across from Richards Road.

Environmental Impacts of the Proposed Development

The applicant has designed his proposed development to minimize environmental impacts to the wetland on-site. Wetland A will not be directly influenced by the proposed project and an adequate setback from the wetland has been proposed. A line of staked haybales for sedimentation/erosion control has been included in the plan. Indirect effects will be an increase in the amount of water directed into this wetland via Wetland B, the point source of all storm water discharge.

As stated above, Wetland B is proposed to receive all storm water discharge from the site with three catch basin/ponds to be excavated in the drainageway. In addition, further impacts will include the placement of fill and culverts for a road crossing to access buildable land to the east.

Recommendations

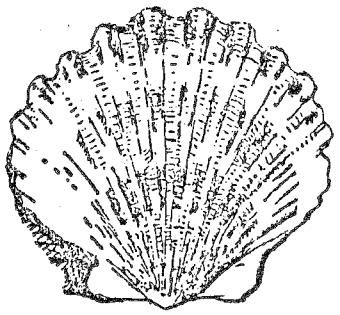
1) To minimize the input of salts, fertilizers, and pesticides from road and lawn maintenance into the aquifer underlying Wetland A, it is recommended that sedimentation basins be located on upland sites. This change in location will facilitate the filtering of these elements prior to water discharge into the wetland areas. In addition the location of these basins on the upland will further minimize impact to the wetlands on site.

2) Prior to the approval of this application by the Town Planning and Zoning Agency and Inland Wetlands Agency, a plan and profile of the roadway crossings should be submitted so that proper measures can be addressed for adequate culvert size and amount of fill necessary to reach the required grade.

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.

ARCHAEOLOGICAL RESOURCES



ARCHAEOLOGICAL SENSITIVITY AND THE IMPACT OF NORTHWEST DEVELOPMENT CONDOMINIUMS

Unlike the area surrounding Bantam Lake and its associated wetland system, the northeastern section of the Town of Litchfield has never been systematically surveyed for prehistoric archaeological sites. Nevertheless, the results from an initial survey of Spruce Brook in 1979 and data gathered by local avocational archaeologists do provide information sufficient to characterize the research significance and potential impact of the proposed development.

The lands surrounding Gulf Stream and its wetlands, south and west of Newberry Corner, have been the focus of sporadic residential development for more that two decades. During this time, housing complexes have been built around Besse Hill and along Hassig Street, Hart Drive and Peck Road. As these lands were developed and intensively used, some archaeological sites must have been partially disturbed or completely destroyed. Artifacts, representative of prehistoric sites between 6000 and 3000 years old, have been reported from several locations along Richards Road between Newberry Corner and Route 118. Other materials also have been found on the landforms north of Gulf Stream including the formerly cultivated fields along Wilson Road in Litchfield. The drainages of Spruce Brook and Gulf Stream clearly were the focus for periodic native settlement and use for several thousand years.

The richness projected for this four square mile area is not unexpected. Systematic archaeological surveys in several towns in Litchfield County have indicated that wetlands were an important focus for native Indian settlement throughout prehistory, perhaps more important even than river valleys. For example, more than twenty sites have been recorded from around the wetland

system associated with the Bantam River, Bantam Lake and their tributaries, south and west of the village of Litchfield. Although the wetlands along Gulf Stream are less extensive than those around Bantam Lake, one should expect that these lands also contain prehistoric sites.

Although no archaeological sites have been recorded from the specific project area east of Hart Drive, there is much evidence to indicate that important sites once existed immediately to the west, between the road and the wetland. These sites, represented in local collections and reports of subsurface fire and storage pits, have been destroyed by the stripping of topsoil and the removal of gravel from this locality. The known archaeological evidence suggests that these lands were used periodically for campsites by prehistoric hunter-gatherers as early as 5000 years ago. This pattern of use continued for at least four thousand years. There is some indication that more permanent villages may have been built there sometime in the last ten centuries.

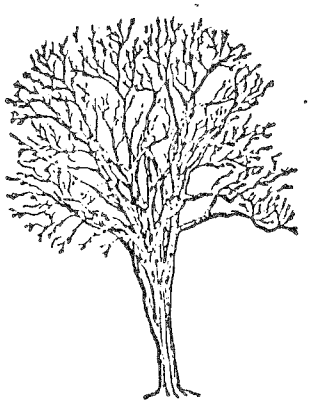
The same prehistoric patterns of land use probably incorporated the space east of Hart Drive, within the boundaries of the proposed Northwest Development. This area has not been extensively developed or disturbed; and prehistoric sites there are still intact unlike resources to the west. A walkover of some of the project area indicates that the more sensitive spaces include the lands below the 920 foot contour as well as the relatively level pasture lot situated along the western border. Both of these areas are to be disturbed by the construction of condominium units; any archaeological sites which may exist in them will therefore be lost if the development is constructed as proposed.

By identifying and mapping critically-important archaeological areas, and by protecting these areas as open space in perpetuity, some of those sites

could be preserved for research in the future. However such areas could only be delimited after a systematic and intensive archaeological survey; such projects often cost $1500-$2000 per week. As an alternative, the scale of the proposed development might be reduced by limiting construction in the sections west of the streamcourse to the lands above the 920 foot contour, preserving any sites that are situated in the zone adjacent to the wetland's edges.

It is important that all parties involved in this project recognize the archaeological richness of the lands around this wetland system. Despite the twentieth century losses, many important sites remain. By limiting and controlling development and destructive land uses such as graveling; some of this region's prehistoric archaeological record can be preserved for future study. Wetlands are now commonly recognized to be rich and critically important environmental places. Yet this richness has always had a human dimension -- specifically a Native American presence -- that is still largely unrecognized and unexplored. It is this record that deserves systematic and cooperative preservation efforts.

LAND USE AND PLANNING CONSIDERATIONS



PLANNING CONSIDERATIONS

Compatibility of Proposed Project with Surrounding Land Uses

The subject site is zoned RMF-160 to allow the construction of garden apartments at a density not to exceed eight dwelling units per 40,000 square feet of usable site area according to the zoning regulations of Litchfield. The land surrounding the subject site in Litchfield was recently rezoned from R-40 to R-80, requiring a minimum of approximately two acres per residential lot. The land in Torrington which abuts the subject site, while predominantly wetland, is zoned R-10 to allow residential construction at a minimum lot size of 10,000 square feet. This abutting land in Torrington is owned by the applicant and is to be protected as open space under the proposed project.

According to the Litchfield Zoning Regulations, a 60 foot rear yard setback must be maintained for the project. In addition, the regulations stipulate that buffer strips of at least fifteen feet wide, planted with a mixture of evergreen and deciduous shrubs and trees, shall be maintained in order to protect adjacent property and the neighborhood in general from detriment.

The proposed project is not inconsistent with the proposed land use or zoning in that section of Torrington which abuts the site. In addition, while the proposed project will result in residential development of considerably greater density than allowed in the abutting R-80 zone in Litchfield, the project is not viewed as incompatible with adjacent land use or zoning in Litchfield.

The setback and buffer strip required by the zoning regulations will serve to soften the transition between the proposed project and adjacent development in Litchfield.

The presence of the project will be most noticeable for the 15 households located on the east side of Hart Drive in Litchfield. Particular care will be needed in this area to ensure that the 60 foot setback regulations are adhered to and the buffer strip vegetation is properly planted and maintained.

Consistency of Project with State, Regional and Local Plans

The State Policies Plan for the Conservation and Development of Connecticut, 1987-1992 is a statement of the growth, resource management and public investment policies of the state. The Plan was prepared by the Office of Policy and Management and adopted by the Connecticut General assembly in 1987. The objective of the Plan is to give a balanced response to human, environmental and economic needs in a manner which best suits the future of Connecticut. Regional planning organizations in the State have been encouraged by OPM to foster implementation of the Plan at the local level.

According to the Locational Guide Map which accompanies the State Plan, the majority of the subject site has been classified as an area of long term urban potential. As such, it is considered suitable for intensive development provided urban facilities and infrastructure are developed.

To facilitate the maintenance of high quality waters, the State Plan discourages state-support of development projects where the design capacity of existing or programed wastewater systems is inadequate.

The Litchfield Hills Council of Elected Officials is a new regional planning organization and does not currently have a regional plan of development. Thus an assessment of the consistency of the proposed project with the goals of a current regional plan is not possible.

The density of the proposed project is consistent with the comprehensive plan of the Town of Litchfield as expressed through its zoning regulations. However, the density of the proposed project is not consistent with the

Litchfield Plan of Development (1984 update) which targets the subject site for development at medium density (i.e. 50,000 sq. ft. minimum lot size). It should be noted that the Town Plan supports the development of a housing mix and recommends maximum use of the existing sewer/water service corridors to achieve the desired variety of housing types and prices. While the subject site is not located within a sewer corridor as defined in the Town Housing Plan Map, it is located adjacent to the Litchfield Road (Route 202) sewer corridor and has easy access to both sewer and water facilities. The Litchfield Planning and Zoning Commission is encouraged to address the conflict between the town plan and zoning regulations for this area of town.

To conclude, the project is generally compatible with the intensity of development proposed in the State Policies Plan and local zoning regulations. The project is not consistent with Litchfield's Plan of Development Map which calls for development at a lower density in this area of town. To the extent that the project may exacerbate the effective treatment of sewage at the Torrington Sewage Treatment Plant, it is inconsistent with the spirit of the State Plan to protect the quality of the resources.

Water and Sewer Facilities

The Bridgeport Hydraulic Company has the public water supply franchise for the Town of Litchfield. Currently, Bridgeport Hydraulic relies upon two well fields as its source of supply for Litchfield. The Connecticut Department of Health Services considers the Bridgeport Hydraulic System marginally adequate and is restricting new connections to the system until such time as the water supply service is improved.

According to William Donovan of Bridgeport Hydraulic, the water company may be interested in developing a new water supply to service the site. However, the existing water mains in Litchfield are quite removed from the project site, extending only a few hundred feet down Route 202 from Litchfield Center

towards Torrington. Extension of the current system to the project site may not be economically feasible.

If it is economically unfeasible for Bridgeport Hydraulic to service the project site, an alternative would be for Bridgeport Hydraulic to authorize the provision of water to the site by the Torrington Water Company, which has water mains much closer to the project site than does the Bridgeport Hydraulic Company. The developer is currently working with the water companies on this matter.

The Torrington Water Company is well positioned to service the proposed project according to Richard Calhoun of the Torrington Water Company. With a safe yield of 4.7 million gallons per day (mgd), and over 1.0 mgd of available capacity, there is abundant water available at the Torrington Water Company to service the site. The Water Company has found that 200 gallons per day (gpd) per living unit is a reliable standard for estimating estimating residential needs. Thus, for design purposes, the proposed project of 228 units can be expected to require 45,600 gallons of water per day. This is less than 5% of the available capacity of the Torrington Water Company.

Due to the density of the proposed project, connection to the Torrington sewer system will be necessary. The sewage treatment plant in Torrington is operating at 80% of its design capacity based on average monthly flows, according to Gerald Rollet, a consulting engineer for the City. However, as shown in Table 1, average high monthly flows are routinely exceeding the 7.0 mgd design capacity of the plant. During such high flow periods, the wastewater may not be receiving adequate biological treatment prior to its discharge into the Naugatuck River. According to the Superintendent of the sewage treatment plant, discharge from the plant failed to meet DEP water quality permit standards 34 times between May 1986 and May 1987, based on testing conducted three times per week at the plant.

TABLE 1

HIGH AND LOW FLOWS AT THE TORRINGTON WASTE TREATMENT PLANT AND AVERAGES FOR THE MONTH*

	1986			1987		
	High	Low	Avg.	High	Low	Avg.
JAN.	8.6	4.1	6.52	7.2	3.5	5.5
FEB.	8.1	3.9	6.40	6.7	2.7	4.88
MARCH	9.8	5.3	7.88	9.04	4.83	7.23
APRIL	8.0	4.0	6.46	12.7	8.10	10.7
MAY	7.3	3.0	5.40	8.3	3.9	6.01
JUNE	9.0	4.4	6.80	7.4	2.7	4.9
JULY	7.0	2.7	4.99	6.2	2.0	4.10
AUG.	8.0	3.3	5.63	6.3	2.0	4.15
SEPT.	6.8	2.6	4.73	6.8	2.6	4.87
OCT.	6.5	2.1	4.30			
NOV.	7.3	2.7	4.83			
DEC.	7.0	4.2	6.30			

* 7.0 MGD/design capacity

Stormwater infiltration is the principal cause of the high flows in the system according to the City's Public Works Director. The City's consulting engineer has indicated that infiltration from stormwater has been known to quadruple the normal sewage flows through the system. During one 3-day storm event in the spring of 1987, sewage flows into the plant exceeded 20 mgd, resulting in both hydraulic and biological failure of the plant. Due to the backup of wastewater into the plant and on-site flooding, evacuation of the plant was being considered at one point according to the City's Public Works Director.

The City is addressing the infiltration problem along with the problem of illegal sewer hookups with the help of a consulting engineering firm which has been retained to identify and seal major points of infiltration and to locate illegal hookups into the system. In addition, the City is pursuing, in cooperation with DEP, the preparation of a facility study to upgrade the sewage treatment plant and sewer lines. According to the City's Public Works Director, it will be 6 to 8 years at the earliest, before an expanded and upgraded sewage treatment plant and system is on line.

With regard to the proposed project, an existing 8 inch sewer line is available along Litchfield Road (Route 202) which the project may tie into. This line connects to a major interceptor line located along Park Avenue in downtown Torrington, which, in turn, connects to the sewage treatment plant located off of Bogue Road.

According to the consulting engineer for the City, the existing sewer line along Litchfield Road is sufficient to handle current flows into the system. However, based on computer modeling conducted by the consulting engineer, it appears that certain sections of the line will not be able to hydraulically

accommodate the additional input generated by the proposed project. To avoid the spectre of sewage backup into residences or overflowing sewer manholes, it may be necessary to install larger sewer lines along portions of Litchfield Road.

In view of the above, the town needs to be assured that adequate sewer facilities are available before the project is approved. These should include both the sewer pipes and capacities of the sewage treatment plant. Approvals from the city of Torrington and the Department of Environmental Protection may be needed for the sewage discharge.

From a regional perspective, it would be judicious for the Town of Litchfield to cooperate with the City of Torrington in planning the sewer line improvements along Litchfield Road based on the development potential of the entire area to be served by the sewer line. Installing a 10 inch line to handle the proposed project alone may not be appropriate if a 15 inch line is needed in 5 or 10 years to service additional development. Intermunicipal cooperation between Litchfield and Torrington in addressing this issue based on local plans for the area is encouraged.

Design Considerations

The interior road layout for the proposed project appears to be adequately designed with the roads generally following existing contours and no long "dead end" segments (see Traffic Considerations). The proposed hammerhead cul-de-sacs are frequently preferred by snow plowers to the more conventional circular cul-de-sacs as removal of snow is facilitated. The proposed dimensions of the cul-de-sacs should be reviewed with local firefighting personnel however to ensure that they do not pose a problem with regard to firefighting capabilities.

The proximity of the proposed active recreational facilities to the detention ponds is of concern. For safety reasons, provisions should be made to discourage access to the ponds from the recreation area through fencing or other means. Alternatively, the recreational facilities could be relocated elsewhere on the site.

The establishment of several small playgrounds on the site was supported by the applicant the day of the field review and should be encouraged due to the lack of such facilities in the area. Maintenance of the facilities could be the responsibility of the homeowner's association.

Consideration should be given to incorporating passive solar design principals in the construction of the project. Those units with a direct southern exposure along the roof line are particularly suitable for solar design.

Based on the site plans available the day of the field review, it appears that a number of proposed units on the western border of the site may infringe on the 60 foot rear lot line setback required by the Litchfield Zoning Regulations. This should be carefully checked both on the final site plans and in the field during construction. To comply with the spirit of the buffer zone concept, consideration should also be given to relocating any cul-de-sacs which would intrude into this buffer zone. As stated above, particular care is needed along this border of the site to ensure that the project is appropriately screened with a vegetative buffer to minimize potential impacts to the established neighborhood on Hart Drive.

TRAFFIC CONSIDERATIONS

Traffic Operations

Sightlines on Clark Road and Roads A and I might be reconsidered to provide for a sightline distance of approximately 600 feet in each direction. This could be achieved by clearing vegetation with some regrading of the existing slopes on Clark Road. Roads A and I intersect Clark Road with a positive grade to the south. Current traffic is fast moving for this class of road. Since Clark Road connects to Route 118 and 202, the intersections of Road A and I should provide for increased traffic.

Traffic (ADT) at the intersection of Route 118 in the vicinity of Northfield Road is about 4300 without significant growth. Traffic (ADT) on Route 202 near Hart Road indicates average growth: 1980/81 - 6400, 1983/84 - 7800 and 1986 - 8800. The impact of 228 proposed condominiums using 8 trips/unit with approximately 10% of the trips generated during the peak hours, will not provide any major operational problems. A potential directional split on to Clark Road could be 30% to Route 118 and 70% to Route 202. The impact on Route 118 does not appear significant. Traffic operations on Route 202 should be reviewed to determine if existing traffic control may require modification.

A State Traffic Commission certificate must be obtained for the proposed facility after approval of the plan documents by the town.

Internal Roadways

The internal road network might be adjusted to improve traffic circulation even though steep natural slope conditions exist. Some recommendations are:

Road J - the proposed configuration ending in a "hammerhead" should be reviewed to determine if a loop from Road I to Road K and back through to Road I could be developed.

Road I - the westerly portion should be reviewed to determine if a southeasterly shift might be made to improve site lines for a number of intersecting roads.

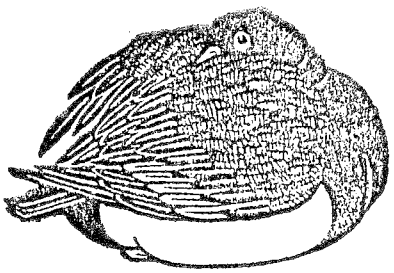
Roads A, C and D - there is the potential to shift and match Roads D and C to a common intersection at Road A.

An unpaved and/or grassed access road to the detention basins should be provided for maintenance. Grassed slopes adjacent to recreation facility and surface water drainage should be provided to prevent erosion.

Roadway excavation and fills should utilize specifications accepted as in a current practice in the state.

Underdrains to protect the pavement section from frost heaving could be incorporated into the project design. "Herringbone" underdrain, which collects water in the subgrade and drains it perpendicular to the roadway rather than parallel, should be considered for roadway cuts where grade exceeds 3%.

APPENDICES



Appendix A: Soils Limitation Chart

A - Apparent Water Table
P - Perched Water Table

Flooding
N - None
C - Common
F - Frequent

Erosion Factor (K)
0.49 More erosive
0.17 Less erosive

Degree of Limitations

SL - Slight Limitations:	Soil properties and site features are generally favorable for indicated use and limitations are minor and easily overcome.
MO - Moderate Limitations:	Soil properties and site features are not favorable for indicated use and special planning, design or maintenance is needed to overcome or minimize the limitations.
SE - Severe Limitations:	Soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs and possibly increased maintenance are required.

Types of Limitations
1 - (SEP) Seepage
2 - (LS) Low Strength
3 - (PS) Percs Slowly
4 - (W) Wetness
5 - (FA) Frost Action
6 - (DS) Dense Layer
7 - (PF) Poor Filter
8 - (SLO) Slope
9 - (SB) Subsides
10 - (PD) Ponding
11 - (FL) Flooding
12 - (EH) Excess Humus
13 - (CB) Cut Bank-Caving
14 - (DB) Depth to Bedrock
15 - (NW) No Water
16 - (SR) Slow Refill
17 - Embankment Seepage
18 - Large Stones
19 - Small Stones
20 - Piping
21 - Erosion

Appendix B: Requirements for Soil Erosion and Sediment Control Plans

Chapter 4 - REQUIREMENTS FOR SOIL EROSION AND SEDIMENT CONTROL PLANS

A. DEFINITION OF PLAN

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

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

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

B. PLAN FORMAT

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

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

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

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

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

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

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

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

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

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

C. PLAN OUTLINE

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

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

1. VICINITY MAP

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

2. PROJECT FEATURES

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

3. NATURAL FEATURES

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

4. TOPOGRAPHIC FEATURES

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

5. DRAINAGE SYSTEM

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

6. UTILITY SYSTEM

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

7. CLEARING, GRADING, VEGETATIVE STABILIZATION

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

8. EROSION CONTROL MEASURES

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

9. NARRATIVE

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

Appendix C: Runoff Calculation Methods

Chapter 9 - ESTIMATING RUNOFF

Selection of the appropriate method of calculating runoff should be based upon the size of the drainage area and the type of output. Figure 9-1 lists acceptable calculation methods for different drainage areas and output requirements.

Figure 9-1 - Runoff Calculation Methods Selection Criteria

Calculation Methods

1. Rational Method (Q = CIA)
2. (Tc) Method - SCS-TR No. 55 and SCS Technical Note 32
3. Tabular Method - SCS-TR No. 55 and SCS Technical Note 32
4. Unit Hydrograph Method - SCS-NEH Section 4

Output Requirements	Drainage Area	Appropriate Calculation Methods
Peak Discharge Only	up to 200 acres	1, 2, 3, or 4
	up to 2,000 acres	2, 3, or 4
	up to 20 sq. mi.	3 or 4
	above 20 sq. mi.	4*
Peak Discharge and Total Runoff Volume	up to 2,000 acres	2, 3, or 4
	up to 20 sq. mi.	3 or 4
	above 20 sq. mi.	4*
Runoff Hydrograph	up to 20 sq. mi.	3 or 4
	above 20 sq. mi.	4*

* Computer models are also appropriate for larger drainage areas.

Source: Virginia Erosion and Sediment Control Handbook, 1980. Virginia Soil and Water Conservation Commission.

The Rational, Tc and Tabular methods of runoff determination are described in this chapter. The Unit Hydrograph method is described in the SCS National Engineering Handbook, Section 4-Hydrology (1).

An attempt is made to standardize the methods used to calculate runoff from a site or watershed. Criteria for selecting an appropriate calculation method are presented along with a step-by-step procedure for using three different methods.

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 - 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 - 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 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.