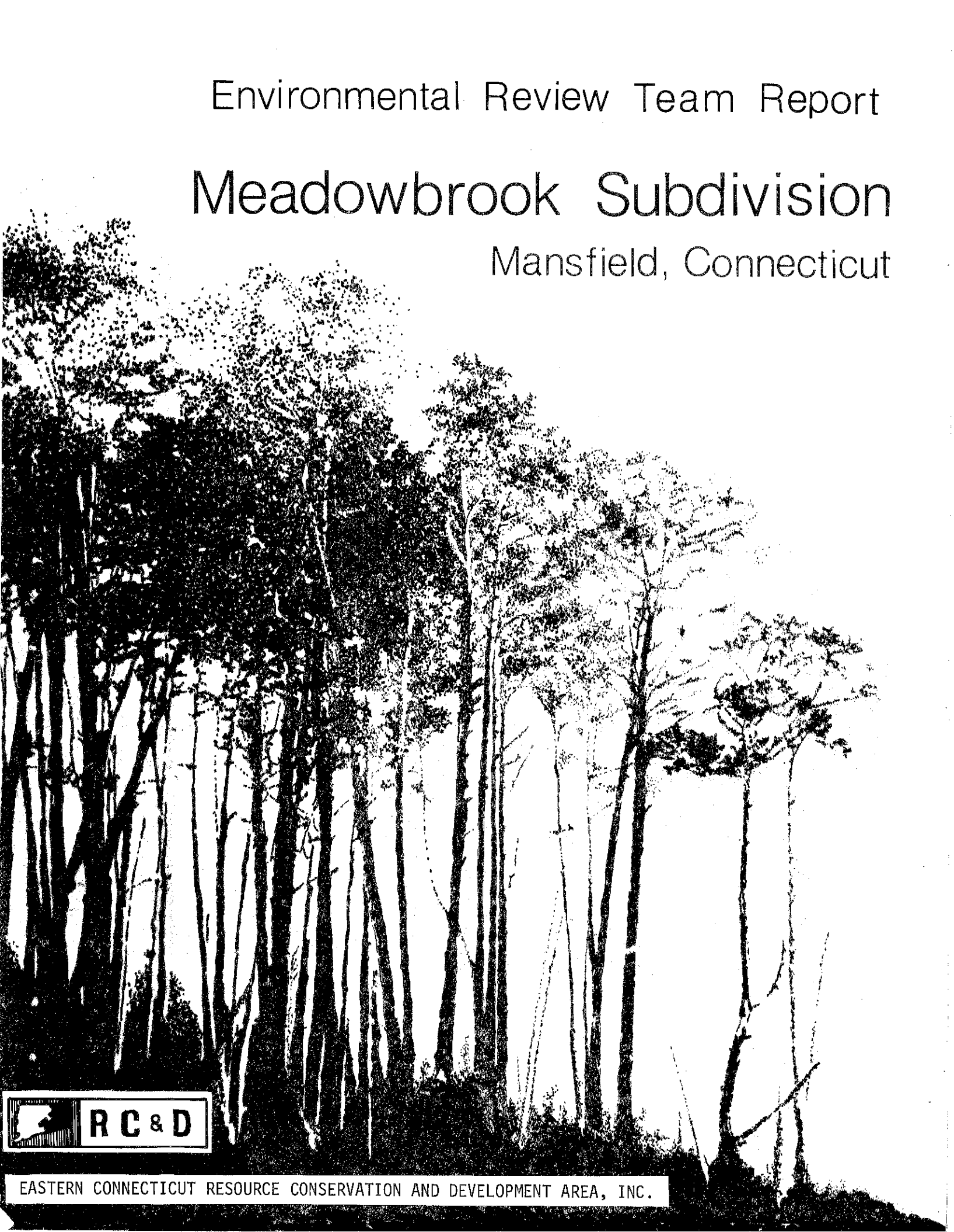
Environmental Review Team Report

Meadowbrook Subdivision

Mansfield, Connecticut



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EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

ENVIRONMENTAL REVIEW TEAM REPORT
ON
MEADOWBROOK SUBDIVISION
MANSFIELD, CONNECTICUT

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

The soils of the site were mapped by a soil scientist of the United States Department of Agriculture (USDA), Soil Conservation Service (SCS). Reproductions of the soil survey map as well as a topographic map of the site were distributed to all ERT participants prior to their field review of the site.

The ERT that field checked the site consisted of the following personnel: Tim Dodge, District Conservationist, SCS, Mike Zizka, Geologist, Department of Environmental Protection, (DEP); Don Smith, Forester, (DEP); Ernest Julian, Sanitarian, State Department of Health; Les Barber, Regional Planner, Windham Regional Planning Agency; and Jeanne Shelburn, ERT Coordinator, Eastern Connecticut RC&D Area.

The Team met and field-checked the site on Thursday, February 9th, 1978. Reports from each Team member were sent to the ERT Coordinator for review and summarization for the final report.

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

The Eastern Connecticut RC&D Project Committee hopes you will find this report of value and assistance in making your decisions on this particular site.

If you require any additional information, please contact: Ms. Jeanne Shelburn, Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, 139 Boswell Avenue, Norwich, Connecticut 06360, 889-2324.

INTRODUCTION

The Eastern Connecticut Environmental Review Team was asked to review an 80-acre parcel in the private ownership of Mr. Robert Welsh, president of Welco Construction Company. The parcel is located at the intersection of Puddin Lane and Mansfield City Road in the Town of Mansfield.

The site appears to have been recently used for agricultural purposes. The most notable features of the site are the open, rocky fields, the centrally located brook and associated wetlands, the rocky outcrops and the south central forested area, consisting of both deciduous and evergreen species.

Three schematic proposals for subdivision of the property were submitted to the Team for review. The first proposal, which is currently awaiting permit approval, includes a subdivision of the periphery of the property into 16 one acre lots for home construction with on site septic systems and on site wells. The remaining 64 acres would be held in open space for future development.

The second proposal encompasses the entire parcel, subdividing into 65 one acre lots with on site septic systems and on site wells. This proposal would accomodate single family dwellings on the entire parcel. The third proposal, also for the entire 80 acre parcel, is a combination of the original 16 single family homes on the periphery of the site and 239 to 472 multi-family dwelling units on the interior of the site. The multi-family units will be served by public water and sewer systems. An 11 acre greenbelt will be provided for open space and recreation.

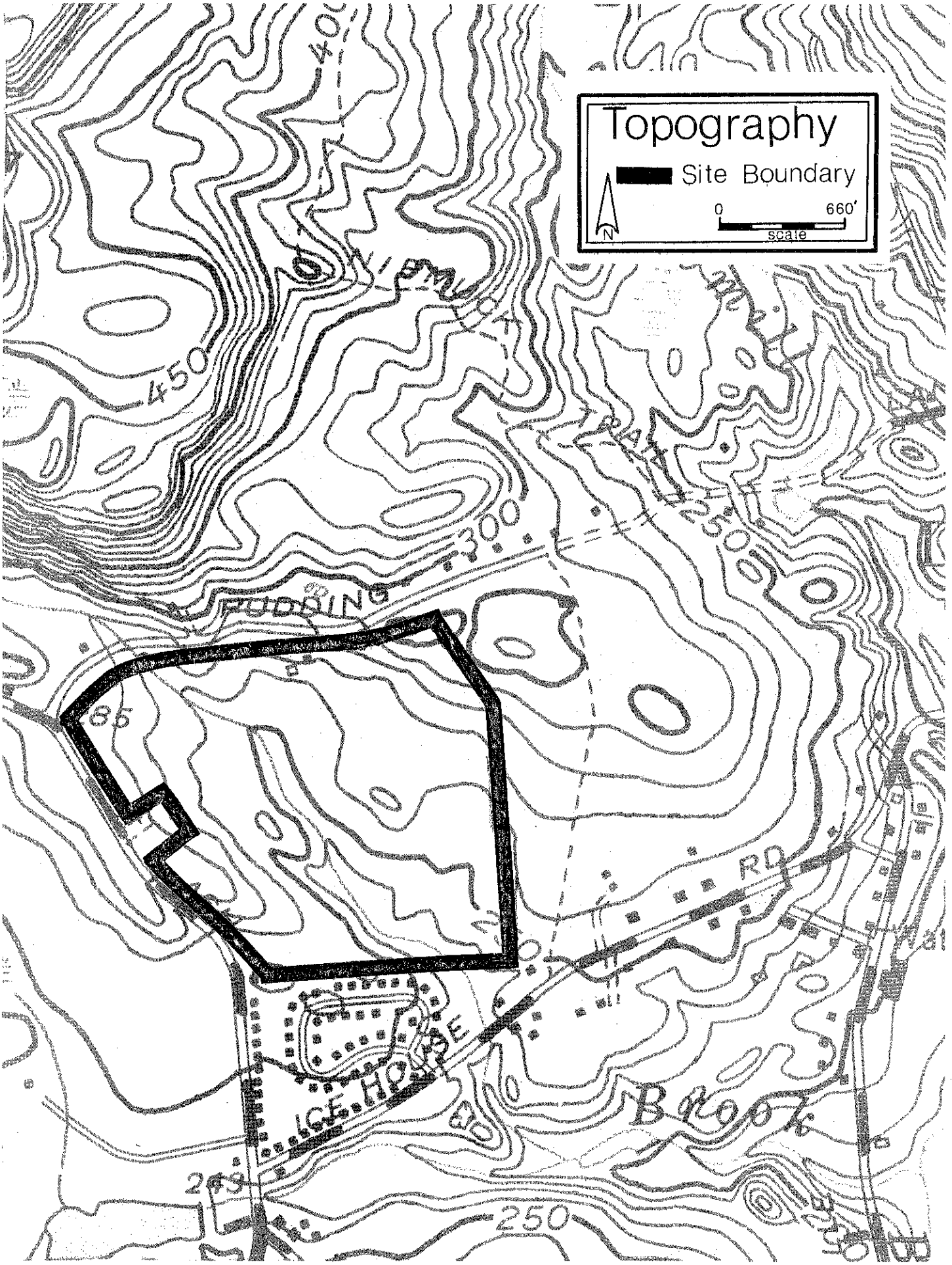
Some aspects of the proposed development discussed by the Team involved waste disposal, the need for an erosion and sedimentation control plan to reduce the potential hazard of siltation and possible pollution into the brook and wetland, the desirability of avoiding the wetlands for any type of construction and the possibility of some modified form of cluster development for more imaginative use of natural site characteristics.

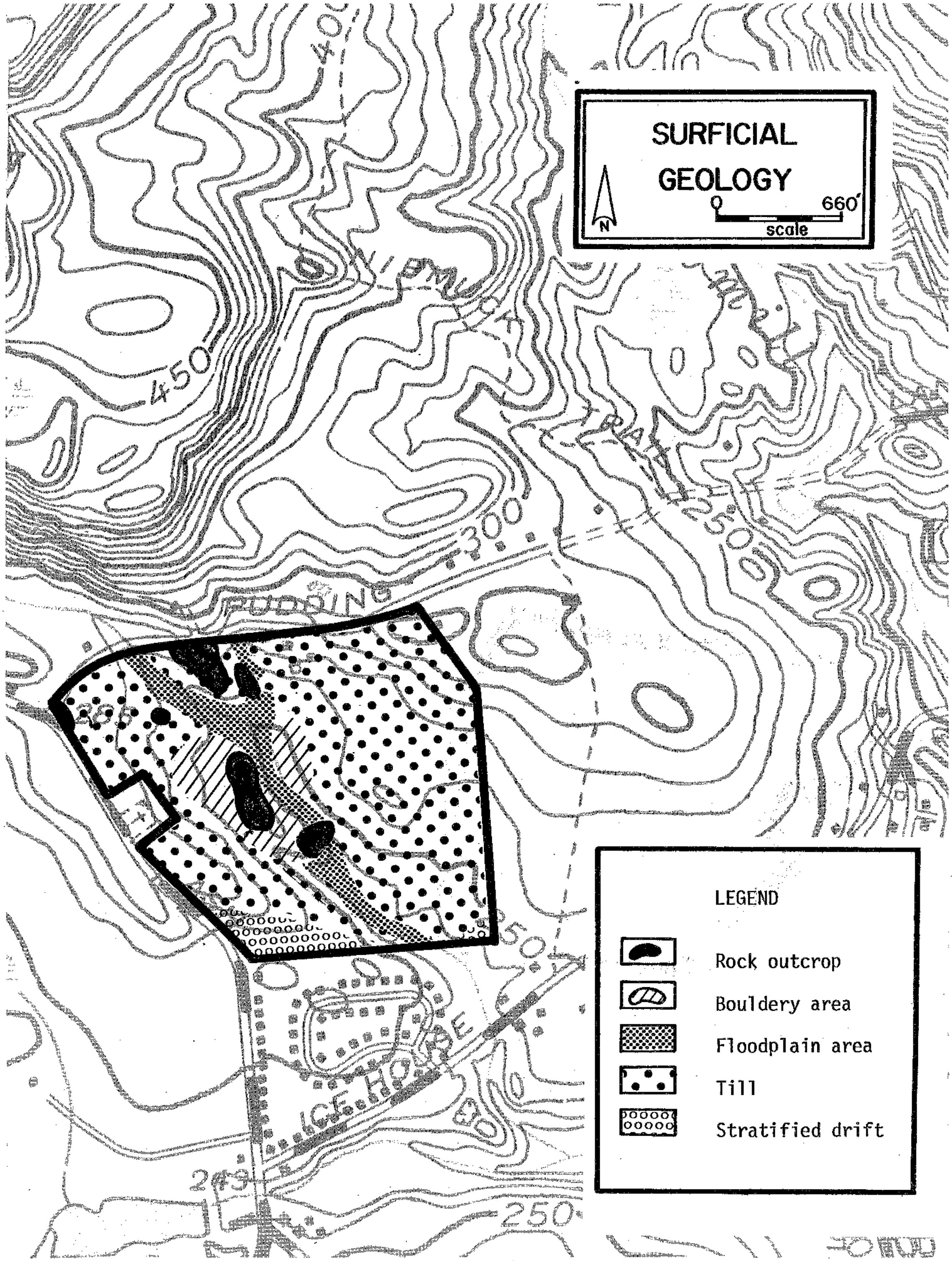
This report will describe the natural resources of the site and discuss them in relation to their compatibility with the proposed development. Comments or recommendations made within the report are presented for consideration by the developer and the Town in the preparation and review of development plans, and should not be construed as mandatory or regulatory in nature.

ENVIRONMENTAL EVALUATION

GEOLOGY

The Meadowbrook Subdivision site contains a thin, unconsolidated blanket of glacial materials over bedrock. The bedrock consists primarily of Willimantic Gneiss, a lineated metamorphic unit rich in quartz and potassium feldspar. The surficial geology of the property is shown on the accompanying map.


Topography
Site Boundary
0
660'
scale
N
400
450
300
250
FOOTING
86
RD
ICE HOUSE
Brook
250



SURFICIAL
GEOLOGY
0
660'
scale
N
LEGEND
Rock outcrop
Bouldery area
Floodplain area
Till
Stratified drift
450
300
250
250
250
243

This glacial cover comprises two major types of deposits: till and stratified drift. Till covers most of the site; stratified drift is generally restricted to the southern periphery. Till is a mixture of rock particles of various sizes derived from the erosion of bedrock and older unconsolidated deposits by glacial ice. In eastern Connecticut, till is commonly called hardpan because of its shovel-resistant compactness, which also makes it only slightly pervious to water. The characteristic lack of grain-size sorting indicates that the till was applied directly onto the landscape by ice and not later transported by meltwater. Stratified drift, however, was deposited by glacial meltwater and consequently tends to be well-sorted and layered. Typically, stratified drift is composed of sand and gravel, but other grain sizes are found in some areas.

Test hole information supplied by Frederick M. Hayes Associates, Inc., indicates that the till underlying the area proposed for immediate development is very shallow. Of the 45 holes drilled, only 11 did not encounter bedrock; however, none of those 11 holes were drilled deeper than eight feet. The remaining 34 holes all tapped bedrock at depths of eight feet or less. Thirty of these holes reached bedrock at depths of seven feet or less; 20 holes encountered rock at depths of five feet or less.

Bedrock is exposed at several places on the property. The location of the outcrops and the irregular topography within the entire subdivision area indicate that much of the interior part of the site, as well as the north and west flanks, is underlain by bedrock at shallow depth. However, test hole information was not available to confirm this hypothesis.

The proximity of bedrock to the surface throughout most of the property and the compact nature of the overlying till are likely to hinder the development of part of the site. If the planned houses are connected to the Willimantic sewer system, as is being considered, waste disposal will be no problem. If only the initial 16 lots are developed, subsurface waste disposal may be the only economical choice. Movement of leachate from septic systems will be impeded by the low permeability of the till and the shallow depth of bedrock. Test hole records indicate a relatively shallow water table in 11 of the 45 holes. Not surprisingly, these 11 holes are concentrated in the rocky area at the north end of the site. Unless the holes were drilled during the wettest times of the year, they probably do not indicate the complete area affected by a high water table during such times. Septic system failure can be anticipated during wet seasons in any area containing a high water table. The most critical section is probably that which is adjacent to the brook. The water table here would probably not only hamper the actual operation of septic systems, but also would expedite flow of leachate into the brook. If 1-acre housing is to be established in any interior part of the property, test holes are essential to evaluate suitability for subsurface drainage.

HYDROLOGY

One small brook traverses the property. Water flowing in the brook, from its source to its point of egress from the property, originates in a drainage area of about 170 acres. A rough estimate of changes to peak flow in the brook may be made for a selected storm event by employing a method detailed in the

DRAINAGE AREA OF BROOK

FIG. 2

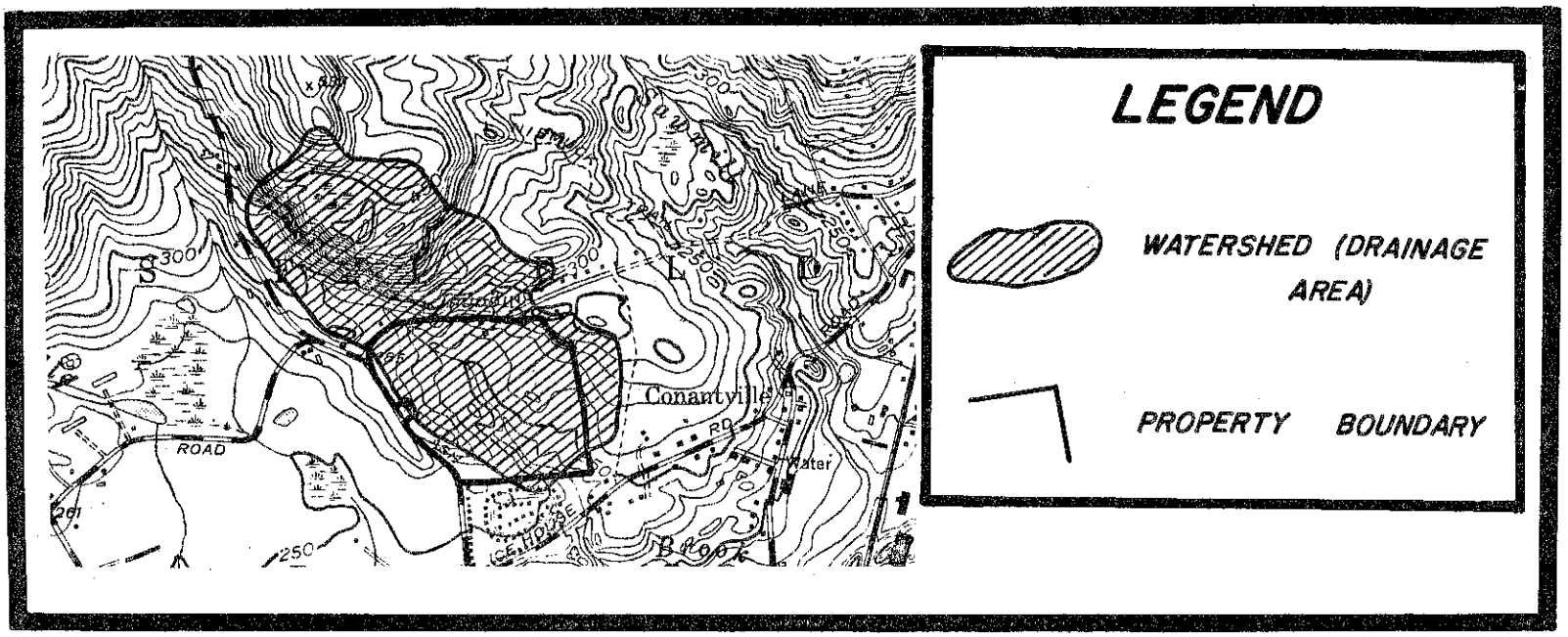


Table 1: Estimates of changes to peak flow under three different proposals for development.* All flow rates given in cubic feet per second (cfs).

	Storm Event		
	24-hour, 2-year	24-hour, 10-year	24-hour, 100-year
Present land use	28	119	298
Proposal (1)*	33	129	315
Proposal (2)*	48	160	366
Proposal (3)*	38	139	332

* See text for a description of the various proposals.

Soil Conservation Service Technical Release No. 55. The method includes evaluation of soil types in the watershed, present and proposed land use, average topographic slope and other factors. Essentially, the technique involves the determination of present and future runoff curve numbers for the watershed. These numbers relate runoff amounts within the drainage area to total precipitation for a particular storm event. Many assumptions are necessary in order to use the method for this property, as the proposal for development is presently very general. A thorough analysis would require the determination of the total percentage of the watershed to be made impervious to rainfall (as by driveways, roofs, roads, etc.), the present ratio of runoff to rainfall for selected storm events, and other parameters. Despite these limitations, the method can be expected to point out potential problems, if they exist.

Although a detailed presentation of data used in the analysis is not practical here, the assumptions employed were based as closely as possible on the three types of proposals presented at the initial review: (1) development of only 16 one-acre lots bordering on present town roads, (2) development of one-acre lots on the entire property, (3) development of the aforementioned lots plus establishment of 4-unit-per-acre multifamily housing in the interior part of the property.

It was also assumed that no changes would occur in the remainder of the watershed. The runoff curve numbers estimated for each proposal are as follows: no development, CN=65; proposal (1), CN=66; proposal (2), CN=69; proposal (3), CN=67. Table 1 shows the estimated changes in peak flow in the brook derived from the curve numbers. The changes caused by proposal (2) are especially significant, ranging from 25% increased peak flow for the 24 hour-100 year storm event, to 74% increased flow for the 24 hour-2 year storm event. Changes from proposal (1) are relatively small, and changes from proposal (3) are moderate.

The channel of the brook is presently most closely accommodated to the more frequent storm events and their associated runoff. The increases in peak flow estimated for proposals (2) and (3) would force the brook to divert its flow more often to its floodplain. Moreover, the area flooded during the larger, less-frequent storms would probably increase. As a consequence, any houses located near the brook would be likely to suffer with flooded basements, driveways, or yards. Bank erosion would increase downstream from the property, but the impact of such erosion is not certain. The culvert on Meadowbrook Lane just east of Circle Drive should be examined to determine its ability to handle increased flow.

If public water supply is not available to the development, individual wells tapping the bedrock aquifer will be necessary. The quality of water drawn from crystalline metamorphic rocks in the region is generally good. The depth of drilling that will be required to tap an adequate source of water will vary from well to well, as the yield depends upon the number and size of water-transmitting fractures encountered. The likelihood of pollution of bedrock wells from nearby septic systems is generally small, but increases with the density and number of such systems.

A limited residential development of the property, such as the current 17-lot plan entails seems feasible. Development of the interior part should

proceed with extreme caution. Further test data should be gathered and evaluated before any such development takes place. By all means, the area near the brook and its floodplain should remain undeveloped (a buffer zone of no less than 300 ft. seems reasonable). A 1-acre subdivision of the interior part of the property is more practical and more environmentally sound than a four-unit-per-acre multi-family arrangement.

SOILS

A detailed soils map of this site is included in the Appendix to this report, accompanied by a chart which indicates soil limitations for various urban uses. As the soil map is an enlargement from the original 1,320'/inch scale to 330'/inch, the soil boundary lines should not be viewed as absolute boundaries, but as guidelines to the distribution of soil types of the site. The soil limitation chart indicates the probable limitations for each of the soils for on site sewage disposal, buildings with basements, streets and parking, and landscaping. However, limitations, even though severe, do not preclude the use of the land for development. If economics permit large expenditures for land development and the intended objective is consistant with the objectives of local and regional development, many soils and sites with difficult problems can be used. The soils map, with the publication Soil Survey: Tolland County, Connecticut, can aid in the identification and interpretation of soils and their uses on this site. Know Your Land: Natural Soil Groups For Connecticut can also give insight to the development potentials of the soils and their relationship to the surficial geology of the site.

The soils on the site of the proposed Meadowbrook Subdivision consist of several natural soil groups ranging from Group A - terrace soils over sands and gravels to Group D - upland soils which are shallow to bedrock. The majority of soils on this site are derived from glacial till, with wetland areas extending over 21% of the site. Charlton, Leicester, Paxton, Sutton and Whitman soil series are most representative of this site.

The Charlton soils (ChB, ChC) are deep well drained soils formed on very friable to firm glacial till; they are gently undulating or sloping to hilly and are moderately permeable, having a high moisture holding capacity. The upper subsoil is brown or dark-brown very friable fine sandy loam, which grades to yellowish-brown fine sandy loam in the lower subsoil at a depth of 18 to 20 inches. The surface layer and subsoil contain varying amounts of small angular rock fragments and some large stones. Principle factors limiting development are slope and large stones.

The Leicester series (Le) are poorly to somewhat poorly drained, formed in very friable to firm glacial deposits. The surface layer is very dark brown to black, very friable and mellow fine sandy loam. The subsoil is mottled, dominantly with gray and grayish brown. At a depth of 2 feet, the lower subsoil grades to sandy loam which is olive gray, finely mottled with brownish gray and strong brown. Coarse fragments make up from 10 to 30% of the surface layer and subsoil. This soil is a designated wetland under P.A. 155 and high water table is an important development concern.

The Paxton series (PbB, PbC) consists of well-drained soils with a hardpan. These soils were formed in deep glacial till derived principally from gray mica

schist, gneiss and granite. The surface layer is friable to very friable fine sandy loam 8 to 10 inches thick. The subsoil is a very friable fine sandy loam of dark yellowish brown which grades to light olive brown fine sandy loam at a depth of 16 to 20 inches. Both the surface layer and the subsoil contain some small angular fragments of rock. The lower soil is underlain by an olive brown hardpan with a few mottles at a depth of two feet. Principle limiting factors of this soil are slope and hardpan.

The Sutton soils (SvA) consist of moderately well drained soils formed on glacial till, which was derived primarily from schist, gneiss, and granite and is very friable to firm. Fine sandy loam is the dominant texture in the surface layer and subsoil, but at a depth of 24 to 30 inches, the material varies from loamy sand to fine sandy loam. Stones and weathered rock fragments are common throughout. Principle factors limiting development are seasonal high water table, frost action and stones.

The Whitman series (Wp) consists of very poorly drained soils formed over glacial till. These soils contain organic matter. Their dominant textures are sandy loam and fine sandy loam, but the range is from loamy sand to silt loam. The Whitman soils are generally conspicuously stony, except in scattered areas where most of the surface stones have been removed. This soil is also protected under P.A. 155. Hardpan, high water table and poor drainage are principle limiting factors.

Soil limitations show that development of the entire parcel may be difficult and costly. Approximately 12 acres of the entire 80 acre site are moderately limited for on-site septic systems, the remaining 68 acres are rated severe. Limitations for buildings with basements are severe for 37 acres of the parcel and slight for 20 acres of the site. Schematic designs for the total 80 acre parcel show road locations in areas of moderate to severe limitations for streets and parking areas.

Of the subdivision plan presently under consideration for permit, lots 1 and 2 are situated on Charlton fine sandy loam soils. These soils are moderately permeable, with a compact layer, if present, below 3 feet in depth. Permeability is generally adequate for on-site sewage disposal. On the more steeply sloping areas, absorptive fields are more difficult to establish and may require special design.

Lots 3, 4 and 5 are located on Sutton soils. These soils are moderately permeable, but a seasonal high water table restricts internal drainage. These soils have severe limitations for on-site sewage disposal systems. A high water table may occur from late fall to late spring and hinder normal septic system operation.

Paxton fine sandy loam comprises about 25-27% of the soils on the site. Lots 7 through 17 are situated on this soil type. The Paxton series consists of deep, well-drained soils. These soils do have a compact pan layer at varying depths ranging up to 36 inches. Although these soils are well drained, the slowly permeable layer creates moderate internal drainage problems. The limitations of these soils for septic tank systems are severe. The success of a drainage field depends on its location and depth to the compact layer.

Lots 1 through 17 may require specially designed on-site sewage disposal systems to overcome problems of slope, seasonally high water tables and hardpan layers which restrict internal drainage.

Schematic proposal 2, which shows the development of 65 single family dwellings on one acre lots with on site sewage and on site wells, should be modified. Should this proposal be constructed, lots 50, 51, 54, 55, 56, 57, 58, 23, 24 and 25 may have to be eliminated, as they are shown as being affected by the existing brook on the site. The soils in the area of these lots are designated wetlands under P.A. 155. Portions of lots 39, 40, 49, 22 and 5 may possibly fall into these soil types which would restrict their use as well.

Schematic proposal 3, which shows the development of multi-family dwellings with both city water and sewers, would also be affected by the wetland area in the central portion of the site. Any units located in the wetland will have associated development problems. Although this development is proposed to be sewered, flooded basements may become a problem in areas with high water tables. The Team also feels that although these facilities will be fullfilling recreation needs of the community, locating tennis courts and a swimming pool in the wetland area cannot be considered in the best interests of the environment. The associated construction of these facilities could increase runoff and soil sedimentation into the brook which may increase flooding in the area. There should also be concern for the long-term condition of these facilities as frost action is high in these soils and could cause cracking of any concrete or asphalt surface.

The present plot plan shows access to back acreage between lots 2 and 3, and lots 6 and 7. Lot 6 is designated open space and includes rock land and wetlands as designated by P.A. 155. Development of the access as indicated in both areas encroach upon the wetlands and jeopardize their integrity. Future use of back acreage will require access, however a less sensitive area should be utilized.

FOREST RESOURCES

Forest development is restricted to the south central portion of the 80 acre tract. Speciation includes, but is not limited to white pine, red maple, white oak and red oak in the canopy and red maple and white pine reproduction in the understory. A cordwood harvest, marked by a professional forester, three to four years prior to development of this area, as well as removal of windthrown trees and trees of poor quality is suggested. This cordwood harvest will encourage white pine reproduction and improve the overall health of the forest.

Consideration should be given to reforestation of the site along the watercourse, near the cemetary and perimeter of the lots. Softwoods such as white pine, larch and pitch pine as well as hardwoods such as tulip poplar, white birch, maples and oaks would be suitable for this site.

WATER SUPPLY

Public water and sewer service is located in the vicinity of the proposed subdivision and undoubtedly could be extended to serve any development on this site. Of these two public services, extension of a public sewer service system

could potentially have the greatest impact on the site permitting more imaginative and flexible use of the parcel while protecting its essential natural features. The Mansfield zoning regulations do permit increased density with the availability of public sewers. Intensive development with on-site septic systems in shallow to bedrock soils could lead to possible groundwater contamination.

WASTE DISPOSAL

As previously stated public sewerage is available and will extend to the boundary of the 80-acre parcel on Mansfield City Road. It could feasibly be further extended to serve all 16 lots in the development proposal which is presently seeking permit approval. As over 70% of this 17 acre proposal and the 80 acre parcel has severe limitations for on-site subsurface sewage disposal, the Team recommends that this subdivision not be approved for on-site subsurface sewage disposal. Section 19-13-B20c(a) of the Public Health Code states, "The Director of Health shall not approve a new subsurface sewage disposal system in an area where public sewers are available and connection thereto is feasible."

Some general comments on the deficiencies of subdivision plan submitted for permit approval include:

(1) Soils testing was not witnessed by the local health department for all lots. Testing must be witnessed by local health department personnel for all lots.
(2) Depth of percolation test was not indicated.
(3) Date percolation tests and observation pits were done is not indicated.
(4) Where hardpan is within 18 inches of the bottom of the proposed system, percolation tests must be conducted in the hardpan material and the system design based on this percolation rate.
(5) Mottling is not indicated for any test pits. Testing should be done during the spring of the year to confirm high groundwater level. Systems would have to be maintained a minimum of 18 inches above this level.
(6) The number of bedrooms is not indicated, though all systems are designed on the basis of 3-bedroom houses.
(7) Many houses would require foundation drains. This would require having septic tanks 25 feet from the house instead of 15 feet as shown.
(8) Percolation tests would have to be conducted in fill after placement.
(9) Lots with less than 4 feet of natural material to ledge are not suitable for subsurface sewage disposal.

FOUNDATION DEVELOPMENT AND GRADED CONDITIONS

Foundation drains would be needed on many of the lots to prevent wet basements. Basements could not be used on some of the presently proposed lots due to the shallow depth of soils to bedrock.

Grading on this site could cause erosion and soil sedimentation problems, on house sites as well as in the brook which runs through the central portion of the parcel. Connecticut's Sediment and Erosion Control Handbook, published

by the Soil Conservation Service will aid both the developer and the Town in preparing and approving an adequate erosion and sediment control plan. Standards and specifications for both mechanical and vegetative practices listed within the handbook are available at the Tolland County Soil Conservation Service Office, Rockville, Connecticut.

ROADS AND UTILITIES

The existing perimeter roads exhibit a multitude of alignment, width and sight distance problems which, while contributing to their very scenic appearance, will be compounded with the setting out of minimum frontage lots along their entire length. Any site development scheme which could minimize the number of road and driveway entrances onto the perimeter roads would certainly reduce the potential hazards resulting from the inevitable increased traffic in the area.

Any subdivision of land on this parcel should take into account the needs for possible realignment or reconstruction of the existing town roads at some point in the future.

A road is proposed through the stream area for access to rear lots, which would require considerable till. Erosion of the road banks and frost heaving could become troublesome if the road is not properly constructed with regard to these problems. Relocation of the road is advisable.

AESTHETICS

The site, while containing no spectacular natural assets, is an attractive site containing rock outcroppings, wetlands, stonewalls and the like. A standard, minimum lot subdivision would obliterate many of these subtle characteristics of the site. Any incentive to permit clustering of lots using common shared "driveways" or other mechanisms, including the installation of public sewers, should be explored to permit alternate approaches to the standard subdivision now being proposed for the land.

SERVICES TO SUPPORT DEVELOPMENT

The subdivision is located in close proximity to the commercial services provided by the City of Willimantic and the growing commercial area in Mansfield on the Willimantic City line.

The subdivision is on the periphery of the service area of the Spring Hill Fire Station, however recommendations have been made for the construction of fire stations in the Town's southwest quadrant. All other municipal services appear to be adequate and unaffected by the proposal.

COMPATIBILITY OF SURROUNDING LAND USES

Agriculture and scattered residential homes predominate as the current land use mix in the vicinity of the site although a large half-acre subdivision borders

the subject parcel to the south. The whole southern Mansfield area is, however, subject to considerable change in the future given the availability of public water and sewer service, proximity to I-84, and the City of Willimantic and the proposed industrial park on the west.

This site is very much a transitional one between the lower density residential development to the north and east and the projected intense industrial development to the west. The current proposal for the site would be in general conformity with likely future patterns of land use in the area--although certainly not the best possible configuration.

ALTERNATIVE LAND USES FOR THE AREA

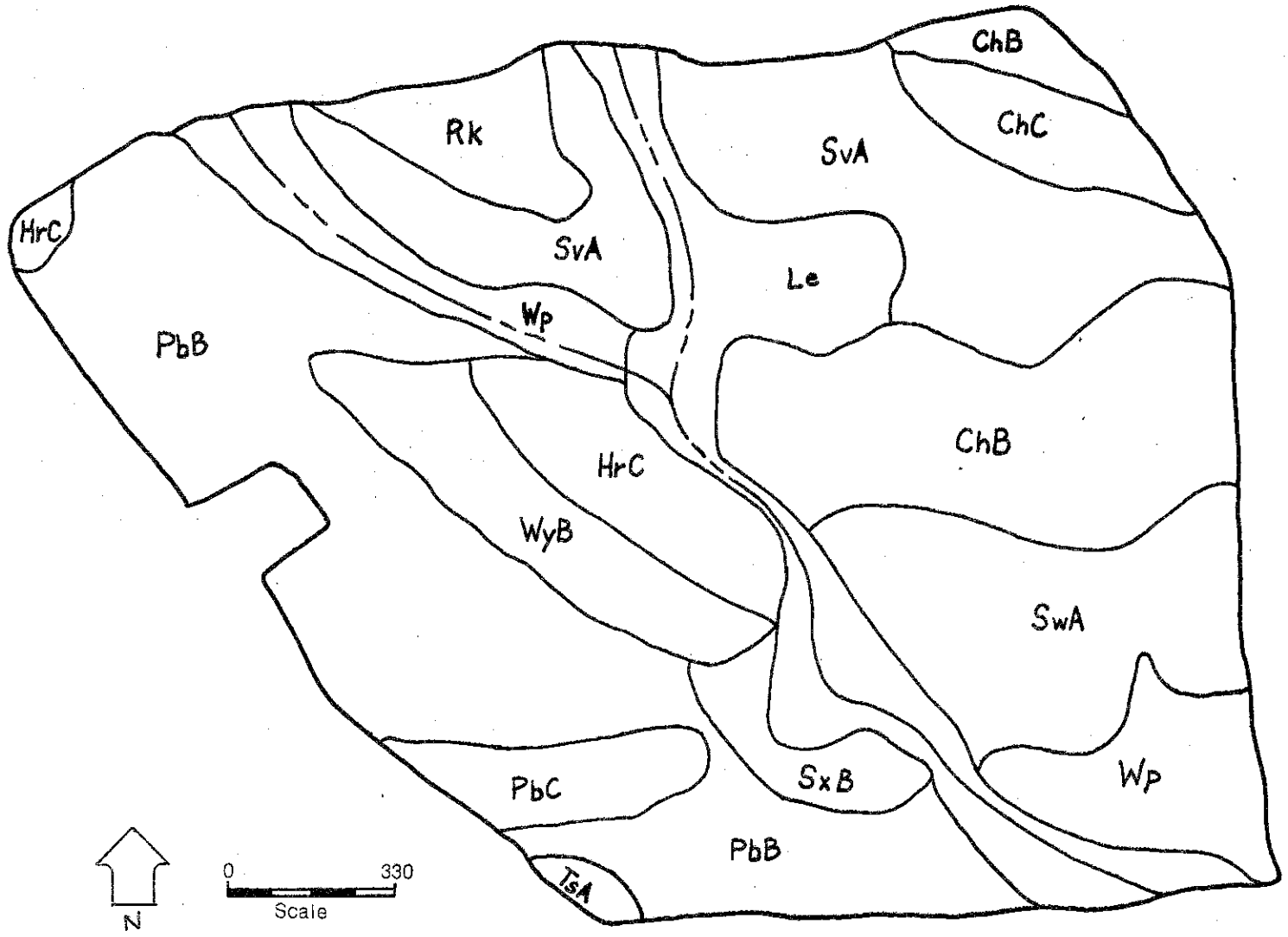
The site offers the possibility of a wide range of alternative patterns of development because of the special locational and service factors previously mentioned. A clustered development, not necessarily tied to substantially increased density, could well preserve more successfully the countryside ambience of the site.

With public services available and located at the very edge of the Region's urban core, higher density residential development could very well be justified, and, depending on an analysis of the market and future need of such housing, might be preferable to a one-acre subdivision of standard format.

Appendix

Soils

MEADOWBROOK SUBDIVISION
MANSFIELD, CONNECTICUT



Prepared by: United States Department of Agriculture, Soil Conservation Service.
Advance copy, subject to change.

MEADOWBROOK SUBDIVISION
MANSFIELD, CONNECTICUT

PROPORTIONAL EXTENT OF SOILS AND THEIR LIMITATIONS FOR CERTAIN LAND USES

Soil Series	Natural Soil Group	Soil Symbol	Approx. Acres	Percent of Acres	Principal Limiting Factor	Urban Use Limitations*			
						On-Site Sewage	Buildings with Basements	Streets & Parking	Land-Scaping
Charlton	B-1a	ChB	9.95	14%	slope,large stones	2	2	1	2
Charlton	B-1b	ChC	1.83	2%	"	2	2	2	2
Hollis	D-1	HrC	3.8	4%	shallow to bedrock,rocky	3	3	3	3
Leicester	B-3a	Le*	8.63	11%	high water table	3	3	3	3
Paxton	C-1a	PbB**	19.63	25%	slope hardpan	3	1	1	2
Paxton	C-1b	PbC	2.0	2%	"	3	2	2	3
Rock Land	D-2	Rk	1.98	2%	shallow to bedrock,rocky	requires on-site inspection			
Sutton	B-2a	SvA**	11.25	15%	wetness,frost action	3	3	2	1
Sutton	B-2b	SxB	1	1%	seasonal high water table, stones	3	3	2	2
Tisbury	A-2	TsA**	1.80	2%	seasonal high water table	2	2	2	2
Whitman	C-3b	Wp*	8.0	10%	hardpan,high water table,poor drainage	3	3	3	3
Woodbridge	C-2a	WyB	3.88	4%	high water table,slope, stones	3	3	3	2

* Wetlands by PA 155
** Prime Agricultural Land
Limitations: 1 = slight, 2 = moderate, 3 = severe

SOIL INTERPRETATIONS FOR URBAN USES

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

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

Slight Limitations

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

Moderate Limitations

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

Severe Limitations

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