

Environmental Review Team Report

# Lakeview Subdivision

Columbia, Connecticut



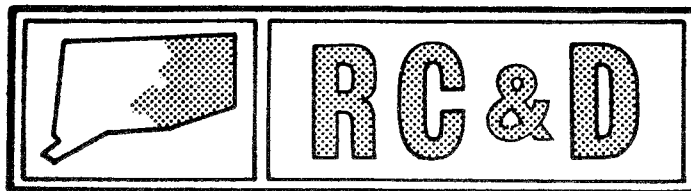
EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

Environmental Review Team  
Report

# Lakeview Subdivision

Columbia, Connecticut

June 1984



Eastern Connecticut Resource Conservation & Development Area

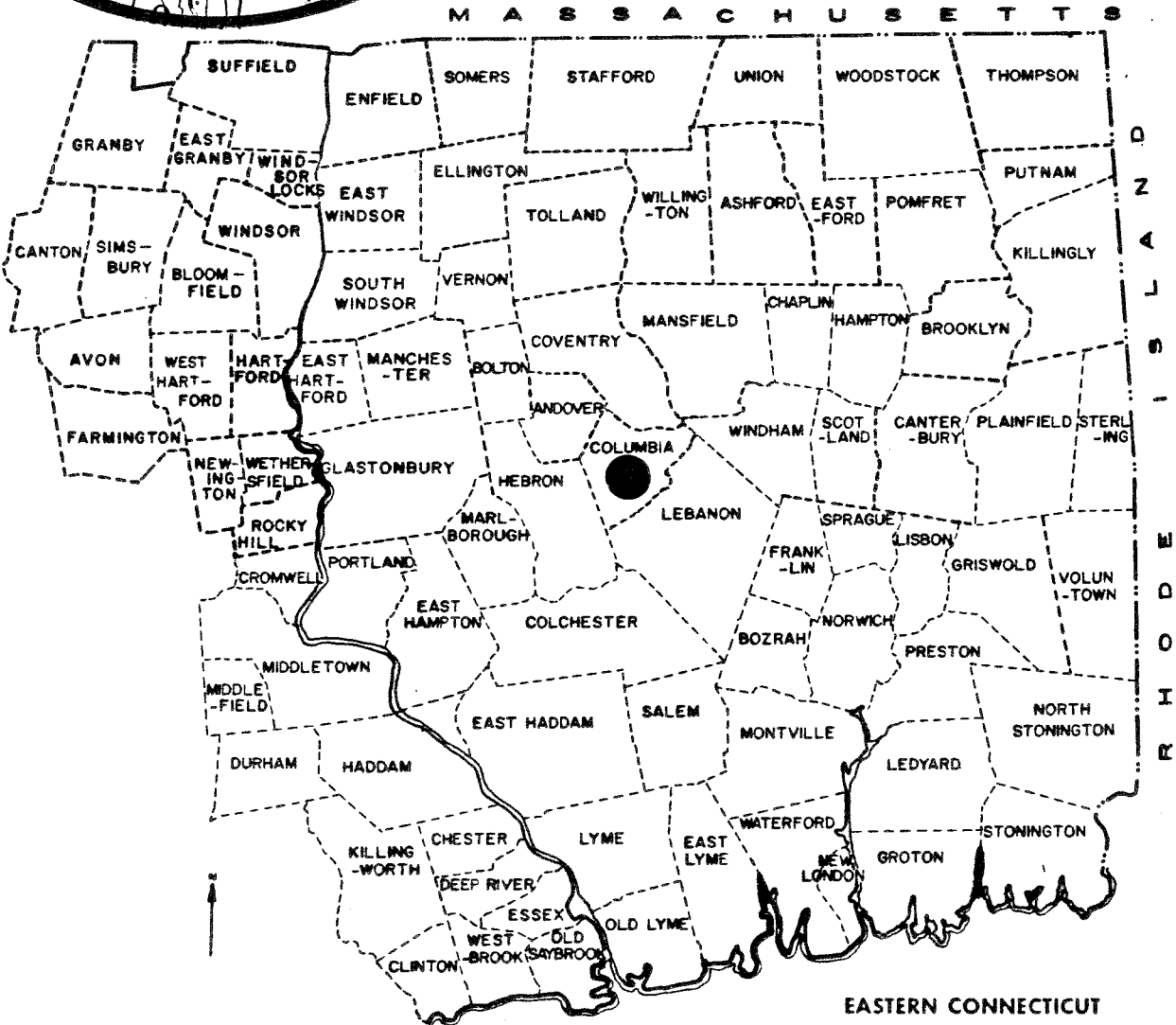
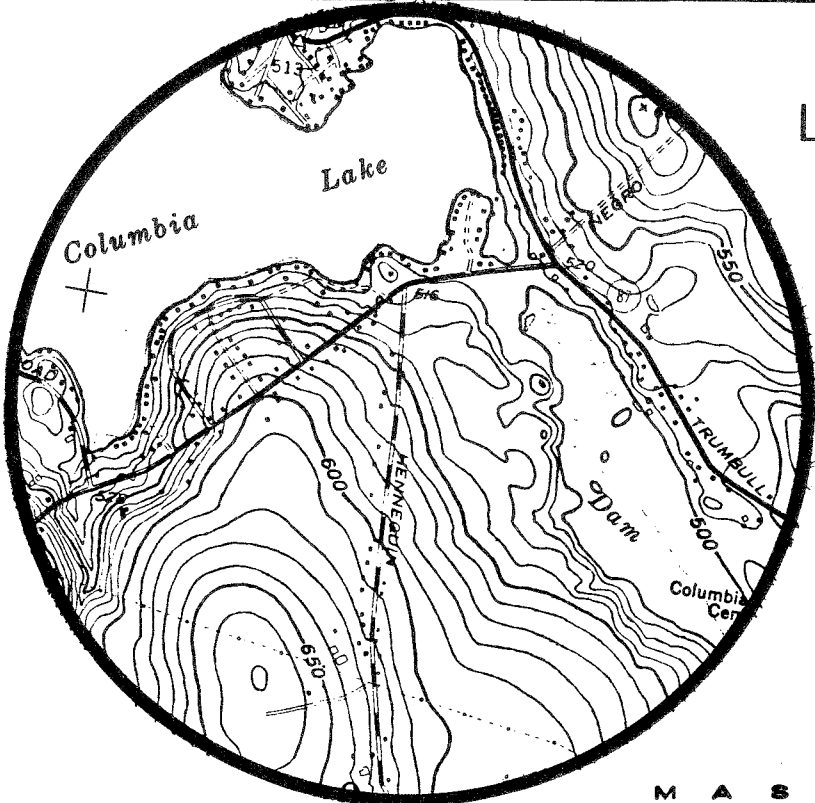
Environmental Review Team

PO Box 198

Brooklyn, Connecticut 06234

# Location of Study Site

LAKEVIEW SUBDIVISION  
COLUMBIA, CONNECTICUT



ENVIRONMENTAL REVIEW TEAM REPORT  
ON  
LAKE VIEW SUBDIVISION  
COLUMBIA, CONNECTICUT

This report is an outgrowth of a request from the Columbia Planning and Zoning Commission to the Tolland County Soil and Water Conservation District (S&WCD). The S&WCD referred this request to the Eastern Connecticut Resource Conservation and Development (RC&D) Area Executive Committee for their consideration and approval. The request was approved, and the measure was reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The soils of the site were mapped by a soil scientist from the United States Department of Agriculture, Soil Conservation Service (SCS). Reproductions of the soil survey map, a table of soils limitations for certain land uses and a topographic map showing property boundaries were distributed to all Team members prior to their review of the site.

The ERT that field-checked the site consisted of the following personnel: Joseph Neafsey, District Conservationist, Soil Conservation Service (SCS); Al Roberts, Soil Specialist, (SCS); Bill Warzecha, Geologist, Connecticut Department of Environmental Protection (DEP); Jim Parda, Forester, (DEP); Don Capellaro, State Department of Health; Meg Reich, Regional Planner, Windham Regional Planning Agency; and Jeanne Shelburn, ERT Coordinator, Eastern Connecticut RC&D Area.

The Team met and field-checked the site on Thursday, April 12, 1984. Reports from each contributing Team member were sent to the ERT Coordinator for review and summarization for the final report.

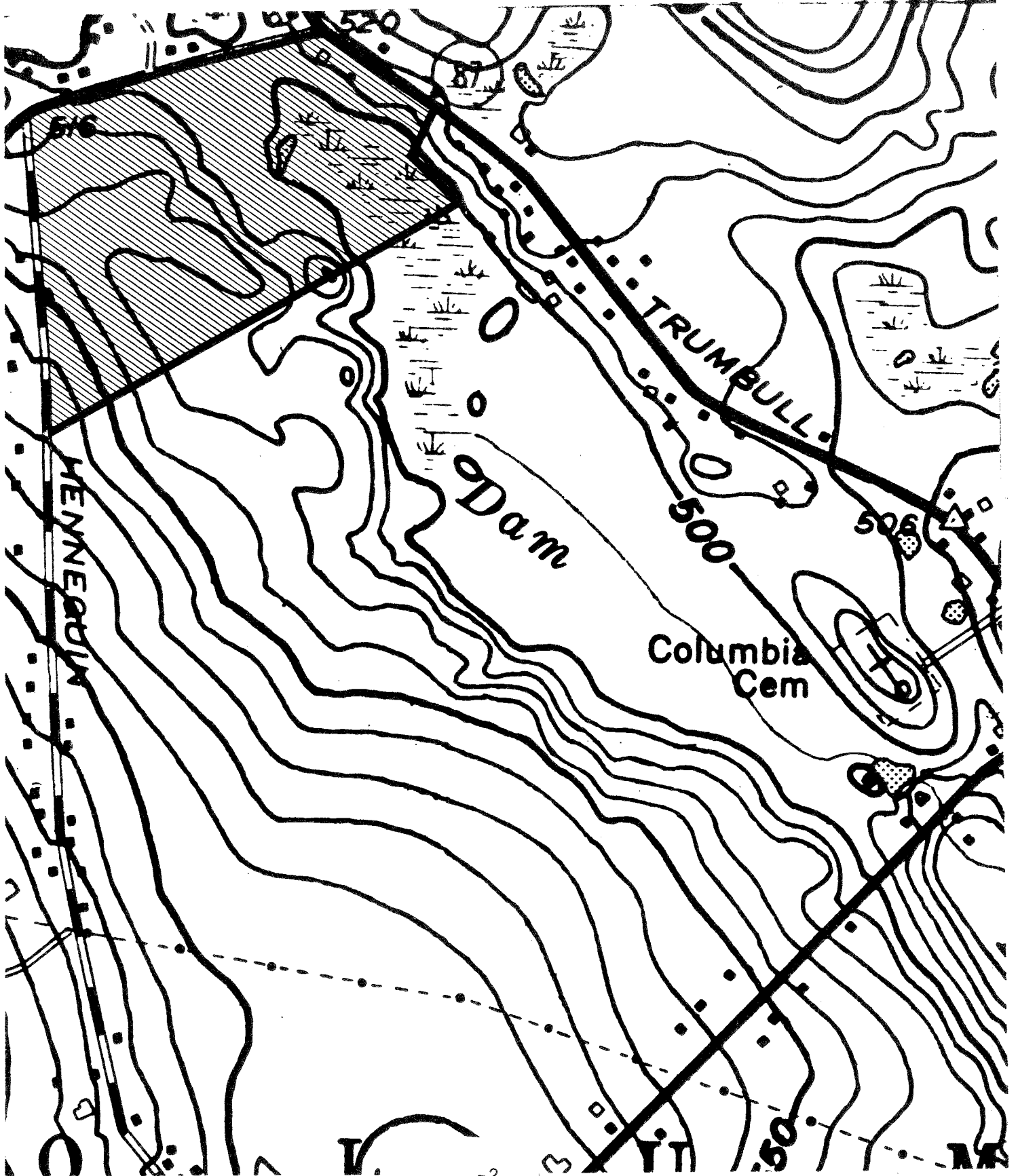
This report is not meant to compete with private consultants by supplying site designs or detailed solutions to development problems. This report identifies the existing resource base and evaluates its significance to the proposed development and also suggests considerations that should be of concern to the developer and the Town of Columbia. The results of this Team action are oriented toward the development of a better environment quality and the long-term economics of the land use.

The Eastern Connecticut RC&D Area Committee hopes that this report will be of value and assistance in making any decisions regarding this particular site.

If you require any additional information, please contact: Ms. Jeanne Shelburn, Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, Box 198, Route 205, Brooklyn, CT 06234, 774-1253.

# Topography

— Site Boundary



## INTRODUCTION

The Eastern Connecticut Environmental Review Team was asked to prepare an environmental assessment for a proposed subdivision in the Town of Columbia. The property, which consists of approximately 58 acres, is bounded by Route 87, Lake Road and Hennequin Road. Columbia Lake is located near the property, on the opposite side northwest of Lake Road. Some of this farm acreage had been used for growing corn, while the majority of the parcel appeared to be pasture land, having both open and wooded areas. The site is characterized by a large wetland area at its eastern side (Route 87), containing a defined watercourse, Dam Brook. This wetland is planned to be used as a detention area for storm water development runoff. Stream flow is towards the south, away from the lake. There is also another relatively large wetland area towards the southeast side of the site (mid-way along Hennequin Road to the rear property line including an area with standing surface water).

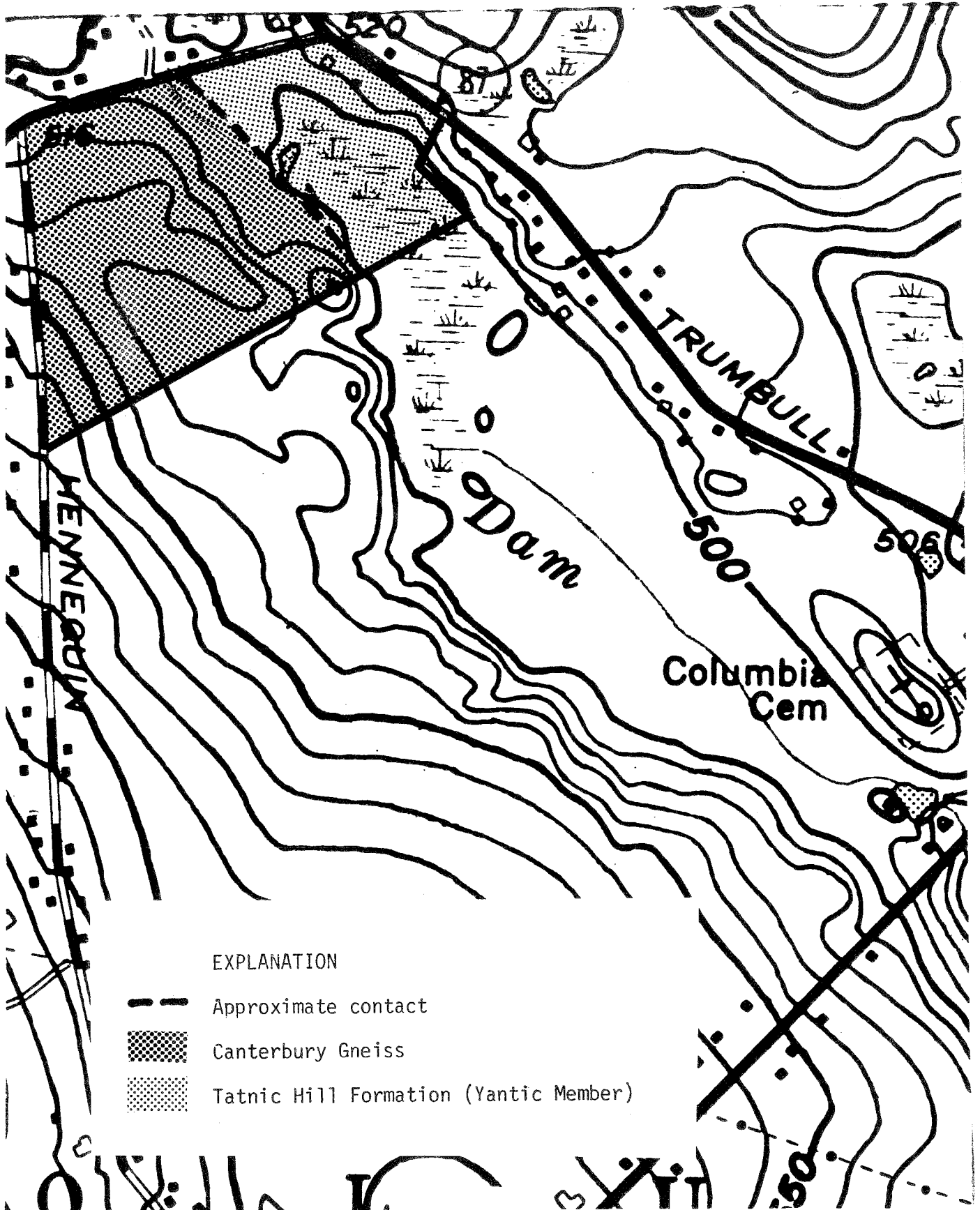
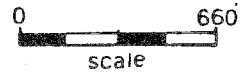
Preliminary subdivision plans prepared by the engineering firm of Megson and Heagle indicates the parcel would be subdivided into 31 lots of approximately 1 acre or larger. Town zoning requires a minimum lot size of 40,000 square feet with at least 150 feet of frontage. Each lot will be served by on-site septic systems and on-site wells. A single road extending 1400 feet into the site and ending in a cul-de-sac will provide access to interior lots.

The Team is concerned with the effect of this proposal on the natural resource base of the site. Although many severe limitations to development can be overcome with proper engineering techniques, these measures can become costly, making a project financially unfeasible for a developer. The most restrictive features of this site are the large wetland areas and highly permeable soil areas. These issues, however, seem to have been adequately addressed by the project engineer. Additional stormwater runoff will not be a major problem due to the change in land use. The wetland area near Route 87 is planned to be used as a detention basin at present. Specific recommendations for this structure are included in the Soils-Stormwater Detention section of this report. Due to the highly permeable nature of some of the soils on site, a number of lots will need specially designed on-site septic systems (see Water Supply/Waste Disposal sections).

Although not required, a cluster design should be considered for this development. Given the size of some of the natural constraints (wetlands), a cluster proposal could more easily avoid severely limited areas, using the land more favorable to development for construction.

The Team members' concerns are discussed in more detail in the following sections of this report.

# Bedrock Geology



## ENVIRONMENTAL ASSESSMENT

### TOPOGRAPHY

The proposed 31-lot subdivision is located on a ±58 acre parcel of land in north central Columbia. It is bounded by Lake Road on the north, Hennequin Road on the west and Route 87 on the east. Columbia Lake, which is a major surface water body in the Town, is located northwest of the site.

The topography of the site is characterized primarily by smooth, gentle slopes. Some relatively flat areas are found in the west central parts of the site. Elevations on the site range from a low of about 500 feet above mean sea level throughout the wetland in the eastern limits of the site to about 570 feet above mean sea level at the southwest corner of the property.

A ±9 acre wetland area, which forms the head-waters of Dam Brook, occupies the east central part of the site. The project engineer is proposing to utilize this wetland as a detention area for post-development runoff flows. The wetland is delineated by the symbols Pm (Peat and Muck, shallow) and Pk (Peat and Muck) on the accompanying soils map.

### GEOLOGY

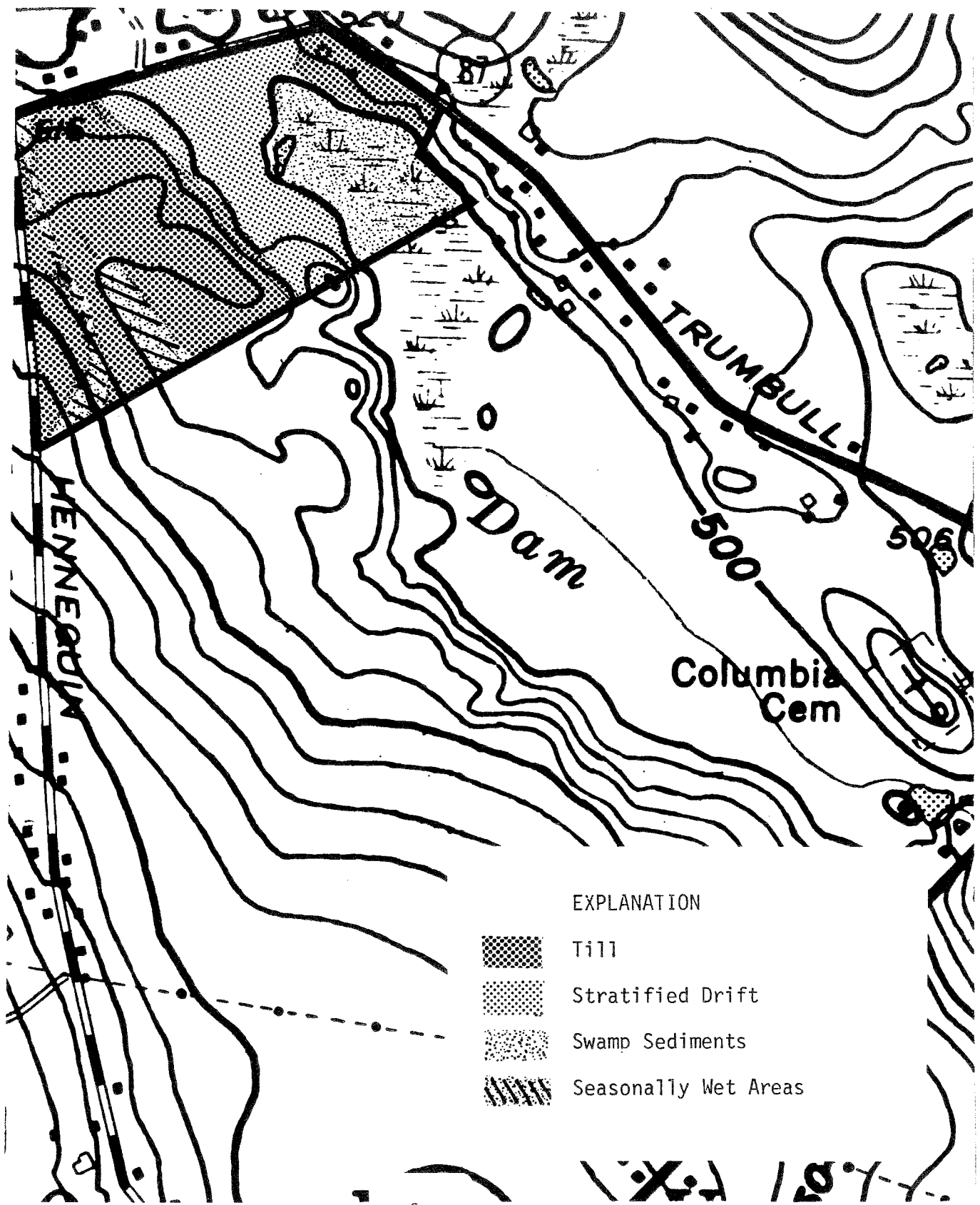
The proposed subdivision is located within the Columbia topographic quadrangle. A bedrock geologic map (GQ-592 by George Snyder) has been published by the U.S. Geological Survey (USGS). The surficial geologic map for the quadrangle has not been published to date. Preliminary surficial geologic information by Michael Zizka for the Columbia quadrangle is available for review purposes at the Department of Environmental Protection, Natural Resource Center in Hartford.

The bedrock formations underlying the site have been classified as Canterbury Gneiss and the Yantic Member of the Tatnic Hill Formation. The approximate contact between these two formations bisects the central parts of the property. The western half of the parcel is underlain by Canterbury Gneiss. This rock consists of a medium grained gray to white granodiorite gneiss composed of the minerals oligoclase, orthoclase, quartz and biotite. The adjective "granodiorite" preceding gneiss describes the mineralogical composition of the rock, i.e., oligoclase, orthoclase, quartz and biotite "Gneisses" are crystalline, metamorphic rocks (rocks altered by great heat and pressure deep within the earth's crust) in which thin bands of elongate minerals alternate with bands of minerals having a blockier or granular shape.





The rock unit underlying the eastern half of the site is the Yantic Member of the Tatnic Hill Formation. This rock consists of silvery-weathered, medium-grained, gneiss composed of the minerals quartz, feldspar, biotite and muscovite. It may contain the minerals garnet and sillimanite in some locations. In the



# Surficial Geology



## EXPLANATION

-  Till
-  Stratified Drift
-  Swamp Sediments
-  Seasonally Wet Areas

upper parts of the unit, the rock grades into a rusty weathering muscovite-graphite schist. The term "schist" refers to metamorphic rocks with a strong foliation caused by the alignment of flaky or elongate mineral grains.

Based on visual inspection of the property and mapped information, it does not appear as though bedrock is exposed on the property.

According to deep test hole information supplied to Team members by the project engineer, bedrock was not encountered in any of the test pits. Depths of the 69 test pits excavated on the property ranged between 84 inches and 108 inches below ground surface. Therefore, it seems likely that underlying bedrock should pose no major problems in terms of the proposed development. Since each lot in the proposed development will be serviced by individual on-site water supply wells, it seems the underlying bedrock aquifer would be the likely source of groundwater to the wells. As a result, the quantity and quality of groundwater withdrawn from the underlying bedrock will depend largely on the number and size of fractures the well intersects and the mineral composition of the rock in that zone.

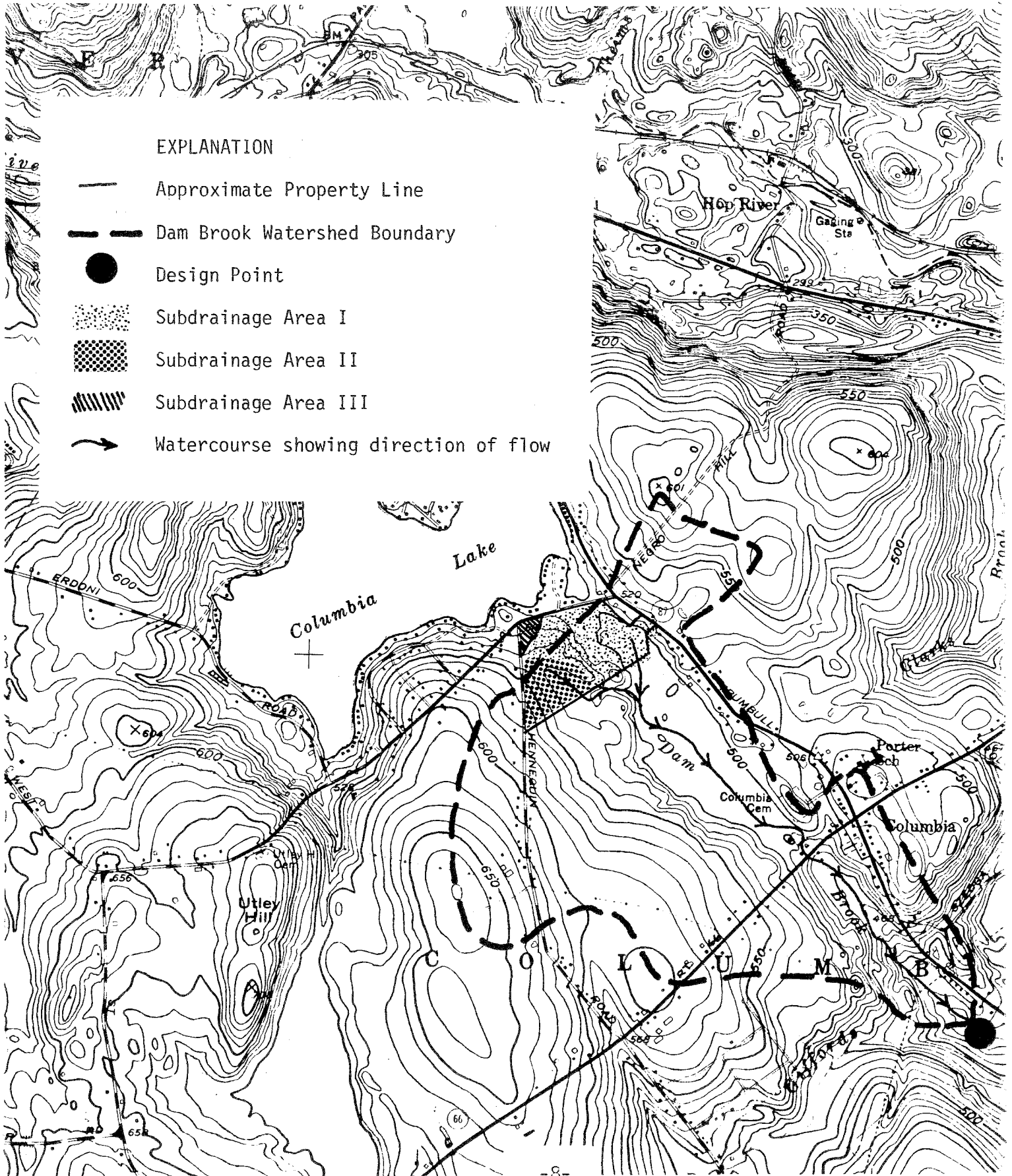
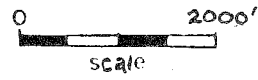
Those surficial deposits (unconsolidated material) overlying bedrock on the site includes till, stratified drift and swamp sediments. Till, which covers the western and eastern limits of the property, are sediments that were deposited directly from the glacial ice sheet. They consist of non-sorted (they are thoroughly mixed by grain size), rock fragments and particles that range in size from clay to boulders. Although the texture of the till varies, it is commonly sandy, stony and relatively loose in the upper few feet and siltier and very compact at depth.

Another glacially deposited sediment found bisecting the central parts of the property are stratified drift deposits. Stratified drift differs from till mainly due to its mode of deposition. Where till was deposited directly by the glacier ice, stratified drift was deposited by meltwater streams from the ice sheet layers (stratified) and was sorted to some degree by grain size. The major components of stratified drift are sand and gravel. Stratified drift is delineated by the symbols EsA (Enfield soils), TsA (Tisbury soils) and MyA and B (Merrimac soils) on the accompanying soils map. The thicknesses of the stratified drift range from a few inches at the till/stratified drift contact zone to probably not more than 35 feet in the eastern portions of the property in the wetland area.








Swamp sediments overlie till and/or stratified drift in the east central parts of the site. Swamp sediments consist of silt, sand and clay mixed with decayed organic material in poorly drained areas. They are delineated by the symbols Pm and Pk (peat and muck). There are also bands of seasonally wet areas in the western limits, which are delineated as Lg (Leicester, Ridgebury and Whitman soils). In addition to being wet, these soils are also characteristically very stony. Leicester, Ridgebury and Whitman soils (Lg) are regulated wetland soils under Public Act 155.

According to the subdivision site plan (revised 3/16/84), it may be necessary to cross wetlands in the western part of the site in order to gain access to Lot 6. Wetland road crossings are feasible, provided they are properly engineered. Since the wetland soils in this area are generally firm, it seems likely that they would be stable enough to support the roadbed without removal

# Drainage Areas



## EXPLANATION

-  Approximate Property Line
-  Dam Brook Watershed Boundary
-  Design Point
-  Subdrainage Area I
-  Subdrainage Area II
-  Subdrainage Area III
-  Watercourse showing direction of flow

of material. Provisions should be made for backfilling with a permeable road base till material and installing culverts as necessary. In addition, roads should be at least 1.5 feet and preferably 2 feet above the top of the culverts used, allowing for better drainage of the roads and decreasing the frost heaving potential of the road. Road construction through wetlands should be done during the drytime of the year and should include provisions for effective erosion and sediment control. Plans for wetland crossings should be submitted to appropriate town and state officials as well as town commissions, i.e. Inland Wetlands, or Conservation Commission, Planning and Zoning, etc. for their review. Also, all necessary state and local permits should be secured prior to any wetland modifications or alterations.

The geology of the site should pose no major difficulties in terms of the proposed subdivision. Seasonally high groundwater tables will be the limiting factor affecting lots fronting Hennequin Road as well as some interior lots. This condition will weigh heaviest on the ability to provide adequate subsurface sewage disposal systems. Where groundwater levels are naturally elevated, specially designed, engineered systems will be required. The engineered plans will require approval by both local and state health officials.

Wetland areas on the parcel will limit the usefulness of lots 5, 6, 16, and 30. Also, scattered surface boulders, particularly in the areas covered by till, may be encountered and be a nuisance during excavation for septic systems, foundations, and roads.

## HYDROLOGY

Approximately 78 percent of the site lies in the Dam Brook watershed. Surface runoff in this area drains mainly by sheetflow or by intermittent drainage swales into the wetlands in the east central part of the site, from which Dam Brook originates. The drainage area for Dam Brook is approximately 735 acres or 1.14 square miles and is shown on accompanying figure. Dam Brook flows generally in a southeast direction en route to Giffords Brook. The remaining 12 percent of the site to the north drains in a north to northeast direction by sheetflow into an intermittent stream. This stream is intercepted by road drainage for Lake Road and ultimately discharges into Columbia Lake.

According to the present plans after the subdivision is completed, surface runoff from only 3 acres of the parcel (portions of lots 7, 8 and 9) would eventually drain into Columbia Lake via road drainage. The development of the site will cause at least a slight increase in the amount of runoff generated during periods of precipitation. These increases will be due largely to the removal of vegetation and the covering of permeable soils by impervious surfaces.

An estimate may be made of the runoff change likely to occur from the proposed land use modification. Technical Release No. 55 of the Soil Conservation Service provides a technique which may be used in formulating the estimate. This method involves the determination of curve numbers which relate the amount of precipitation to amounts of runoff. A higher curve number indicates that a greater volume of runoff would occur following a given amount of rainfall. For the purpose of computing these estimates, the Team Geohydrologist divided

the property into three smaller drainage areas similar to the project engineer's approach (see Drainage Area map). Because most of the development (65%) will occur in subarea I, runoff changes are shown only for that drainage area. It is estimated that development in subarea I would increase the curve number only by 1 (from 65 to 66). Under these conditions, runoff depth for a 25-year storm event would increase from 1.99" to 2.08"; an increase of approximately 4.5 percent. Although it might be expected that runoff increases would be greater, due to the presence of the highly permeable soils, the curve number for approximately 8 acres of land (cultivated) in subarea I would actually be reduced to a lower curve number after development. Under existing conditions, the cultivated land in the northern part of the site has a higher curve number than would a developed one acre residential lot with 20% imperviousness. Once the lots have been developed on the cultivated lands, it is presumed grass lawns would be established. As a result, this type of vegetative cover would yield lower runoff than would the exposed cultivated fields.

The project engineer has addressed storm drainage in a plan that was made available to Team members. The storm water proposal for the project indicates that surface runoff created by impervious surfaces, roof tops and paved surfaces, will be artificially collected and discharged. Stormwater drainage from catch basins in subarea I will be discharged into the proposed detention area (wetlands) at a point between lots 30 and 31 since the slope is relatively flat. At this point of outflow, it is important that stormwater be directed southeastward into the proposed detention area rather than intercepted by the culvert passing under Lake Road, which would ultimately discharge the stormwater into Columbia Lake.

Stormwater drainage emanating from catch basins in subarea II will be discharged south of the proposed cul-de-sac (Columbia Landing) into a well-defined channel. This channel empties into the wetland (Dam Brook) south of the spillway proposed for the detention area. Therefore, surface runoff from lots 1-5 and 16-19 would not be detained in the proposed detention area. Surface runoff from a small portion of lots 7 and 8 and a larger portion of lot 9 will continue to drain by sheetflow towards Lake Road. It will ultimately be intercepted by road drainage and discharged into Columbia Lake. Special attention should be focused on controlling the runoff discharged into the wetland to ensure scouring is minimized. Also, maintenance measures should be included in the runoff plan in case a significant buildup of sediments occurs at the discharge points in subareas I and II.

The applicant's engineer has prepared drainage calculations for the project which will help ensure that pipes are properly sized. The stormwater plan indicates that points of outflow will discharge into a rip-rap plunge pool. In order to prevent erosion beneath the splash pad, it is recommended that 18" of coarse gravel be placed beneath the plunge pool. This will help prevent the scouring of underlying material.

The area proposed for development represents about five percent of the watershed. In view of this and the proposed detention area, it seems likely that the increases in runoff generated by the proposed development would have a small impact upon peak flows into Dam Brook. However, a series of potential future developments in the watershed, i.e., southeast of Laurel Lane, east of Hennequin Road, each producing small peak flow increases, could ultimately result

in a substantial change in the flow characteristics of Dam Brook. As a result, these increases may lead to streambank erosion and possible downstream flooding, particularly at the culvert passing under Route 66. For this reason, it is recommended that any future developments in the watershed submit detailed hydrological information on pre- and post-development runoff volumes and peak flows from the respective properties. Consideration should be given to including stormwater control facilities, i.e. retention/detention ponds in future developments.

## SOILS

The site is located on a 58 acre parcel bounded by Lake Road on the north, Hennequin Road on the west, and Connecticut Route 87 on the east. The plan shows the parcel divided into 31 lots of one or more acres each. Each lot will be served by on-site septic systems and on-site wells.

Included in the Appendix to this report are a soils map, with the approximate boundary of the parcel outlined, and an interpretation chart listing the soils on the parcel and their interpretations for the planned use.

The wetland soils on the parcel were flagged in the field by a private consultant and are identified on the developer's plot plan. These soils are identified on the soil map as Lg-Leicester, Ridgebury and Whitman; Pk-Peat and Muck; and Pm-Peat and Muck, shallow. Areas of these soils are more extensive in the field than they appear to be on the soil survey map. Without detailed explanation, this is due to map scale versus "ground truth."

Lg-Leicester, Ridgebury and Whitman are nearly level, poorly and very poorly drained soils in drainageways and depressions of this area. Stones and boulders cover about 10 percent of the surface. The water table is at or near the surface for most of the year. Permeability is moderate to slow and runoff is slow or very slow.

Pk-Peat and Muck and Pm-Peat and Muck, shallow are nearly level, very poorly drained organic soils in pockets and low depressions of this site. In areas mapped as Peat and Muck, the muck is commonly greater than 51 inches thick. In areas of Peat and Muck shallow, the muck ranges from 16 to 51 inches over sand and loamy sands with included areas of muck deeper than 51 inches. Areas of these soils, located on the eastern part of the parcel, are interpreted for the Carlisle, Adrian and Palms series on the accompanying chart.

Several of the soils on this parcel qualifies as prime farmland soils. They are: CaB-Canton and Charlton fine sandy loams, 3 to 8 percent slopes, EsA-Haven and Enfield silt loams, 0 to 3 percent slopes, MyA and MyB-Merrimac sandy loam, 0 to 3 percent slopes and 3 to 8 percent slopes, TsA-Ninnigret and Tisbury soils, 0 to 3 percent slopes and PbB-Paxton and Montauk fine sandy loams, 3 to 8 percent slopes. These soils are best suited to the production of food and fiber and cover about 28 acres of the parcel. Other soils at the site are described below.

GeC-Canton and Charlton fine sandy loams, 3 to 15 percent slopes are well drained and stony. The slopes are mostly less than 8 percent with a few areas with slopes up to 15 percent near the center of the site. The water table is commonly below a depth of six feet and the permeability is moderate in the surface and subsoil and rapid in the substratum.

SwB and SxB-Sutton fine sandy loams, 3 to 8 percent slopes and 3 to 15 percent slopes are moderately well drained stony soils at the base of slopes and in depressed areas. These soils have a seasonal water table between 14 and 24 inches. The permeability is moderate or moderately rapid throughout the soil. Runoff is slow to moderate.

WzC-Woodbridge fine sandy loams, 3 to 15 percent slopes are moderately well drained stony soils on the tops and sides of hills. These soils are underlain by a dense basal till substratum with a seasonal water table between 14 and 24 inches. The permeability is moderate in the surface and subsoil and slow to very slow in the substratum. Runoff on these soils are slow to moderate.

Most of the soils on this site are interpreted for soils other than soils that are described in the Tolland County Soil Survey report. This is due to the vintage of the survey. All current names and interpretations are listed with the symbol as it appears on the soil map. For the most part, the soils are located on the landscape as they appear on the attached soils map.

#### Sediment and Erosion Control

A sediment and erosion control measure plan was not submitted for review. Because of the proximity to wetlands and watercourses and the erodible nature of the soils on the site, the site should have measures planned and installed to prevent erosion and possible off-site sedimentation. Measures and notes should be shown on the plan where they can be easily used by contractors and inspectors. On request, the Soil and Water Conservation District can review the plan for adequacy or provide assistance to the developer during implementation.

#### Stormwater Detention Structure

The District Conservationist and the Team Geohydrologist reviewed the stormwater runoff calculations submitted by Mr. Megson. SCS prefers the TR-55 method for calculating runoff from urbanizing watersheds but the figures provided appear reasonable. The following are comments regarding the detention structure:

- a. Fill material for the dike should be selected fill that has sufficient fines to be compactable to Class II standards. Most gravel material does not meet this standard.
- b. The emergency spillway should not be located on fill material. An area of original ground west of the proposed principal spillway is a preferable site.
- c. The emergency spillway should be designed so that it will safely pass the peak flow from a 100-year storm without overtopping the structure. The top of the dike should be at least one foot above the water elevation in the emergency spillway when it flows at design depth. The

minimum capacity of the spillway should be required to pass the peak flow expected from a 100 year 24 hour Type II storm distribution less any reduction creditable to conduit discharge and detention storage. Using a criteria of twice the release rate is not acceptable.

- d. The principal spillway conduit should have antiseep collars installed to prevent seepage along the outside flow line and possible piping.
- e. Modified riprap is proposed for the lining of the emergency spillway. A calculation of the velocity expected with the spillway flowing at design depth should be used to select riprap size.
- f. The average release rate for the principal spillway is about 6 CFS. The capacity of the detention pond at the emergency spillway crest is estimated at 260,000 CF. The base flow of the stream is estimated at 2 CFS. If it is assumed that the detention pond is half full when the stream returns to base flow and that this occurs 15 hours after the start of a storm, then the wetland will be submerged 15 hours plus 9 hours (130,000 CF storage/4 CFS average release rate) or 24 hour total. This should not have a significant impact on the existing wetlands.

## VEGETATION

The tract proposed for subdivision can be divided into four vegetative types. These include old field 17 acres; hardwood swamp 9 acres; agricultural field 8.5 acres, and mixed hardwood forest 13.5 acres.

The parcel is recently abandoned farm occupied by vegetation typical to this area of Connecticut. A few large oak trees occur in the mixed hardwood forest. These should be considered for retention because of their high aesthetic value.

### Vegetation Type Descriptions

Stand 1: Agricultural field. 8.5 acres. Corn field.

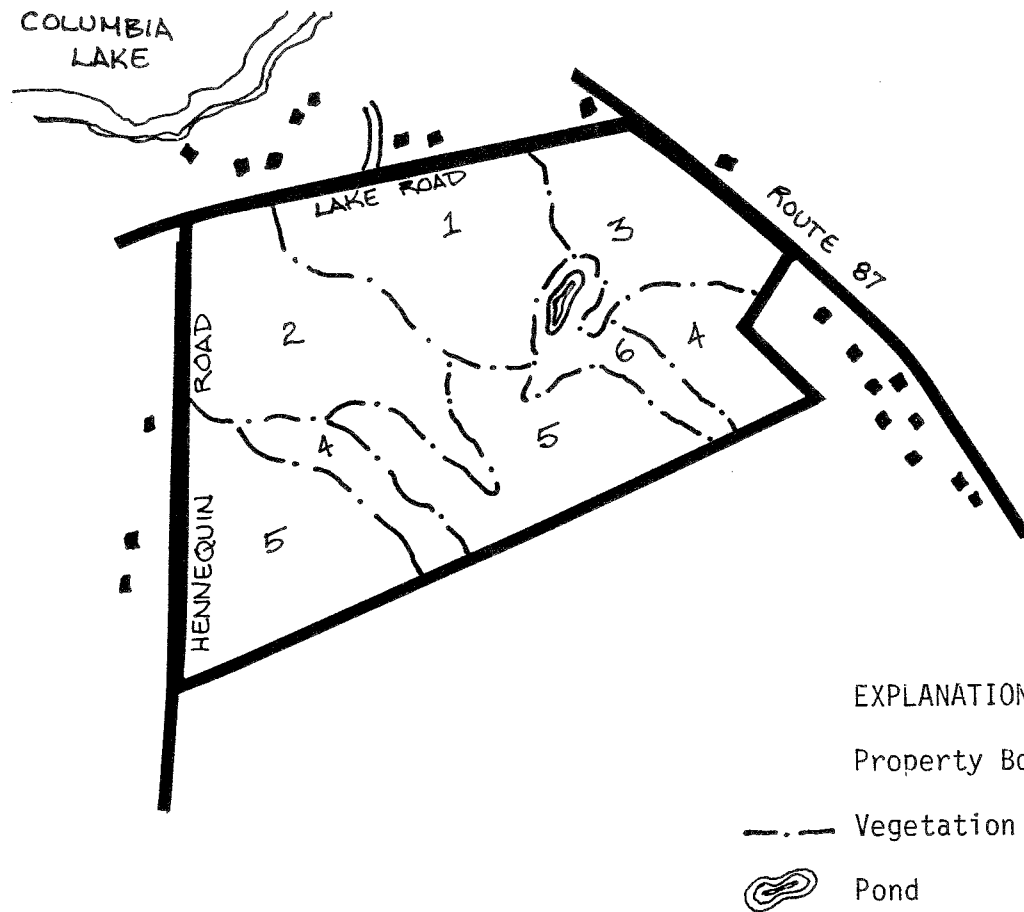
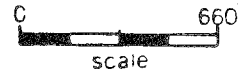
Stand 2: Old field. 13.5 acres. This abandoned pasture is presently reverting to hardwood forest and is occupied by a few large, spreading white oak, silky dogwood, barberry, dwarf sumac, grey birch, blueberry, red maple, oaks, white pine, meadowsweet, blackberry, sweet fern, red cedar and grass.

Stand 3: Hardwood swamp. 4 acres. Vegetation consists of seedling-sapline red maple, multiflora rose, fern and grasses.

Stand 4: Hardwood swamp. 5 acres. This stand is composed of poletimber sized (6", 8", 10" diameter trees) red maple with an understory of blueberry, spicebush, witch hazel, black alder, skunk cabbage, club mosses and sphagnum moss.



# Vegetation



## VEGETATION TYPE DESCRIPTIONS

STAND 1: Agricultural Field , Corn 8.5 acres.

STAND 2: Old Field: Grasses and scattered brush, 13.5 acres.

STAND 3: Hardwood Swamp: Seedling-sapling size red maple, 4 acres.

STAND 4: Hardwood Swamp: Pole timber size red maple, 5 acres.

STAND 5: Mixed Hardwoods: Sawtimber-pole size , 13.5 acres.

STAND 6: Old Field/Pasture, 3.5 acres.

Stand 5: Mixed hardwoods. 13.5 acres. This stand is typical of many eastern Connecticut woodlots. Species on site include black oak, red oak, white oak, scarlet oak, hickory, red maple, black birch, white ash, sassafras, and sugar maple. The tree sizes vary throughout the stand, but the stand is generally composed of poletimber and sawtimber sized trees. The understory vegetation includes juniper, blueberry, apple, lambkill, grey dogwood, sweet pepperbush, spicebush and club mosses.

Stand 6: Old field. 3.5 acres. Grazing lot, grass.

### Aesthetic Considerations

In Stand 2 at the intersection of Lake Road and Hennequin Road there are 6-10 large, old field white oak trees which were originally shade trees in the pasture. One of these oaks is particularly interesting and unique due to its extremely large size, spreading crown and symmetry. Any development and construction activity should be kept at least 25 feet away from the dripline of the tree crown. Trees are very sensitive to the condition of the soil within the entire area under their crowns. Development practices near the largest white oak, or any of the others that are to be retained, may disturb the balance between soil aeration, soil moisture level and soil composition. These disturbances may cause a decline in tree health and vigor, with a potential for tree mortality within three to five years. Care should be taken during the construction period not to disturb the trees that are to be retained both in Stand 2 and 5. In general, favor health, well-formed high vigor trees for protection over unhealthy trees as they are usually more resistant to environmental stresses brought about by construction.

### Limiting Conditions

Alterations in wetlands which permanently raise or lower the water table by restricting flow and natural stream drainage can have a negative effect on vegetation in these areas. Raising the water table may drown roots causing widespread mortality in the trees and herbaceous vegetation. Elimination of wetlands reduces wildlife breeding, cover and water sources also. The use of Stand 4 for a detention basin would decrease the value on the present quality of wildlife habitat.

### Management Considerations

The trees in Stand 5 have grown into a crowded condition over the years and although the stand is still healthy, if left to grow untended will become overcrowded and result in unhealthy trees. Trees in a crowded condition are susceptible to degradation from environmental stresses such as disease, insects, adverse weather and construction. An improvement thinning, prior to development, would remove undesirable trees and reduce competition for space, sunlight, nutrients and water. Over time this would allow trees to improve in health, vigor and stability. This type of thinning when properly implemented will improve aesthetic value of an area, improve tree health, improve wildlife food supply, and provide wood products. In Stand 5, timber and fuelwood could be removed and sold prior to development. The trees to remove in this type of "Intermediate Harvest" would be bent or crooked, leaning or have crown dieback. Trees to favor for retention should be tall and straight, usually the larger trees retained for future growth. A thinning would remove about 20 thousand board feet of sawtimber

and about 75 cords of tops and cull poletrees for fuelwood. Ideally, a thinning should occur prior to development to create an uniformity throughout the stand.

A public service forester or private forester should be contacted to help with the implementation of the suggested thinning.

## WATER SUPPLY

No public water facilities are available to the subject parcel, therefore, it is proposed that each lot will be served by individual on-site wells. Bedrock appears to be the only practical source of water to the site. Bedrock transmits water mostly by means of its fracture system. The fracture system in bedrock is generally within the first 100 to 150 feet of the surface. The yield of a well, therefore, depends on how many fractures it intersects and how much water each fracture is capable of transmitting. Yields of bedrock-based wells typically are small but reliable. It is commonly advised to space wells as far apart as is practical in order to prevent interference of one well with another during pumping.

Depending upon certain hydrogeologic characteristics (i.e., thickness, texture, proximity to watercourses), stratified drift deposits, which are found in the east central parts of the site may have potential for high yielding wells. There is little known about the potential of the stratified drift in this area for groundwater supplies. Based on limited data available, it appears the sediments are probably too thin to allow the development of high yielding wells. Due to the high permeability of stratified drift (pollutants such as septic effluent travels more quickly through stratified drift without adequate renovation), there is a greater risk of well contamination. Properly constructed bedrock-based wells would provide better protection from contamination.

Although it is virtually impossible to predict the absolute yield of a well drilled at any given location, 90 percent of the wells tapping bedrock in this area yield at least 3 gallons per minute (gpm) (Source: Connecticut Water Resources Bulletin #11, Shetucket River Basin). A yield of 3 gpm should be adequate for most domestic uses.

Groundwater quality should be satisfactory; however, there is a chance that iron and/or manganese may affect the water quality because of the nature of the underlying bedrock. If elevated iron and manganese levels do arise, there are filters available to alleviate such problems.

Wells should be located at a relatively high point on each site and in a direction opposite to the expected direction of groundwater flow.

Of particular concern would be the presence of the stratified drift deposits in the central and east central parts of the property (i.e., lots 21, 22, 24, 26, 27, 28, 29 and 30). Due to the highly permeable characteristics of the stratified drift deposits, percolation rates (measures the rate at which soil will disperse liquid by capillary uptake) are commonly quite rapid. According to the site plan, only three of the above mentioned lots have been perc tested. Percolation rates for lots 22, 28 and 30 were 1.0 minutes/inch, 5 minutes/inch and 2.5 minutes/inch, respectively. When percolation rates are faster than 1 minute/inch, the State Public Health Code requires that sewage disposal

systems installed in such areas be specially designed and in compliance with all applicable sections of Sec. 19-13-B103a-Sec. 19-13-B103f, inclusive, of the State Public Health Code or any applicable local regulations. One of the requirements is that the separating distance between well and sewage disposal systems be doubled where the soil has a minimum percolation rate faster than 1 inch per minute. If there is a lot that has a percolation rate faster than 1 minute per inch, it may be difficult to comply with the separation distance requirement between the well and septic system, particularly on the smaller one-acre lots.

Therefore, it is recommended that the Town Sanitarian conduct or witness percolation tests on all lots covered by the stratified drift (lots 21, 24, 26, 27 and 29) to determine whether or not that particular lot will be an area of special concern in terms of percolation rates faster than 1 minute/inch.

## WASTE DISPOSAL

As there is no public sewerage facilities available, the development would be served by individual on-site sewage disposal systems.

Based on visual observation and according to soil survey mapping data and deep test pit information by the developer's engineer, the site has variable soil conditions. Percolation rates indicate permeable soils, with the section containing sand and gravel being considerably more permeable. The chief concern for 12 lots is a high seasonal groundwater table. Also, some lots contain a considerable area of wetlands (particularly lot 5) which further restricts possible usable area. Although there is evidence of surface rocks or boulders in the higher terrain, shallow underlying bedrock is not an apparent problem.

The Public Health Code requires the bottoms of the leaching systems to be at least 18 inches above the maximum groundwater table. No doubt subsurface sewage disposal systems would have to be kept shallow and spread out on lots having this condition. Groundwater in some cases could probably be controlled by the use of curtain drains and proper surface grading and drainage. The use of fill to elevate the sewage systems would probably also be necessary. For these reasons detailed engineered sewage disposal systems are required for lots having high groundwater levels.

As noted in the water supply section, some lots are apparently composed of sand and gravel soils. Only a few of these have been perc tested and a couple show rather fast seepage rates. Because of special requirements where soils have percolation rates in excess of 1 inch/minute, other lots not already tested and also composed of sand and gravel should be tested and evaluated for placement of sewage system(s) and well location(s).

Special measures should be taken during development to prevent or minimize erosion and sedimentation problems.

## PLANNING CONCERNS

The Columbia Lake basin is currently zoned to 40,000 square foot lots for single family homes only. Past development, however, resulted in small lot cottage development along the lake's edge which over the years have been converted to year-round homes. The lake's long-term health will depend in large measure on the management and control of septic tank effluent from these dense neighborhoods within 300 feet of the lake. It is the control of phosphorus input into the lake in this critical area which will most directly shape the future quality of the lake.

Nevertheless, the undeveloped nature of much of the lake's watershed helps immeasurably to reduce harmful phosphorus loading to the lake. With increased urban development, this portion of the watershed will contribute significant quantities of phosphorus unless development is kept to a minimum and if development which does occur is carefully controlled to minimize soil erosion and sedimentation into streams tributary to the lake. Any reduction in density of development which will limit disturbance of steeply sloping land, or highly erodible soils, or construction near stream banks will improve the chances of limiting phosphorus release from disturbed, exposed soils into tributary systems and ultimately into the lake. A reduction in density to one home per two acres, coupled with flexible cluster provisions, might increase the protection of the lake from upper watershed development. Permanent open space protection of the watershed would more directly achieve that objective. Most important, perhaps, is an effective erosion and sedimentation control program which monitors all land use changes in the watershed and insists on effective erosion control measures.

The predominant land-uses within the watershed, as compiled by the Connecticut Areawide Waste Treatment Management Planning Program, their acreage and percentage of the total watershed area are as follows:

<u>Category of Land-Use</u>	<u>Area (acres)</u>	<u>% of Total Watershed Area</u>
Low density residential 2 dwell/acre	149.0	7.7
Moderate density residential 2-8 dwell/acre	63.0	3.2
Openland	218.0	11.2
Cropland	138.0	7.1
Dairy and Poultry	6.0	0.3
Wetland	235.0	12.1
Water	287.0	14.7
Woodland	850.0	43.7

The greatest density of residential development lies immediately adjacent to the lake. The major portion of the lakeshore was developed prior to 1944.

The major portion of the drainage basin lies to the south of the lake. This area is primarily undeveloped wetland and woodland. This relatively large wetland acts as a nutrient sink, tying up nutrients which would otherwise enter the lake. The undeveloped wooded areas of the watershed act as both a nutrient and erosion barrier. Should these areas be developed, a significant increase in nutrients reaching the lake would occur with a subsequent decline in water quality.

The Connecticut 208 study of nonpoint phosphorus sources to Columbia Lake recommended the use of nonphosphorus detergents in the lake watershed. Subsequently, the Town of Columbia requested the DEP to issue an order pursuant to Section 25-5400 of the General Statutes to ban phosphorus detergents in the watershed. Such an action would be accompanied by enforcement responsibilities and legal penalties for violations. The DEP initiated a detailed lot by lot study of septic systems in the watershed to evaluate the potential improvement in trophic conditions which could be anticipated from this action. DEP requested assistance from the town in obtaining information, but was not successful in obtaining a response.

#### Surrounding Land Use

The surrounding land uses are almost exclusively other single family residences developed at densities ranging from relatively low density along Hennequin Road to high density along Route 87 fronting on Columbia Lake.

The Town Beach facility--beach, parking, commissary stand, dock, and boat launch is directly across Lake Road from Lakeview Subdivision.

The proposed subdivision will not be incompatible with surrounding land uses, since it will be so similar to existing land uses.

#### General Design Concerns/Alternate Land Use

This subdivision could be better designed, provide usable common open space for recreation, and meet the proposed 2 acre density requirement for the area within the Columbia Lake watershed if cluster design techniques and zoning provisions were employed. The large wetland areas currently incorporated into the lots could have become common open space for passive recreation. The area within the Columbia Lake watershed could have been a combination of common open space for active recreation and smaller cluster lots at an overall density of one dwelling per two acres.

Cluster design, however, is an option for the subdivider, rather than a requirement. The proposed subdivision is not "bad" design, it is simply a standard subdivision layout which is not as sensitive to the environmental constraints of a site as cluster design can be.

Columbia's subdivision regulations do not require dedication of open space.

There are limited local active recreation facilities available--the town beach is the only "park" in the area.

The Columbia Planning & Zoning Commission should consider open space dedication requirements for all subdivisions, not just for cluster designs.

The Traffic Analysis report prepared for the subdivision states:

"Provisions have been made to give a portion of the property located at the intersection of Lake Road and Hennequin Road for parking use by those residents going to the beach."

This proposal has both positive and negative impacts. It would seem the small rectangular piece of land could provide parking for approximately 40 passenger cars. A parking lot here would greatly increase the beach parking available. It would also add a great deal of traffic to this intersection during the summer months. It would probably also increase the number of residents who use the town beach because it would be more accessible to Columbia residents who live outside of walking/biking distance to the beach and need to drive their cars.

A parking lot adjacent to residential uses can be quite irritating to its neighbors, albeit the use of this lot would generally be limited for beach purposes to the summer months and daylight hours.

A landscaped area buffering the adjacent lots from the parking area would be a necessity. Pedestrian crossing provisions would be needed--at a minimum a painted crossing pavement across Lake Road and signs noting the crossing. Placement of an entrance/exit to this lot would be difficult because of the lot's location and configuration. A driveway off of Lake Road, so close to the intersection of Hennequin Road could make traffic circulation confusing, if not hazardous.

An entrance/exit on Hennequin Road could raise similar problems. A one-way entrance and one-way exit on each street might be considered. If developed as a beach parking lot, this location might be appropriate for a commuter weekday parking lot.

When the ERT reviewers met, the parking lot dedication proposal had not been formalized and it was uncertain if it would indeed be proposed. Section 8-24 of the Connecticut State Statutes should be consulted if the lot is offered to the Town.

Section 8-24. Municipal Improvements. No municipal agency or legislative body shall locate, accept, abandon, widen, narrow or extend any street, bridge, parkway or other public way, locate, relocate, acquire land for, or abandon, sell or lease, any airport, park, playground, school or other municipally owned property or public building, extend or locate any public housing project or redevelop, recondition or improve any specified area, or take action on any proposal involving the extent and location of public utilities and terminals, whether publicly or privately owned, for water, sewerage, light, power, transit and other purposes, until the proposal to take such action has been referred to the commission for a report. The failure of the commission to report within thirty-five days after the date of official submission to it shall be taken as approval of the proposal. In the case of the disapproval of the proposal by the commission the reasons therefore shall be recorded and transmitted to the legislative body of the municipality. A proposal disapproved by the commission shall be adopted by the municipality only after (a) a two-thirds vote of the town council where one exists, or a majority vote of those present and voting in an annual or special town meeting, or (b) by a two-thirds vote of the representative town meeting or city council or the warden and burgesses, as the case may be.

Section 8-25 (b) of the Connecticut General Statutes provides:

The regulations adopted under subsection (a) of this section may also encourage energy-efficient patterns of development and land use, the use of solar and other renewable forms of energy, and energy conservation. The regulations shall require any person submitting a plan for a subdivision to the commission under subsection (a) of this section to demonstrate to the commission that he has considered, in developing the plan, using passive solar energy techniques which would not significantly increase the cost of the housing to the buyer, after tax credits, subsidies and exemptions. As used in this subsection and section 8-1, passive solar energy techniques mean site design techniques which maximize solar heat gain, minimize heat loss and provide thermal storage within a building during the heating season and minimize heat gain and provide for natural ventilation during the cooling season. The site design techniques shall include, but not be limited to: (1) House orientation; (2) street and lot layout; (3) vegetation; (4) natural and man-made topographical features; (5) protection of solar access within the development.

Columbia should consider adopting such subdivision regulations and similar zoning provisions in accordance with Section 8-25 of the State Statutes.

All the lots in this subdivision seem to provide the possibility for solar access, although most homes would not be oriented in the traditional fashion of front door facing the street.

#### Aesthetic Considerations

A few very large old oak trees exist in the open field of the northwesterly corner of the subdivision. They should be preserved for their character. Chapter X, Section 1(a) of Columbia's subdivision regulations provides:

For the purpose of enhancement or property values and for erosion control, the preservation and protection of shade trees throughout the subdivision shall be encouraged, except where they interfere with roads and utilities.

#### Services to Support Development

An average of 1.4 school children per three to four bedroom single family home,\* might be expected from a typical subdivision.

Thus, Lakeview's 31 lots might be expected to generate approximately 43 students. If age breakdowns of school children follow general trends, about one-third of the school age children will be of high school age and two-thirds of grammar school age. Thus, about 28 students from this subdivision could be expected to be enrolled at Columbia's Porter Elementary School with the subdivision is fully developed. Since the homes in the subdivision will most likely be developed over the course of a few years, there should be no major influx of school children into the Columbia School System all at once, and school

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\* New Jersey County & Municipal Government Study Commission Housing and Suburbs, Fiscal & Social Impact of Multifamily Development.



facilities would probably not be overtaxed by this one subdivision.

The new library planned for Columbia should be able to accommodate the 31 new households (about 91 new residents based on the average number of people per household from the 1980 U.S. Census--2.94 persons/household).

Columbia's population of 3,386 is currently served by a resident state police trooper and volunteer fire department. These services will not be overtaxed by 31 new homes.

Columbia's landfill capacity is expected to last until 1998 under present rate of use. This 31 lot subdivision will not significantly shorten the life of the town's solid waste disposal facility by itself.

#### Alternate Land Use

The site is not appropriate for industrial or commercial uses. Residential use as proposed is suitable for the property, however, a lower density of development and more open space uses are recommended in various documents and reports previously noted. Open space use of some or all of the property would also be appropriate.

#### Relation to Plans/Zoning

The Windham Regional Planning Agency's Regional Growth and Preservation Guide Plan recommends most of the property in the Lakeview Subdivision for land uses consistent with Lake Watershed Preservation or Historic Land Preservation. The uses recommended in these areas are as follows:

##### 6. Historic-Land Preserve District

The region is rich in historic sites, forest product producing areas, and areas of great interest as natural science laboratories and recreational areas. The entire region benefits from protection of these areas since they are what gives the region its uniqueness--its attractiveness.

##### (Policy for Historic-Land Preserve District)

. A buffer of very low density development with, in the case of historic sites and village centers, compatible architectural design should be provided.

. Special emphasis should be placed on the restoration of village centers and development which is not compatible architecturally with town centers should be excluded.

. Historic areas and town centers should be bypassed by major traffic arteries wherever possible. Town greens should be carefully landscaped and where they have been eliminated by, for example, highway construction, they should be restored.

. Tax incentives should be developed which will encourage the rehabilitation and restoration of historic buildings.

. Historic buildings which qualify for inclusion on the Windham Region Register of Historic Sites (which includes those on the National Register of Historic Sites) should be given a grace period after they are restored during which time they will not be reassessed for tax purposes.

## 7. Lake Watershed Preservation District

Lakes in the region serve a variety of purposes including recreational opportunities and enhancement of the landscape. Lakes are fragile entities whose water quality and hence usefulness could be threatened by land uses within lake watersheds.

(Policy for the Lake Watershed Preservation District)

. Towns should adopt and enforce sediment control ordinances within lake watersheds.

. New development around lakes should be set back at least 300 feet from the high water line.

. Minimum lot sizes within lake watersheds should be based on physiographic considerations. Generally minimum lot sizes should be two acres or more in order to reduce the amount of deleterious material transported by erosion to lakes.

. Discharges of phosphorus from on-site waste disposal systems should be eliminated either through reconstructing the on-site system, reducing or eliminating the discharge of phosphorus producing materials into the system or collecting effluent as it leaves the septic tank for transport and treatment-disposal away from the lake shore.

. Municipalities--and where appropriate, private associations--should maintain storm drainage structures and construct new drainage structures where such structures will significantly reduce the amount of sediment and other materials entering lakes.

Columbia's Zoning Regulations designate the area included in the subdivision as an RA-2 Zoning District which requires minimum lot areas of 40,000 square feet. The subdivision seems to generally meet the requirements of Columbia's zoning and subdivision regulations as to lot size, design and layout. It seems all the lots meet the requirements of section 9.15 of the zoning regulations that not more than 25% of the minimum lot size be wetlands, but this should be reviewed carefully.

An earlier ERT report on the Columbia Lake Watershed (March 1981) raised some planning concerns which apply to part of the property in the Lakeview Subdivision. From that report, it appears parts of lots number 6, 14, 15, 27, 30 and 31 and perhaps all of lots 7, 8, 9, 10, 11, 12, 13, 28 and 29 fall into the Columbia Lake Watershed.

The planning concerns raised in that report resulted in a recommendation that density requirements in the watershed be reduced to one home per two acres, and cluster development provisions be adopted. Columbia's zoning regulations do provide for "Cluster Design" flexibility when the owner applies for a special permit to develop single family detached residences. It is not, however, a design the commission can impose. Two acre zoning does not exist in the Columbia Lake Watershed area. Only lot 31 in Lakeview Subdivision would meet the recommended two acre density.

Columbia's Planning and Zoning Commission should consider implementing the recommendations contained in the ERT report on the Lake's Watershed.

Maps prepared by the Federal Emergency Management Agency showing floodways and Flood Insurance Rate Zones indicate the wetland area proposed as a detention area as being within the 500 year flood boundary and within the "B" flood zone for flood insurance purposes. Columbia's Flood Plain Regulations (Section 53 of zoning regulations) pertain to "A" zones and floodways which are not indicated within the property proposed for subdivision.

The subdivision map should show this flood prone area and reference the Floodway and Flood Insurance Rate maps so that potential property buyers could be made aware of the potential flood hazard.

#### ROADS/TRAFFIC CONCERNS

This subdivision plan proposes 31 lots, 16 with frontage on an existing road and 15 fronting on a proposed new "temporary cul-de-sac road"--Columbia Landing which exits onto Lake Road across from Nuffer Road. Columbia Landing should be realigned to insure its center line and that of Nuffer Road are directly opposite one another (the plan seems to indicate the center lines are offset by about 20 feet) and that Columbia Landing continue to intersect Lake Road at a 90° angle.

Adequate site distance exists to insure clear visibility where Columbia Landing intersects Lake Road. (The recommended 20' centerline realignment will also have adequate visibility). Subdivision Regulation Provisions as to visibility relating to plantings and screenings should be enforced in the development of the lots (see Chapter V paragraph (K)--page 11 of Columbia Subdivision Regulations).

The 31 new lots in this subdivision, when fully developed, could be expected to generate between 310 and 329 vehicle trips per day.\* Ultimately the number of vehicle trips actually generated will depend upon the size and price of home constructed, the type, age, and economic class of families who reside there and the number of vehicles they own, as well as the price of gasoline and the

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\*Based on the average single family dwelling unit generating an average of: 10.6 vehicle trips/dwelling unit/weekday. Source: Trip Generation Study of Various Land Uses, Israel Zevin, ConnDOT, 1974. 10.0 vehicle trips/dwelling unit/weekday. Source: Trip Generation, 3rd edition, Institute of Transportation Engineers, 1983.

mass transit or commuter options available in the area. U.S. Census statistics from 1980 indicate Columbia residents have an average of 1.74 autos per household, the highest in the region. Working people who reside in Columbia, however, carpool more than others in the region--29.4% of them as compared to an average of 23.6% for the region and 19.6% for the state. Columbia's working population also tends to commute further than other workers in the Windham Region--taking 31.3 minutes as the mean travel time to work compared to 21.6 minutes as a regional average and 20.6 minutes as a state average.

Columbia is very much a bedroom community with 63.4% of Columbia's workers employed outside the Windham Region (only Coventry, among the Windham Region towns has more commuters), 29.7% employed in the Windham Region but outside of Columbia, and only 6.9% of Columbia's workers actually are employed in Columbia (the smallest percentage in the region) reflecting the residential nature of the town with few commercial, industrial, or governmental employment opportunities in Columbia.

Windham, East Hartford, and Hartford are the three destinations to which the largest percent of Columbia's workers commute, 20, 14, and 13 percent, respectively.

Average daily traffic volumes for Route 87, the nearest route for which data is available, indicates the following ADT's for 1981:

	<u>ADT</u>
. Route 87 at a point NW of Route 66	2600
. Route 87 at a point NW of Lake Road	1850
. Route 87 at a point W of Woodlawn Terrace	1250

Adding 300± vehicle trips/day to Route 87 will increase traffic on the State highway, but in no way tax its theoretical capacity. Route 87, however, is in need of some improvement. The Windham Regional Planning Agency's Regional Transportation Plan for the Windham Region recommends:

Columbia's long-range highway priority involves upgrading Route 87 in the vicinity of Columbia Lake. The growth of residential development in this area coupled with the series of knolls and sharp horizontal curves will cause an ever-increasing safety hazard unless preventive measures are taken. It is recommended that this section of Route 87 be upgraded by softening some of the more troublesome knolls and horizontal curves that restrict motorist visibility. Though a transportation problem does exist on this section of Route 87, considerable thought must be given to potential negative impacts on abutting land before any type of improvement is initiated.

The 1984 Connecticut Master Transportation Plan schedules Route 87 from Route 6 to Route 66, for resurfacing during the period 1987-1994 utilizing the Eastern Connecticut Interstate Trade-in Funds, but no realignment or reconstruction is currently scheduled.

As noted in the Environmental Review Team Report for the Laurel Lane subdivision, Laurel Lane intersects Route 87 at a point offset by 50 to 75 feet from Lake Road. In that ERT, it was noted that traffic between the proposed 120 lot Laurel Lane Subdivision and Lake Road could cause traffic hazards. That large subdivision has not been developed, but the hazard will exist until the geometric problem is resolved.

The 300± vehicle trips/day will have an impact on Lake Road, and to a lesser degree on Hennequin Road, but since these trips will be staggered over 24 hours, the impact will be minimal at any given time. Based on peak hour vehicle trip generation rates for single family dwellings, only about 30 vehicle trips will be generated by Lakeview Subdivision in the peak hour.\*

The "Traffic Analysis prepared for Lakeview Subdivision" by Kenneth MacGregor, P.E., Management of Resources and the Environment provides essentially the same conclusions--the proposed subdivision's traffic will not negatively affect the area roads by and of itself. A number of subdivisions like this one combined with proposals for elderly housing developments and the 120 lot Laurel Land Subdivision nearby could, however, provide increased traffic which could exacerbate the need to improve Route 87, realign the geometry of the Laurel Lane/Lake Road intersection, or require the flow of traffic at the Lake Road/Route 87 intersection be regulated.

The Columbia Planning and Zoning Commission expressed concern about the length of Columbia Landing--proposed as a "temporary" cul-de-sac. Columbia's Subdivision Regulations [Chapter V, paragraph (e)] stipulates that cul-de-sacs "generally not exceed four hundred (400) feet in length."

The developers have noted that the adjacent property owners are interested in subdividing their property and that at some time in the future, Columbia Landing could be extended through the adjoining property and intersect with Hennequin Road.

Chapter V (e) also provides that,

"When a cul-de-sac is proposed as a temporary measure pending future development of adjoining property, provision shall be made in the turn-around for continuing the street later and for reversion of any resulting excess right-of-way to abutting property owners. A note to this effect shall appear on the Final Subdivision Plan and be made part of the land transfer document for the lot involved."

Since the cul-de-sac is proposed as a temporary one, the Commission may allow the proposed 1400 foot Columbia Landing cul-de-sac. Sometimes a Community's Plan of Development relating to the street plan can provide guidance on where new streets are recommended to be placed.

The town should realize that "temporary" is a relative term and may mean that no future road connection is made for 5, 10, or 20 more years. If the intent of the Planning and Zoning Commission through its zoning and subdivision

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\*Trip Generation, Institute of Transportation Engineers, 1983.

regulations, and Plan of Development is to allow adjacent land to have access via a future extension of a "temporary" cul-de-sac, then the length of time the street is "temporarily" a dead-end is not important.

The length of the temporary cul-de-sac can be limited by public health and safety issues. Is adequate access for fire, police or emergency vehicles available for all the lots served by the temporary cul-de-sac? Check with local fire, police and ambulance services.

Maximum lengths for permanent cul-de-sacs are often stipulated because "as cul-de-sac lengths increase, general circulation becomes more indirect, service deliveries longer, and emergency access more liable to misdirection. These rules are commonly held standards of reasonableness."\*

However, few communities have developed standards to control the length of temporary cul-de-sacs.\*\*

Ultimately, the question remains whether extension of the cul-de-sac is possible. The adjacent property has wetlands which an extension of Columbia Landing would have to cross. Any alternate arrangement of roads in the subdivision, however, would also involve a road crossing a wetland. One possible alternate road layout which would allow the cul-de-sac to meet the 400 foot requirement would be to add a road connecting Hennequin Road with Columbia Landing. Such a road would cut across lots 5 and 17 or lots 5 and 16, as well as crossing a large expanse of wetlands. Such an alternative is not particularly preferable to the proposed 1400 foot temporary cul-de-sac.

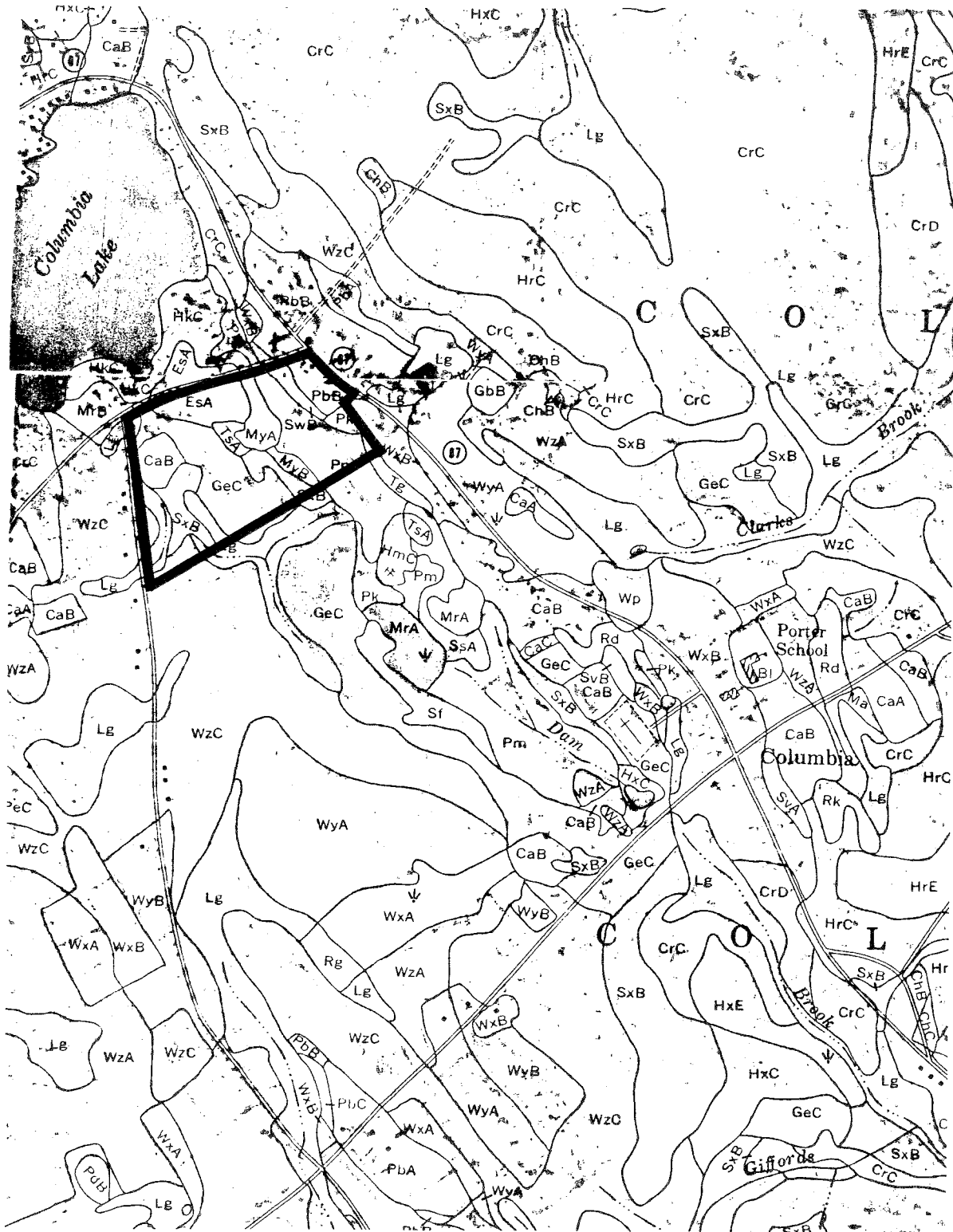
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\* Lynch, Kevin, Site Planning, MIT Press, Cambridge, Mass., 1962.

\*\* Central Naugatuck Valley Regional Planning Agency, A Handbook of Land Use Trends and Practices, 1976 to 1983, November, 1983.

# Appendix

# Soils





INTERPRETATIONS FOR COMMUNITY DEVELOPMENT  
LAKEVIEW SUBDIVISION  
COLUMBIA, CONNECTICUT

SOIL MAP SYMBOL AND SOIL NAME	SEPTIC TANK ABSORPTION FIELDS	DWELLINGS WITHOUT BASEMENTS	DWELLINGS WITH BASEMENTS	LOCAL ROADS AND STREETS	LAWNS AND LANDSCAPING
#CaB - 3 to 8% Canton	Severe-poor filter	Slight	Slight	Slight	Slight
	Slight	Slight	Slight	Slight	Slight
#EsA - 0 to 3% Haven	Severe-poor filter	Slight	Slight	Moderate-frost action	Slight
	Severe-poor filter	Slight	Slight	Moderate-frost action	Slight
GeC - 3 to 15%, stony Canton	Severe	Moderate-slope	Moderate-slope	Moderate-slope	Moderate-large stones, slope
	Moderate-slope	Moderate-slope	Moderate-slope	Moderate-slope	Moderate-large stones, slope
*Lg - 0 to 5%, stony Ridgebury	Severe-wetness, percs slowly	Severe-wetness	Severe-wetness	Severe-wetness, frost action	Severe-wetness
	Severe-wetness	Severe-wetness	Severe-wetness	Severe-wetness, frost action	Severe-wetness
Whitman	Severe-ponding, percs slowly	Severe-ponding	Severe-ponding	Severe-large stones, ponding	Severe-ponding

INTERPRETATIONS FOR COMMUNITY DEVELOPMENT  
LAKEVIEW SUBDIVISION  
COLUMBIA, CONNECTICUT

SOIL MAP SYMBOL AND SOIL NAME	SEPTIC TANK ABSORPTION FIELDS	DWELLINGS WITHOUT BASEMENTS	DWELLINGS WITH BASEMENTS	LOCAL ROADS AND STREETS	LAWNS AND LANDSCAPING
#MyA, MyB - 0 to 8% Merrimac	Severe-poor filter	Slight	Slight	Slight	Slight
#PbB - 3 to 8% Paxton	Severe-percs slowly	Moderate-wetness	Moderate-wetness	Moderate-wetness, frost action	Slight
Montauk	Severe-percs slowly	Moderate-wetness	Moderate-wetness	Moderate-wetness, frost action	Slight
*Pk - Carlisle	Severe-ponding, percs slowly	Severe-ponding, low strength	Severe-ponding, low strength	Severe-ponding, frost action, subsides	Severe-ponding, excess humus
*Pm - Adrian	Severe-ponding, poor filter	Severe-ponding, low strength	Severe-ponding	Severe-ponding, low strength, frost action	Severe-excess humus, ponding
Palms	Severe-subsides, ponding	Severe-ponding, low strength	Severe-ponding, low strength	Severe-ponding, frost action	Severe-excess humus, ponding
SwB - 3 to 8%, stony Sutton	Severe-wetness	Moderate-wetness	Severe-wetness	Severe-frost action	Moderate-wetness, large stones

INTERPRETATIONS FOR COMMUNITY DEVELOPMENT  
LAKEVIEW SUBDIVISION  
COLUMBIA, CONNECTICUT

SOIL MAP SYMBOL AND SOIL NAME	SEPTIC TANK ABSORPTION FIELDS	DWELLINGS WITHOUT BASEMENTS	DWELLINGS WITH BASEMENTS	LOCAL ROADS AND STREETS	LAWNS AND LANDSCAPING
SxB - 3 to 15%, stony Sutton	Severe-wetness	Moderate-wetness, slope	Severe-wetness	Moderate-wetness, slope, large stones	Moderate-slope, large stones, wetness
#TSA - 0 to 3% Ninigret	Severe-wetness, poor filter	Moderate-wetness	Severe-wetness	Moderate-frost action, wetness	Moderate-wetness
Tisbury	Severe-wetness, poor filter	Moderate-wetness	Severe-wetness	Severe-frost action	Moderate-wetness
WzC - 3 to 15%, stony Woodbridge	Severe-wetness, percs slowly	Moderate-wetness, slope	Severe-wetness	Severe-frost action	Moderate-large stones, wetness, slope

\*Designated inland wetland soil by Public Act 155  
#Prime farmland soil

## SOIL INTERPRETATIONS FOR URBAN USES

The ratings of the soils for elements of community and recreational development uses consist of three degrees of "limitations:" slight or no limitations; moderate limitations; and severe limitations. In the interpretive scheme various physical properties are weighed before judging their relative severity of limitations.

The user is cautioned that the suitability ratings, degree of limitations and other interpretations are based on the typical soil in each mapping unit. At any given point the actual conditions may differ from the information presented here because of the inclusion of other soils which were impractical to map separately at the scale of mapping used. On-site investigations are suggested where the proposed soil use involves heavy loads, deep excavations, or high cost. Limitations, even though severe, do not always preclude the use of land for development. If economics permit greater expenditures for land development and the intended land use is consistent with the objectives of local or regional development, many soils and sites with difficult problems can be used.

### Slight Limitations

Areas rated as slight have relatively few limitations in terms of soil suitability for a particular use. The degree of suitability is such that a minimum of time or cost would be needed to overcome relatively minor soil limitations.

### Moderate Limitations

In areas rated moderate, it is relatively more difficult and more costly to correct the natural limitations of the soil for certain uses than for soils rated as having slight limitations.

### Severe Limitations

Areas designated as having severe limitations would require more extensive and more costly measures than soils rated with moderate limitations in order to overcome natural soil limitations. The soil may have more than one limiting characteristic causing it to be rated severe.

# About the Team

The Eastern Connecticut Environmental Review Team (ERT) is a group of professionals in environmental fields drawn together from a variety of federal, state, and regional agencies. Specialists on the Team include geologists, biologists, foresters, climatologists, soil scientists, landscape architects, archeologists, recreation specialists, engineers and planners. The ERT operates with state funding under the supervision of the Eastern Connecticut Resource Conservation and Development (RC&D) Area.

The Team is available as a public service at no cost to Connecticut towns.

## PURPOSE OF THE TEAM

The Environmental Review Team is available to help towns and developers in the review of sites proposed for major land use activities. To date, the ERT has been involved in reviewing a wide range of projects including subdivisions, sanitary landfills, commercial and industrial developments, sand and gravel operations, elderly housing, recreation/open space projects, watershed studies and resource inventories.

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

## REQUESTING A REVIEW

Environmental reviews may be requested by the chief elected officials of a municipality or the chairman of town commissions such as planning and zoning, conservation, inland wetlands, parks and recreation or economic development. Requests should be directed to the Chairman of your local Soil and Water Conservation District. This request letter should include a summary of the proposed project, a location map of the project site, written permission from the landowner allowing the Team to enter the property for purposes of review, and a statement identifying the specific areas of concern the Team should address. When this request is approved by the local Soil and Water Conservation District and the Eastern Connecticut RC&D Executive Council, the Team will undertake the review on a priority basis.

For additional information regarding the Environmental Review Team, please contact Jeanne Shelburn (774-1253), Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, P.O. Box 198, Brooklyn, Connecticut 06234.