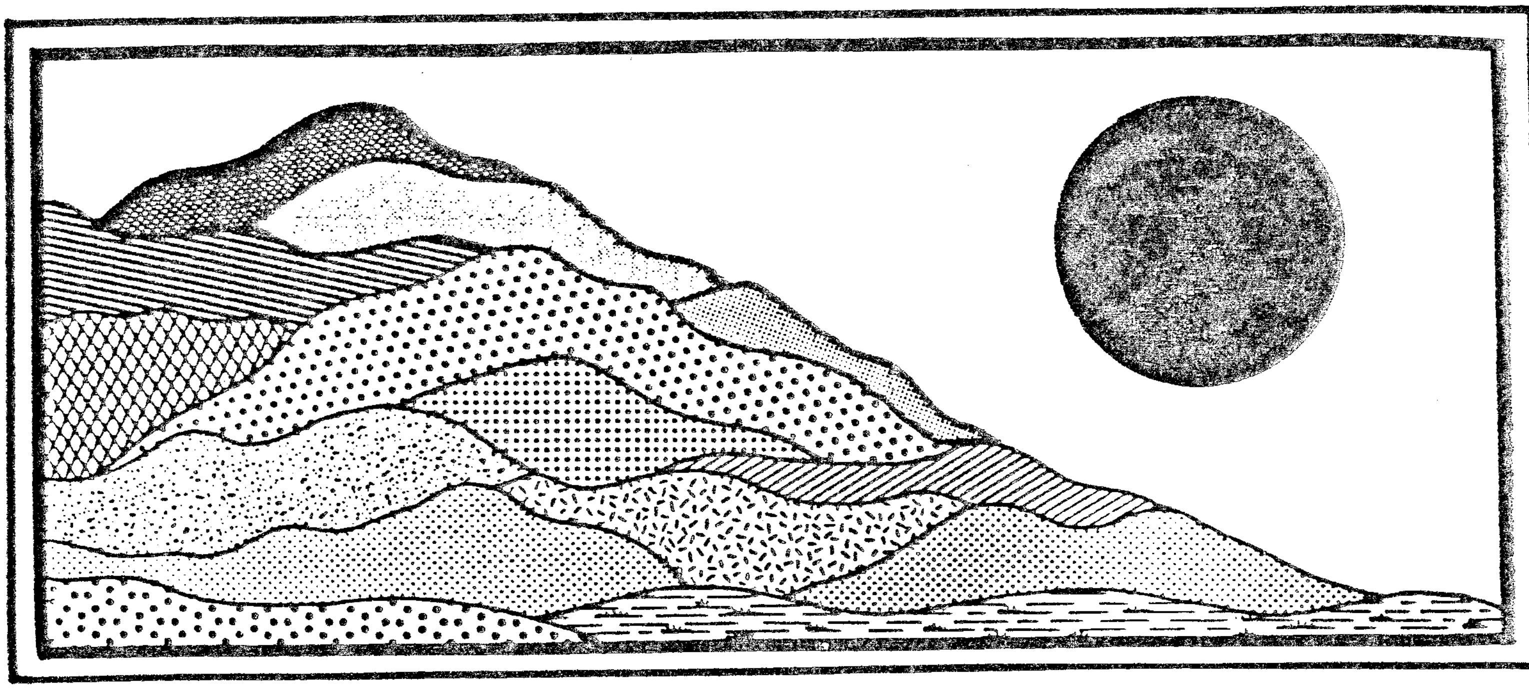
Jeremy Development Corporation

Lisbon, Connecticut

November 1986



ENVIRONMENTAL

REVIEW TEAM

REPORT

EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

Jeremy Development Corporation

Lisbon, Connecticut

Review Date: SEPTEMBER 11, 1986

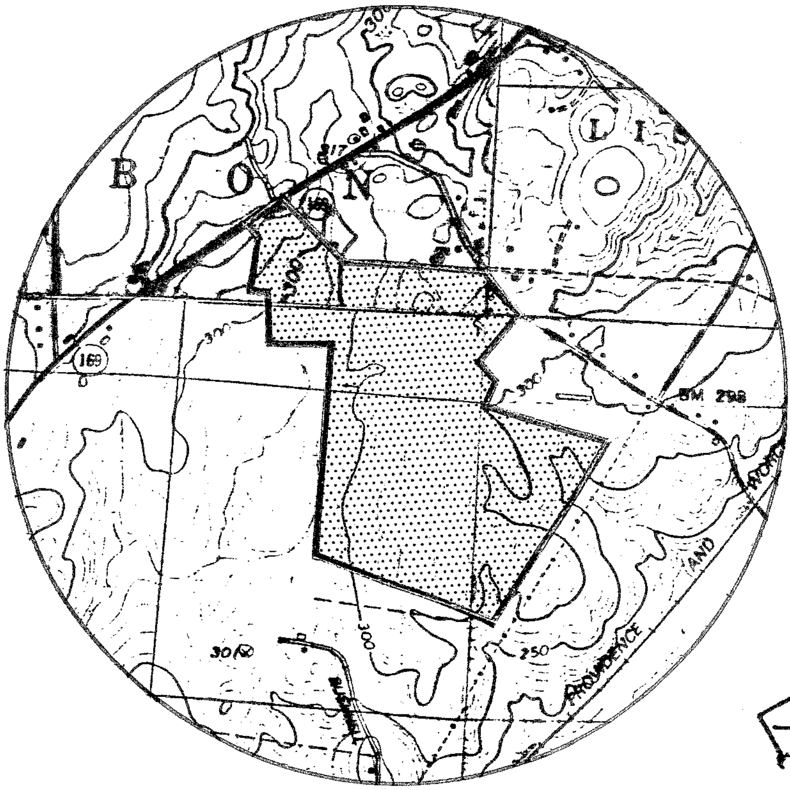
Report Date: NOVEMBER 1986

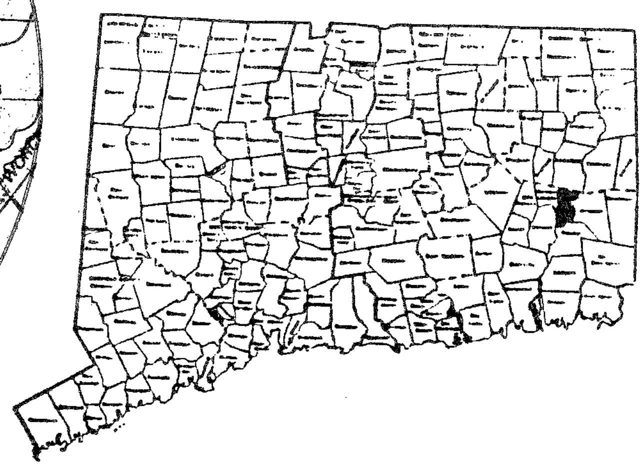
RC&D

ENVIRONMENTAL REVIEW TEAM
PO BOX 198
BROOKLYN, CONNECTICUT 06234

Site Location

JEREMY DEVELOPMENT CORPORATION SUBDIVISION
LISBON, CONNECTICUT





EASTERN CONNECTICUT

RESOURCE CONSERVATION

& DEVELOPMENT AREA

ENVIRONMENTAL REVIEW TEAM REPORT

ON

THE JEREMY DEVELOPMENT CORPORATION SUBDIVISION

LISBON, CONNECTICUT

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

The ERT met and field checked the site on Thursday, September 11, 1986. Team members participating on this review included:

Don Capellaro	--Sanitarian - Connecticut Department of Health
Pete Merrill	--Forester - Connecticut Department of Environmental Protection
Al Roberts	--Soil Resource Specialist - U. S. D. A., Soil Conservation Service
Charles Storrow	--Planner - Southeastern Connecticut Regional Planning Agency
Elaine Sych	--ERT Coordinator - Eastern Connecticut 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, two (2) topographic maps, a soils map and a copy of the preliminary subdivision plan. The Team met with, and were accompanied by the Town Planner, the Town Sanitarian and an engineer for the Developer. 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 and conclusions 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.

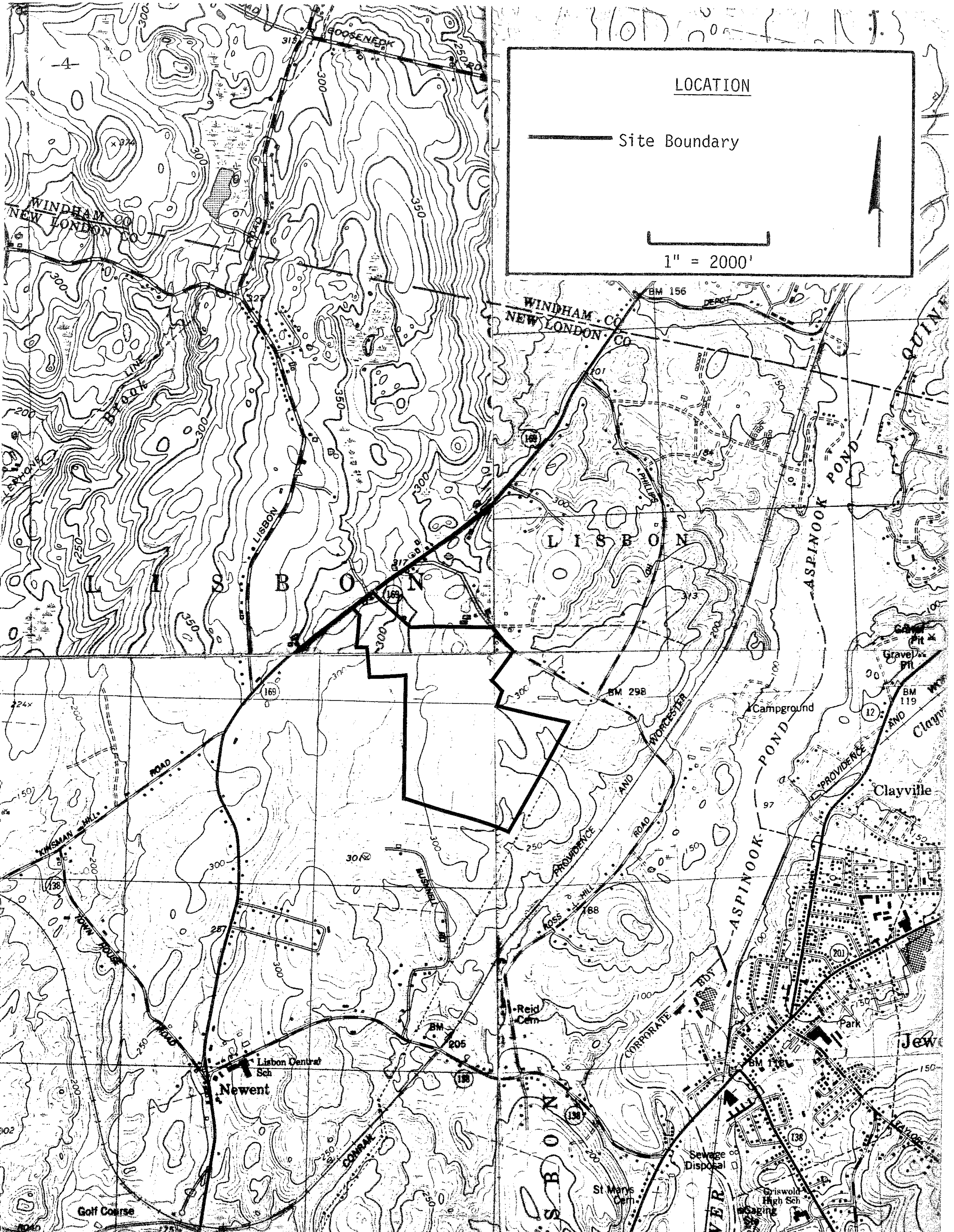
The Eastern Connecticut RC&D Executive Committee hopes you will find this report of value and assistance in making your decisions on this proposed subdivision.

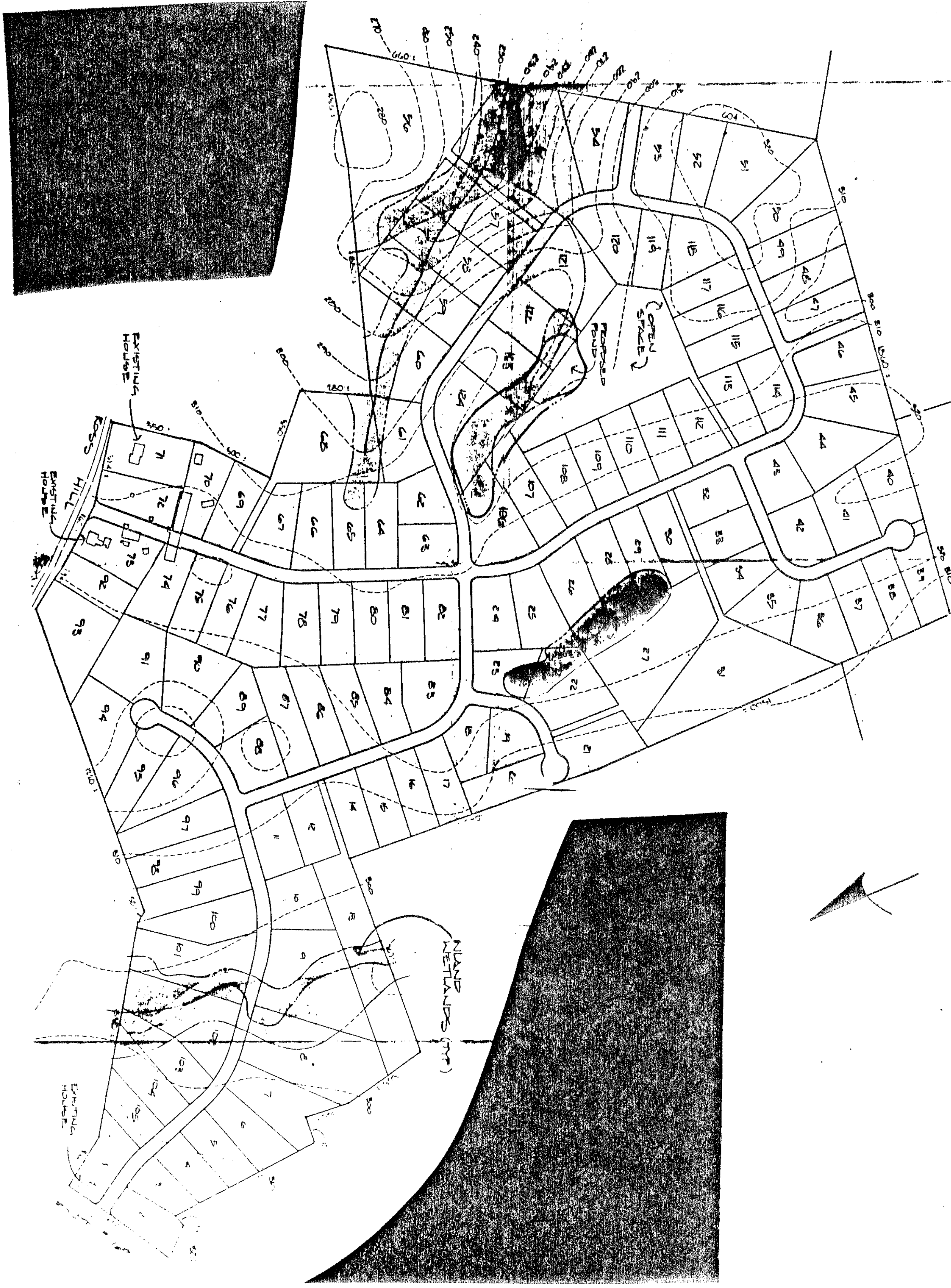
If you require any additional information, please contact:

Elaine A. Sych
ERT Coordinator
Eastern Connecticut RC&D Area
P. O. Box 198
Brooklyn, CT 06234
(203) 774-1253

TABLE OF CONTENTS

TABLE OF MAPS


LOCATION
Site Boundary
1" = 2000'
WINDHAM CO
NEW LONDON CO
LISBON
LISBON
ASPINOOK POND
PROVIDENCE AND WORCESTER
Campground
Clayville
Newent
Lisbon Central Sch
Reid Cem
Sewage Disposal
St Marys Cem
Golf Course
Griswold High Sch
Park
Gravel Pit
BM 298
BM 205
BM 156
BM 119
KINSMAN HILL ROAD
TOWN HOUSE ROAD
CONRAD
CORPORATE
GOOSENECK
PHILLIPS
BUSHNELL
ROSS HILL
DEPOT



THIS MAP IS COMPILED FROM OTHER MAPS, DEED DIMENSIONS AND OTHER SOURCES OF INFORMATION, NOT TO BE CONSTRUED AS AN ACCURATE SURVEY AND SUBJECT TO FINAL CHANGES AS A MORE ACCURATE SURVEY MAY DISCLOSE.

I HEREBY CERTIFY THAT THIS MAP AND SURVEY WERE PREPARED IN ACCORDANCE WITH THE STANDARDS OF A CLASS D SURVEY AS DEFINED IN THE CODE OF PRACTICE FOR STANDARDS OF ACCURACY OF SURVEYS AND MAPS, ADOPTED DECEMBER 10, 1975 AS AMENDED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC

[signature] 6/30/86 12__
SURVEYOR DATE REGISTRATION NO

STATE OF CONNECTICUT ROLAND J. HARRIS LICENSED LAND SURVEYOR

ROLAND J. HARRIS & ASSOC.
Land Surveyors - Civil Engineers - Land Planners
GRISWOLD CONNECTICUT

PRELIMINARY SUBDIVISION PLAN
PREPARED FOR
THE JEREMY DEVELOPMENT CORP.
ROSS HILL RD & RTE #169 LISBON, CT.

SCALE	DATE	IDENT. NO.
1"=200'	JULY, '86	86-761

I. INTRODUCTION

The Eastern Connecticut Environmental Review Team was asked to perform an environmental review and evaluation of the proposed Jeremy Development Corporation Subdivision by the Lisbon Planning and Zoning Commission.

It is understood the overall parcel consists of approximately 188 acres of open and wooded property which most recently was operated as a chicken farm. The property is located on the south side of Route 169 and west of Ross Hill Road. The south easterly property line extends parallel with a nearby power line. This portion of the property also has the most slopes and the presence of several drainage courses. The remainder of the parcel is relatively flat, also having several drainage or watercourses. The most pronounced stream is the one which cuts through the property starting near the northwest side and which leaves the property starting near the mid-point of the property line on the west side. The existing farmhouse and outbuildings are located on Ross Hill Road.

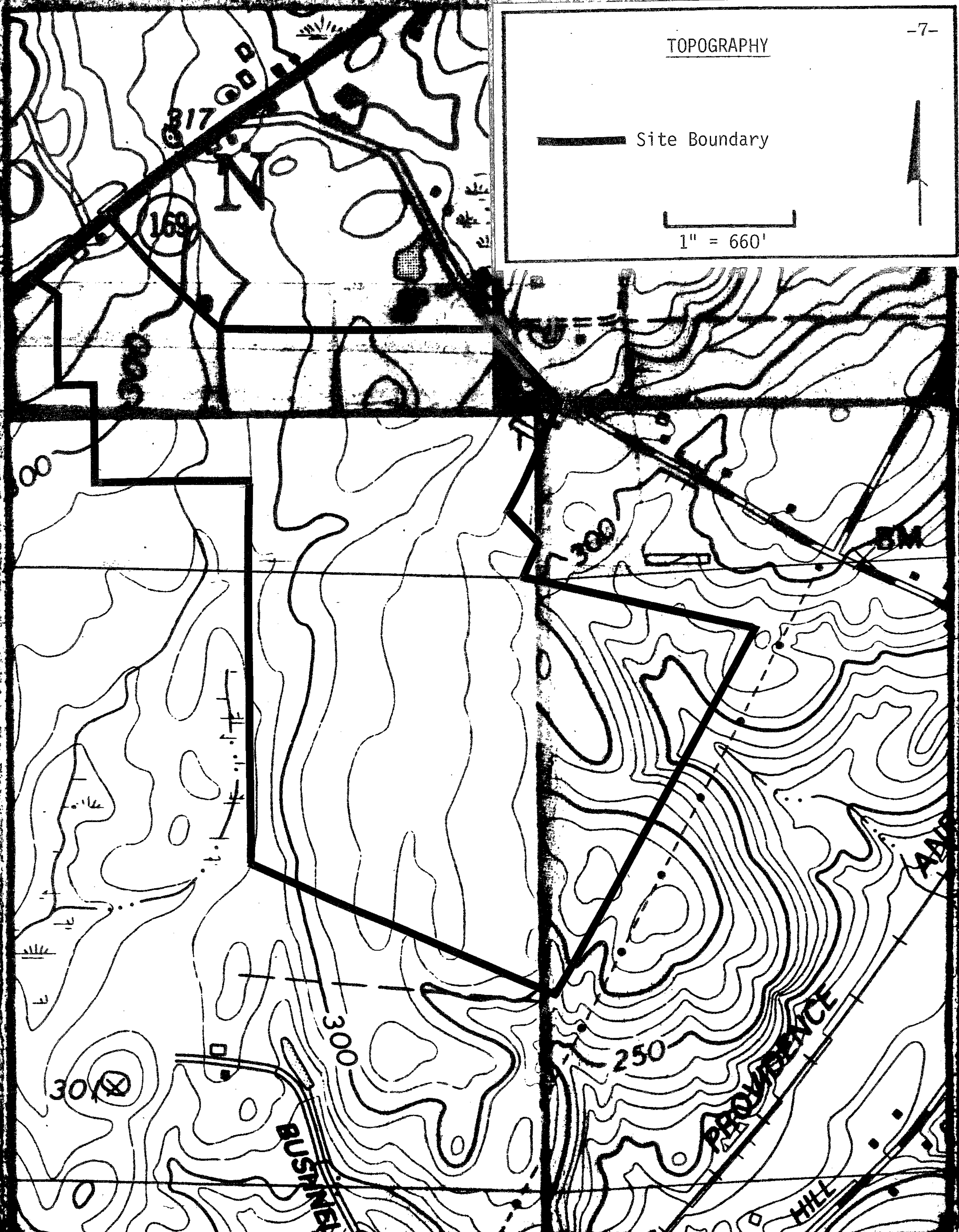
Preliminary subdivision plans have been prepared by Roland Harris & Associates for approximately 125 lots. The area is presently zoned for 40,000 minimum square foot lots. Approximately 10,000 linear feet of new road will be constructed through the site. Although the consulting firm has made a number of soil test holes, delineation of wetlands and other limiting site factors apparently have not been taken into full account. (As of the review date September 11, 1986.)

Therefore, it is anticipated that the original concept of this many lots would be refined to a lower and more proven workable number. Along with the layout for interior roadways, a proposal for the development of a large pond and some open space area is included.

II. TOPOGRAPHY AND SETTING

Most of the ± 188 acre parcel has a history of agricultural use. Based on a 1934 air photo, the eastern parts of the site consisted of active agricultural land, pasture land and an apple orchard. (Apple orchard was located in the open field directly behind the chicken coop.) Except for a ± 17 acre field in the northeast section (where lots 88-99 are proposed), the existing open fields within the parcel have not changed drastically in shape or size from the 1934 air photo. The remaining parts of the property consist mainly of woodlands.

The topography of the site is mainly flat to gentle slopes. Some moderate slopes in the southeast corner, which are associated with shallow to bedrock soils, may pose some hindrances in terms of road/driveway construction and sewage disposal systems. On the other hand, the flatter, more gentle slopes should not pose any major problems in terms of development.


TOPOGRAPHY
Site Boundary
1" = 660'
317
169
N
300
300
300
250
301
BM
PROVIDENCE
HILL

The major streamcourse within the site flows in a north/south direction through the northern parts. Several intermittent watercourses and wet areas are visible throughout the site.

III. GEOLOGY

The proposed subdivision is encompassed by four (4) topographic quadrangles; Norwich, Jewett City, Scotland and Plainfield. Most of the land lies within the Norwich topographic quadrangle. Below is a list of the quadrangles, map identification numbers for their respective bedrock and surficial geologic maps, and the author or authors of the geologic maps.

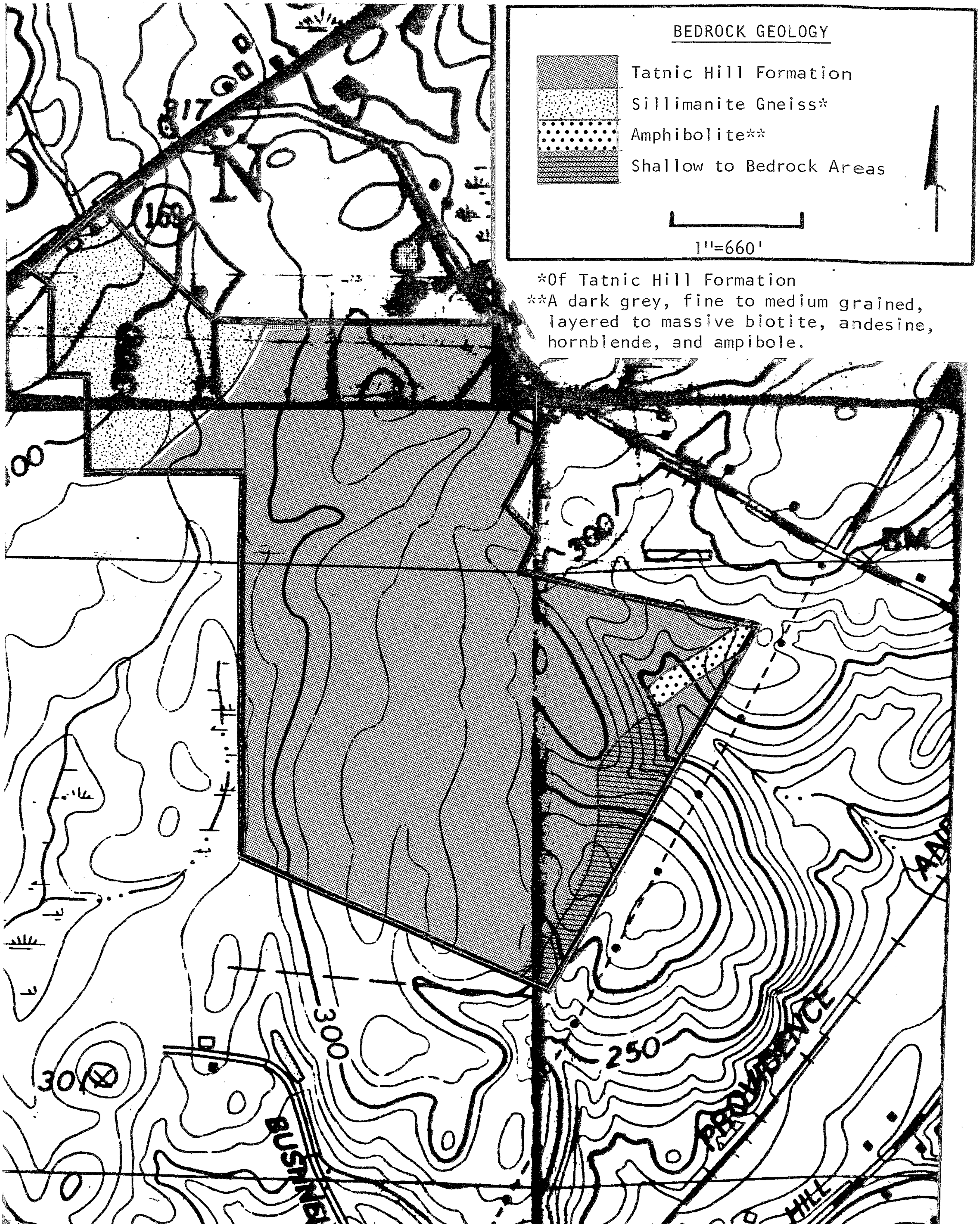
QUADRANGLE NAME	BEDROCK GEOLOGIC MAP	AUTHORS	SURFICIAL GEOLOGIC MAP	AUTHORS
Norwich	GQ-144	George L. Synder	GQ-165	P.M. Hanshaw George L. Synder
Jewett City	GQ-1434	J. Karen Felmlee H. Roberta Dixon	GQ-1575	Byron Stone
Scotland	GQ-392	Charles Shaw H. Roberta Dixon	GQ-392	Charles E. Shaw H. Roberta Dixon
Plainfield	GQ-481	H. Roberta Dixon	GQ-1422	Bryon Stone Allan D. Randall

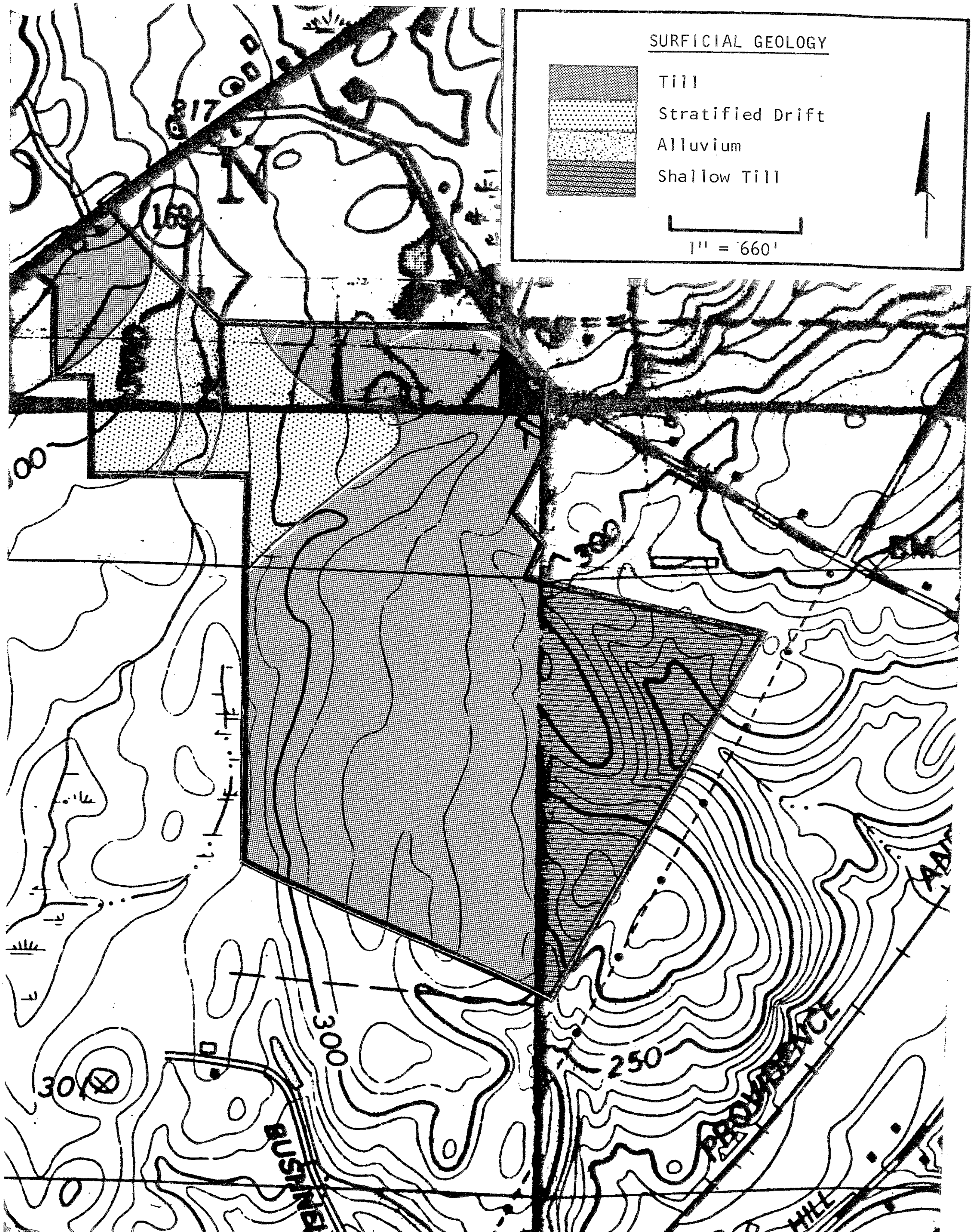
All of the above maps have been published by the U. S. Geological Survey and are available for purchase at the Department of Environmental Protection's Natural Resources Center in Hartford.

It should be pointed out that the Soil Survey for New London County was also referenced for the Surficial Geology section of this report.

Bedrock is at or near ground surface in the eastern most parts of the site, where slopes are moderate. The bedrock geology of the site has been well described in the bedrock geologic maps cited above. The bedrock underlying the site is described as Tatnic Hill Formation which dates back to the Ordovician geologic period (438-505 million years ago). They consist predominantly of gray to dark gray, medium grained gneiss and schist. Quartz, biotite and garnet are the major minerals found in the rock. Minor minerals include potassium feldspar, muscovite and iron oxides. Minerals comprising the latter mineral group may be a source of elevated iron and manganese minerals to water which fills cracks, seams and fractures in the underlying bedrock. As a result, individual on-site wells, which will tap the underlying bedrock as a source of water, may be mineralized with iron and manganese. If levels are moderate to high, there may be a need for filtration.

Gneisses and schists are common bedrock types in upland areas of eastern and western Connecticut. These rocks are crystalline, metamorphic rocks (rocks geologically deformed by great heat and pressure) which have been complexly folded.


BEDROCK GEOLOGY
Tatnic Hill Formation
Sillimanite Gneiss*
Amphibolite**
Shallow to Bedrock Areas
1"=660'
*Of Tatnic Hill Formation
**A dark grey, fine to medium grained, layered to massive biotite, andesine, hornblende, and ampibole.
300
250
PROVIDENCE
HILL


SURFICIAL GEOLOGY
Till
Stratified Drift
Alluvium
Shallow Till
1" = 660'
300
250
PROVIDENCE
HILL
BUSHNELL

Depth to bedrock is probably about ten (10) feet throughout the site, except in the easternmost parts where it may break the ground surface.

Most of the site is covered by a blanket of glacial sediment called till. Till is an unsorted accumulation of rock fragments and particles that was plastered directly on the ground by glacial ice. It is composed of boulders, pebbles, clays and sand particles that were derived from various types of bedrock (i.e., gneisses and schists) underlying the area.

Because of differences in source areas for the particles and in modes of desposition, the texture of the till may be highly variable. It may vary from sandy, stony and relatively loose, to silty, nonstony and compact. Generally speaking, the compact layers are encountered at some depth below the looser variety. The parcel appears to contain both types of till. Based on soils mapping, the variety which contains a compact layer is associated primarily with the Woodbridge soils in the northern parts of the site. Based on the remnants of deep test holes excavated in the central and southern parts, the other soils on the site appear to be predominantly sandy and probably lack a compact "hardpan" layer.

Another type of glacial sediment found on the site is stratified drift. Stratified drift, which covers a flat area in the northcentral parts, consists of material deposited by streams of glacial meltwater. Sand and gravel are the major components of stratified drift. The thickness of these deposits probably does not exceed much more than ten (10) feet on the site.

Overlying the glacial sediments described above are post-glacial sediments called alluvium. They parallel the unnamed streamcourse in the northern parts. Alluvium consists of gravel, sand and silt along recent streams. Because these areas are wet most of the year and provide storage for flood waters during certain storm events, they hold low potential for development.

Based on the Soil Survey for New London County several intermittent watercourses throughout the site are paralleled by regulated inland-wetland soils. It is recommended that a thorough survey of the wetlands on the site be conducted by a certified soil scientist. Once the wetland boundaries are flagged, they should be superimposed onto the subdivision plan. Wetland flagging will also help heavy equipment operators working on the site from disturbing these regulated areas.

IV. SOILS

This report does not contain any information that cannot be obtained from the published soil survey report of New London County. However, there are wetlands on this site that should be flagged in the field and surveyed onto the proposed plan. If the wetlands were flagged prior to the ERT, it could have provided a more thorough and site specific investigation. There are a number of wetlands on this site other than those shown in the published soil survey. These areas are sometimes indicated with miscellaneous symbols or not indicated at all.

It is recommended that a detailed soils study be done for this development. The number of lots proposed warrants a closer look at soils and their suitability for on-site septic disposal.

The attached soil map is from pages 11 and 12 of the New London County Soil Survey Report. There are a number of wetland soils on this parcel of land that are not indicated on this map. It is recommended that detailed flagging of wetlands be done in the field and subsequently surveying the flag numbers and wetland boundaries onto the developer's plot plan. A plan such as this will give the Town commissioners a better prospective of how the house lots and septic systems will relate to the wetlands. Septic systems will be sized based on site specific perc test data.

A list of soils and detailed descriptions from the soil survey report has been compiled to assist with the evaluation of this area.

LIST OF SOIL SYMBOLS AND MAP UNIT NAMES

MAP SYMBOL		SOIL NAME
Aa	-	Adrian and Palms Mucks
AfB	-	Agawam fine sandy loam, 3 to 8 percent slopes
CbB	-	Canton and Charlton fine sandy loams, 3 to 8 percent slopes
CbD	-	Canton and Charlton fine sandy loams, 15 to 25 percent slopes
CcB	-	Canton and Charlton fine sandy loams, 3 to 8 percent slopes
CrC	-	Charlton-Hollis fine sandy loams, 3 to 15 percent slopes, very rocky
CrD	-	Charlton-Hollis fine sandy loams, 15 to 45 percent slopes, very rocky
HcA	-	Haven silt loam, 0 to 3 percent slopes
HcB	-	Haven silt loam, 3 to 8 percent slopes
HkC	-	Hinckley gravelly sandy loam, 3 to 15 percent slopes
MyB	-	Merrimac sandy loam
Nn	-	Ninigret fine sandy loam
Rc	-	Raypol silt loam
Rd	-	Ridgebury fine sandy loam
Rn	-	Ridgebury, Leicester, and Whitman fine sandy loams, extremely stony
SwB	-	Sutton fine sandy loam, 0 to 8 percent slopes, very stony
Wd	-	Walpole fine sandy loam
WyB	-	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony

United States Department of Agriculture

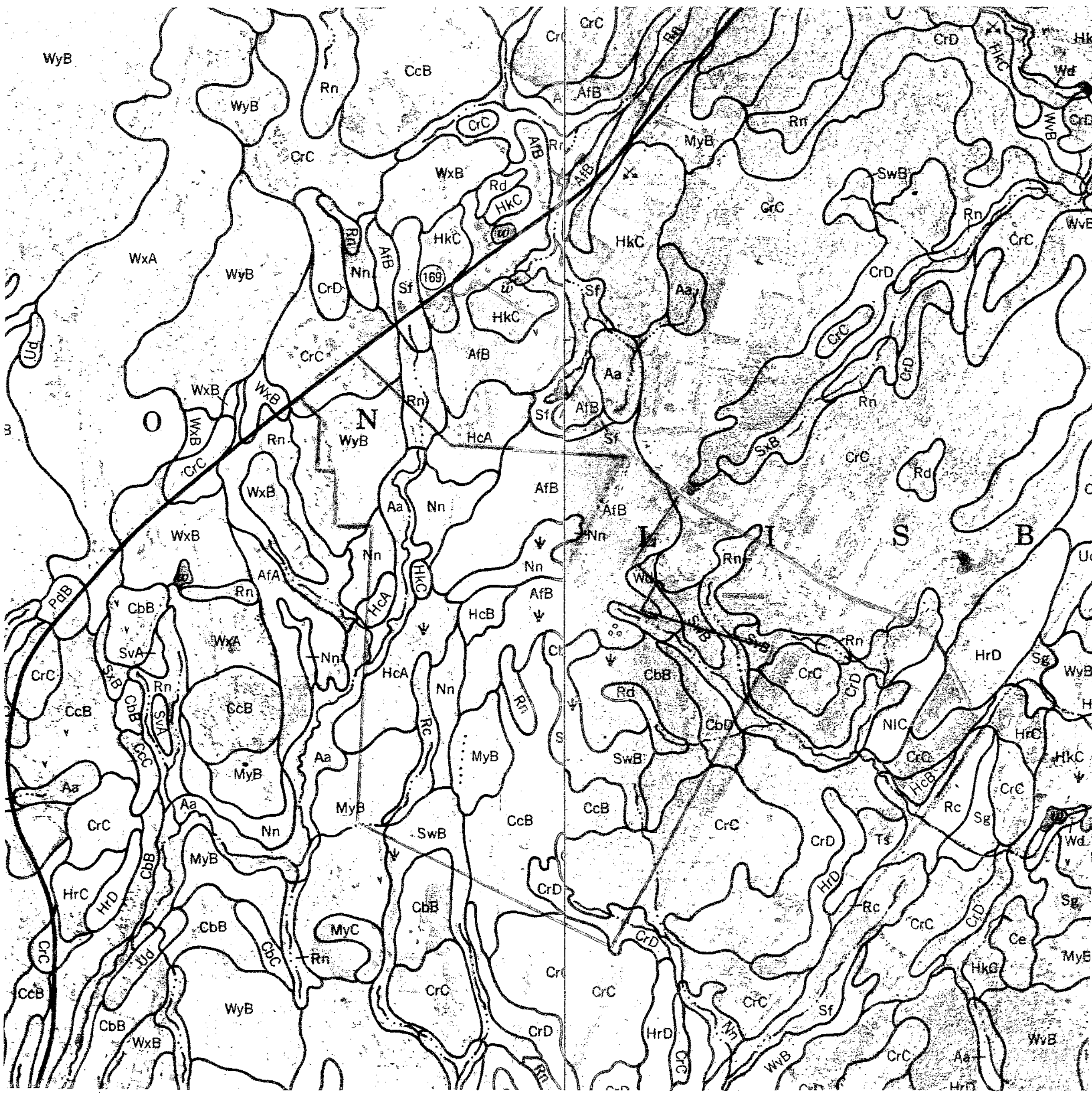
Soil Conservation Service

New London County USDA-SCS
562 New London Turnpike
Norwich, CT 06360
887-4163

New London Soil Survey Sheets #11 & #12

Scale 1" = 1320'

Approximate Site Boundary



DETAILED SOIL MAP UNIT DESCRIPTION

Aa - Adrian and Palms mucks - This mapping unit consists of very poorly drained soils with an organic layer at least 16 inches thick, but not more than 51 inches thick over sandy and loamy mineral soil materials. These soils are on the landscape commonly in low depressions and along drainageways of outwash plains and glacial till uplands. Slopes are commonly less than one percent.

Adrian and Palms soils have a high water table at or near the surface for most of the year. Permeability is moderately rapid in the organic layers and moderately slow to rapid in the underlying mineral materials. Included in these soils in mapping are small areas of soils with organic material less than 16 inches thick and small areas with organic materials greater than 51 inches thick. These soils are generally not suited to agricultural use or building site development without major reclamation.

AfB- Agawam fine sandy loam, 3 to 8 percent slopes. This gently sloping, well drained soil is on stream terraces and outwash plains. Areas are dominantly irregular in shape.

Typically, this Agawam soil has a dark brown, fine sandy loam surface layer nine inches thick. The subsoil is dark yellowish brown fine sandy loam 15 inches thick. The substratum is light olive brown sand and very gravelly coarse sand to a depth of 60 inches or more.

Included with this soil are small areas of somewhat excessively drained Merrimac soils, well drained Haven soils, moderately well drained Ninigret soils, and poorly drained Raypol and Walpole soils. Included areas make up about 15 percent of this map unit.

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

Onsite septic systems function with normal design and installation, but they pollute the ground water in palces. Slopes of excavated areas are unstable. Lawns are easy to establish and maintain. Quickly establishing a plant cover and using mulch, temporary diversions, and sediment basins help to control erosion during construction.

CbB - 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 moderate or 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.

CbD - Canton and Charlton soils, 15 to 25 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.

CcB - <u>Canton and Charlton soils, 3 to 8 percent slopes, very stony.</u> 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 yellowish brown fine sandy loam, gravelly fine sandy loam, and gravelly sand 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 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 - <u>Charlton-Hollis, fine sandy loams, 3 to 15 percent slopes, very rocky</u> - 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.

CrD - <u>Charlton-Hollis fine sandy loams, 15 to 45 percent slopes, very rocky</u> - This complex consists of 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 in shape. Slopes are mainly convex and are 100 to 500 feet long. Stones and boulders 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 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.

Typically, the Hollis soils have a surface layer of dark grayish brown fine sandy loam 2 inches thick. The subsoil is yellowish brown gravelly fine sandy loam 12 inches thick. Hard, unweathered schist bedrock is at a depth of 14 inches.

Included with these soils in mapping are small areas of well drained Canton and Paxton soils; and moderately well drained Sutton and Woodbridge soils. Also included are areas with bedrock at a depth of 20 to 40 inches and a few small areas with slopes of more than 35 percent.

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 to moderately rapid permeability and rapid runoff.

The slope, exposed rock, and the depth to bedrock in the Hollis soils limit these areas for community development, especially as a site for onsite septic systems and buildings.

HcA - Haven silt loam, 0 to 3 percent slopes. This nearly level, well drained soil is on stream terraces and outwash plains. Areas are dominantly irregular in shape.

Typically, this Haven soil has a dark brown, silt loam surface layer 7 inches thick. The subsoil is brown, yellowish brown, and dark yellowish brown silt loam 16 inches thick. The substratum is light yellowish brown very gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of excessively drained Hinckley soils, well drained Agawam soils, and moderately well drained Ninigret and Tisbury soils. A few areas have a gravelly surface layer and subsoil. Included areas make up about 15 percent of this map unit.

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

Onsite septic systems function with normal design and installation, but they can pollute the ground water in places. Slopes of excavated areas are unstable. Quickly establishing a plant cover and using mulch, temporary diversions, and sediment basins help to control erosion during construction.

HcB - <u>Haven silt loam, 3 to 8 percent slopes</u>. This gently sloping, well drained soil is on stream terraces and outwash plains. Areas are dominantly irregular in shape and mostly 2 to 30 acres.

Typically, this Haven soil has a dark brown, silt loam surface layer 7 inches thick. The subsoil is brown, yellowish brown, and dark yellowish brown silt loam 16 inches thick. The substratum is light yellowish brown very gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of excessively drained Hinckley soils, well drained Agawam soils, and moderately well drained Ninigret and Tisbury soils. A few areas have a gravelly surface layer and subsoil. Included areas make up about 15 percent of this map unit.

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

Onsite septic systems function with normal design and installation, but they can pollute the ground water in places. Slopes of excavated areas are unstable. Quickly establishing a plant cover and using mulch, temporary diversions, and sediment basins help to control erosion during construction.

HkC - <u>Hinckley gravelly sandy loam, 3 to 15 percent slopes</u>. 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.

MyB - <u>Merrimac sandy loam 3 to 8 percent slopes</u>. This soil is gently sloping and somewhat excessively drained. It is on terraces and outwash plains of stream valleys. The areas are mostly irregular in shape. Slopes are smooth and convex and less than 200 feet long.

Typically, the surface layer is dark brown sandy loam 8 inches thick. The subsoil is yellowish brown sandy loam and loamy sand 16 inches thick. The substratum is yellowish brown gravelly sand and stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are small areas of excessively drained Hinckley and Windsor soils; well drained Agawam soils, and moderately well drained Sudbury soils. Included areas make up about 15 percent of the unit.

The water table of this Merrimac soil is commonly below a depth of 6 feet. The available water capacity is moderate. The soil has moderately rapid permeability in the surface layer and upper part of the subsoil, moderately rapid or rapid permeability in the lower part of the subsoil, and rapid permeability in the substratum. Runoff is slow to medium.

This soil generally is suited to community development, but the rapid permeability of the substratum causes a hazard of pollution to the ground water in areas used for septic tanks. Some slopes of excavations in this soil are unstable.

Nn - <u>Ninigret fine sandy loam</u>. This nearly level to gently sloping, moderately well drained soil is on outwash plains and stream terraces. Areas are dominantly irregular in shape. Slopes range from 0 to 5 percent.

Typically, this Ninigret soil has a very dark grayish brown, fine sandy loam surface layer 8 inches thick. The subsoil is yellowish brown, mottled fine sandy loam 18 inches thick. The substratum is pale brown, mottled loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well drained Agawam and Haven soils, moderately well drained Sudbury and Tisbury soils, and poorly drained Raypol and Walpole soils. Included areas make up about 15 percent of this map unit.

The Ninigret soil has a seasonal high water table at a depth of about 20 inches. Permeability is moderately rapid in the surface layer and subsoil and rapid in the substratum. The available water capacity is high. Runoff is slow or medium. Ninigret 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, and most sites require extensive filling. In places, onsite septic systems pollute the ground water. Slopes of excavated areas are unstable. Foundation drains help to prevent wet basements. Lawns are wet and soggy in the spring and fall. Quickly establishing a plant cover and using mulch, temporary diversions, and sediment basins help to control erosion during construction.

Rc - <u>Raypol silt loam</u>. This nearly level, poorly drained soil is on stream terraces and outwash plains. Areas are dominantly irregular in shape.

Typically, this Raypol soil has a very dark brown, silt loam surface layer 5 inches thick. The subsoil is yellowish brown and light brownish gray, mottled silt loam 22 inches thick. The substratum is light brownish gray, mottled gravelly fine sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Tisbury and Ninigret soils, poorly drained Walpole soils, and very poorly drained Scarboro soils. Included areas make up about 15 percent of the map unit.

The Raypol soil has a seasonal high water table at a depth of about 6 inches. Permeability is moderate in the surface layer and subsoil and rapid or very rapid in the substratum. The available water capacity is high. Runoff is slow. Raypol 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, and most sites require extensive filling. In places, onsite septic systems pollute the ground water. Slopes of excavated areas are unstable. Foundation drains help to prevent wet basements. Lawns are wet and soggy in the spring and fall. Quickly establishing a plant cover and using mulch, temporary diversions, and sediment basins help to control erosion during construction.

Rd - <u>Ridgebury fine sandy loam</u>. This nearly level, poorly drained soil is on drumloidal, glacial till, upland landforms. Areas are dominantly long and narrow. Slopes range from 0 to 3 percent.

Typically, this Ridgebury soil has a black, fine sandy loam surface layer 4 inches thick. The subsoil is gray and brown, mottled fine sandy loam, 16 inches thick. The substratum is very firm, brittle, grayish brown, mottled sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Rainbow and Woodbridge soils, poorly drained Leicester soils, and very poorly drained Whitman soils. A few small areas have stones and boulders on the surface. A few areas of the southeastern part of the county have a silt loam surface layer and subsoil. Included areas make up about 15 percent of this map unit.

The Ridgebury soil has a seasonal high water table at a depth of about 6 inches. Permeability is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. The available water capacity is moderate. Runoff is very slow or slow. Ridgebury soil warms up and dries out slowly in the spring.

The major limiting factors for community development are the slow or very slow permeability in the substratum and the seasonal high water table. Onsite septic systems need special design and installation, and most areas need extensive filling. Slopes of excavated areas slump when wet. Foundation drains help to prevent wet basements. Lawns are wet and soggy in the spring and fall. Quickly establishing a plant cover and using mulch, temporary diversions, and sediment basins help to control erosion during construction.

Rn - <u>Ridgebury, Leicester, and Whitman soils, extremely stony</u> - 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 is Ridgebury soils, 25 percent is Leicester soils, 15 percent is Whitman soils, and 10 percent is other soils. Some areas of this unit will consist of one of 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 and 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 slow to 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 lawns are soggy most of the year.

SwB - <u>Sutton fine sandy loam, 2 to 8 percent slopes, very stony</u> - This nearly level to gently sloping moderately well drained soil is on upland glacial till plains, hills, and ridges. Stones and boulders cover 1 to 8 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. Included 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. Lawns are wet and soggy in the fall and spring. Quickly establishing a plant cover and using mulch, temporary diversions, and sediment basins to help control erosion during construction.

Wd - <u>Walpole sandy loam</u>

This soil is nearly level and poorly drained. It is in depressions and drainageways on stream terraces and outwash plains. The areas are mostly irregular in shape. Slopes range from 0 to 3 percent.

Typically, the surface layer is very dark brown sandy loam 6 inches thick. The subsoil is mottled, dark grayish brown and grayish brown sandy loam and gravelly sandy loam 17 inches thick. The substratum is mottled, light brownish gray gravelly loamy sand and gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Ninigret, Pootatuck, and Sudbury soils; poorly drained Rippowam soils; and very poorly drained Scarboro soils. A few large areas have a surface layer of silt loam. Included areas make up about 10 percent of the unit.

This Walpole soil has a seasonal high water table at a depth of about 10 inches during fall and spring. This soil has moderately rapid permeability in the surface layer and subsoil and rapid or very rapid permeability in the substratum. Runoff is slow. The soil has moderate available water capacity.

This soil is mostly in woodland. Some areas are used for pasture or hay, and a few areas are in community development.

Drained areas of this soil are suited to cultivated crops. Even when drained, however, this soil remains wet for several days after heavy rains, restricting the use of farming equipment.

The soil is suited to woodland, but seasonal wetness causes a high rate of seedling mortality and restricts the use of some types of harvesting equipment. Uprooting is a hazard during windy periods.

The seasonal high water table is a major limitation of this soil for community development, especially for on-site septic systems. Steep slopes of excavations in this soil are unstable. Lawns on this soil are soggy in fall and spring and after heavy rains.

WyB - Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony.

This soil is nearly level to gently sloping and moderately well rained. It is on the tops and side slopes of drumlins and hills on glacial till uplands. The areas are mostly long and narrow or irregular in shape. Stones cover 1 to 8 percent of the surface.

Typically, the surface layer is very dark grayish brown fine sandy loam 8 inches thick. The subsoil is mottled, dark yellowish brown, and yellowish brown fine sandy loam 22 inches thick. The substratum is firm to very firm, olive gray fine sandy loam, and gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well drained Paxton soils, moderately well drained Sutton soils, and poorly drained Leicester and Ridgebury soils. A few small areas do not have stones on the surface. Included areas make up about 10 percent of the unit.

This Woodbridge soil has a seasonal high water table at a depth of about 20 inches from fall to spring. The available water capacity is moderate. This soil has moderate permeability in the surface layer and subsoil and slow to very slow permeability in the substratum. Runoff is medium.

Most areas of this soil are in woodland. A few areas are in pasture, and a few are in community development.

This soil generally is too stony for cultivation, but is well suited to woodland. Stone removal makes the soil well suited to cultivated crops, but is difficult. Seasonal wetness is an additional limitation of the soil for crops.

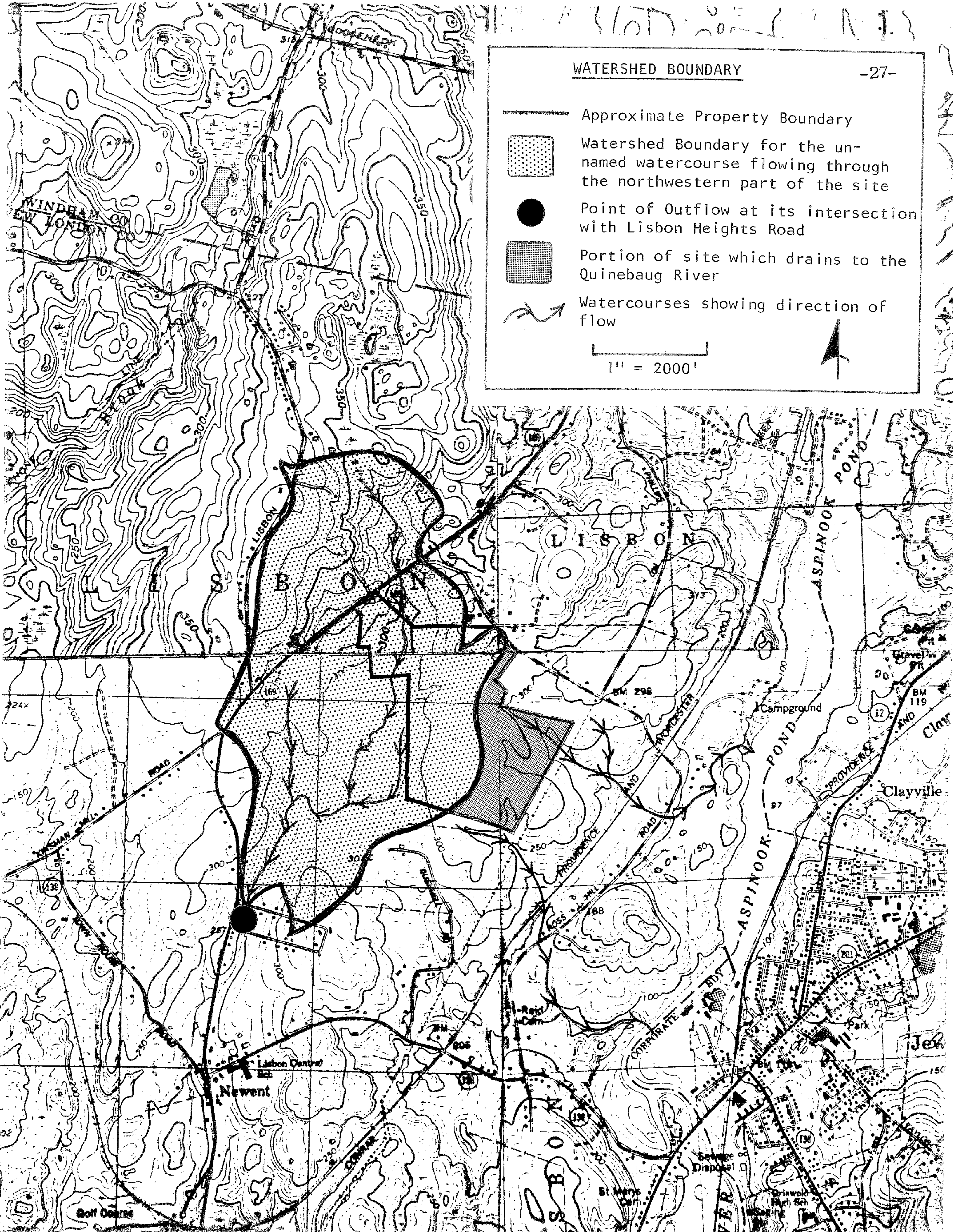
The water table and the slow or very slow permeability in the substratum are the main limitations of this soil for community development, especially for on-site septic systems. Lawns on this soil are soggy in the autumn and spring and after heavy rains.

V. HYDROLOGY

Surface water and to a large extent subsurface water within the parcel can be divided roughly into two (2) drainage areas. Runoff emmanating from the northwestern parts of the site drains to an unnamed tributary to Blissville Brook. Blissville Brook ultimately discharges into the Shetucket River. This unnamed watercourse and its accompanying watercourse flows through lots 8, 9, 13 and 101-104. Runoff arising from the southeast portions of the site is ultimately routed by unnamed watercourses to the Quinebaug River.

The subdivision of the property as planned, followed by the construction of new homes, driveways and 10,000 linear feet of paved road, would be expected to lead to increases in runoff from each of the watersheds described above. According to the project engineer, drainage calculations have not been prepared to date. Because of the large number of homes proposed and because the proposed access road will comprise almost seven (7) acres of impervious surface, it is strongly recommended that the applicant's engineer prepare a stormwater management plan which includes pre-and post runoff calculations. Drainage calculations should include computations for the 2, 10, 25 and 100 year storm-events. Once drainage calculations have been prepared the Town should have their Town engineer check the calculations as well as the stormwater plan for accuracy and completeness. If the Town does not have a Town Engineer, perhaps an engineer knowledgeable in hydrology could be retained to review the proposed plan and calculations. This should be done before the subdivision plan is approved. A close look at downstream culverts for both watersheds is warranted.

If drainage calculations indicate substantial increases in runoff from the site, a likely resolution for controlling post development would be the installation of one (1) or more detention basins. Some of the swampy areas within the site have at least some ability to regulate streamflows. During periods of heavy rainfall or snow melt, these areas store surface water temporarily, releasing it more slowly than would otherwise be the case, and thereby reducing the peak flows in streamcourses on the site. Because these swampy areas are already detaining stormwater to some degree, detention basin(s) proposed for the site should be constructed on upland soils. Present plans indicate that a pond is proposed in the southwestern corner of the site. A small pond presently exists at the southwestern tip of the proposed pond. According to the project engineer, the pond would be about 25-35 feet deep. Based on available surficial and bedrock geologic mapping, it appears that bedrock would probably be encountered at around ten (10) feet. Also, the slope of the land in the area of the proposed pond may preclude the construction of a pond as large as shown on the plan. Detailed testing, which includes borings, will need to be conducted before the pond is constructed. Detailed plans for this proposed pond and/or any other detention basis, should first be submitted to Town officials for their review as well as the Soil Conservation Service in Norwich.



WATERSHED BOUNDARY
Approximate Property Boundary
Watershed Boundary for the un-named watercourse flowing through the northwestern part of the site
Point of Outflow at its intersection with Lisbon Heights Road
Portion of site which drains to the Quinebaug River
Watercourses showing direction of flow
1" = 2000'
WINDHAM CO
NEW LONDON CO
LISBON
L I S B O N
ASPINOOK POND
Campground
Clayville
Newent
Lisbon Central Sch
Reid Cem
St Marys Cem
Sewage Disposal
Golf Course
BM 298
BM 119

On July 1, 1985, the Connecticut Soil Erosion and Sediment Control Act (P.A. Number 83-398) was put into effect. As a result, a thorough erosion-sediment control plan will be required and should be enforced. Special attention should be directed at the moderately sloping areas in the southeast corner. Also, any disturbed water on the site should be properly contained and filtered in order to avoid environmental damage and complaints from neighbors. For example, where streamcourses are crossed, there is a good chance that excavating will cause finer soil particles to be mobilized, thereby causing silt-laden waters.

It is advised that Town officials closely monitor erosion and sediment control measures throughout the construction phase and after storm events.

VI. GEOLOGIC DEVELOPMENT CONCERNS

According to present plans, each of the proposed lots would require on-site septic systems and individual water supply wells. Although the applicant's engineer stated that approximately 120 deep test pits have been excavated throughout the site, mainly for determining the suitability for on-site sewage disposal systems, the results of the deep test hole were not made available to Team members except through verbal communication with the project engineer on the review day.

Based on visual observations, verbal communications with the project engineer, and available surficial, bedrock and soil mapping, the major geological limitations which may pose constraints with respect to the proposed subdivision include: 1) areas in the easternmost sections of the site whose bedrock is at or near the ground surface; and 2) the presence of till-based soils which may have slow percolation rates and/or seasonally high groundwater conditions. It should be noted that percolation tests have not been conducted to date (September 11, 1986). In addition to the geologic limitations mentioned above, wetland soils and alluvial deposits on the site hold little potential for development.

Soils which are classified a inland-wetland soils are regulated under Public Act 155 in Connecticut. Any activity which involves modification, filling, removal of soils, etc., will require a permit and ultimate approval by the Town's Inland Wetland Commission. Although the wetland areas on the site appear to be relatively narrow, they have at least some ability to reduce runoff and control water quality. For this reason, it is recommended that disturbance to the wetland area on the site be minimized.

Based on present plans, it appears that inland-wetland soils will need to be crossed in order to construct the proposed interior road system and driveways, depending upon house locations.

Although undesirable, wetland road crossing are feasible provided they are properly engineered. The road should be constructed adequately above the surface elevation of the wetlands. This will allow for better drainage of the road and also decrease the frost heaving potential of the road. Road construction through wetlands should preferably be done during the dry time of the year and should include provisions for effective erosion and sediment control. Finally, culvert(s) should be properly sized and located so as not to alter the water levels in the wetland or cause flooding problems.

VII. SEWAGE DISPOSAL

The geologic limitations mentioned earlier will weigh heaviest in the potential for installation of on-site subsurface sewage disposal systems. These limitations may also pose constraints in terms of foundation placement, and road and driveway construction.

The soils, as indicated by soil survey mapping data, over a considerable portion of the property in question appear to be relatively or quite permeable. However, some of this soil has a high seasonal groundwater table. There also appears to be limited, an area near Route 169 which is underlain with firm, tight soil, and a section near the southeast side which should contain some areas of shallow ledge rock.

No doubt, in a considerable portion of the parcel, subsurface sewage disposal systems would need to be kept relatively shallow in order to be sufficiently elevated above the maximum water table. On some areas of the site, it will probably be necessary to elevate the leaching systems in suitable fill. In the case where the area tends to also be underlain with a compact soil layer, drainage improvements such as by curtain drains, to control perched groundwater may also be needed.

Although no soil percolation test results were available at the time, there is indication of, and concern that, areas of the property would possibly have high permeable soils. Where the minimum percolation rate is faster than one (1) inch a minute special measures should be considered in order to protect ground and surface water from pollution. In general, separating distances should be increased in order to provide more lateral distance in which sewage effluent can receive treatment and undergo renovation and dilution. Also, in the design of systems, leaching areas should be elevated as much as possible above groundwater. It is also important to know the depth to any underlying ledge rock as a greater separating distance needs to be maintained between the bottom area of a leach system and ledge rock. In order to assess that suitable area exists, a sufficient number of deep test pits are needed on each lot to establish a bedrock profile.

It was indicated to Team members on the review day, that soil testing was conducted during the month of August. Because the soil testing was conducted during the dry time of the year (summer), it might be wise to retest the wetter lots during the spring when water tables are usually at their highest.

Overall, the parcel appears to be generally feasible for subdivision and subsurface sewage disposal purposes. However, before a final determination of possible subdivision density (lots) is made, all watercourses and wetlands areas should be designated, along with any areas having rock outcrops or very shallow soil depths to ledge rock. Sufficient on-site testing should be conducted and evaluated. In some areas it may also be necessary to monitor groundwater (wet period) in order to determine the maximum groundwater level.

It also appears that a number of possible lots in the subdivision will require detailed engineering plans for the sewage disposal system. It may also be necessary to make realignments of the present preliminary layout, which could lead to a reduction in the number of overall lots on the site.

VIII. WATER SUPPLY

Since public water is not available to this site, individual on-site wells will need to be developed on each lot of the subdivision. Because the sand and gravel deposits on this site are not that extensive the underlying bedrock would be the most likely aquifer to be tapped. Sand and gravel deposits, if saturated, can generally yield water at a high rate compared to wells tapping crystalline metamorphic bedrock. Nevertheless, bedrock wells can generally yield quantities of water adequate for most domestic uses. The exact yield of a bedrock-based well is a function of many hydrogeologic factors, including the number and size of fractures present in the bedrock. Because the fractures are unevenly spaced throughout the rock, there is no practical way, short of expensive geophysical tests, to assess the potential of any particular site for a satisfactory well.

Connecticut Water Resources Bulletin Number 11 (Shetucket River Basin), which include the subject site, indicates that 90% of the 134 wells assessed in the study yielded at least three (3) gallons per minute. A well yielding three (3) gallons per minute or more should adequately meet the needs of most domestic households.

A survey of several well completion reports for drilled wells serving homes along Ross Hill Road indicated varying yields:

1. 2.5 gallons per minute at a depth of 500 feet.
2. 3.0 gallons per minute at a depth of 23 feet.
3. 8.0 gallons per minute at 140 and 160 feet (2 wells).
4. 9.0 gallons per minute at 180 and 200 feet (2 wells).
5. 17.0 gallons per minute at 200 feet.
6. 20.0 gallons per minute at 100 and 120 feet.
7. 25.0 gallons per minute at 100 feet.
8. 30.0 gallons per minute at 130 feet.
9. 30 gallons per minute at 230 feet.

The latter well data was obtained from a well serving a residence three-tenths (3/10) of a mile southwest of the intersection of Ross Hill Road and Phillips Road. As indicated by these well completion reports, the yield of bedrock wells in the area are moderately high (most of which exceed three (3) gallons per minute) and were attained at relatively shallow depths (230 feet or less). This goes along with the findings of Water Resources Bulletin Number 11 which states that "water bearing fractures diminish in number and yield with depths". Because fractures in the rock generally occur within the first 100-250 feet of bedrock surface, it has been shown that the probability of increasing the yield of a well decreases with depth below this level.

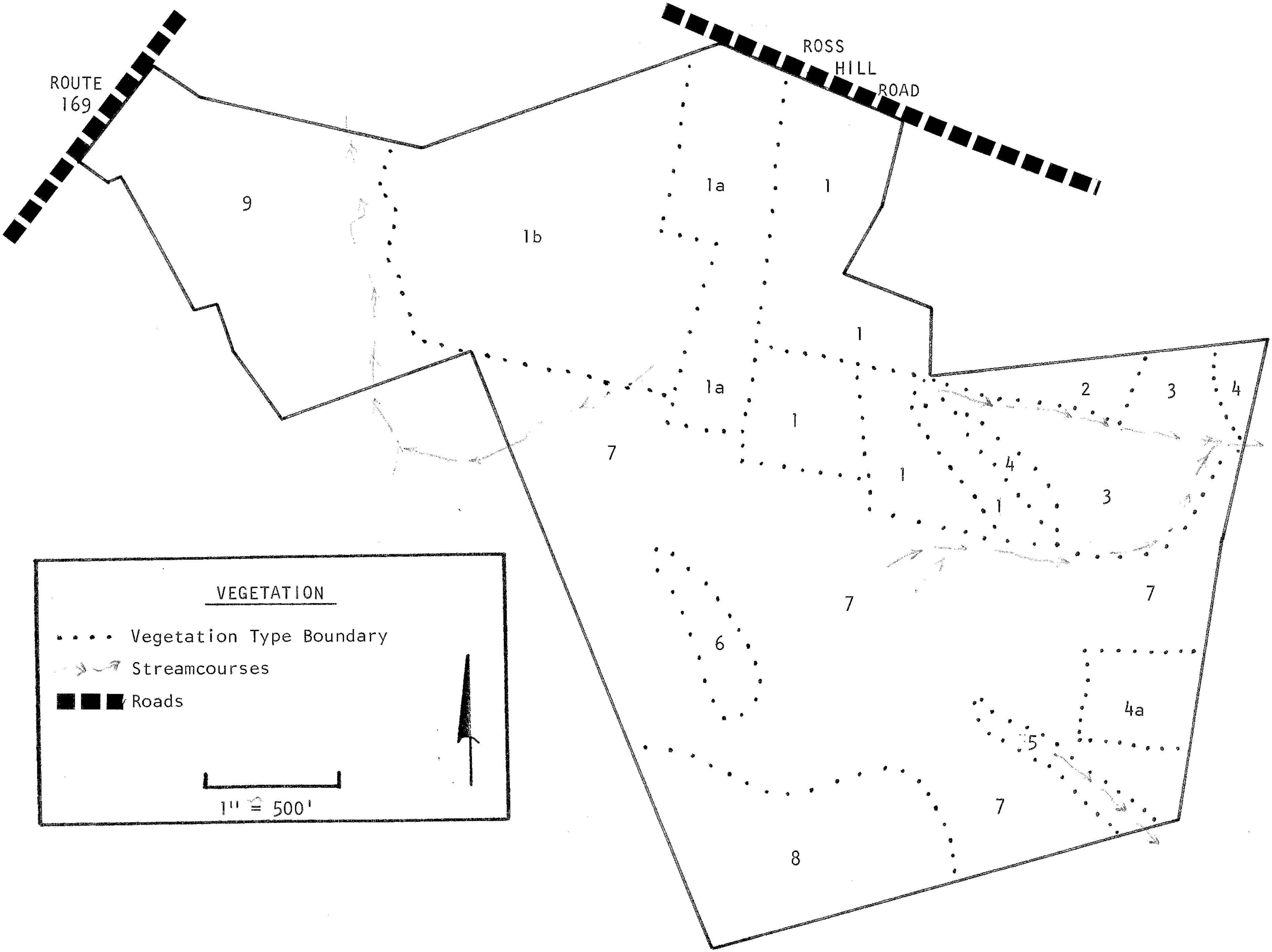
Each well should ideally be located on a relatively high portion of a lot, properly separated from the sewage disposal system or any other potential pollutant (e.g., fuel oil storage tank, etc.) and in a direction opposite the expected direction of groundwater movement. Of particular concern in some portions of the site are areas having shallow depths to bedrock and moderate slopes. These adverse conditions can allow for the rapid movement and wide dispersal of sewage effluent through fractures in bedrock without providing adequate filtration and renovation of the sewage effluent. As a result, there is a potential for wells, which may also derive their source of water from the same rock formation, to be subjected to septic effluent contamination.

In areas where a number of wells are drilled relatively close together, there is a chance of well interference (that is, the yield of one (1) well detracting from the yield of another). As a result, it is advisable to space wells conservatively, if possible, to minimize the risk of mutual interference. Most of the site is zoned R-40 or 40,000 square foot lots. It seems likely that a 200 foot separating distance could be maintained between neighboring wells, although this would depend on the actual lot configuration.

The water quality of the groundwater may be expected to be good. However, there is a chance that water produced from wells tapping the underlying bedrock may be mineralized with elevated levels of iron and manganese. Elevated levels of iron in water is objectionable mainly from an aesthetic standpoint because it imparts a brownish color to laundered goods and may affect the taste of water or beverages such as tea and coffee made with the water. For the most part, elevated manganese levels are objectionable for the same reasons as iron.

The recommended limit for iron in water is 0.3 milligrams per liter and parts per million and .05 mg/l and ppm for manganese (Source: U. S. Environmental Protection Agency, Office of Drinking Water, "National Interim Primary Drinking Water Regulations").

If the levels of iron and/or manganese exceed the above recommended limits, the water may need to be treated by filtration equipment.


ROUTE 169
ROSS HILL ROAD
9
1b
1a
1
1a
1
1
1
7
4
1
2
3
4
3
7
7
6
4a
5
7
8
VEGETATION
Vegetation Type Boundary
Streamcourses
Roads
1" = 500'

IX. VEGETATION

This 188 acre area is comprised of about 53 acres of open land (field, pastureland, and building sites), and 135 acres of woodland. Most of the woodland is mixed hardwood with three (3) small areas of mixed red cedar and hardwoods.

Different forest type delineations are shown on the vegetation map and are described as follows:

Area #1--Pastureland: These are improved pastures, in that there is little or no brush, but some of the area is quite rough with many stones showing. Most of the area is grass, but the wettest sites have been overrun with goldenrod and small shrubs.

Area #1a is a mowing or hay production lot.
Area #1b is newly seeded land.

Area #2: This area was cut for sawlogs eight (8) to ten (10) years ago. The harvest was quite heavy and left only a light stand of 6"--10" trees. Most of these trees are red maple, but there is some shagbark hickory and red oak in the overstory. The understory is quite variable. In the moister areas along the drainage, there is a thicket of spice bush and sweetpepper bush. The upper slope is mostly sweetpepper bush and seedlings--saplings of the overstory trees.

Area #3: This is an unthinned mixed hardwood stand. This is a good hardwood growing site and is dominated by red and black oaks. There is also black birch, red maple, and large-toothed aspen. Because the stand is quite dense, there is not much understory except along the drainage where there is some sweetpepper bush, northern wild-raisin and a scattering of mapleleaf viburnum.

Area #4: These areas were more recently field areas as evidenced by the presence of considerable red cedar in the stand. The predominant tree size is four (4) to six (6) inches and under 30 years of age. These are the only conifer stands on the property. Fields number four (4) are on good sites and the red cedar is mixed with black oak, hickory and black birch.

Area #4a might appear to be the same, but it is a poor growing site as indicated by the hardwood component being almost totally scarlet oak with a few red maples and gray birches. The understory is Princess pine, huckleberry, bayberry and common juniper, whereas, the better sites have only light stands of poison ivy, woodbine and mapleleaf viburnum.

Area #5: This is a minor drainage area and is somewhat typical of several other unmapped and poorly defined areas. These areas are slightly lower than the surrounding area and become seasonal streams or drains. The overstory contains a little more red maple and white ash than the rest of the area, but the real noticeable difference is the dense path of sweetpepper bush and blueberry bushes along these watercourses.

Area #6: This area is somewhat different from Area #5 in that this appears to be more of an area of seasonally impounded water rather than a drainage. This overstory is almost pure red maple with a few black gum, and along the delineating edge a mixture with the oaks. The understory is a dense tangle of highbush blueberry, spice bush, sweetpepper bush and greenbrier.

Area #7: This general area covers most of the rest of the forested area. The area was cut for sawlogs four (4) to five (5) years ago, but in most areas the harvest was fairly light, which left the area pretty well stocked with good quality trees 6 inches to 14 inches in diameter. The overstory trees include black, white and red oaks, pignut and shagbark hickories, black and yellow birch, beech, red maple, and scattered white ash. There is a good stand of seedlings---saplings of all the overstory species coming along in the understory. There are few real thickets of brush, but conditions and species change with the intensity of the harvest operation. Other less important species include mapleleaf viburnum, blueberry, red cedar, goldenrods, flowering dogwood, sassafras, poison ivy, woodbine, and beaked hazelnut.

Area #8: This area is separated from Area #7 in that the stand was not cut. In general the area is drier and not as good a growing site, so it had less volume of sawlogs that could be harvested. The overstory is more dense because of the lack of harvesting. Species include scarlet and black oaks, white ash, pignut and shagbark hickories, beech and red maple. The understory is sparse with some hickory, sweetpepper bush, chestnut, beaked hazelnut, hornbeam, and mapleleaf viburnum.

Area #9: Much of this area was logged quite heavily eight (8) to ten (10) years ago, leaving a fairly thin overstory stand of red maple and black oak, with some black gum in the moister areas along the stream drainage. Lesser vegetation includes tangles of spice bush, sweetpepper bush, and greenbrier. There are also thickets of wild raisin and silky dogwood. With a high seasonal water table and a minimum overstory shade, this lush growth has made impenetrable thickets.

A development of this intensity will most certainly have an effect on this woodland. Aside from the fact that this area will be carved up by a series of roads, many tree roots will be damaged by the excavation for basements and power lines. This damage will show up in five (5) to ten (10) years by loss of tree vigor and the increase in mortality. Of greater importance is changing of the water table. Most of the woodland has a fairly high water table; but impeding any of this drainage will cause large scale mortality, and conversely lowering the water table will cause a loss of tree vigor, which in combination with the physical barriers of paving will cause individual tree deaths. Also, windthrow or trees being blown over is a real possibility where lanes and alleys (roads) are opened up in these stands; however, the wettest areas, i.e., the area where the trees are shallowest rooted have been delineated as open space, with a minimum of openings. This should provide protection to some of these more sensitive areas.

Careful observance and control of groundwater management should negate many of the potential problems with the tree and plant cover in the area.

X. TRAFFIC

With regard to traffic, data from the Connecticut Department of Transportation[1] indicates that such a subdivision can be expected to generate 10.6 trips per dwelling unit per weekday. A trip is defined as either beginning or ending at the dwelling unit where it is generated. For example, a shopping expedition by a resident of the subdivision would require two (2) trips, one departing from the resident's house, and one returning to it. On this basis, the subdivision containing 120 houses can be expected to generate 1,272 trips per day. The Department of Transportation data cited above also indicates that 7.9% of these trips or 100 can be expected to occur in the morning peak hour from 7:00 to 8:00 a.m. and 10.1% or 128 can be expected to occur in the evening peak hour from 5:00 to 6:00 p.m.

The next question is that of the routes that this traffic will follow in entering and leaving the subdivision. Two (2) access roads to the development are proposed; one connecting to Ross Hill Road and the other connecting to Route 169. Ross Hill Road is a comparatively narrow and curved Town road, while Route 169 is a quite commodious two-lane State highway. Route 169 also gives good access to the highway network in the region and the Town, while Ross Hill Road is strictly local; although it does connect with Route 169 about one-half (1/2) mile west of the proposed access point to the subdivision. Ross Hill Road would be expensive to improve because of the necessary acquisition of property.

It thus seems highly desirable that traffic to the subdivision be encouraged to use the access point from Route 169 as much as possible. To some extent, this will occur naturally because the roads within the subdivision will be built to a much higher standard than is Ross Hill Road, and because the subdivision road network will provide a route to Route 169 parallel to Ross Hill Road from the majority of the lots. It would seem that most commuting and shopping trips would normally use Route 169. It appears that the subdivision design should encourage this pattern as much as possible, in order to minimize the impact on Ross Hill Road.

Connecticut Department of Transportation data show that the average daily traffic (ADT) on this section of Route 169 in 1985 was 2,700 vehicles, although south of Ross Hill Road between Kinsman Hill Road and Kimball Road, the ADT was 4,100 vehicles. Using very approximate formulas published by the Department, it can be calculated that currently, where the ADT is 2,700 vehicles, the volume to capacity ratio on Route 169 was 0.162, and where the ADT is 4,100 vehicles, the volume to capacity ratio is 0.246. These two (2) figures increase to 0.210 and 0.294 if we assume that 75% of the 1,272 trips generated by the subdivision will use Route 169 and not Ross Hill Road. While these are significant increases in volume to capacity ratio, they suggest that Route 169 will still be easily capable of handling the traffic caused by the subdivision.

Nevertheless, it is desirable that the developer does what he can to prepare for the possible widening of Ross Hill Road in the future by providing a strip of land for such widening along the subdivision's frontage.

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[1] Trip Generation Study of Various Land Uses, by Isarel Zevin, 1974.

XI. OPEN SPACE

In a relatively less intensively developed Town like Lisbon, it is highly desirable to set aside some area for recreational use in a subdivision of this size. Even though the Town has recently acquired the 70-acre Whitaker property, a neighborhood facility that could be reached on foot from the development would be very useful, especially for children. It would also help to provide a sense of identity for the subdivision's residents. It would seem that the highest priorities should go to a playground for small children and a field that could be used for various kinds of team sports, such as baseball, touch football or soccer.

It would be possible that a recreational facility could be managed by an association of the property owners in the subdivision, or it could be deeded to the Town, if the Town was willing to undertake its management. The important point is to have the facility in existance and available for use.

Currently, there are many opportunities for less organized outdoor recreation activities in Lisbon, such as hiking and fishing. However, as the Town grows, these will diminish. An area that could be retained in its natural state within the subdivision property would seem to be a good investment for the future. Here, as well as Town ownership and a resident's association, ownership by a land trust would be a possibility.

Related to the subject of open space and recreation is that of cluster development. The cluster development concept maintains the overall density permitted by zoning for the subdivision of any given property, but allows the individual lots to be reduced in size so that there will be land left over which can be used as open space. This concept is especially useful in dealing with large subdivisions such as the one under discussion here, as it is possible to maintain more of the open character of the existing landscape than is the case with a design based on conventional zoning.

Section 9.9 of the Lisbon Zoning Regulations permits the cluster concept to be utilized. However, the provisions in this regulation make the concept unattractive to a developer, because in determining the permitted number of lots, it is required that areas with development limitations such as wetlands, rock outcrops, and steep slopes be subtracted from the total area of the parcel. Since this is not required under the normal zoning procedures, fewer lots are permitted under the cluster provisions than under the conventional regulations.

It would seem that the Commission might consider revising the cluster regulations since they could prove useful upon receipt of some future subdivision application.

XII. SUMMARY

NOTE: This is a brief summary of the major concerns and reccomendations of the Team. You are strongly urged to read the entire report, and to refer back to the specific sections in order to obtain all the information about a certain topic.

--Wetlands on the site should be flagged in the field and surveyed onto the proposed plan.

--A detailed soils study should be done because the number of lots proposed warrants a closer look at the soils and their suitability for on-site sewage disposal.

--It is recommended that because of the large number of homes proposed and the amount of road to be built that the applicant's engineer prepare a stormwater management plan which includes pre-and post runoff calculations. The Town engineer should check the drainage calculations and stormwater management plan for accuracy and completeness.

--Downstream culverts should be examined in both watersheds of the parcel.

--If drainage calculations indicate substantial increases in runoff, a likely resolution would be the installation of one (1) or more detention basins. (See page 26 for futher detail.)

--Detailed testing, which includes borings, will need to be conducted before a pond is constructed. Detailed plans for the proposed pond and/or any detention basins should first be submitted to Town officials as well as the Soil Conservation Service.

--It appears that the major geological limitations to the development are: 1) areas in the easternmost sections of the site where bedrock is at or near the ground surface, and 2) the presence of till-based soils which may have slow percolation rates and/or seasonally high groundwater conditions.

--Wetland road crossings for roads and driveways are feasible provided that they are properly engineered. Town officials should closely monitor erosion and sediment control measures throughout the construction phase and after storm events.

--Overall, the parcel appears to be generally feasible for subdivision and subsurface sewage disposal purposes but before a final determination of subdivision density is made all wetlands, watercourses, rock outcrops and areas of shallow soil depths to bedrock should be designated. On-site testing should be evaluated, and it may be necessary to monitor groundwater in order to determine the maximum groundwater level.

-It appears that a number of the lots in the subdivision will require detailed engineering plans for sewage disposal systems. It may be necessary to realign the present layout which could result in a reduction in the overall number of lots.

--Individual on-site wells will likely tap the underlying bedrock aquifer. The water quality of the groundwater may be expected to be good.

--Careful observance and control of groundwater management should negate many of the potential problems with tree and plant cover in the area. (See page 34 for further detail.)

--It seems highly desirable that traffic to the subdivision be encouraged to use the access point from Route 169 as much as possible in order to minimize the impact on Ross Hill Road.

--Route 169 will be easily capable of handling any traffic caused by the subdivision.

--It is desirable that the developer do what he can to prepare for the possible widening of Ross Hill Road in the future by providing a strip of land for widening along the subdivision's frontage.

--A neighborhood recreation facility would be highly desirable in a subdivision of this size. It could be managed as an association of subdivision property owners or it could be deeded to the Town, or given to a land trust.

--The Planning and Zoning Commission may want to consider revising their cluster development regulations to make them more attractive to developers.

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--an 86 town 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, a statement identifying the specific areas of concern the Team should address, and the time available for completion of the ERT study. 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 Elaine A. Sych (774-1253), Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, P.O. Box 198, Brooklyn, Connecticut 06234.