# Environmental Review Team Report

# Champagne Property

## Canterbury, Connecticut

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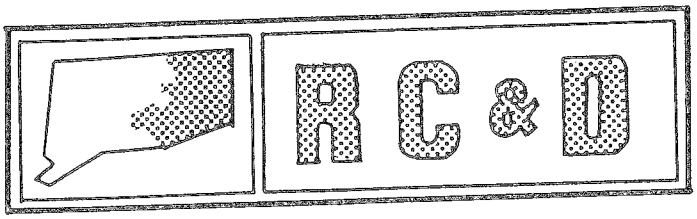
EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

# Environmental Review Team Report on

# Champagne Property

## Canterbury, Connecticut

February, 1982




eastern connecticut resource conservation & development area

environmental review team
139 boswell avenue
norwich, connecticut 06360

# Preliminary Site Plan

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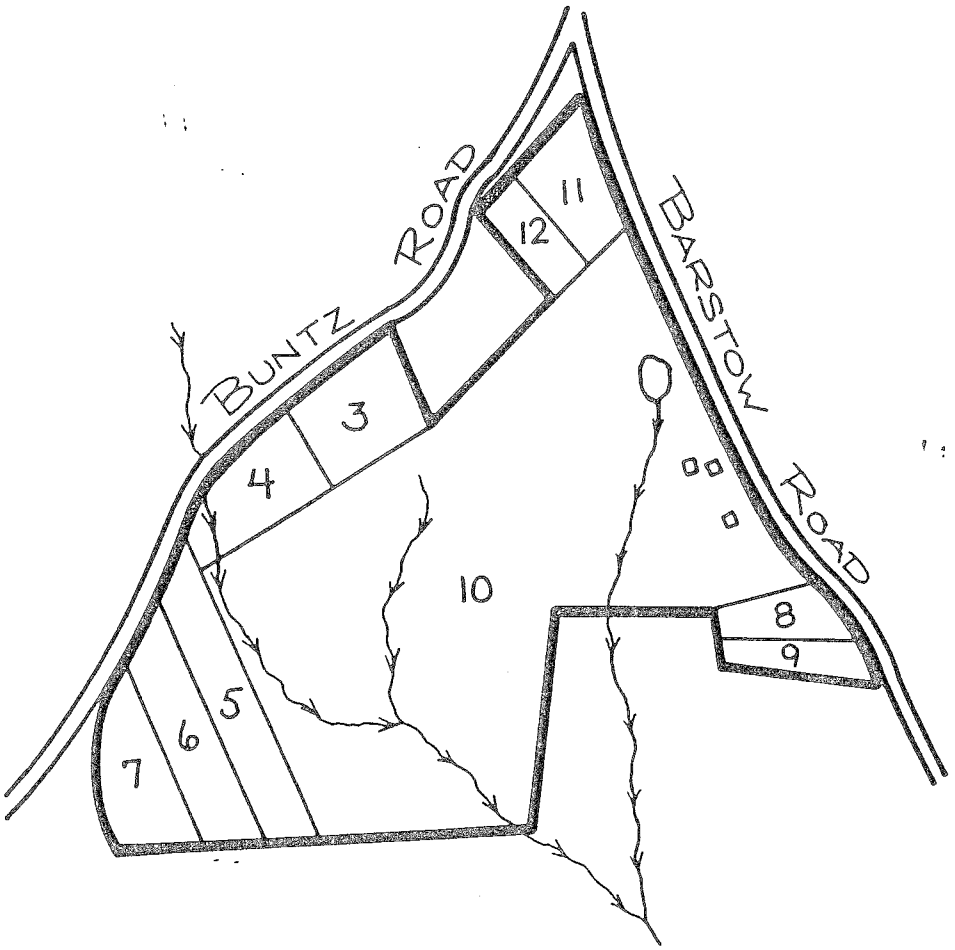


# INTRODUCTION

The Eastern Connecticut Environmental Review Team was asked to prepare an environmental assessment of a proposed subdivision in the town of Canterbury. The site is approximately 70 acres in size and is located at the corner of Buntz and Barstow Roads. The property is presently in the private ownership of William and Patrice Champagne. Preliminary plans have been prepared by Albert Fitzback, land surveyor.

Preliminary plans show the property divided into ten lots. Lots range in size from 1.4 acres to 3.6 acres, with one large 47 acre parcel containing the original homestead and barns to be retained in the central section of the property. All lots will be served by on-site septic systems and on-site wells. Driveways to Buntz and Barstow Roads will provide access to the lots.

The elevation of the property varies from a low of approximately 330 feet where Bennett Brook flows from the property to a height of approximately 400 feet along Buntz Road. The flattest areas are in wetland or open cropland. Hillier areas are poor pastureland and/or forested.

The vegetation on the property varies. A typical eastern hardwood forest association of oak, hickory, ash and maple exists south of the farmstead where two lots have been considered. It also exists at the western side of the property where three lots have been considered. A red maple swamp is present where Adrian and Palm muck soils (91) are present. A less dense forested area rests on steep slopes along Buntz Road. Open portions of the property were used as pasture or cropland. An exception would be the sizeable wetland area running north to south immediately behind the farm buildings.

The Team is concerned with the effect of this proposal on the natural resource base of this site. Although severe limitations to development can often be overcome with appropriate engineering techniques, these measures can become costly, making a project financially unfeasible for a developer. This site has several severe development limitations; a large centrally located wetland and brook system, shallow depth of soil to bedrock and generally stony soil conditions. These natural limitations may pose problems in the proper functioning and location of septic systems, the location and construction of driveways and home foundations, and erosion control during construction. Each of these issues is discussed in detail in the following sections of this report. In the Team opinion, those areas with the most severe development limitations were found in the vicinity of Lots 5, 6, and 7; Lots 8 and 9; and Lots 11 and 12.

# ENVIRONMENTAL ASSESSMENT

## GEOLOGY

The Champagne property is located within the Scotland topographic quadrangle. A geologic map of the quadrangle, prepared by H.E. Dixon and C.E. Shaw, Jr.,

has been published by the U.S. Geological Survey (Map GQ-392). The bedrock geologic map accompanying this report is based upon information in the Scotland quadrangle report. The surficial geologic map included in this report is based upon field observations and aerial photographs.

Rock types found on the site are generally schists, gneisses, or pegmatites. A schist is a crystalline metamorphic rock (metamorphic means altered from a previously existing rock type) in which mineral grains that are flaky, platy, or elongate have been aligned into distinct layers. A gneiss is a crystalline metamorphic rock in which granular minerals are interlayered with thin bands of elongate or flaky mineral grains. A pegmatite is a crystalline igneous rock (igneous means formed directly from a liquid) generally dominated by very large crystals of feldspar and quartz.

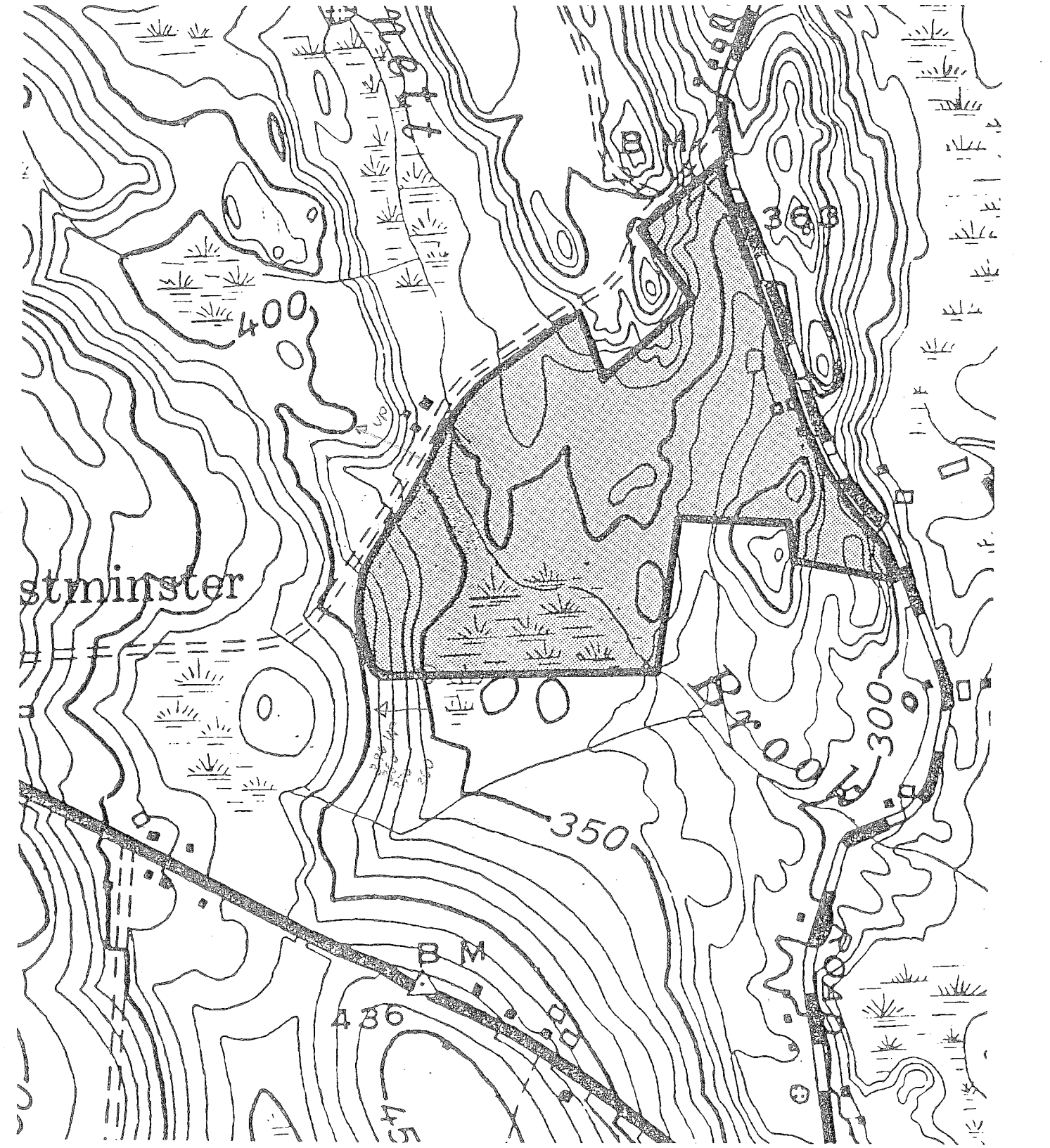
The bedrock on the site may be grouped into three units: Tatnic Hill Formation, Hebron Formation, and Canterbury Gneiss. The Tatnic Hill group occupies the eastern half of the property. It consists largely of schists and gneissic schists, which are composed primarily of the minerals quartz, oligoclase, biotite, and muscovite. Hornblende, garnet, epidote, potassium feldspar, staurolite, sillimanite, andesine, and labradorite may be present in some places. Iron staining is noticeable in portions of the unit. Lenses and layers of pegmatite, a rock more resistant to weathering than the schists, are often found in association with outcrops of the Tatnic Hill rocks. The pegmatites are not considered as part of the Formation; they are younger rocks which intruded the schists as a liquid and then solidified.

The Hebron Formation occupies most of the remainder of the site. This unit consists of interlayered schists and more granular metamorphic rocks. Quartz, andesine, hornblende, biotite, and muscovite are the principal minerals, although their percentages may vary. Diopside, calcite, epidote, sphene, and tourmaline are among the minor mineral components. No outcrops of the Hebron Formation were seen on the site.

Canterbury Gneiss underlies a small portion of the western part of the property. This rock is composed largely of quartz, oligoclase, potassium feldspar, and biotite. Muscovite and epidote are minor components. No outcrops of Canterbury Gneiss were seen on the site, although several outcrops occur just to the west and north.

Bedrock is most likely to influence residential development in the northern and eastern portion of the site. In those areas, the rock is at or very close to the surface. Blasting could be required for driveway construction in some places. The schists should yield easily to blasting, if required. The variable minerology of the schists may cause groundwater withdrawn from one or more deep wells on the site to be high in iron, manganese, or sulfur. It is more likely, however, that the groundwater quality will be good.

Several types of surficial geologic material overlie bedrock on the site. Till, a glacial sediment deposited directly from an ice sheet, is the most common material along Buntz and Barstow Roads. The till contains a poorly sorted mixture of clay, silt, sand, gravel, and boulders. Thin alluvium (recent


Topography
Site Boundary
0
660'
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486
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# Surficial Geology

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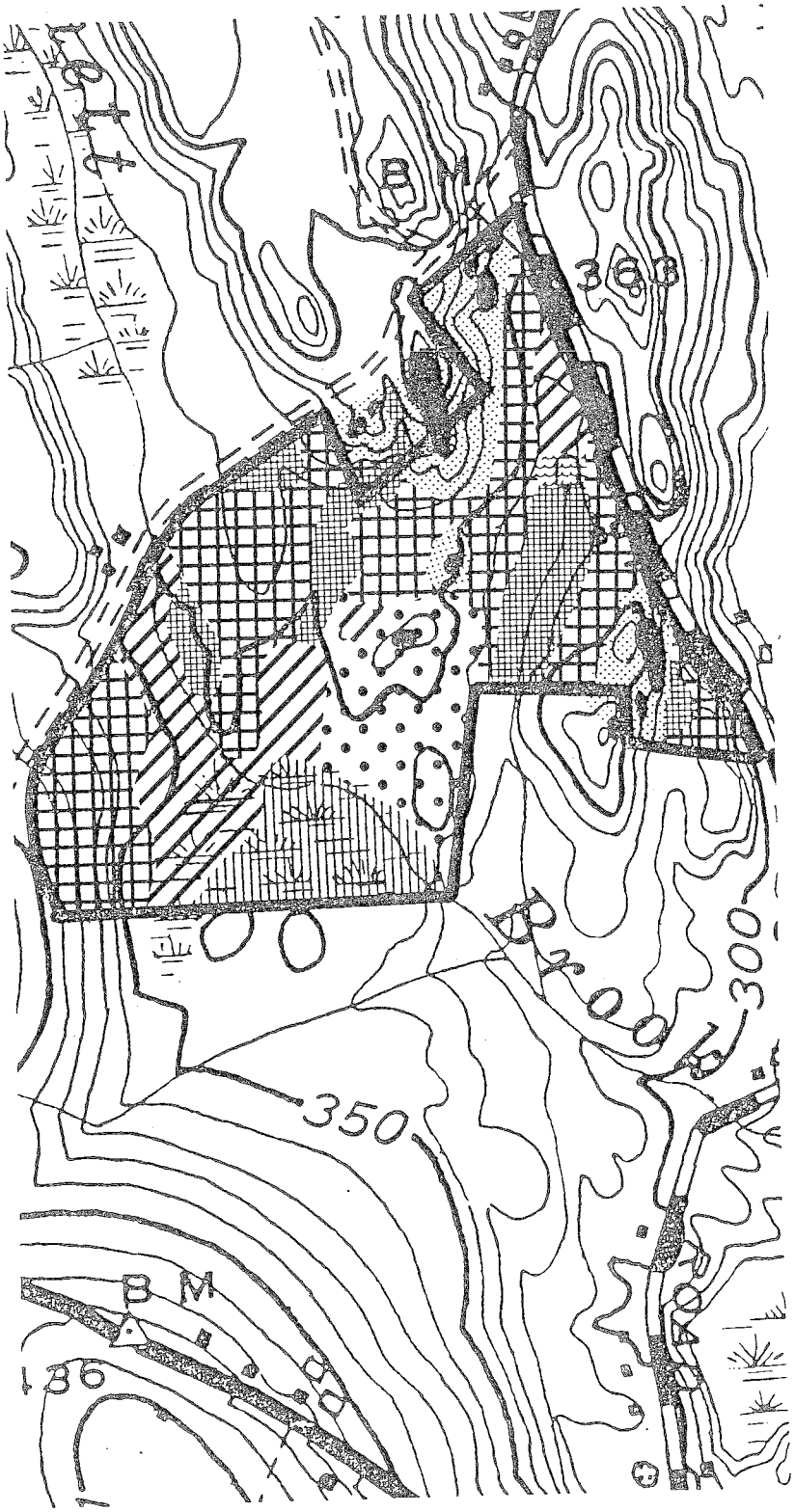
EXPLANATION

- Till. Thickness in most places is estimated to be greater than five feet.
- Thin till. Estimated to be less than five feet in most places.
- Bedrock outcrops. Rock in the stratified drift area may be a boulder.
- Till area marked by substantial wetness. Includes some stream-deposited silt and sand (alluvium), and some organic material.
- Swamp sediments. Silt, sand, and clay mixed with much organic material.
- Stratified drift. Mostly sand and cobble gravel.
- Hummocky area marked by interspersed small, dry areas and wet swales or channels.
- Pond.



# Bedrock Geology

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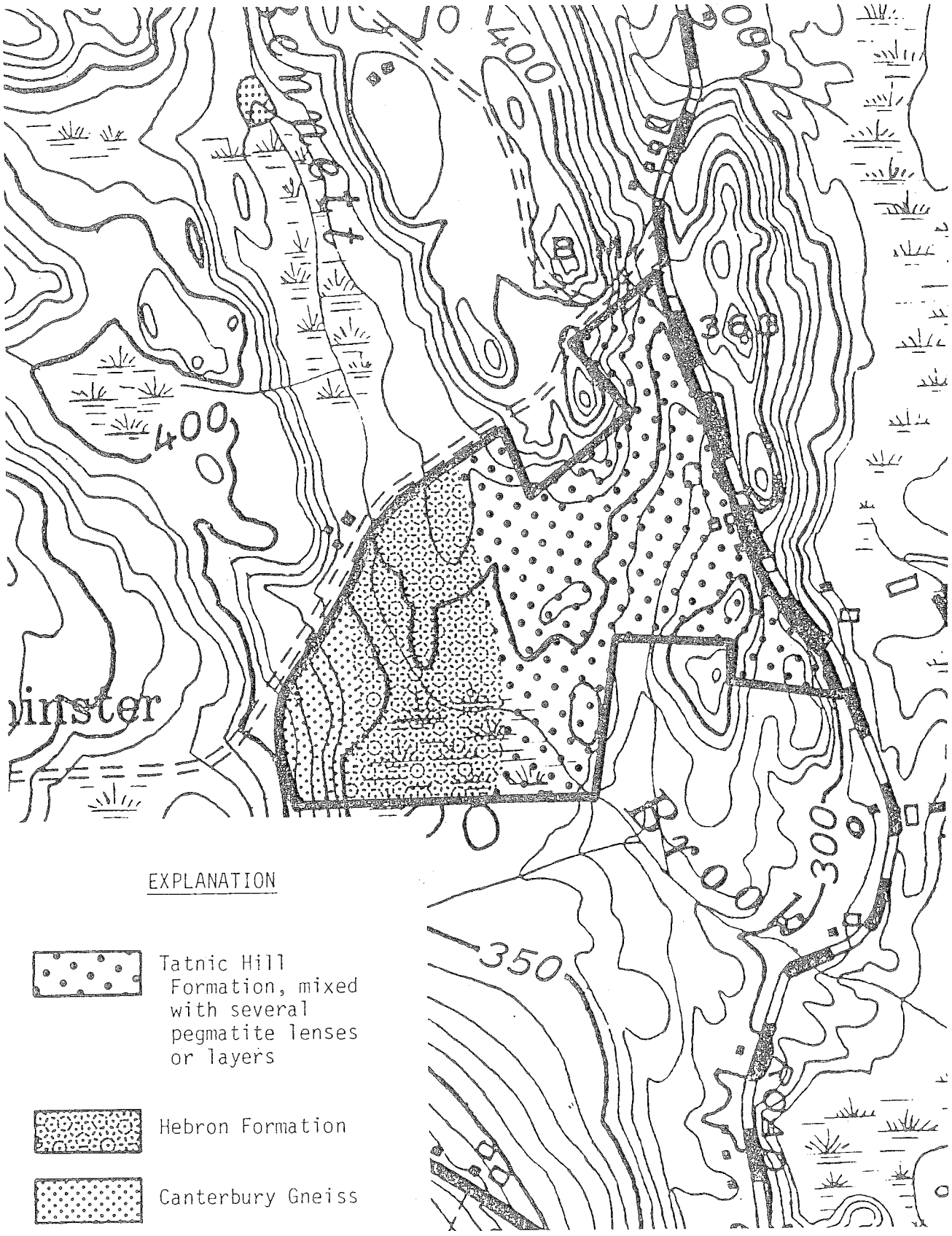


EXPLANATION

Tatnic Hill Formation, mixed with several pegmatite lenses or layers

Hebron Formation

Canterbury Gneiss

# Watershed Areas

0 2000'
scale

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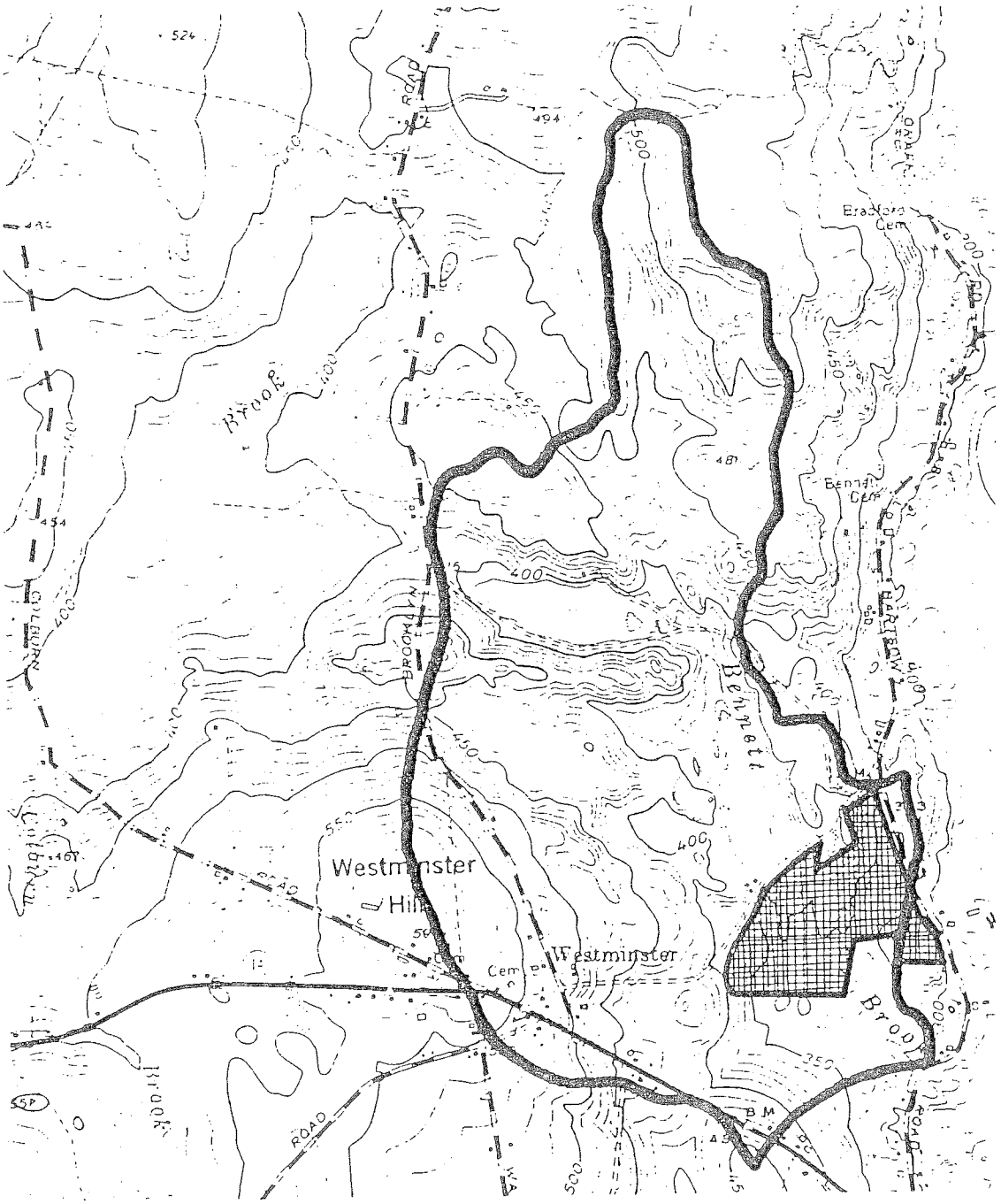



Watershed of Bennett Brook at Barstow Road

stream-deposited sediments) and swamp deposits are found along the site's two principal streams. The central portion of the site, a group of rounded knolls, is composed of stratified drift, a layered material deposited by streams of glacial meltwater. This material was exposed in two test pits and was shown to consist of as much as seven feet of cobble gravel and sand.

The areas most suitable for development from a geologic standpoint are the westernmost till area (i.e., west of Bennett Brook), the eastern edge of the large cornfield, the stratified drift area, and a small thick-till area near the corner of Buntz and Barstow Roads.

## HYDROLOGY

Two streams flow through the Champagne property: Bennett Brook and a tributary. Bennett Brook, which begins about two miles north of the site, enters the property from Buntz Road along the northwestern boundary. The brook passes through a flat, wet, and partially swampy section of the property before exiting the site at the south-central corner. The tributary stream originates in a swampy area and adjoining pond in the east-central portion of the property. This stream flows south through the site and joins Bennett Brook about 900 feet south of the parcel. The combined stream then flows southeastward toward and under Barstow Road. The drainage area of Bennett Brook at Barstow Road is approximately 1.5 square miles.

The subdivision of the property as planned, followed by the construction of new homes, driveways, etc., will lead to increases in runoff from the property. Ordinarily, the Team would recommend that consideration be given to measures that would mitigate the effects of these increases. Stream flows, for example, are often increased during storms following construction in the stream's watershed. In this case, however, the overall density of the subdivision is so low that any peak flow increases would be negligible. Moreover, the site has a substantial amount of wetland area, which will serve as natural runoff-control basins. Under these circumstances, runoff retention does not seem to be necessary.

Much of the central portion of the site has year-round or seasonal high groundwater-table conditions. These conditions will hamper the construction of adequate septic systems. The driest areas in this portion of the site appear to be the eastern portion of the largest existing cornfield and the gravelly knolls in the south-central section of the parcel. The coarse material in the knolls has a relatively poor ability to renovate septic effluent, however. If a septic system is located in that area, any water supply wells should be located at least 100 feet away.

## SOILS

A detailed soils map of this site is included in the Appendix to this report accompanied by a chart which indicates soils limitations for various urban uses. As the soil map is an enlargement from the original 1,320 feet/inch scale to 660 feet/inch, the soil boundary lines should not be viewed as absolute boundaries, but as guidelines to the distribution of soil types on the site. The

soil limitation chart indicates the probable limitations for each of the soils for on-site sewerage, building with basements, buildings without basements, streets and parking, and landscaping. However, limitations, even though severe, do not preclude the use of the land for development. If economics permit large expenditures for land development and the intended objective is consistent with the objectives of local and regional development, many soils and sites with difficult problems can be used. The soils map, with the publication Soil Survey, Windham County, Connecticut, can aid in the indentification and interpretation of soils and their uses on this site. Know Your Land: Natural Soil Groups for Connecticut can also give insight to the development potentials of the soils and their relationship to the surficial geology of the site.

Soil series typical of the site include the Canton-Charlton series, the Charlton-Hollis series, the Hinckley series, the Woodbridge series, the Adrian-Palms series, the Ridgebury, Leicester and Whitman series and the Rippowam series. These soils are described in detail below.

3MC Canton & Charlton extremely stony fine sandy loams, 3 to 15 percent slopes. These gently sloping to sloping, well drained soils are on ridges, hills, and side slopes of glacial till uplands. Areas are oval or irregular in shape and range from 5 to 100 acres. Slopes are mostly smooth and convex and are 100 to 600 feet long. Stones cover 8 to 25 percent of the surface. About 45 percent of the mapped acreage of this unit is Canton soils, 40 percent is Charlton soils, and 15 percent is other soils. Areas of this unit consist of Canton soils or Charlton soils or both. These soils were mapped together because they have no significant differences in use and management. Typically, Canton soils have a very dark grayish brown fine sandy loam surface layer two inches thick. The subsoil is yellowish brown fine sandy loam, gravelly fine sandy loam, and gravelly sandy loam twenty-one inches thick. The substratum is pale brown gravelly loamy sand to a depth of sixty inches or more. Typically, Charlton soils have a dark yellowish brown fine sandy loam surface layer five inches thick. The subsoil is yellowish brown fine sandy loam and sandy loam twenty inches thick. The substratum is light yellowish brown and light brownish gray sandy loam to a depth of sixty inches or more. The water table is commonly deeper than six feet. The available water capacity is moderate. The permeability of the Canton soils is moderately rapid in the surface layer and subsoil and rapid in the substratum. The permeability of the Charlton soils is moderate or moderately rapid. Runoff is medium to rapid. The soils are very strongly acid to medium acid. The soils of this unit are too stony for cultivation. Stones and boulders hinder the use of farm equipment. These soils are suited to cultivation if the stones are removed, but stone removal is costly. These soils have a moderate to severe erosion hazard. Maintaining permanent vegetative cover is a suitable management practice. The soils of this unit are well suited to community development. The steepness of slope is the main limitation. Onsite septic systems need careful design and installation to prevent effluent from seeping to the surface. Steep slopes of excavations are unstable. Stones and boulders need to be removed for landscaping. Establishing quick plant cover, mulching, and using siltation basins are suitable management practices to control runoff and erosion during construction.

17LC Charlton-Hollis fine sandy loams, very rocky, 3 to 15 percent slopes.
17LD Charlton-Hollis fine sandy loams, very rocky, 15 to 35 percent slopes.
This complex consists of gently sloping to sloping, moderately steep to steep, somewhat excessively drained and well drained soils on hills and ridges of glacial till uplands. Areas of this unit are mostly long and narrow or oval and range from 5 to 100 acres. Slopes are mostly convex and 100 to 500 feet long. Stones and boulders cover 1 to 8 percent of the surface. This complex is about 55 percent Charlton soils, 20 percent Hollis soils, and 25 percent other soils and rock outcrops. Rock outcrops make up to 10 percent of this unit. These soils are in such a complex pattern that they could not be separated at the scale mapped. Typically, Charlton soils have a dark yellowish brown fine sandy loam surface layer five inches thick. The subsoil is yellowish brown fine sandy loam and sandy loam twenty inches thick. The substratum is light yellowish brown and light brownish gray sandy loam to a depth of sixty inches or more. Typically, Hollis soils have a dark grayish brown fine sandy loam surface layer two inches thick. The subsoil is yellowish brown gravelly fine sandy loam twelve inches thick. Hard, unweathered schist bedrock is at a depth of fourteen inches. The water table is commonly below a depth of six feet in the Charlton soils. The available water capacity is moderate. Permeability is moderate or moderately rapid. Runoff is medium to rapid. The soil is very strongly acid to medium acid. The Hollis soils have a low available water capacity. Permeability is moderate to moderately rapid above the bedrock. Runoff is medium to rapid. The soil is very strongly acid to medium acid. This complex is too stony for cultivation. Stoniness, rock outcrops, and steep slopes make the use of farming equipment impractical. Cleared areas can be used for pasture, and some can be used to grow hay. The erosion hazard is moderate to severe. Maintaining permanent vegetative cover is a suitable management practice. This complex is poorly suited to community developments because of steep slopes, bedrock outcrops, and the shallow depth to bedrock in many places. Large lots are commonly needed to locate a suitable site for onsite septic systems and care is needed to prevent effluent from seeping to the surface downslope. Excavations commonly require blasting. Steep slopes, stoniness, and rock outcrops hinder landscaping. Establishing quick plant cover and using mulch and siltation basins are suitable management practices to control erosion during construction.

#31B Woodbridge fine sandy loam, 3 to 8 percent slopes. This gently sloping, moderately well drained soil is on the tops and lower sideslopes of large drumlins and hills of glacial till uplands. Areas are mostly long and narrow and range from 3 to 50 acres. Typically, the surface layer is very dark grayish brown fine sandy loam eight inches thick. The subsoil is mottled, dark yellowish brown and yellowish brown fine sandy loam twenty-two inches thick. The substratum is firm to very firm, olive gray fine sandy loam and gravelly fine sandy loam to a depth of sixty inches or more. This soil has a seasonal water table at a depth of about twenty inches from fall to spring. It has a moderate available water capacity. This soil has moderate permeability in the surface layer and subsoil and slow to very slow permeability in the substratum. Runoff is medium. The soil is very strongly acid to medium acid in the surface layer and subsoil and very strongly acid to slightly acid in the substratum. This soil is well suited to cultivated crops. The main limitation is wetness and this soil dries out slowly in the spring. Artificial drainage helps dry this soil earlier in the spring, but even when drained, it remains wet for several days after heavy

mottled, dark brown, grayish brown, and dark grayish brown fine sandy loam twenty-eight inches thick. The substratum is grayish brown, and gray gravelly sand to a depth of sixty inches or more. This soil has a seasonal water table at a depth of about ten inches from autumn through spring. It is subject to frequent flooding, mainly from autumn to spring. This soil has a moderate available water capacity. It has moderate or moderately rapid permeability in the substratum. Runoff is slow. The soil is very strongly acid to medium acid. This soil is fairly suited to cultivated crops when drained. Wetness is the major limitation. This soil dries out slowly in the spring and often delays planting of crops. Areas that cannot be drained are poorly suited for cultivation. This soil is poorly suited to community development. Frequent flooding and the seasonal high water table are the major limitations. Areas used for onsite septic systems require extensive filling and systems require special design and installation. Steep slopes of excavations are unstable. In places, onsite septic systems pollute the ground water. Lawns are wet and soggy from autumn to spring, and sediment deposited by floodwater can damage lawns, shrubs, and other kinds of landscaping.

\# Prime Farmland
\## Additional Farmland of Statewide Importance
* Designated wetland soil by P.A. 155

The soils distribution is shown on the map developed from the original aerial soils maps. Soil limitations and ratings for development are included in the Appendix to this report. Even soils other than wetlands have moderate to severe limitations for building due to seasonal wetness, slope, or stoniness. The Woodbridge fine sandy loam (31B) although wet due to a perched water table in winter and spring months, is recognized as prime farmland by USDA standards. A few acres of this soil are present on the site along Buntz Road. Wetlands designated by soil map units 43M, 91, and 825 interlace the property. The Rippowam (825) soil is subject to flooding from Buntz Brook during severe storm events and snow melt conditions. Storm water will flood periodically on the other two wetlands soils.

As initially proposed, the Team soil specialist sees potential for building on lots as follows:

Lot #3: Access from Buntz Road is favorable; a fairly level driveway could run in along the contour. Although fairly steep, careful architectural design could "fit" a home on the site. Locating an adequate spot for the septic leaching field is a problem. Also rockiness of the lot could affect foundation location and construction.

Lot #4: The soil 31B is prime farmland. As such, the Windham County Soil and Water Conservation District cannot encourage use of it for building. Any federal loam agency may not subsidize building on this soil. However, except for the probability that an engineered septic system would be necessary, and that foundation footing drains are advisable, this area would be good for one or maybe two homes (one further back from the road). Since the water table in this soil rises to within twenty-four inches of the surface in winter, raised foundations should be considered.

Lots #5,6,7: It may be possible to locate one residence in this area, preferably higher up - where lot 6 and 7 are shown. The land is subject to flooding where lot 5 is shown. Slope and stoniness present the problems. A drive should be installed running with the land's contour.

Lots #8,9: Access from Barstow Road is only available in one location. This was discussed thoroughly during the field review. It is logical to combine these lots due to topography and very limited access.

Lot #10: Restoration of the farmstead is planned. The concept of selling a sizeable tract of land with the old home and barn is admirable.

Lots #11,12: The outcrops of ledge, general stoniness, severe slope, and wetland at the toe of the slope (lot 11) severely affect the buildability of these lots. Filling around a home and stabilization of any fill used would be inevitable. It is questionable whether or not the Northeast District Department of Health would find a suitable location for a septic system. Bringing a driveway in from Buntz Road will be a problem, fill will probably be necessary. Sight visibility from a driveway entering the road should be considered. Possibly one residence could be built on these two lots.

VEGETATION

The property proposed for subdivision may be divided into five vegetation types. These include three distinctive mixed hardwood areas which total 24± acres; open fields which total 24± acres; open swamp/wet meadow, 11± acres; hardwood swamp, 10± acres; and an old field/orchard area which totals approximately 1 acre.

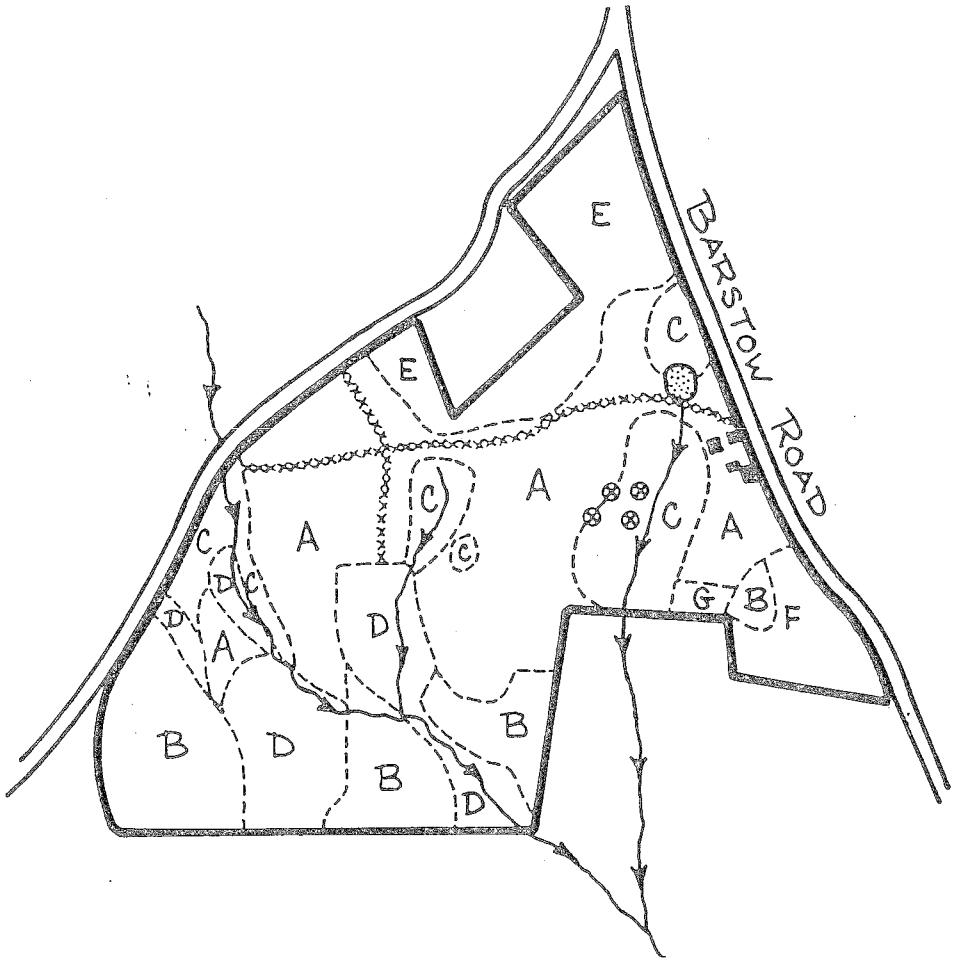
Vegetation Type Descriptions:

Type A. (Open Fields) Approximately 24 acres of open fields are present within this tract. Grasses are dominant throughout the rocky, less fertile areas with scattered goldenrod, sweet fern, Canada thistle and seedling size eastern red cedar. Areas, where fertility is higher and rocks are less numerous, are utilized for corn cultivation.

Type B. (Mixed Hardwoods) These areas total 12± acres and were harvested for fuelwood at various times throughout the last twenty years. The most recent harvests were implemented within several months of the field investigation. At present these areas are variably stocked with pole and occasional small sawtimber size red maple, black birch, tuliptree, red oak, white oak, shagbark hickory and pignut hickory. The quality of these trees ranges widely, however, a majority of the trees are of poor quality. The understory species which are present include hardwood tree seedlings, witch hazel, maple-leaved viburnum and arrowwood. Ground cover consists of club moss, Christmas fern, huckleberry, raspberry, aster, green brier and Pennsylvania sedge.

# Vegetation

scale 660'




LEGEND

- Road, paved
- Road, gravel
- Property boundary
- Vegetation type boundary
- Stream
- Pond
- Buildings
- Small stands of northern white cedar

VEGETATION TYPE BOUNDARY *

TYPE A. Open field. 24 ± acres.
TYPE B. Mixed hardwoods. 12 ± acres.
Variably stocked, pole and occasional sawtimber-size.
TYPE C. Open swamp/wet meadow. 11 ± acres.
TYPE D. Hardwood swamp. 10 ± acres.
Over-stocked, sapling to pole-size.
TYPE E. Mixed hardwoods. 8 ± acres.
Under-stocked, sawtimber-size.
TYPE F. Mixed hardwoods. 4 ± acres.
Fully-stocked, pole to small sawtimber-size.
TYPE G. Old field/orchard. 1 ± acres.

* Seedling-size = trees less than 1 inch in diameter at 4.5 feet above the ground (d.b.h.)
Sapling-size = trees 1 to 5 inches in d.b.h.
Pole-size = trees 5 to 11 inches in d.b.h.
Sawtimber-size = trees 11 inches and greater in d.b.h.

Type C. (Open Swamp/Wet Meadow) Several open swamp/wet meadow areas are present within this tract. These areas, which total approximately 11 acres, have an excellent diversity of herbaceous species. The more open areas are dominated by many different species of sedges, steeple bush, sheep laurel, skunk cabbage, swamp dewberry, goldenrod and raspberry. Other areas are dominated by shrub and herbaceous species which include highbush blueberry, swamp azalea, sweet pepperbush, speckled alder, maleberry, common cattail, sphagnum moss, tussock sedge, and phragmities. Several small patches of pole to sawtimber Atlantic white cedar and eastern white pine are present within this vegetation type. These patches are depicted on the vegetation type map.

Type D. (Hardwood Swamp) Poor to medium quality sapling to pole size red maple and scattered white ash, yellow birch and black gum are characteristic of these over-stocked stands which total 10± acres. The understory is made up of spice-bush, highbush blueberry, sweet pepperbush and elderberry. Ground cover consists of cinnamon fern, sensitive fern, skunk cabbage, tussock sedge and sphagnum moss.

Type E. (Mixed Hardwoods) This 8± acre under-stocked stand is made up of predominantly healthy open grown sawtimber size red oak, white oak, black oak, and pignut hickory. Understory vegetation is conspicuously lacking where grazing has taken place. A sparce understory of hardwood tree seedlings, witch hazel and highbush blueberry is however present on the southwestern portion of this stand, where grazing has not been as heavy. The trees in this area are somewhat lower in quality than those elsewhere in this stand. Grasses, Pennsylvania sedge, bracken fern, aster and old field juniper form the ground cover in this area.

Type F. (Mixed Hardwoods) Pole to small sawtimber size black oak, scarlet oak, white oak, red maple, pignut hickory, American beech, black birch and sugar maple are beginning to decline in health and vigor in this 4± acre fully stocked stand. The understory is dominated by maple-leaved viburnum, witch hazel, American chestnut sprouts, highbush blueberry and eastern white pine seedlings. Ground cover is made up of huckleberry, green brier, old field juniper, Pennsylvania sedge, club moss, Christmas fern, evergreen wood fern, rock polypody and dewberry.

Type G. (Old Field/Orchard) Poorly maintained pole size apple trees are present within this 1± acre area. Many of these trees could be brought back into health and productivity by proper pruning and perhaps grafting. The poorest quality of these trees could be cut low to the ground and allowed to sprout.

A majority of the large and healthy trees in Vegetation Type F (Mixed Hardwoods) have high aesthetic and shade value. These trees are nicely spaced and should be retained to the greatest extent possible. Recent research has shown that healthy trees on a lot may enhance the value of that lot by as much as twenty percent.

The small patches of Atlantic white cedar and eastern white pine which are present in Vegetation Type C (Open Swamp/Wet Meadow) have high aesthetic value. These evergreen trees also provide excellent year round cover for many wildlife species. Retention of these trees would be desirable.

It should be noted that trees are very sensitive to the condition of the soil within the entire area under their crowns. Development practices near trees such as excavation, filling and grading for construction of driveways and buildings may disturb the balance between soil aeration, soil moisture level and soil composition. These disturbances may cause a decline in tree health and vigor, potentially resulting in tree mortality within three to five years. Mechanical injury to trees may cause the same results. Dead trees reduce the aesthetic quality of an area and may become hazardous and expensive to remove if near roadways, buildings or utility lines.

Care should be taken during the construction period not to disturb the trees that are to be retained. In general, healthy and high vigor trees should be favored for retention over unhealthy trees because they are usually more resistant to the environmental stresses brought about by construction.

The poorly drained and saturated soils which are present in the hardwood swamp and open swamp areas limit not only the potential for tree growth and tree quality but also the ability to effectively manage these areas. Red maple and occasional black gum, white ash and yellow birch are able to tolerate the excessive moisture levels which are present, however, under these conditions, the trees are generally slow growing and of poor quality. Conditions are more severe in the open swamp areas where the soils are so saturated that tree species have not been able to become established.

The loss of trees to windthrow in the hardwood swamp area represents a potential hazard. The saturated soils which are present result in the development of shallow root systems which are unable to securely anchor trees. The crowded condition which is present may aggravate this windthrow hazard because the trees now rely on each other for stability. Heavy thinning operations, and clearing in or along side these areas, may increase the windthrow potential by allowing wind to pass through rather than over these areas. Disturbances in or near these areas should be kept to a minimum to avoid increasing the windthrow potential.

Several of the large trees present within the southwestern section of Vegetation Type E have large dead branches. These branches should be removed should houses be built in this area. This will reduce the potential hazard caused by falling branches.

Extreme rockiness throughout the open field areas which are not presently cultivated may limit the establishment of quality woody vegetation. This rockiness will also preclude the establishment of agricultural row crops in these areas.

## Management Considerations

The trees which are present in Vegetation Type F (Mixed Hardwoods) and parts of Vegetation Type D (Hardwood Swamp) are declining in health and vigor as a result of their crowded condition. Periodic fuelwood thinnings that are focused on the removal of the poorest quality trees in the overstory, up to one-third of the total volume in Vegetation Type F and on more than one-fourth of the total volume in Vegetation Type D, will reduce the crowded condition

enough to allow the residual trees to respond over time with improved health, vigor, and stability.

To avoid irreversible soil damage, thinning operations in the hardwood swamp area should only be implemented during the winter months when the ground is frozen or the summer months when the ground is dry.

Thinnings in the mixed hardwood stand will produce between five and six cords of fuelwood per acre. The highest quality two-thirds of the trees in the overstory should, however, be left in the residual stand. The thinning suggested in the hardwood swamp area will produce three to four cords of fuelwood per acre, once again the highest quality trees and species other than red maple should be favored.

It would be feasible to plant conifer species in the less rocky section of the open fields which are present within this tract. Such plantings would improve the aesthetic quality of the area, improve cover conditions for wildlife and eventually provide a product of either Christmas trees or sawtimber. These areas will best support white spruce, eastern white pine or eastern hemlock. If white spruce are planted for Christmas trees, they should be planted at a spacing of 5' x 5' or 6' x 6' or at a random spacing where rockiness is severe. Where surface rocks can be removed, planting and maintenance will be greatly simplified. It should be realized that the proper maintenance of high quality Christmas trees may take four days per acre per year throughout the entire rotation. If this maintenance responsibility cannot be realistically met, conifers such as eastern white pine, eastern hemlock and larch could be planted.

These trees should be planted in a random mixture at a spacing of approximately eight to ten feet apart. They will not require the intensive maintenance that Christmas trees do, however, some initial grass and weed control may be desirable. A public service forester or private forester should be contacted to help implement the suggested thinnings and plantings should they be desired.

## WILDLIFE

Habitat for wetland oriented wildlife is obviously present. Rural and secluded, the wetlands and associated drier land, some wooded - some open, provides good natural food and cover for ducks, songbirds, and native wild mammals including deer. It is unlikely that residential building at the density proposed would lessen use of the area by wildlife. Appropriate planning could lead to enhancement of the wildlife habitat for wetland oriented species. For example, the existing pond and adjacent wetland behind the farmstead could be enlarged, a nesting island built, woodduck boxes erected, etc. A multi-purpose pond could be constructed, appropriate vegetation to provide cover and food could be planted.

## WATER SUPPLY

Potable water for the proposed lots in the subdivision would be secured by the installation of individual on-site wells. Bedrock appears to be the most

practical source of water for most parts of the site. Bedrock is the most common source of water for individual residences in the state, in areas where public water supplies are not available. In most cases, bedrock wells are capable of supplying small but reliable yields that are adequate to serve the needs of an average family.

Bedrock transmits water by means of fractures that pass through the rock. The yield of a well drilled in bedrock, therefore, depends upon the number and size of water-bearing fractures that the well intersects. The fractures tend to be most concentrated near the surface of the rock. If a well has penetrated 150-200 feet of bedrock without achieving a yield of one gallon per minute or more, it may be more practical to drill in a different location than to continue drilling in the original hole. Although a yield of three gallons per minute (gpm) or more is desirable, a yield of 1-3 gpm may be suitable if enough storage volume is available in the well shaft to cover peak demand periods.

The quality of the groundwater derived from the bedrock should be good. There is a slight probability that the schists in the eastern section of the property may cause wells in that area to produce groundwater high in iron, manganese, or sulfur, but several methods of filtration are available to solve such problems. Care should be used in designing and installing septic systems in the shallow-to-bedrock areas in order to prevent pollution of the well water.

It is possible that a relatively shallow dug well placed in the stratified drift in the center of the property could produce yields suitable for residential purposes. If the material remains coarse-grained for ten feet or more below the water table, a well test should be run to determine the sustainable yield. If a well is based in these materials, any septic system should be kept 100 feet or more away from it. Although the State Health Code requires a separation of only 75 feet, coarse-grained stratified drift is a particularly poor filter of septic effluent and a particularly good transmitter of groundwater.

In general, if lots are an acre or larger in size, assuming proper placement and construction of individual wells, along with properly designed and installed subsurface sewage systems, there should be no associated adverse water quality problems.

In some areas, mineral concentrations of iron and/or manganese may be sufficiently elevated in water to cause objectionable conditions. Under such circumstances, the water would need appropriate treatment before being acceptable for various domestic uses.

Also farm lands which may have been heavily fertilized over the years or received seepage from livestock manure deposits could have higher concentrations of nitrates in water supplies. Excessive nitrogen constituents may cause methemoglobinemia in infants one year of age or younger and in pregnant and nursing mothers. In such cases, the water would not be suitable for drinking by the above mentioned people.

## SEWAGE DISPOSAL

Sewage disposal for the proposed subdivision would be provided by private on site subsurface systems. Based on visual observations and consideration of

Soil Conservation Service data, it is apparent that a large portion of the property would not be particularly favorable for sewage disposal purposes. These limiting factors consist of surface water courses and wetlands, shallow depth to bedrock and seasonal high water table.

In accordance with requirements of the State Public Health Code, it is necessary for bedrock to be no closer than four feet below a leaching system. Maximum ground water level should be one and one-half feet below the bottom areas of a subsurface leaching system. These separating distances are needed for the satisfactory operation of leaching systems and to provide an adequate soil depth for treatment and renovation of the sewage effluent. Also, having sufficient suitable soils and distance to treatment of sewage will significantly reduce the possibility of pollution problems. This is particularly important if well water supplies, streams or bodies of water are located downgradient of leaching systems. It is generally recognized that a minimum horizontal separating distance of 50 feet should be maintained from streams, ponds or lakes. A distance of 75 feet or more is required from potable well water supplies.

In regard to the preliminary layout of lots, the Team Sanitarian has reservations concerning the feasibility of some lots for sewage disposal. In particular are the lots (#8 and 9) at the south end of Barstow Road, the corner (#11) lot at Barstow and Buntz Roads and lots (#6 and 5) near the west end of Buntz Road. While no actual soil testing has been done, careful evaluation of the above noted lots should be made in order to locate possible suitable areas of sufficient size to accommodate both primary and reserve sewage systems. In general, it would appear that some revisions or modifications to the plan for lot layouts should be made.

## PLANNING CONCERNS

The site poses the obvious limitations to development which have been discussed in detail by the other Team members. All of the limitations such as wetlands, slope, bedrock, are of definite significance from a planning as well as a natural resources point of view. In the interests of good land use planning, the site restraints should be fully considered by the subdivider.

It may be possible to engineer septic systems for several lots and obtain health department approval of engineered plans because the plans do meet the health code; however, septic system approval provides absolutely no guarantee that the system will actually work for a long period of time. The site constraints are such that engineered septic systems may fail, unless frequent homeowner maintenance is practiced.

The development of this site as a subdivision is not in conformance with the town plan of development (prepared in 1976). Canterbury's plan of development contains the following objectives which apply to the site:

(1) existing agricultural land should be preserved;

(2) subdivisions should be designed to preserve important natural resources such as wetlands;

(3) growth in general should be directed away from wetlands;

(4) use of existing town roads should be minimized, with subdivisions creating new interior roads. The number of driveways exiting on existing roads should be minimized.

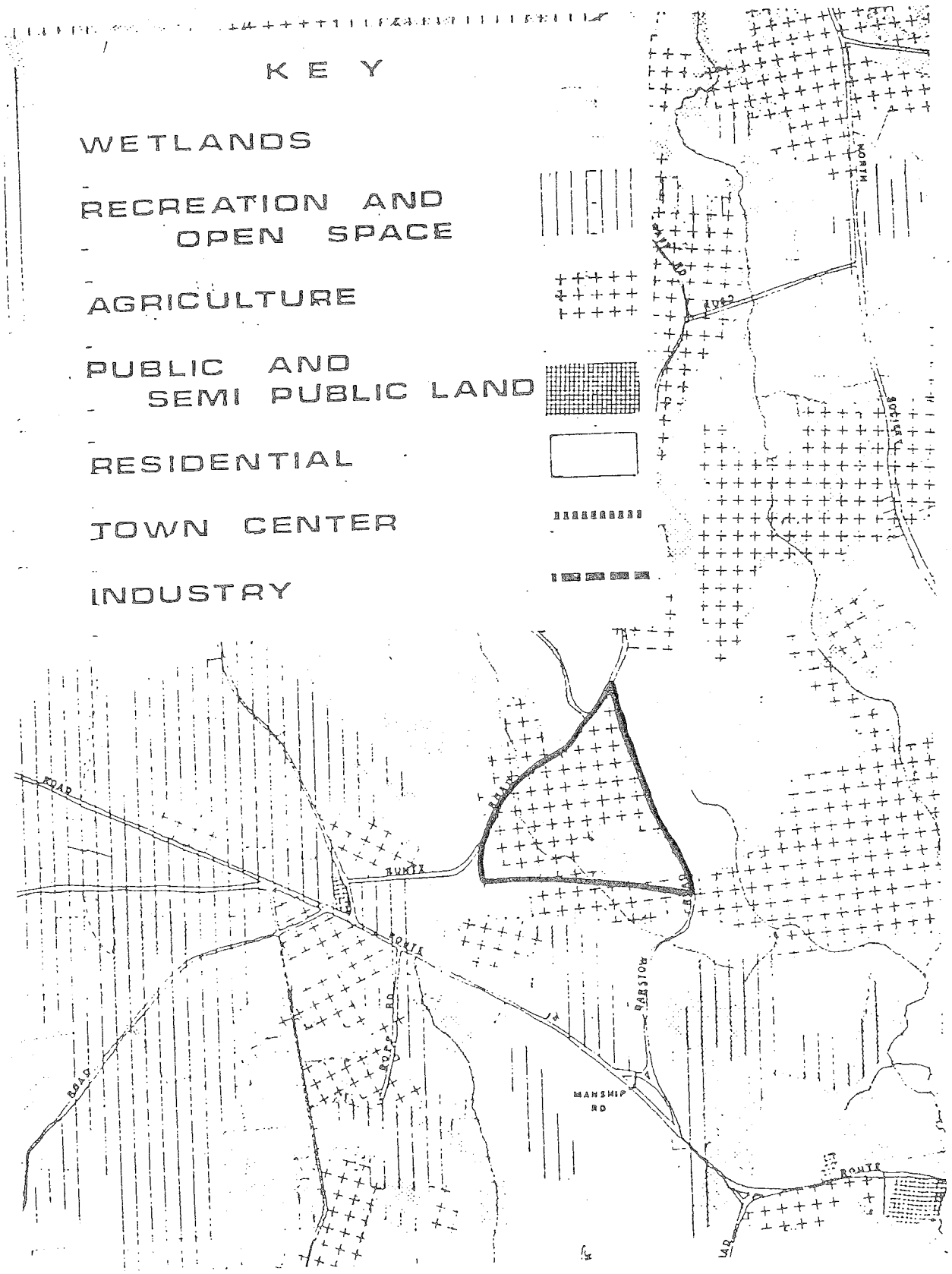
The proposed site is specificially designated on the plan of development suggested land use maps as a desired agricultural area (see accompanying illustration).

Canterbury's subdivision and zoning regulations do not require submission of erosion and sedimentation plans. As large sections of this site contain soils which have been designated as highly erodible by the Soil Conservation Service and as there are several wetland areas, efforts should be made to provide erosion controls when construction begins.

Care should be taken to ensure that adequate sight distances exist for all driveways, in some cases, combined driveways may be desirable.

The site constraints present on this property combined with the town's own plan of development seem to indicate that a subdivision at this location is not particularly desirable.

# Excerpt : Canterbury Plan of Development (1976)

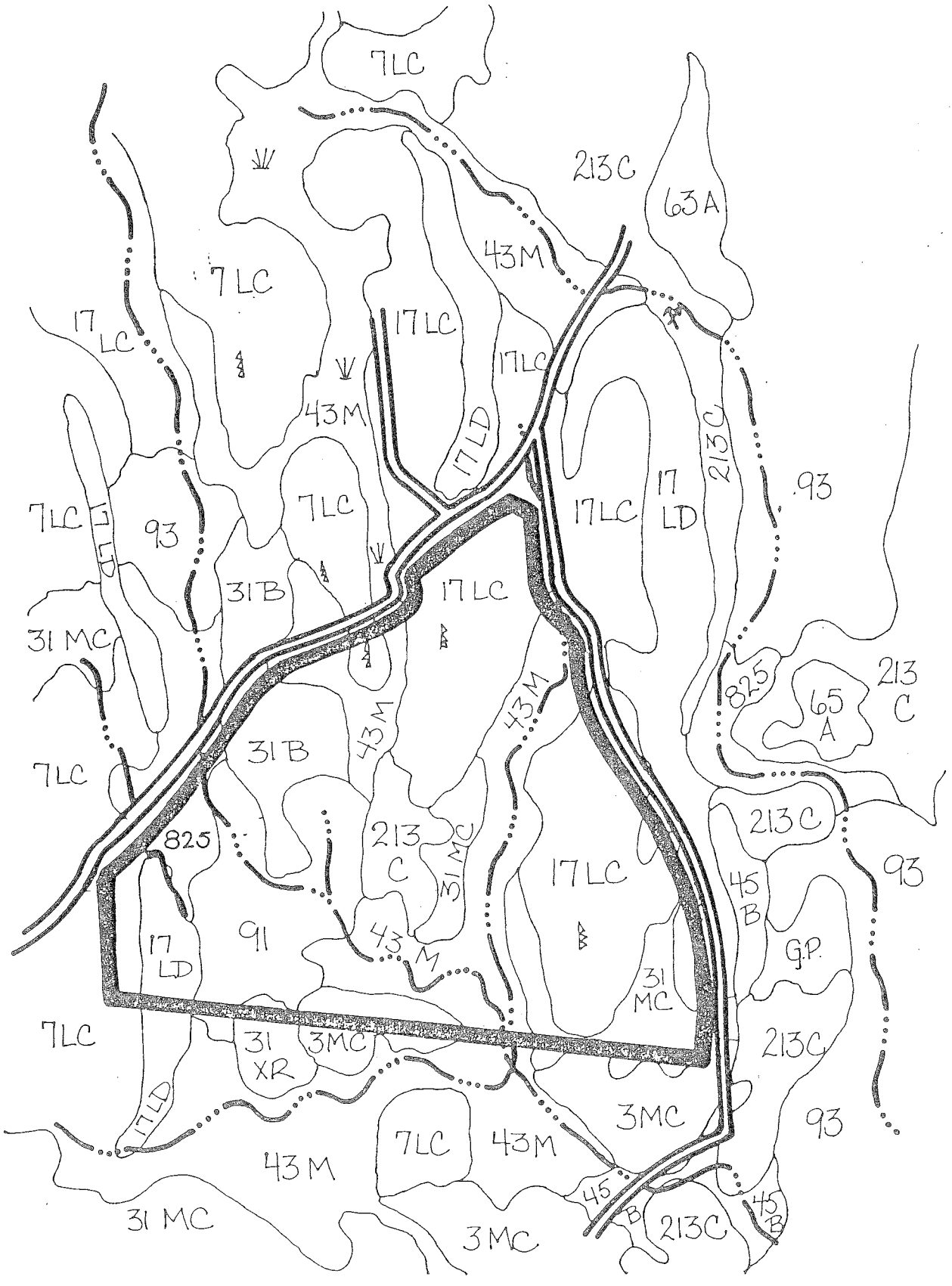


# Appendix

# Soils

Site Boundary

0 660'
scale



United States Department of Agriculture
Soil Conservation Service
Agricultural Center
Brooklyn, Connecticut
06234-0327

774-0224

Assisting the Windham County Soil and Water Conservation District

## SOILS

3MC Canton & Charlton extremely stony fine sandy loams, 3 to 15 percent slopes.

7LC
17LC Charlton-Hollis fine sandy loams, very rocky, 3 to 15 percent slopes.

17LD Charlton-Hollis fine sandy loams, very rocky, 15 to 35 percent slopes.

##213C Hinckley gravelly sandy loam, 3 to 15 percent slopes.

#31B Woodbridge fine sandy loam, 3 to 8 percent slopes.

31MC Woodbridge extremely stony fine sandy loam, 3 to 15 percent slopes.

*51 Adrian and Palms mucks.

*43M Ridgebury, Leicester and Whitman extremely stony fine sandy loams.

*825 Rippowam fine sandy loam.

\# Prime Farmland
## Additional Farmland of Statewide Importance
* Designated wetland soil by P.A. 155

Champagne Property

Buntz and Barstow Road

Canterbury, Conn.

Principal Limitations and Ratings of Soils For

COMMUNITY DEVELOPMENT

| Soil Symbol and Series | Houses with Basements | Local Streets | Septic Tank Absorption Fields | Lawns and Landscaping | Drainage |
|---|---|---|---|---|---|
| 3MC Canton | Moderate,slope | Moderate,slope | Moderate,slope | Moderate,slope, large stones | Deep to water |
| Charlton | Moderate,slope | Moderate,slope | Moderate,slope | Moderate,slope, large stones | Deep to water |
| 7LC 17LC Charlton | Moderate,slope | Moderate,slope | Moderate,slope | Moderate,slope, large stones | Deep to water |
| Hollis | Severe,depth to rock | Severe,depth to rock | Severe,depth to rock | Severe,depth to rock, thin layer | Deep to water |
| 17LD Charlton | Severe,slope | Severe,slope | Severe,slope | Severe,slope | Deep to water |
| Hollis | Severe,slope, depth to rock | Severe,slope, depth to rock | Severe,slope, depth to rock | Severe,slope, depth to rock, thin layer | Deep to water |
| ##213C Hinckley | Moderate,slope, large stones | Moderate,slope, large stones | Severe,poor filter | Severe,small stones | Deep to water |
| #31B Woodbridge | Severe,wetness | Severe,frost action | Severe,percs. slowly,wetness | Moderate,wetness | Slope,Percs slowly,fros action |

Champagne Property

Buntz and Barstow Road

Canterbury, Conn.

Principal Limitations and Ratings of Soils For

COMMUNITY DEVELOPMENT

| Soil Symbol and Series | Houses with Basements | Local Streets | Septic Tank Absorption Fields | Lawns and Landscaping | Drainage |
|---|---|---|---|---|---|
| 31MC Woodbridge | Severe, wetness | Severe, frost action | Severe, percs. slowly, wetness | Moderate, slope, large stones, wetness | Percs. slowly, slope, frost action |
| *91 Adrian | Severe, ponding | Severe, ponding, low strength, frost action | Severe, ponding, poor filter | Severe, excess humus, ponding | Ponding, frost action, subsides |
| Palms | Severe, ponding, low strength, flooding | Severe, ponding, flooding, frost action | Severe, flooding, subsides, ponding | Severe, ponding, flooding, excess humus | Flooding, ponding, subsides |
| *43M Ridgebury | Severe, wetness | Severe, wetness, frost action | Severe, percs. slowly, wetness | Severe, wetness | Percs. slowly, frost action |
| Leicester | Severe, wetness | Severe, wetness, frost action | Severe, wetness | Severe, wetness | Frost action |
| Whitman | Severe, ponding | Severe, frost action, ponding | Severe, percs. slowly, ponding | Severe, ponding | Percs. slowly, frost action |
| *825 Rippowam | Severe, flooding, wetness | Severe, flooding, wetness, frost action | Severe, flooding, wetness, poor filter | Severe, wetness, flooding | Flooding, cutbanks cave, frost action |

\# Prime Farmland
\#\# Additional Farmland of Statewide Importance
* Designated wetland soil by P.A. 155

## 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 (889-2324), Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, 139 Boswell Avenue, Norwich, Connecticut 06360.