FENTON BLUFFS SUBDIVISION

WILLINGTON, CONNECTICUT

DECEMBER 1988

EASTERN CONNECTICUT ENVIRONMENTAL REVIEW TEAM REPORT

EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

FENTON BLUFFS SUBDIVISION

WILLINGTON, CONNECTICUT

REVIEW DATE: **NOVEMBER 1, 1988**

REPORT DATE: **DECEMBER 1988**

EASTERN CONNECTICUT RESOURCE CONSERVATION AND
DEVELOPMENT AREA, INC.

EASTERN CONNECTICUT ENVIRONMENTAL REVIEW TEAM
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HADDAM, CONNECTICUT 06438
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ENVIRONMENTAL REVIEW TEAM REPORT
ON

FENTON BLUFFS SUBDIVISION
WILLINGTON, CONNECTICUT

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

The ERT met and field checked the site on Tuesday, November 1, 1988.

Team members participating on this review included:

Kevin DesRoberts	Wildlife Assistant	DEP-Eastern District
Steve Hill	Wildlife Biologist	DEP-Eastern District
Gerald Lang	Hydraulic Engineer	USDA-Soil Conservation Service
Brian Murphy	Fisheries Biologist	DEP-Eastern District
Joe Neafsey	District Conservationist	USDA-Soil Conservation Service
Elaine Sych	ERT Coordinator	Eastern CT RC&D Area
Bill Warzecha	Geologist	DEP-Natural Resources Center

Prior to the review day, each Team member received a summary of the proposed project, a list of the town's concerns, a location map, a topographic map, and a soils map. During the field review the Team members were given test hole information, complete plans for sections II and III, and a stormwater management plan. The Team met with, and were accompanied by the Zoning Enforcement Officer, members of the Inland Wetlands Commission, a sanitarian from the State Department of Health, the developer/engineer and his consultants. Following the review, reports from each Team member were submitted to the ERT Coordinator for compilation and editing into this final report.

This report represents the Team's findings. It is not meant to compete with private consultants by providing site designs or detailed solutions to development problems. The Team does not recommend what final action should be taken on a proposed project -- all final decisions rest with the Town and landowner. 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. The results of this Team action are oriented toward the development of better environmental quality and the long-term economics of land use.

The Eastern Connecticut RC&D Executive Council hopes you will find this report of value and assistance in making your decisions on these proposed subdivisions.

If you require additional information, please contact:

Elaine A. Sych
ERT Coordinator
Eastern Connecticut RC&D Area
P.O. Box 70
Haddam, Connecticut 06438
(203)345-3977

FENTON BLUFFS SUBDIVISION

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1. SETTING AND LAND USE

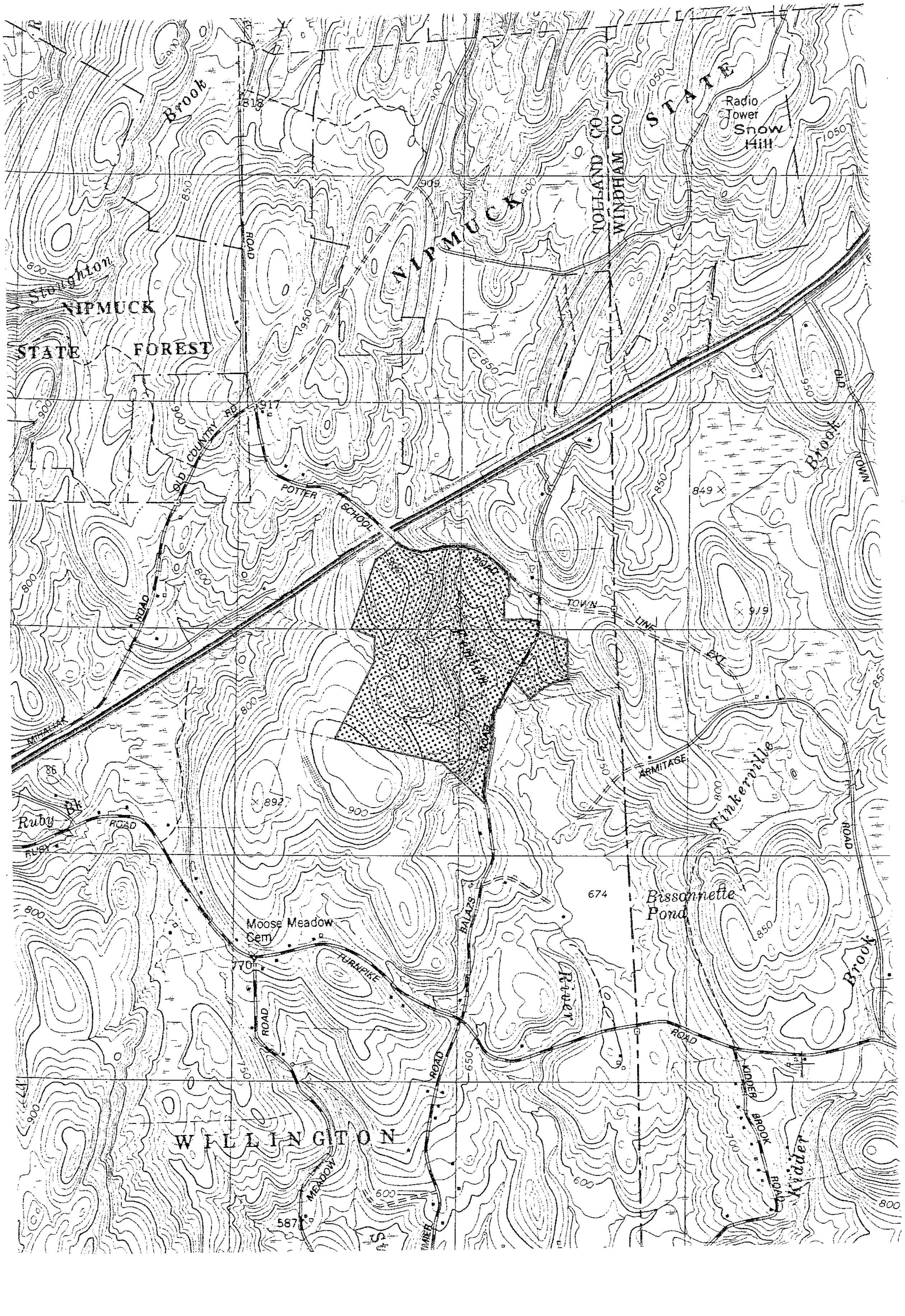
The site, about 150 acres in size, is located in the northeast corner of Willington near Bissonnette Pond. The site is bounded on the north by Potter Hill Road, on the east by Balazs Road and private, undeveloped land on the south and west. Interstate-84 is located within 125 feet of the northern property line. It should be pointed out that the ±10 acre portion of the site proposed for open space is located on the east side of Balazs Road. Fenton River, the main topographical feature of the site, bisects the property in a southerly direction.

According to town officials the entire parcel is located in a R-80 zone which permits residential development with a minimum lot size of two acres. It is understood that the Willington Inland Wetland Commission regulates any activity within 75 feet of wetlands, watercourses and surface waters.

The site and general vicinity have been used for residential and agricultural land-uses. The presence of stonewalls transecting the property verifies this agricultural past. The eastern parts of the proposed open space area is comprised of an open field. The remainder of the site is wooded.

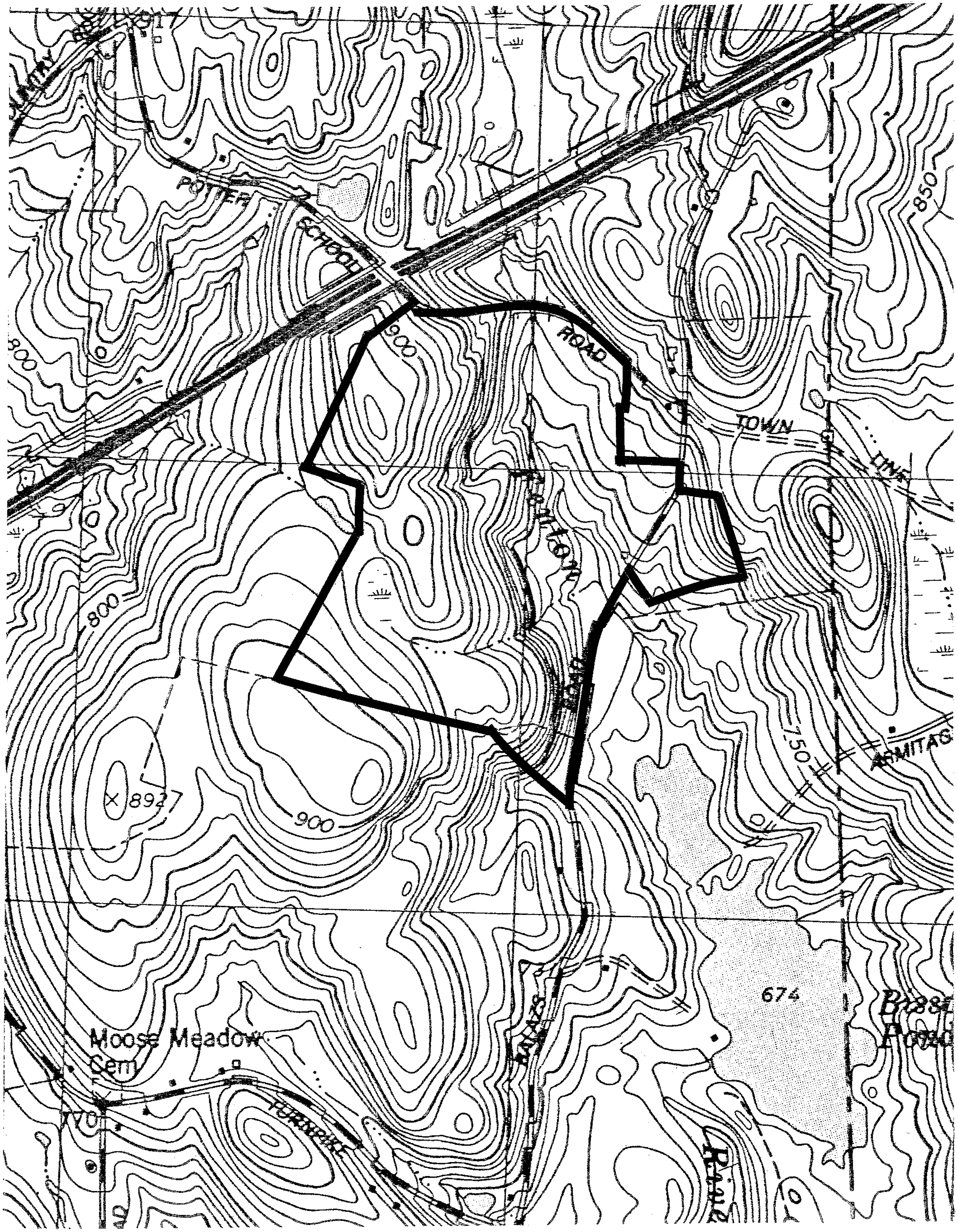
2. TOPOGRAPHY

The site contains highly irregular terrain controlled by the underlying bedrock. Site elevations range from about 910 feet above mean sea level at the southern limits, to 690 feet above mean sea level at the intersection of the Fenton River and Balazs Road. Slopes generally range from flat (tableland at the western limits) to steep. The steepest slopes bisect the site in a north/south direction. There are three man-made ponds on the site.



LOCATION

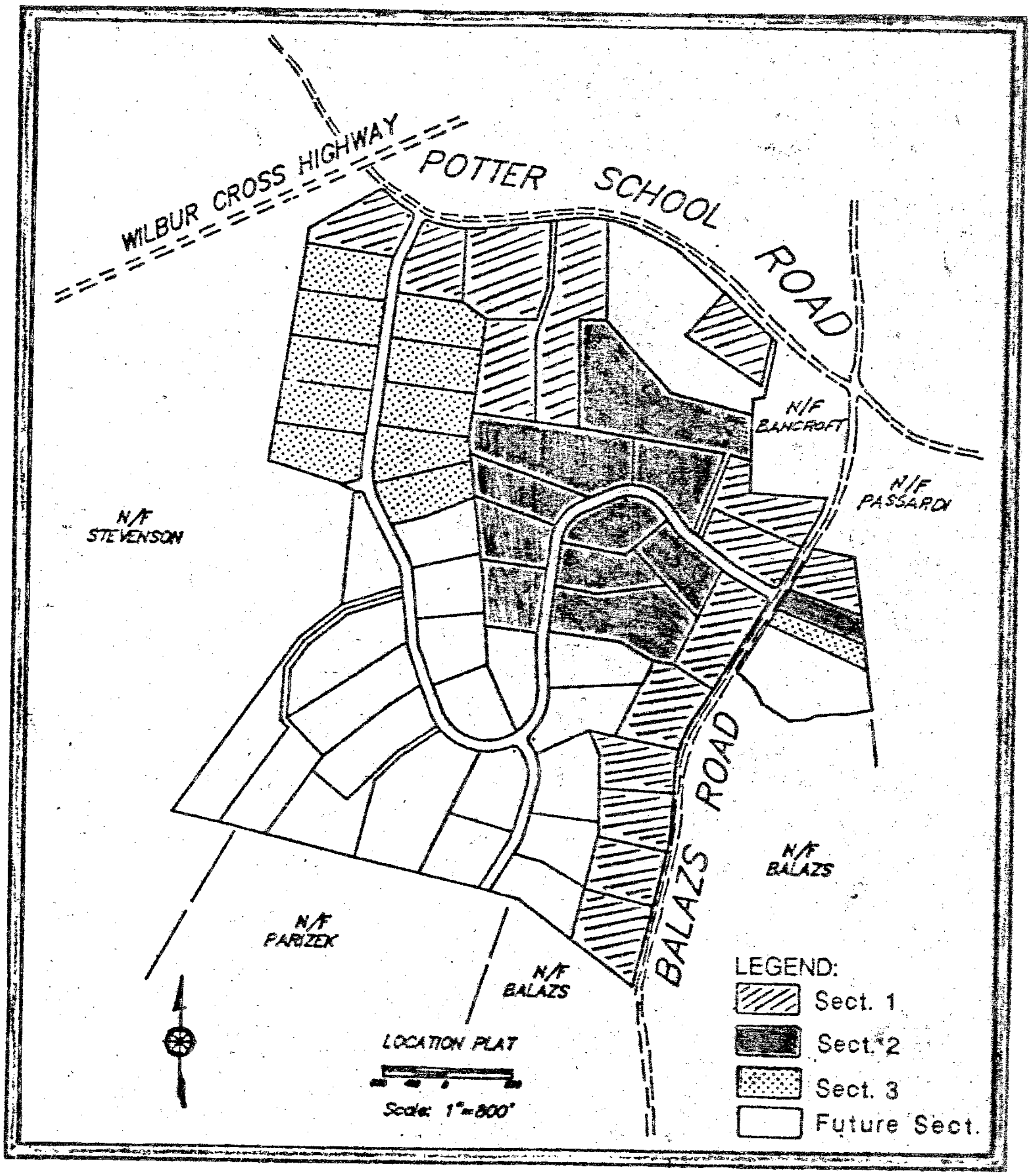
Scale 1" = 2000'



<u>**TOPOGRAPHY**</u>

Approximate Site Boundary   Scale 1" = 1000'

LOT LAYOUT FOR ALL SECTIONS



3. GEOLOGY

The rock core of the parcel is made up of NE/SW trending belts of crystalline metamorphic rocks, which have a very complex history. The rocks, which range in age from 438 to 505 million years old, have been subjected to the heat and pressure of mountain building. They are greatly changed since their deposition as muck, silt, sand or volcanic material. Foliation or the layering in the rock has developed as micas, and other platy minerals grew along preferred directions in response to the heat and pressure. The resulting metamorphic rocks are schists and gneisses. The foliation of the bedrock on the site dips moderately to steeply westward. Bedrock is exposed in scattered areas throughout the site.

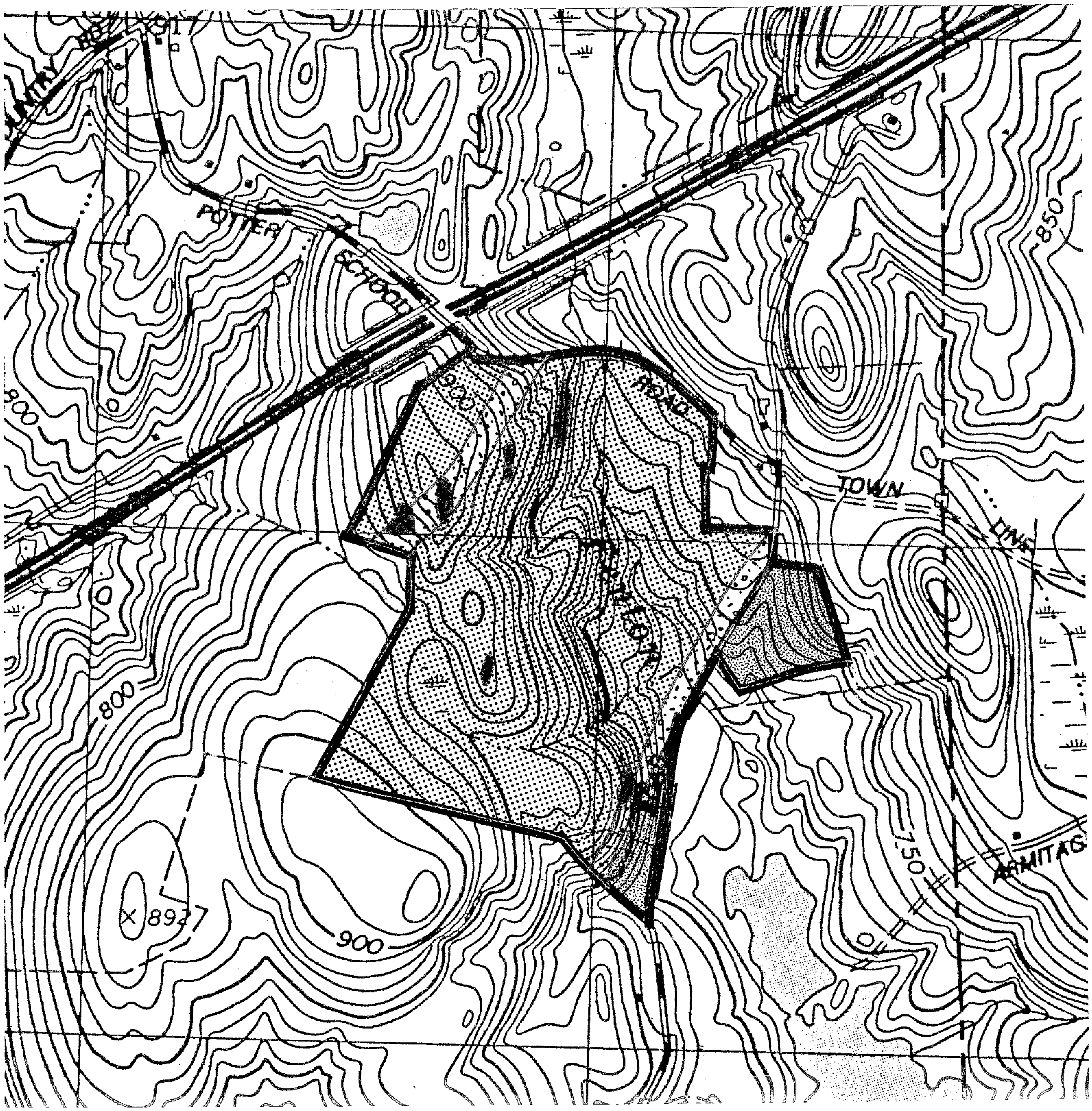
The underlying metamorphic rock serves as the source of water to many homes in Willington. Present plans indicate that the proposed subdivision will rely on individual wells that tap the underlying bedrock. *

Regionally, the site is located in an area of faulted rock. Several fault zones have been mapped on or in close proximity to the site. In general, they are aligned with the Fenton River, the pond/wetland system in the southeast corner of the site, and I-84. Because of the site's close proximity to the fault zone, it is expected that the upper few hundred feet of the bedrock surface is fractured and probably weathered. The faults discussed in the preceding sentences are structural features that formed during the geologic past (mountain building periods) and are no longer believed to be experiencing active movement.*

Except for a small area of sand and gravel deposits along Balazs Road at the southern limits, the site is covered by a glacial deposit known as "till".

The till consists of materials that were deposited directly from glacier ice with much re-working by meltwater. These materials are made up of varying proportions of sand, silt, gravel, clay and boulders. Particles of different sizes are generally mixed together in a complex fashion. Based on soils mapping data the texture of the till on the parcel ranges from sandy, stony and loose to moderately loose in the eastern parts to a siltier, more compact variety in the western half of the site. The exact thickness of the till on the site is unknown but it probably does not exceed much more than 10 feet in most places.

The sand and gravel deposits in the southern limits were laid down by glacial melt water streams. These deposits are probably 10 feet thick or less.*



BEDROCK GEOLOGY

Gneisses and Schists*

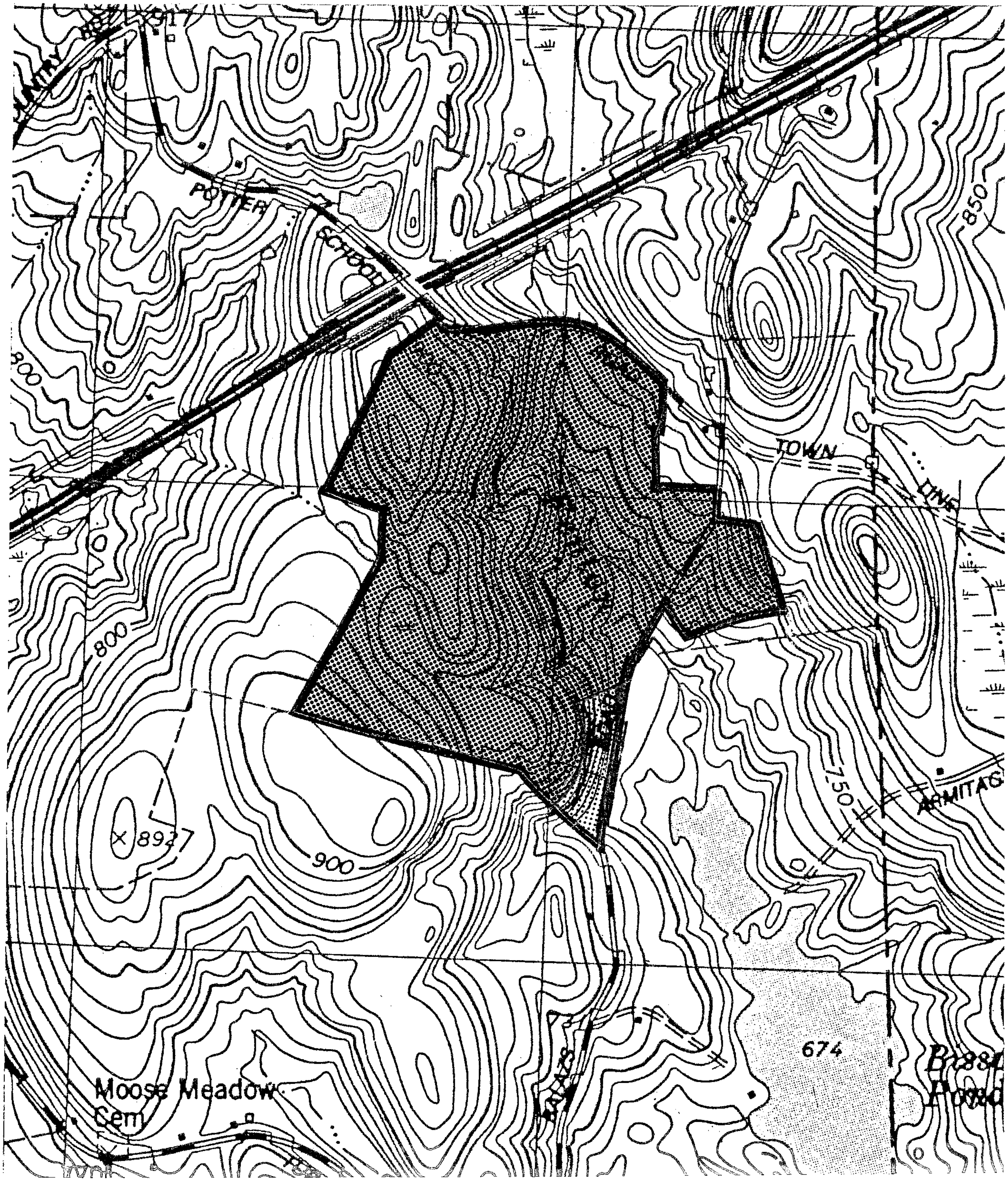
Gneisses*

Gneisses*

Areas where bedrock is at or near the ground surface

*All rock types underlying the site comprise the Middle Schist member of the Hamilton Reservoir Formation. In general they consist of chiefly rusty-weathering semi-pelitic and pelitic schist. The term pelitic in the preceding sentence refers to a rock derived from fine-grained sediments, i.e., deep ocean sediments.

Scale 1" = 1000'



SURFICIAL GEOLOGY

Till

Stratified Drift

Scale 1" = 1000'

Wetland soils on the site have been flagged by a certified soil scientist and their boundaries superimposed on the subdivision plan. The principal wetland areas on the site parallel the Fenton River and two unnamed streamcourses that flow to the River. A narrow wetland area, which is associated with a small streamcourse, bisects the proposed open space land.

Based on the subdivision plan distributed to Team members on the review day, several road crossings of the wetlands are proposed. It is estimated that a total of 280 feet of wetlands will need to be crossed. This does not take into account potential driveway wetlands crossings. It seems likely that several driveways will need to cross wetlands, especially in future sections. There appears to be some flexibility for the realignment of Fenton Bluffs Drive (near lots 13 & 14 and 58 & 59), which would result in less of an impact on the wetlands in that area. Consideration should be given to alternate routes which would have the least impact on regulated wetland areas.

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*"Geologic Map of the Westford Quadrangle, Connecticut", J. D. Poper and M.H. Pease, U.S. Geological Survey, GQ-1214.

4. SOILS

The information contained in the Soil Survey of Tolland County, CT appears to be adequate for planning purposes. Basic interpretive information for the following map units is included in this section. If the Commission requires additional information it is suggested that the applicant retain the services of a certified soil scientist to review the information in the soil survey of Tolland County, CT, examine conditions in the field and provide the Commission with a verified map and more detailed interpretive information for the site. Map units within the site boundaries are: CaB, ChB, CrC, CrD, HrC, JaC, Le, Lg, PbC, PbD, PeC, Pk, and SxB.

Soils Descriptions:

CaB - Canton and Charlton soils, 3 to 8 percent slopes

This unit consists of gently sloping, deep well drained soils on ridges, hills, and side slopes of glacial till uplands. The areas are mostly rectangular or irregular in shape. Slopes are generally smooth and convex and 200 to 400 feet long. About 45 percent of this unit is Canton soils, 40 percent is Charlton soils, and 15 percent is other soils. Some areas of this unit consist almost entirely of Canton soils, some almost entirely of Charlton soils, and some of both. The soils were mapped together because they have no significant differences in use and management.

Typically, the Canton soils have a surface layer of very dark grayish brown fine sandy loam 2 inches thick. The subsoil is yellowish brown fine sandy loam, gravelly fine sandy loam, and gravelly loamy sand to a depth of 60 inches or more.

Typically, the Charlton soils have a surface layer of dark yellowish brown fine sandy loam 5 inches thick. The subsoil is yellowish brown fine sandy loam and sandy loam 20 inches thick. The substratum is light yellowish brown and light brownish gray sandy loam to a depth of 60 inches or more.

Included with these soils in mapping are small areas of somewhat excessively drained Gloucester and Hollis soils, well drained Paxton soils, and moderately well drained Sutton soils. Also included are a few large, nearly level areas and a few areas that have a compact substratum at a depth of 40 to 50 inches.

The water table in these Canton and Charlton soils is commonly at a depth of more than 6 feet. 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 moderately rapid. Both soils have medium to rapid runoff, have moderate available water capacity.

Instability of some excavations in the Canton soils is the main limitation of these soils for community development.

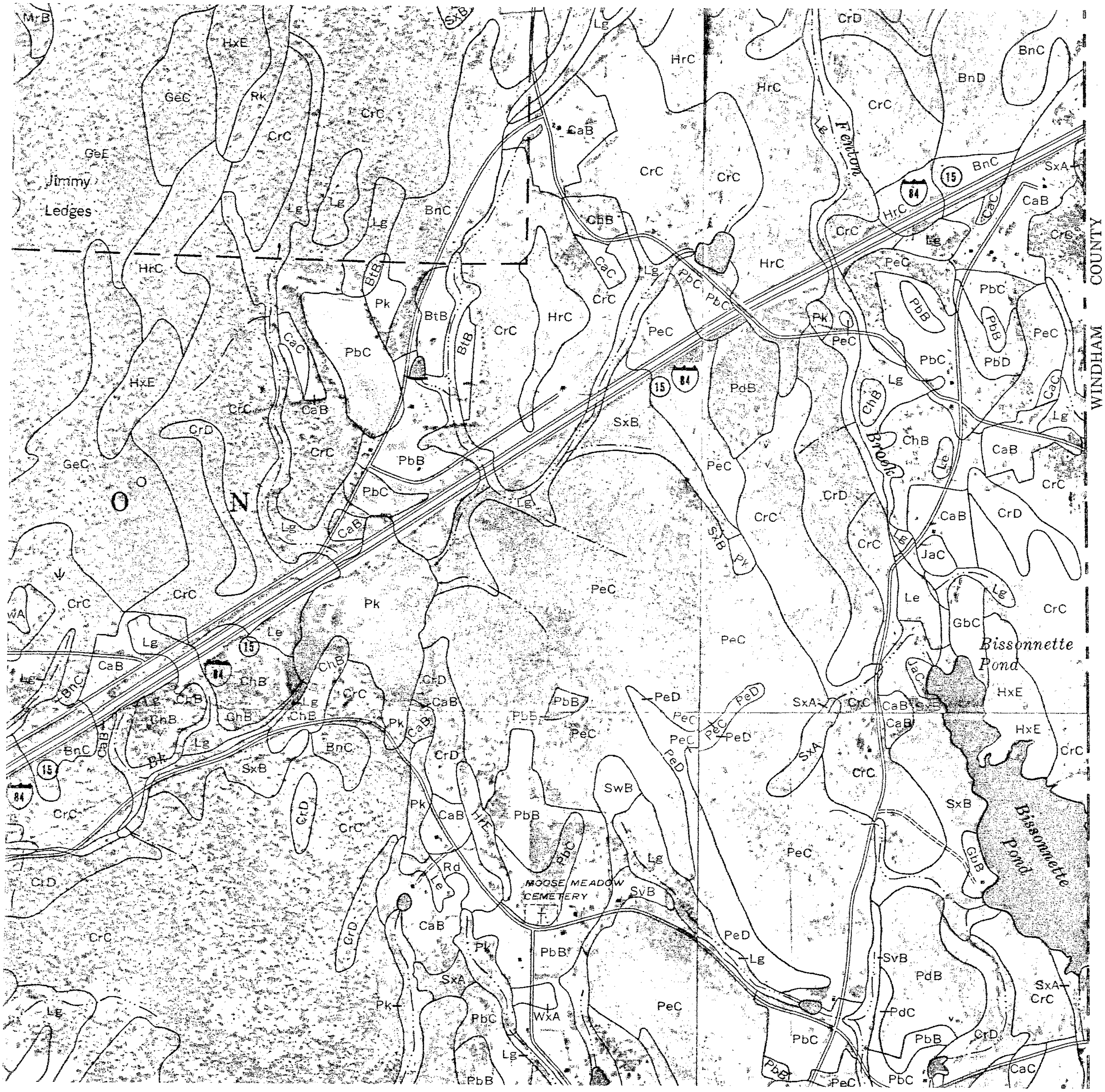
United States Department of Agriculture

Soil Conservation Service

SOILS

Tolland County USDA-SCS
24 Hyde Avenue
Rockville, CT 06066
875-3881

Scale 1" = 1320'



The Soil Conservation Service is an agency of the Department of Agriculture

ChB - Canton and Charlton soils, 3 to 8 percent slopes, very stony

This mapping unit consists of gently sloping well drained soils on ridges, hills, and side slopes of glacial till uplands. The areas are mostly rectangular or irregular in shape. Slopes are generally smooth and convex and less than 200 feet long. About 45 percent of this unit is Canton soils, 40 percent is Charlton soils, and 15 percent is other soils. In some areas, this unit will consist almost entirely of Canton soils or almost entirely of Charlton soils. The soils were mapped together because they have no significant differences in use and management. Stones cover 1 to 8 percent of the soil surface.

Typically, the Canton soils have a surface layer of very dark grayish brown fine sandy loam 2 inches thick. The subsoil is grayish brown fine sandy loam, gravelly fine sandy loam and gravelly sandy loam 21 inches thick. The substratus is pale brown gravelly loamy sand to a depth of 60 inches or more.

Typically, the Charlton soils have a surface layer of dark yellowish brown fine sandy loam 5 inches thick. The subsoil is yellowish brown fine sandy loam and sandy loam 20 inches thick. The substratum is light yellowish brown and light brownish gray sandy loam to a depth of 60 inches or more.

Included with these soils in mapping are small areas of somewhat excessively drained Gloucester and Hollis soils; well drained Paxton soils; and moderately well drained Sutton soils. Also included are a few areas that have a compact substratum at a depth of 40 to 50 inches.

The water table in these soils is commonly at a depth of more than six feet. 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. Both soils have medium to rapid runoff, and have moderate available water capacity.

Instability of some excavations in the Canton soils is the main limitation for community development.

CrC - Canton and Charlton soils, 3 to 15 percent slopes, extremely stony

This mapping unit consists of gently sloping to sloping, well drained soils on ridges, hills, and side slopes of glacial till uplands. The areas are oval or irregular in shape. 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 this unit is Canton soils, 40 percent is Charlton soils, and 15 percent is other soils. Some areas of this unit consist almost entirely of Canton soils, some almost entirely of Charlton soils, and some of both. The soils were mapped together because they have no significant differences in use and management.

Typically, the Canton soils have a surface layer of very dark grayish brown fine sandy loam 2 inches thick. The subsoil is yellowish brown fine sandy loam, gravelly fine sandy loam, and gravelly sandy loam 21 inches thick. The substratum is pale brown gravelly loamy sand to a depth of 60 inches or more.

Typically, the Charlton soils have a surface layer of dark yellowish brown fine sandy loam 5 inches thick. The subsoil is yellowish brown fine sandy loam and sandy loam 20 inches thick. The substratum is light yellowish brown and light brownish gray sandy loam to a depth of 60 inches or more.

Included with these soils in mapping are small areas of somewhat excessively drained Gloucester and Hollis soils, well drained Paxton soils, and moderately well drained Sutton soils. Also included are a few nearly level areas and a few areas that have a compact substratum at a depth of 40 to 50 inches.

The water table in these Canton and Charlton soils is commonly at a depth of more than 6 feet. 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 moderately rapid. Both soils have moderate available water capacity and medium to rapid runoff.

Slope is the main limitation of these soils for community development, especially for onsite septic systems. Slopes of excavations in these soils are unstable. The stones on the surface hinder landscaping.

CrD - Canton and Charlton soils, 15 to 35 percent slopes, extremely stony

This mapping unit consists of moderately steep to steep, well drained soils on ridges, hills, and side slopes of glacial till uplands. The areas are mostly long and narrow. Slopes are smooth and convex and are mainly less than 200 feet long. Stones cover 8 to 25 percent of the surface. About 45 percent of this unit is Canton soils, 40 percent is Charlton soils, and 15 percent is other soils. Some areas consist almost entirely of Canton soils, some almost entirely of Charlton soils, and some of both. The soils were mapped together because they have no significant differences in use and management.

Typically, the Canton soils have a surface layer of very dark grayish brown fine sandy loam 2 inches thick. The subsoil is yellowish brown fine sandy loam, gravelly fine sandy loam, and gravelly sandy loam 21 inches thick. The substratum is pale brown gravelly loamy sand to a depth of 60 inches or more.

Typically, the Charlton soils have a surface layer of dark yellowish brown fine sandy loam 5 inches thick. The subsoil is yellowish brown fine sandy loam 20 inches thick. The substratum is light yellowish brown and light brownish gray sandy loam to a depth of 60 inches.

Included with these soils in mapping are small areas of somewhat excessively drained Gloucester and Hollis soils and well drained Paxton soils. Also included are a few large areas where stones cover less than 8 percent of the surface and areas with a compact substratum at a depth of 40 to 50 inches.

The water table in these Canton and Charlton soils is commonly at a depth of more than 6 feet. 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. Both soils have moderate available water capacity and rapid runoff.

Slope limits the soils of this unit for community development, especially for onsite septic systems. Slopes of excavations in the soils are unstable and the stones on the surface hinder landscaping.

HrC - Charlton-Hollis complex, 3 to 15 percent slopes, very rocky

This complex consists of gently sloping to sloping, somewhat excessively drained and well drained soils on hills and ridges of glacial till uplands. The areas of this unit are mostly irregular in shape. Slopes are mostly complex and are 100 to 200 feet long. Stones cover 1 to 8 percent of the surface.

This unit is about 55 percent Charlton soils, 20 percent Hollis soils, 15 percent other soils, and 10 percent exposed bedrock. The Charlton and Hollis soils are in such a complex pattern that it was not practical to map them separately.

Typically, the Charlton soils have a thick, fine sandy loam topsoil and subsoil over a sandy loam substratum. The soils are commonly deeper than 60 inches.

The Hollis soils have fine sandy loam topsoil and subsoil from 10 to 20 inches thick over hard, unweathered schist bedrock.

Included with these soils in mapping are small areas of well drained Canton and Paxton soils; moderately well drained Sutton and Woodbridge soils; and poorly drained Leicester soils. Also included are small areas with bedrock at a depth of 20 to 40 inches.

The water table of these soils is commonly at a depth of more than 6 feet. The available water capacity is moderate in the Charlton soils and very low or low in the Hollis soils. Both soils have moderate or moderately rapid permeability and medium to rapid runoff.

The areas of exposed rock and the depth to bedrock in the Hollis soils limit the use of these areas for community development, especially as a building site or as a site for onsite septic systems. The stones on the surface restrict landscaping.

JaC - Hinckley gravelly sandy loam, 3 to 15 percent slopes

This is a gently sloping to sloping , excessively drained soil on terraces of stream valleys and on glacial outwash plains. The areas of this soil are oval or irregular in shape. Slopes are convex or undulating and are mostly less than 200 feet long.

Typically the surface layer is very dark grayish brown gravelly sandy loam 2 inches thick. The subsoil is dark yellowish brown, yellowish brown, and brownish yellow gravelly sandy loam and gravelly loamy sand 16 inches thick. The substratum is pale yellow gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of excessively drained Windsor soils, somewhat excessively drained Merrimac soils, well drained Agawam soils and moderately well drained Sudbury soils.

The water table in this Hinckley soil is commonly below a depth of 6 feet. The available water capacity is low. Runoff is rapid. This soil has rapid permeability in the surface layer and subsoil and very rapid permeability in the substratum.

This soil is generally suited to community development, but the rapid permeability imposes a hazard of groundwater pollution in areas used for septic tanks. The slopes in some excavated areas are unstable.

Le - Ridgebury, Leicester and Whitman soils, extremely stony

This mapping unit consists of nearly level, poorly drained and very poorly drained soils in depressions and drainageways of glacial till uplands. The areas are mostly long and narrow or irregular in shape. Slopes range from 0 to 3 percent and are mainly 100 to 300 feet long. Stones cover 8 to 25 percent of the surface. About 40 percent of this unit are Ridgebury soils, 25 percent are Leicester soils, 15 percent are Whitman soils and 10 percent are other soils. Some areas of this unit will consist of one these soils and other areas will consist of two or three. The soils of this unit were mapped together because they have no significant differences in use or management.

The Ridgebury soils have a seasonal high water table at a depth of about 10 inches from fall through spring. The permeability of the soils is moderate to moderately rapid in the surface layer and the subsoil and slow to very slow in the substratum. Runoff is slow The Ridgebury soils have a moderate available water capacity.

The Leicester soils have a seasonal high water table at a depth of about 10 inches from fall through spring. The permeability of the soils is moderate or moderately rapid throughout. Runoff is slow. The Leicester soils have a moderate available water capacity.

The Whitman soils have a seasonal high water table at or near the surface from fall through spring. The permeability of the soils is moderate or moderately rapid in the surface layer and subsoil and very slow in the substratum. Runoff is slow. The Whitman soils have a moderate available water capacity.

The high water table and slow to very slow permeability are major limitations of the soils of these areas for community development. Steep slopes of excavations in these soils slump when saturated. The stones on the surface restrict landscaping and lawn areas are soggy most of the year.

Lg - Ridgebury, Leicester and Whitman soils, extremely stony

This mapping unit consists of nearly level, poorly drained and very poorly drained soils in depressions and drainageways of glacial till uplands. The areas are mostly long and narrow or irregular in shape. Slopes range from 0 to 3 percent and are mainly 100 to 300 feet long. Stones cover 8 to 25 percent of the surface. About 40 percent of this unit are Ridgebury soils, 25 percent are Leicester soils, 15 percent are Whitman soils and 10 percent are other soils. Some areas of this unit will consist of one these soils and other areas will consist of two or three. The soils of this unit were mapped together because they have no significant differences in use or management.

The Ridgebury soils have a seasonal high water table at a depth of about 10 inches from fall through spring. The permeability of the soils is moderate to moderately rapid in the surface layer and the subsoil and slow to very slow in the substratum. Runoff is slow The Ridgebury soils have a moderate available water capacity.

The Leicester soils have a seasonal high water table at a depth of about 10 inches from fall through spring. The permeability of the soils is moderate or moderately rapid throughout. Runoff is slow. The Leicester soils have a moderate available water capacity.

The Whitman soils have a seasonal high water table at or near the surface from fall through spring. The permeability of the soils is moderate or moderately rapid in the surface layer and subsoil and very slow in the substratum. Runoff is slow. The Whitman soils have a moderate available water capacity.

The high water table and slow to very slow permeability are major limitations of the soils of these areas for community development. Steep slopes of excavations in these soils slump when saturated. The stones on the surface restrict landscaping and lawn areas are soggy most of the year.

PbC - Paxton and Montauk soils, 8 to 15 percent slopes

These sloping, well drained soils are on drumloidal, glacial till, upland landforms.

This mapping unit is about 45 percent Paxton soil, 40 percent Montauk soil, and 15 percent other soils. Mapped areas consist of Paxton soil or Montauk soil, or both. These soils were mapped together because there are no major differences in use and management.

Typically, the Paxton soil has a very dark grayish brown, fine sandy loam surface layer 8 inches thick. The subsoil is dark yellowish brown, and light olive fine sandy loam to a depth of 60 inches or more.

Typically, the Montauk soil has a very dark grayish brown, fine sandy loam surface layer 7 inches thick. The subsoil is dark yellowish brown fine sandy loam and yellowish brown sandy loam 16 inches thick. The substratum is brown loamy sand and firm, very firm, and brittle, grayish brown loamy sand to a depth of 60 inches or more.

Included with these soils in mapping are small areas of well drained Broadbrook, Canton, and Charlton soils; moderately well drained Woodbridge soils; and poorly drained Ridgebury soils.

Permeability of the Paxton soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. The available water capacity is moderate. Runoff is rapid. Paxton soil warms up and dries out rapidly in the spring.

Permeability of the Montauk soil is moderate or moderately rapid in the surface layer and subsoil and slow or moderately slow in the substratum. The available water capacity is moderate. Runoff is rapid. Montauk soil warms up and dries out rapidly in the spring.

The major limiting factor for community development is the very slow, slow, and moderately slow permeability in the substratum. Onsite septic systems need careful design and installtion to prevent effluent from seeping to the surface in areas downslope from the leaching system. Quickly establishing a plant cover and using mulch and netting, temporary diversions, and sediment basins help to control erosion during construction.

PdB - Paxton and Montauk soils, 3 to 8 percent slopes, very stony

These gently sloping, well drained soils are on drumloidal, glacial till, upland landforms. Stones and boulders cover 1 to 8 percent of the surface.

This mapping unit is about 45 percent Paxton soil, 40 percent Montauk soil, and 15 percent other soils. Mapped areas consist of Paxton soil or Montauk soil, or both. These soils were mapped together because there are no major differences in use and management.

Typically, the Paxton soil has a very dark grayish brown, fine sandy loam surface layer 3 inches thick. The subsoil is dark yellowish brown, yellowish brown, and light olive brown fine sandy loam 24 inches thick. The substratum is firm, very firm, and brittle, olive brown fine sandy loam to a depth of 60 inches or more.

Typically, the Montauk soil has a very dark grayish brown, fine sandy loam surface layer 3 inches thick. The subsoil is dark yellowish brown fine sandy loam and yellowish brown sandy loam 20 inches thick. The substratum is brown loamy sand and firm, very firm, and brittle, grayish brown loamy sand to a depth of 60 inches or more.

Included with these soils in mapping are small areas of well drained Broadbrook, Canton, and Charlton soils; moderately well drained Woodbridge soils; and poorly drained Ridgebury soils.

Permeability of the Paxton soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. The available water capacity is moderate. Runoff is medium. Paxton soil warms up and dries out rapidly in the spring.

Permeability of the Montauk soil is moderate or moderately rapid in the surface layer and subsoil and slow or moderately slow in the substratum. The available water capacity is moderate. Runoff is medium. Montauk soil warms up and dries out rapidly in the spring.

The major limiting factor for community development is very slow, slow, and moderately slow permeability in the substratum. Onsite septic systems need careful design and installation to prevent effluent from seeping to the surface in areas downslope from the leaching system. Stones and boulders need to be removed for landscaping. Quickly establishing a plant cover and using mulch, temporary diversions, and sediment basins help to control erosion during construction.

PeC - Paxton and Montauk soils, 3 to 15 percent slopes, extremely stony

These gently sloping to sloping, well drained soils are on drumloidal, glacial till, upland landforms. Stones and boulders cover 8 to 25 percent of the surface.

This mapping unit is about 45 percent Paxton soil, 40 percent Montauk soil, and 15 percent other soils. Mapped areas are composed of Paxton soil or Montauk soil, or both. These soils were mapped together because there are no major differences in use and management.

Typically, the Paxton soil has a very dark grayish brown, fine sandy loam surface layer 3 inches thick. The subsoil is dark yellowish brown, yellowish brown, and light olive brown fine sandy loam, 24 inches thick. The substratum is firm, very firm, and brittle, olive brown fine sandy loam to a depth of 60 inches or more.

Typically, the Montauk soil has a very dark grayish brown, fine sandy loam surface layer 3 inches thick. The subsoil is dark yellowish brown fine sandy loam and yellowish brown sandy loam 20 inches thick. The substratum is brown loamy sand and firm, very firm, and brittle, grayish brown loam sand to a depth of 60 inches or more.

Included with these soils in mapping are small areas of well drained Broadbrook, Canton, and Charlton soils; moderately well drained Woodbridge soils; and poorly drained Ridgebury soils.

Permeability of the Paxton soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. The available water capacity is moderate. Runoff is medium or rapid. Paxton soil warms up and dries out rapidly in the spring.

Permeability of the Montauk soil is moderate or moderately rapid in the surface layer and subsoil and slow or moderately slow in the substratum. The available water capacity is moderate. Runoff is medium to rapid. Montauk soil warms up and dries out rapidly in the spring.

The major limiting factor for community development is the very slow, slow, and moderately slow permeability in the substratum. Onsite septic systems need careful design and installation to prevent effluent from seeping to the surface in areas downslope from the leaching system. Stones and boulders need to be removed for landscaping. Quickly establishing a plant cover and using mulch netting, temporary diversions and sediment basins help to control erosion during construction.

Pk - Carlisle muck

This soil is nearly level to level and very poorly drained. It is in low depressions on outwash terraces and glacial till plains. Areas of this soil are mostly oval in shape. Slopes range from 0 to 2 percent but are mostly less than 1 percent.

Typicaly, this soil is black, very dark brown, and dark reddish brown muck to a depth of 60 inches or more.

Included with this soil in mapping are small areas of very poorly drained Adrian, Palms, Saco, Scarboro, and Whitman soils. A few small areas have a thin mineral layer on the surface. Included areas make up about 25 percent of the unit.

The water table of this Carlisle soil is at or near the surface during most of the year. The available water capacity is high. Permeability is moderatley rapid. Runoff is very slow, and water is on the surface of some areas from autumn to spring and after heavy rains.

Most areas of this soil are wooded or are covered by marshgrasses and sedges. Most areas do not have adequate drainage outlets. Although this soil supports red maple, ash, and alder, it is poorly suited to woodland production. The organic material will not support heavy equipment, and uprooting is common during windy periods.

The high water table and the low strength of the organic material make this soil generally unsuitable for community development.

SxB - Sutton fine sandy loam, 2 to 15 percent slopes, extremely stony

This nearly level to gently sloping, moderately well drained soil is on upland glacial till plains, hills, and ridges. Stones and boulders cover 8 to 25 percent of the surface. Areas are dominantly irregular in shape.

Typically, this Sutton soil has a very dark grayish brown, fine sandy loam surface layer 4 inches thick. The subsoil is yellowish brown, dark yellowish brown, and dark brown, mottled fine sandy loam and sandy loam 29 inches thick. The substratum is olive brown, mottled sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well drained Canton and Charlton soils; moderately well drained Woodbridge soils; and poorly drained Leicester soils. Indluded areas make up about 10 percent of this map unit.

The Sutton soil has a seasonal high water table at a depth of about 18 inches. Permeability is moderate or moderately rapid. The available water capacity is moderate. Runoff is slow or medium. Sutton soil warms up and dries out slowly in the spring.

The major limiting factor for community development is the seasonal high water table. Onsite septic systems need special design and installation to prevent effluent from seeping to the surface. Foundation drains help to prevent wet basements. Stones and boulders need to be removed for landscaping. Quickly establishing a plant cover and using mulch, temporary diversions, and sediment basins help to control erosion during construction.

5. HYDROLOGY

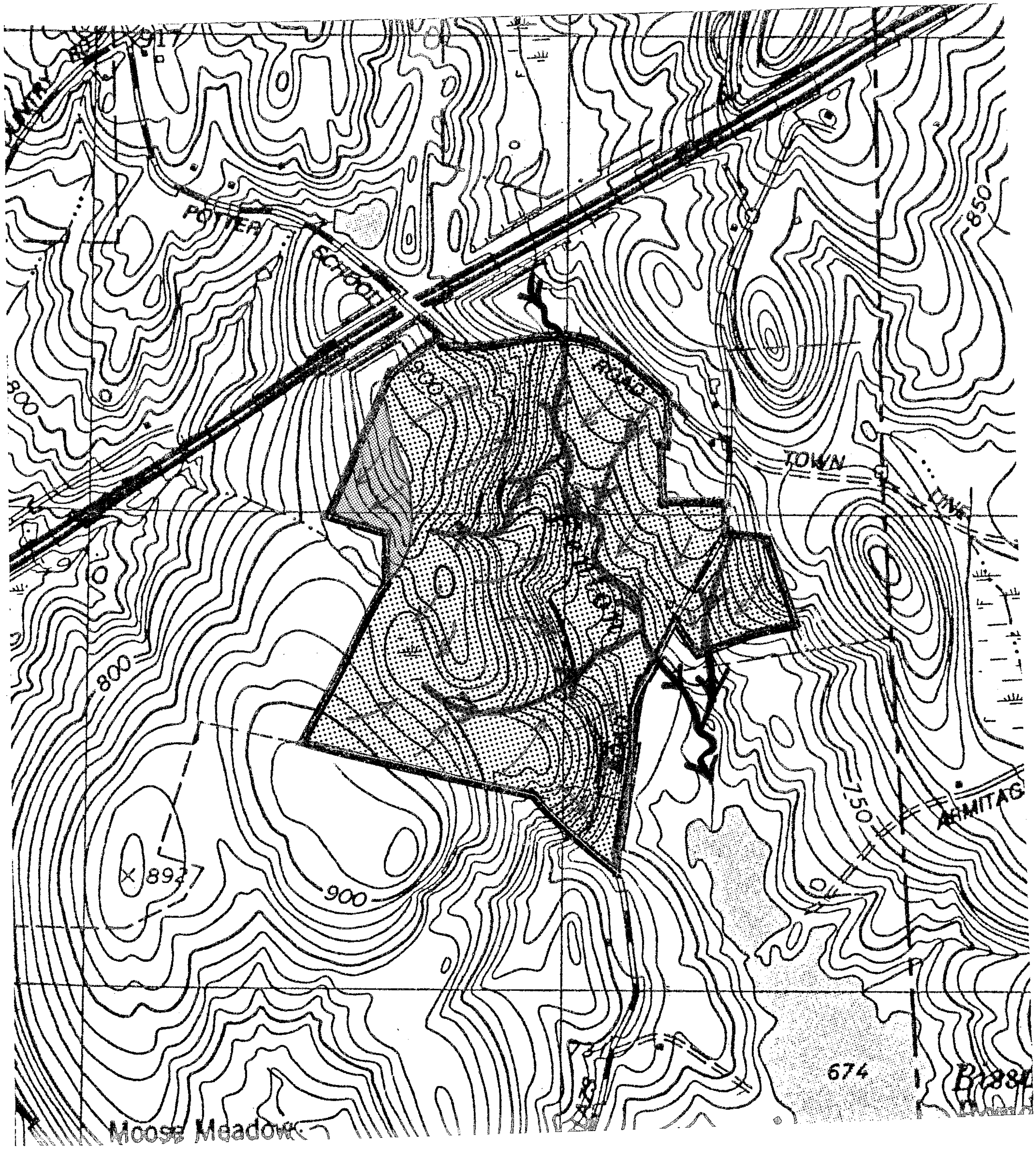
Except for far western limits of Lots 49-51, the site lies within the Fenton River drainage area. This includes the ±10 acre piece on the east side of Balazs Road. The unnamed streamcourse that bisects the parcel is tributary to Fenton River. Another unnamed tributary to Fenton River on the property is the outlet stream for the two ponds at the southern limits. The Fenton River flows into Bissonnette Pond just under one half mile from the site. Surface and groundwater on the far western limits of Lots 49-51 ultimately drains to Ruby Brook.

The surface water quality of streamcourses on the site are classified by DEP as A. This means the surface water may be suitable for drinking water supply; may be suitable for all other water uses including bathing; character uniformly excellent and may be subject to absolute restrictions on the discharge of pollutants.

Development of the site for residential use under the proposed density would be expected to lead to increases in the amount of runoff shed from the site. The amount of increases will depend upon the extent of development, the impervious surfaces created, and the amount of vegetation removed or preserved. The two major concerns with increased runoff are the potential for flooding to downstream areas and streambank erosion. Team members received drainage calculations only for Fenton Bluffs III. In order to properly determine the effects of stormwater to downstream areas, runoff calculations and drainage plans should be submitted for the entire subdivision. The calculation, an assessment of downstream effects and plans for control of stormwater, should be developed and submitted for review by Town Officials. Calculations should be developed using the appropriate method selected from Chapter 9 of the **Connecticut Guidelines For Soil Erosion and Sediment Control, 1985**. In addition, designs for sediment basins and stormwater detention basins should also follow the criteria and standards found in the Guidelines. Close examination of all culverts passing under Potter Hill Road is warranted.

It seems likely that road drainage will be artificially collected in catch basins and discharged near wetland areas on the site. The applicant should develop a plunge pool designed for stormwater pipe outlets and show them on the subdivision plan. It is suggested that the plunge pools not be located in the regulated wetland areas.

Another concern with increased runoff is the potential for streambank erosion and gulleying. In view of the moderately steep slopes,



WATERSHED BOUNDARY

Surface and ground water that flows to Ruby Brook

Surface and ground water that flows to Fenton River watershed

Watercourses showing direction of flow

Surface runoff showing direction of flow

Scale 1" = 1000'

silty soils and downstream surface water bodies, the potential for erosion related problems is expected to be high, especially if a comprehensive erosion and sediment control plan is not developed for the subdivision. Every effort should be made to protect these surface water bodies. This will be accomplished best by proper enforcement of the erosion and sediment control plan by Town officials or a designated agent.

In order to protect the quality of water in drainageways on the site and receiving surface water bodies downstream, consideration should be given to the installation of a temporary sediment pool(s) during construction phases. If a sediment pool is constructed, it should be located on upland soils rather than wetland soils. This will help to minimize wetland disturbances. If the primary purpose of detention basins is to minimize erosion and sedimentation, the peak discharge from a 2-year and lO-year frequency, 24 hour duration, Type III distribution storm should be analyzed. Since the site is located within a public water supply watershed, all applicable parts of Section 19-13-B32. Sanitation of watersheds must be complied with. The design of storm water drainage facilities shall be such as to minimize soil erosion and maximize absorption of pollutants by the soil. A copy of Sec. 19-13-B32 is shown below.

19.13.B32. Sanitation of watersheds.

Unless specifically limited, the following regulations apply to land and watercourses tributary to a public water supply in both surface and groundwater sources.

(a) As used in this section,"sewage" shall have the meaning found in section 19-1S-H20(a) of the public health code: "Toxic metals" shall be arsenic, barium, cadmium, chromium, lead mercury and silver and the salts thereof;"high water mark" shall be the upper limit of any land area which water may cover, either standing or flowing, at any time during the year and "watershed" shall mean land which drains by natural or man-made causes to a public drinking water supply intake.

(b) No sewage disposal system,cesspool, privy or other place for the deposit or storage of sewage shall be located within one hundred feet of the high water mark of any reservoir or within fifty feet of the high water mark of any stream, brook, or watercourse, flowing into any reservoir used for drinking purposes.

(c) No sewage disposal system, cesspool, privy or other place for the deposit or storage of sewage shall be located on any watershed, unless such facility is so constructed that no portion of the contents can escape or be washed into the stream or reservoir.

(d) No sewage shall be discharged on the surface of the ground on any watershed.

(e) No stable, pigpen, chicken house or other structure where the excrement of animals or fowls is allowed to accumulate shall be located within one hundred feet of the high water mark of a reservoir or within fifty feet of the high water mark of any watercourse as above mentioned, and no such structure shall be located on any watershed unless provision is made in a manner acceptable to the commissioner of health services for preventing manure or other polluting materials from flowing or being washed into such waters.

(f) No toxic metals, gasoline, oil or any pesticide shall be disposed of as a waste into any watercourse tributary to a public drinking water supply or to any ground water identified as supplying a public water supply well.

(g.) Where fertilizer is identified as a significant contributing factor to nitrate nitrogen occurring in excess of 8 mg./l in a public water supply, fertilizer application shall be made only under current guidelines established by the commissioner of health in cooperation with the state commissioner of agriculture, the college of agriculture of the University of Connecticut and the Connecticut agricultural experiment station in order to prevent exceeding. the maximum allowable limit in public drinking water of 10.0 mg/l for nitrite plus nitrate nitrogen.

(h) Where sodium, occur in excess of 15 mg/l in a public drinking water supply, no sodium chloride shall be used for maintenance of roads, driveways, or parking areas draining to that water supply except under application rates approved by the commissioner of health, designed to prevent the sodium content of the public drinking water from exceeding 2 mg./l.

(i) The design of storm water drainage facilities shall be such as to minimize soil erosion and maximize absorption of pollutants by the soil. Storm water drain pipes, except for crossing culverts, shall terminate at least one hundred feet from the edge of an established watercourse unless such termination is impractical, the discharge arrangement is so constructed as to dissipate the flow energy in a way that will minimize the possibility of soil erosion, and the commissioner of health finds that a discharge at a lesser distance is advantageous to stream quality. Special precautions shall be taken to protect stream quality during construction.

6. WETLAND BOUNDARY INFORMATION

A plan map with the field delineated wetland boundaries and station numbers shown was reviewed. Because many of the boundary flags were missing it was not possible to verify this information. It is suggested that the soil scientist who performed the field work review and sign a statement on the map(s) certifying that the information is substantially correct. The certification statement should be similar to the following:

> "The wetland soils on this site were identified in the field using the criteria required by Connecticut P.A. 72-155 as amended by Connecticut P.A. 73-571, Connecticut P.A. 87-338, and P.A. 87-533. The boundaries of these soils and of identified watercourses are accurately represented on the plot plan."

If this procedure is followed and discrepancies are found, the Tolland County Soil and Water Conservation District can on request review the submitted information for adequacy.

7. EROSION AND SEDIMENT CONTROL PLAN

A detailed soil erosion and sediment control plan should be developed and implemented for this site. The plan should be developed using the criteria contained in the Connecticut Guidelines for Soil Erosion and Sediment Control (1985). The Tolland County Soil and Water Conservation District would appreciate the opportunity to review this plan prior to final approval. The plans reviewed to date cannot be considered adequate.

8. ENGINEERING AND OTHER RELATED CONCERNS

1. The hydrologic calculations for section II and section III have been reviewed by Gerald Lang, Hydraulic Engineer-SCS, and a copy of his reports follow at the end of this section. His main concern is that the hydrologic analysis looked at separate small areas (phases or sections) which were analyzed ***separately*** for their impact on the watershed. His suggestion is to include all proposed development areas (phases or section) ***together*** as one subarea of the watershed and compare (no development) against future (developed) conditions. The curve number procedure that was used showed an insignificant impact when comparing a 30 acre development (section II or III) to the 600 acre watershed (Fenton Brook), however, the impacts become more significant when comparing a 100+ acre development (sections I, II, III, and IV ***combined***) to the same 600 acre watershed. The analysis presented to the Commission should illustrate this ***combined*** effect.

2. A biological resource analysis should be prepared to inventory and evaluate biological resources present on the ***interior sections*** of the proposed subdivision.

3. Erosion control blankets are recommended for all slopes 3:1 or steeper, especially along the cut for the Fenton Bluffs Drive and Potter School Road junction, and along severe cuts and fills along Fenton Bluffs Drive adjacent to Fenton Brook.

4. Protection of Fenton Brook is necessary not only during the construction of the project, but also after construction. Conservation easements, open space protection or streambelt protection should be in place prior to approval of the protection.

5. Adequate outlet protection is necessary on the outlets that discharge onto Lots 35 and 56 and lots 29 and 30. The Q's and V's for 2, 10 and 25 year storms should be calculated for the steep areas below the discharge points. The velocities calculated should be compared to the maximum permissible velocities for the soils in the area and appropriate control measures taken.

6. The present erosion and sediment control measures that are in place on section I of the subdivision appear to be inadequate due to improper installation techniques, such as silt fence placed up and down the hill and not on the contour.

7. A typical paved driveway cross section should be included on the plan.

8. The proposed driveway for Lot 42 appears to be planned for the top of the pond dike (Lots 43,44, and 45). A principle spillway could not be found, runoff was overtopping a portion of the dike and the dike does not appear to be constructed in a manner that can be considered safe. Boulders were used in the fill material and leakage (piping) was evident on the day of inspection. The recommendation to the Town is to contact the Dam Safety Unit of DEP (566-7244) and request their assistance to inspect the dam and make recommendations concerning the safety and review the proposal to use the dike as a driveway. A second concern is the spoil material which was placed in the wetlands below the dike. This material has not been vegetatively stabilized. A question arises as to whether or not permits were obtained from DEP for this project. The dam, in the opinion of the District Conservationist, represents a serious safety hazard and requires immediate attention.

9. The ultimate ownership of the pond and dam structure is another concern. Who will be the owner and responsible party for the dike? As proposed it appears that the downstream half will be part of Lot 42, and the upstream half part of Lot 43. As Lot 42 contains none of the pond surface, it is doubtful that the owner would have much interest in assuming half of the liability for the structure. It is recommended that the Commission examine this situation and suggest that the developer adjust proposed lot lines so the entire pond and dike are contained on one lot, and possibly dedicate it to the Town as open space. (also see OPEN SPACE TRACT section for additional comments)

Subject: ENG - Fenton Bluffs Development
Hydrologic Review

October 19, 1988

Joe Neafsey
District Conservationist
24 Hyde Avenue
Vernon, Connecticut

File Code: 210-18

I have reviewed the Fenton Bluffs - Section 2 Development Plan submitted by Russel W. Waldo Associates. The following are my comments about the development plan:

1. The concrete box 4 feet high by 16 feet wide designed to carry the Fenton Brook flows under Fenton Bluffs Drive is not properly designed. The low point elevation in the road is approximately 2.5 feet above the inlet invert. This causes the road to become flooded when the peak flow exceeds 190 cfs because of inlet control. The low point in the road would have to be raised an additional 4.0 feet to get 600 cfs through the culvert. I also recommend the culvert be installed in line with the outlet channel to reduce erosive action on the outside curve of the channel. The velocities will be high coming out of the box culvert requiring large sized riprap in the channel below the outlet. Please check if the 25-yr frequency storm is the required maximum to be used for design of the culvert.

2. Your calculations using TR-55 do show no increase in the peak discharge because the development area is a small percent of the total 636 acres of drainage area. However, it would be much better to analyze the runoff conditions using 2 subareas. The upper subarea is controlled by the culvert under I-84 while the lower subarea contains all of the new development. The peak discharges and peak times from these subareas will probably show no total increase in peak runoff, but the methodology will be much better.

3. It is also helpful to show the calculated Tc flow path on the watershed map. The watershed map should also be at a scale of 1" = 1000' or larger with subarea boundaries shown.

4. I did not check the design of the stormwater pipes and catch basins since these design notes were not included in the report.

If you have any additional questions, please contact me.

Gerald J. Lang

Gerald J. Lang
Hydraulic Engineer

cc: William Ireland, SCE, SCS, Storrs, CT

November 29, 1988

Subject: ENG - Fenton Bluffs Development
Hydrology Review

File Code: 210-18

Joe Neafsey
District Conservationist
24 Hyde Avenue
Vernon, Connecticut

I have reviewed the Fenton Bluffs - Section 2 and 3 Development Plan submitted by Russel W. Waldo Associates for the second time. Following are my comments:

1. An introductory summary sheet stating the design and development requirements of the town should be included along with a summary of the hydrologic analysis. The summary should show the pre- and post-development peak discharges for the different frequency storms. If peak discharges increase but no detention basin is required then an explanation is needed.

2. The subarea analysis for the watershed is good. I question how the drainage area for subarea #1 increases in the developed condition when the development takes place in subarea #2. Please check this.

3. The Tc values used in the basin inlet design appear high for the short distances used. Please verify by showing the method used.

4. The 4' x 16' concrete box design will be adequate if the computed 600 cfs capacity is the design requirement.

5. I do not know where Section III is located. It appears they did a complete watershed analysis using the same two subareas used in the analysis of Section II. If several sections are being developed in different phases then the hydrologic analysis should include all proposed development areas together as one subarea, not as separate small areas to be analyzed separately as a small part of the whole large watershed. The curve number procedure will show an insignificant impact when comparing a 30 acre development to a 600 acre watershed. However, the impacts become more significant when comparing a 100 acre development to the 600 acre watershed.

If you have any additional questions, please contact me.

Gerald J. Lang

Gerald J. Lang
Hydraulic Engineer

cc: William Ireland, SCE, SCS, Storrs, CT

DEC 02 1988

9. GEOLOGIC DEVELOPMENT CONCERNS

Present plans indicate that the ±150 acre site would be subdivided into 60 building lots ranging in size from just under 2 acres to probably over 5 acres. The houses will be serviced by individual on-site wells and septic systems. The main access road, Fenton Bluffs Drive, will wind through the site from Balazs Road to Potter Hill Road. A future road is being considered off Fenton Bluffs Drive at the southern limits. It would extend to the property line in the south.

About 10 acres of the site on the east side of Balazs Road will be dedicated as open space.

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

1) Scattered areas throughout the side where bedrock is at or near ground surface (generally 7 feet or less):
2) Areas of moderately steep slopes, which occur mainly in interior sections of the site:
3) The presence of till soils, (mainly the western half), which are characterized by seasonally high water tables and slow percolation rates: and
4) Areas of seasonal or permanent wetness (regulated wetland soils).

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

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

It may be possible to use curtain drains on certain lots to control the seasonally high water tables from interfering with leaching fields.

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

In addition to placing selected fill material, leaching systems serving most lots in the proposed subdivision will need to be relatively large due to the moderately slow to slow percolation rates. They will also need to be spread out along the contours to further lateral disposal into the naturally occurring soil. In cut areas (e.g., roads, driveways) which are prone to high water tables resulting from a restrictive soil zone (hardpan), special care must be taken to ensure that septic systems are not located too close to the embankment. If they are too close, untreated effluent may bleed out along the embankment causing a public health hazard.

In areas where bedrock is 7 feet or less, it is suggested that several deep test holes be excavated on the lots so that an accurate profile of the bedrock surface is determined. Since ground and surface waters within the site ultimately drain to a public water supply watershed (Mansfield Hollow Dam). **Section 1913-B32.** Sanitation of watersheds, Connecticut Public Health Code, should be referenced with respect to the design of subsurface sewage disposal systems, a copy of this section may be found in the HYDROLOGY section of this report.

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

Project plans submitted to Team members indicated that the Fenton Bluffs Road will cross wetlands in four areas. Based on the present configuration of lots, it seems likely that several driveways will also need to cross wetlands.

Wetland and driveway crossings can be feasible provided they are properly designed (e.g., culverts are properly sized and installed and permeable road base fill material is used). The roads should be constructed at least 1.5 feet and preferably 2 feet above the surface elevation of the wetlands. If there is any unstable material, it should be removed. Soil mapping data does not indicate the presence of organic soils. This will allow better drainage of the roads and decrease the frost heaving potential. The best time for road construction through wetland areas is during the dry time of the year with adequate provisions for effective erosion and sediment control. Detailed plans for all road crossing through wetlands should be shown on the subdivision plans and carefully reviewed by Town Officials.

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

10. WATER SUPPLY

The principal source of water to homes in the proposed subdivision is the underlying, crystalline metamorphic bedrock. Obtaining water from any given bedrock is dependent upon the number and size of water transmitting fractures that are encountered by the well. The crystalline, metamorphic rock underlying the site responds to tectonic forces by fracturing, folding and forming distinct open joints. As mentioned earlier, most of the site is underlain primarily by schist rocks. The schistose rock is characterized by an abundance and parallel orientation of platy or flaky (mica) minerals and by the ease of parting into thin layers. They respond to the geologic forces by slipping and folding along foliation or layered planes. As a result, the joint openings that develop in the schists are generally smaller and discontinuous compared to other crystalline rock types, e.i., gneisses that are found on the site. If the underlying rock contains continuous and interconnected fractures and joints, then the availability of groundwater for domestic uses should be good.

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

According to the Connecticut Resources Bulletin No. 11 (Shetucket River Basin) 90 percent of the wells surveyed yielded about 3 gallons per minute or more. Generally speaking, a yield of 2-3 gallons per minute is satisfactory for domestic purposes. A review of well completion reports for homes along Balazs Road revealed yields ranging from 7 gallons per minute to 25 gallons per minute at depths ranging from 130 feet to 225 feet.

In general, private wells should be located to the high side of lots with proper separating distances from on-site sewage disposal systems and other potential sources of pollution, particularly buried fuel storage tanks. Wells must also be properly separated from water impoundments, watercourses and drains and should be protected from surface runoff and erosion problems. Proper well construction and separating distances in accordance with State Public Health Code, Connecticut Well Drilling Board and any town regulations, will allow for adequate protection of the quality of the bedrock aquifer.

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

Groundwater within the site should be of good quality. It is classified by the DEP as GAA. This means that the ground waters are within a public water supply watershed. It is presumed suitable for direct human consumption. In many locations certain rock formations alter the natural quality of water that it comes in contact with. Two of the most common components produced are elevated levels of iron and/or manganese which may affect water quality. There is a good chance that both constituents may occur in the schistose gneissic rock underlying the site. As a result, it may be necessary to install appropriate water treatment systems in order to reduce concentration to nonobjectionable levels.

11. OPEN SPACE TRACT

Approximately 10 acres of the site located on the east side of Balazs Road is proposed for open space. The front half is wooded while the back half is an open farm field. The land slopes moderately to a topographic swale, which bisects the parcel and carries surface drainage to the Fenton River. Regulated wetland soils parallel the drainageway. The drainageway and its accompanying wetlands, and the presence of moderate slopes will be the major hindrance for active recreational development, such as playing fields. Also, there is a possibility for seasonally high water tables which will limit the usefulness of the parcel. Unless the developer or town has definite plans for the proposed open space area, consideration should instead be given to possibly dedicating the land area around the recently excavated pond, located on lots 43-45 as open space land. The pond and surrounding area would be excellent for boating (canoe and row boats), kyacking, cross-county skiing, jogging trails, hiking and picnicking. Under this scenario, water quality in the pond would be protected by a natural buffer rather than potentially threatened by septic system effluent, lawn fertilizers, etc., emanating from lots 43-45. Based on the present lot layout, house and septic systems would have to be very close to the highwater mark of the pond. Also, it is likely that the lawns would extend to the pond.

Present plans indicate that lots 43-45 would each have control of about one third of the pond. In order to avoid the potential for erecting fencing (barb wire) along property lines that traverse the pond due to neighborhood squabbles, it might be wise to place the pond and surrounding land under one ownership.

12. WILDLIFE RESOURCES

Wildlife Habitat Description:

The area of the proposed Fenton Bluffs subdivision is composed of three major habitat types; mixed hardwoods, wetland/riparian areas, and old field/reverting areas. This area currently provides a variety of cover types that support a number of wildlife species.

The majority of the area consists of mixed hardwoods. Dominant species in the overstory are oak, red maple, and black birch. The understory is dominated by mountain laurel, witch hazel, black cherry and black birch seedlings.

Wetland/riparian areas consist of Fenton Brook, three small ponds, and a small brook that connects two of the small ponds, and associated wetlands. Fenton Brook is shallow in many areas. The bottom composition consists of flat rocks, which provides habitat for a diversity of amphibian species. The ponds are small in size and contain some aquatic and terrestrial vegetation including cat-tails. These ponds also provide habitat for a number of amphibian and reptilian species.

Old field/reverting areas comprise a small portion of the area and consist primarily of shrubs, grasses, and sedges.

Impacts of Development on Wildlife:

The proposed development of this property will reduce the present diversity of wildlife habitat, which will in turn reduce species diversity and richness. Because of the fragmentation and elimination of habitat types there will be a negative impact on many species of wildlife. Species that are intolerable to man will be forced to emigrate into adjacent habitat. Species dispersion into adjacent habitats may result in competition with species already occupying the area. Many species will also be forced to inhabit less desirable habitat; decreasing survivorability. Species more tolerable to man such as starlings, robins, house sparrows, and raccoons may increase in number and become a nuisance.

Development will also be adjacent to wetland/ riparian habitat in many areas. There will be a negative impact on these areas if there is any clearing or removal of vegetation. Vegetation removal in wetlands would have severe impacts on wildlife, especially reptiles and amphibians. Soil and water types, cover, food, breeding grounds, and hibernation areas may be altered so that species dependant on specialized habitats are eliminated and more adaptable species reduced. Barriers to seasonal movement and population dispersal, such as roads, are also serious threats. The road layout crosses Fenton Brook and another small brook. The steepness of slope in many areas creates a high risk of siltation to wetland areas, especially Fenton Brook.

Mitigation of Impacts on Wildlife:

There are several measures that can be taken to minimize the impact of developmental activities on wildlife. No vegetation removal should take place within 100 ft of wetlands, including Fenton Brook and the three small ponds. These buffer strips will limit disturbance to wetlands and provide important corridors for a number of wildlife species. Owners of lots adjacent to or containing wetlands should be discouraged from any clearing or removal of vegetation within 100 ft of wetlands. With the abundance of wetland/riparian areas and steepness in slope, erosion control measures will have to be implemented during and prior development to limit siltation. Vegetation removal at road crossings should be kept to a minimum and the application of fill in wetlands be carefully considered. We also discourage any diverting or rerouting of brooks. To do so would eliminate a major component of wildlife habitat.

Since many of the building lots are two acres in size, as much of each lot as possible should be left as wooded area. This will reduce vegetation removal, benefit wildlife, and be more aesthetically pleasing for the residents of the development.

13. FISHERIES RESOURCES

Site Description

The proposed Fenton Bluffs Subdivision will impact the Fenton River and its associated aquatic resources. This report will address these impacts and outline necessary mitigation measures needed to reduce and offset losses to the Fenton River ecosystem.

The proposed development site which is approximately 150 acres will be served by on-site wells and sewage disposal. Building lots which will have the greatest impact on aquatic resources are those that abut the Fenton River; lot numbers 56-59 and 13-15 of Section II. Additionally, lots 9, 18, 20/22 of Section I which have already been approved for construction will impact the Fenton River.

Approximately 0.5 river miles of stream flow through the proposed site. The river generally ranges from 10 to 16 feet wide and contains excellent instream and streamside habitat for trout and other coldwater resident fishes. Instream habitat exists in the form of pools and riffles. Pools provide beneficial cover "hiding and resting areas" for stream fishes, whereas upper reaches of riffles are commonly used as feeding areas by fish since aquatic insects, their primary food source, reside in this type of habitat. A 1:1 pool-riffle ratio which is considered optimal conditions for the survival and production of resident fishes was observed. Stream bottom substrate was mainly comprised of llarge bouldersl and cobble-type rocks (2-12"). Streamside riparian zones are comprised of mixed hardwoods and shrubs. This vegetation provides vital shading and cooling of stream waters.

Aquatic Resources

Surface waters of the Fenton River are classified by the Department of Environmental Protection (DEP) as "Class A". Designated uses for a "Class A" watercourse are: potential drinking water supply, fish and wildlife habitat, recreational use, agricultural and industrial supply, and other legitimate uses.

The Fenton River supports a valuable recreational coldwater fishery. The Bureau of Fisheries (DEP) stocks the river throughout its length with more than 7,000 adult brook, brown, and rainbow trout in the towns of Willington and Mansfield. Other species expected to inhabit the Fenton River in this area are: native (wild) brook trout, longnose dace, blacknose dace, fallfish, shiner, tesselated darter, and white sucker.

Impacts

The following impacts of the Fenton Bluffs Subdivision on the Fenton River can be expected if proper mitigation measures are not implemented:

1. Construction site soil erosion and sedimentation of the Fenton River through increased runoff from unvegetated areas : During construction topsoil within the proposed building lots will be exposed and susceptible to runoff events especially since site slopes are extreme!y steep. Devegetation, steep slopes (>15%), and "highly" erodible soils on this parcel present a situation which is very conducive to the development of serious erosion problems. Erosion and sedimentation due to construction has long been regarded as a major cause of stream degradation. Nationally, silt is considered a major stream pollutant. Excessive sediment deposition could damage the Fenton River aquatic ecosystem in the following ways:

(1) Sediment reduces the survival of resident fish eggs and hinders the emergence of newly hatched fry. Adequate water flow, free of excess sediment particles is required for fish egg respiration and successful hatching.

(2) Sediment reduces the survival of aquatic insects. Since aquatic insects are important food items in fish diets, reduced insect populations levels in turn will adversely affect fish growth and survival. Fish require an excessive output of energy to locate preferred prey when aquatic insect levels decrease.

(3) Sediment reduces the amount of usable habitat required for spawning purposes. Excessive fines can clog and even cement gravels and other desirable substrate together. Resident fish may be forced to disperse to other areas of the Fenton River not impacted by siltation.

(4) Sediment reduces stream pool depth. Pools are invaluable stream components since they provide necessary cover, shelter, and resting areas for resident fish. A reduction of usable fish habitat can effectively limit fish population levels.

(5).Turbid waters impair gill functions of fish and normal feeding activities of fish. High concentrations of sediment can cause mortality in adult fish by clogging gills.

(6) Sediment encourages the growth of filamentous algae and nuisance proportions of aquatic weeds. Eroded soils contain plant nutrients such as phosphates and nitrates. Once introduced into aquatic habitats, these nutrients function as fertilizers resulting in accelerated plant growth. Presently, the Fenton River supports very sparse aquatic weed communities.

(7) Sediment contributes to the depletion of dissolved oxygen. Organic matter associated with soil particles is readily decomposed by microorganisms thereby effectively reducing oxygen levels.

2. Road construction over the Fenton River : Development plans call for crossing the Fenton River with an "Inverted U" culvert. Instream culvert placement in concert with placement of fill alongside the stream will inevitably result in stream sedimentation problems if proper precautions are not followed. Impacts due to stream sedimentation were previously discussed.

3. Percolation of septic effluent into the Fenton River : A failure of individual septic systems to operate properly would be potentially dangerous to stream environments Local soils present severe limitations for septic system placement. Some septic systems are close to wetlands, especially, the system in lot #59 which is within 100' of the wetland edge. Nutrients and assorted chemicals that may be placed in septic systems could possibly enter stream waters in the event of a septic system failure or infiltrate the groundwater during the spring when water tables are close to the surface. The introduction of septic effluent could result in a major threat to fish habitat, public health, and overall water quality conditions. Effluent will also stimulate the growth of nuisance aquatic vegetation and algae.

4. Aquatic habitat degradation in Fenton River due to the influx of stormwater drainage from nearby residential housing : The developer has proposed a stormwater management plan which includes the use of a pond on the property as a detention basin. Runoff will then be discharged to the Fenton River via a tributary stream. These stormwaters can contain a variety of pollutants that are detrimental to aquatic organisms. Pollutants commonly found in stormwaters are: hydrocarbons (gasoline and oil), herbicides, heavy metals, road salt, fine silts, and coarse sediment. Once introduced into stream environments, stormwater runoff will fertilize stream waters causing water quality degradation. Additionally, fine silts in stormwaters that remain in suspension for prolonged periods of time often cannot be effectively removed from stormwater detention basins. More harmful still are spilled petroleum based chemicals or other toxicants that can precipitate partial or complete fishkills. Stormwater drainage from this property can increase stream flows. Increased volumes of water in the

Fenton River can negatively impact stream channel hydraulics, e.g. natural stream scouring processes are disrupted.

5. Loss of streamside overhead vegetation along the proposed Fenton River stream crossing : This will result in a net loss of this important stream parameter. Vegetation loss will increase evaporation of exposed stream waters. Trees are very important in that they help cool stream water temperatures in the summer and provide important cover for resident fishes. Resident fish may be forced to disperse and locate to more suitable sections in lower sections of these streams.

6. Transport of lawn fertilizers and chemicals to the Fenton River : Runoff and leaching of nutrients from fertilizers on lawns will stimulate filamentous algae growth in this stream and degrade water quality. Introduction of lawn herbicides can result in "fish kills" and overall water quality degradation.

7. Degradation of wetland habitat : Proposed building lots will be constructed adjacent to vital wetland habitat associated with the Fenton River. Wetlands are critical to water quality maintenance and the ultimate health of the Fenton River. Wetlands are beneficial in many ways. They serve to: (1) control flood waters by acting as a water storage basin, (2) trap sediment from natural and man-made sources of erosion, and (3) help filter-out pollutants from runoff before they enter watercourses. Development which brings about polluted stormwaters, excessive stream sedimentation, lawn fertilizers, and lawn herbicides can negatively impact these wetland complexes by hindering their ability to properly function. Negative impacts observed in wetland habitat will be readily observed in the Fenton River as well

8. Impacts to downstream environments : Any water quality problems and habitat degradation that occurs within the Fenton River will eventually be observed in downstream areas such as Bissonnette Pond. Increased eutrophication (aging) or nutrient enrichment over time can be expected in Bissonnette Pond if it receives elevated levels of nutrient enrichment. Increased pond aging will result in the creation of dense algae blooms, sediment accumulation, nuisance amounts of aquatic vegetation, and increased production of microorganisms that cause fish disease. The probability of partial or complete fish kills will increase.

Recommendations

The following recommendations should be considered by the Town of Willington to mitigate impacts to the Fenton River:

1. Discourage residential development on lots that abut the Fenton River : Due to their close proximity, these lots pose the greatest threat to the aquatic resources of the Fenton River. Lots in Section I that border the Fenton River that can potentially impact the river have already been approved. Thus, the town should consider the elimination of lots that abut the river from Section II subdivision plans. These areas should be converted over to "open space". Impacts such as soil erosion, septic effluent, stormwater runoff, and wetland degradation can be more effectively minimized if these areas are left in their natural condition.

2. It is highly recommended that at the minimum. a 100 foot open space buffer zone be maintained along wetland boundaries that border the Fenton River : This buffer can be an effective mitigation measure at this development location, especially if buildings lots that border the Fenton River are approved. No construction and alteration of existing habitat should be allowed in this zone. Research has shown that 100 foot buffer zones help prevent damage to wetlands and stream ecosystems that support diverse fish and aquatic insect life (USFWS 1984;USFWS 1986;0DFW 1985). These buffers will absorb surface runoff and other pollutants before they can enter wetlands, ponds, and stream ecosystems. Additionally, buffer zones can improve the quantity of instream habitat for fishes. For example, research has shown that brook trout habitat units can increase 2,400% when well vegetated buffer zones are used for stream corridor protection (HEP Notes, 1988).

3. Install and maintain proper erosion and sedimentation controls during site construction activities : Silt fences and haybales should be placed within excavated trenches to ensure that all runoff is properly contained. Only small areas of soil should be exposed at one time and these areas should be reseeded and restabilized as soon as possible. Complete mitigation of silt runoff may be difficult to achieve at this subdivision location if development is allowed on steep slopes. If further phases of the Fenton Bluffs development are approved, a town official should be responsible for inspecting this development on a daily basis to ensure that contractors have complied with all stipulated mitigation devices. Past stream siltation disturbances in Connecticut associated with residential housing developments have occurred when individual contractors either improperly deployed mitigation devices or failed to maintain these devices on a regular basis. Proper installation and maintenance of these devices is critical to environmental well being.

4. Properly design and locate individual septic systems : It is critical that all septic systems be placed in areas that will effectively limit septic effluent reaching streams. The addition of septic effluent to these streams can be one of the greatest threats to stream ecology. Septic systems should be maintained on a regular basis. Prevent the disposal of harmful chemicals into septic systems which may negatively effect operation and possibly result in system failure. Residents should be encouraged to utilize non-phosphate laundry detergents.

5. The developer should submit a detailed stormwater management plan for town review : The effective management of stormwaters and roadway runoff can only be accomplished through proper design, location, and maintenance of catch basins and the detention basin. Maintenance is very critical. Roadway catch basins and the proposed detention basin should be regularly maintained to minimize adverse impacts to the Fenton River. The use of road salt to de-ice roads should be prohibited. Catch/detention basins will only trap heavy, sediments reducing the likelihood of excessive stream sedimentation; however, waters that contain pollutants such as salts and even small amounts of fine enriched sediments will eventually cause water quality and aquatic habitat degradation. This impact can not be prevented since catch basins will not remove these materials. A major concern of the Team's fisheries biologist is the proper management of waters from the proposed detention basin. Stormwaters should be released after Fenton River stream flows have peaked; otherwise increased scouring of stream materials from excessive stormwater flows will lead to stream siltation problems. To ensure that stormwaters are properly managed, the Town of Willington should be responsible for the operation of the detention basin.

6. All instream work and land grading/filling near the Fenton River should take place during low flow periods : This will help minimize the impact to the aquatic resources. Reduced streamflows and rainfall during the summer and early fall provide the least hazardous conditions in which to work near sensitive aquatic environments.

7.Riparian (streamside) vegetation should be restored and replanted at the proposed stream crossing : Fast growing trees that provide good overhead canopy such as red maple, white pine, American larch, and black willow should be planted.

8. Limit liming. fertilization and the introduction of chemicals to subdivision lawns : This will help abate the amount of additional nutrients to the Fenton River. Non-phosphorus lawn fertilizers are currently available from various lawn care distribution centers.

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ABOUT THE TEAM

The Eastern Connecticut Environmental Review Team (ERT) is a group of professionals in environmental fields drawn together from a varety of federal, state and regional agencies. Specialists on the Team include geologists, biologists, foresters, soil specialsits, engineers and planners. The ERT operates with state funding under the supervision of the Eastern Connecticut Resource Conservation and Development (RC&D) Area --- an 86 town region.

The services of the Team are 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, landfills, commercial and industrial developments, sand and gravel excavations, 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 official 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 and the ERT Coordinator. A request form should be completely filled out and should include the required materials. 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 and request forms regarding the Environmental Review Team please contact the ERT Coordinator: 203-345-3977, Eastern Connecticut RC&D Area, P.O. Box 70, Haddam, Connecticut 06438.