GENERAL PURPOSE ZONE
BROOKFIELD, CONNECTICUT

KING'S MARK
RESOURCE CONSERVATION AND DEVELOPMENT AREA

KING'S MARK
ENVIRONMENTAL REVIEW TEAM REPORT

on the

GENERAL PURPOSE ZONE
BROOKFIELD, CONNECTICUT
NOVEMBER, 1976

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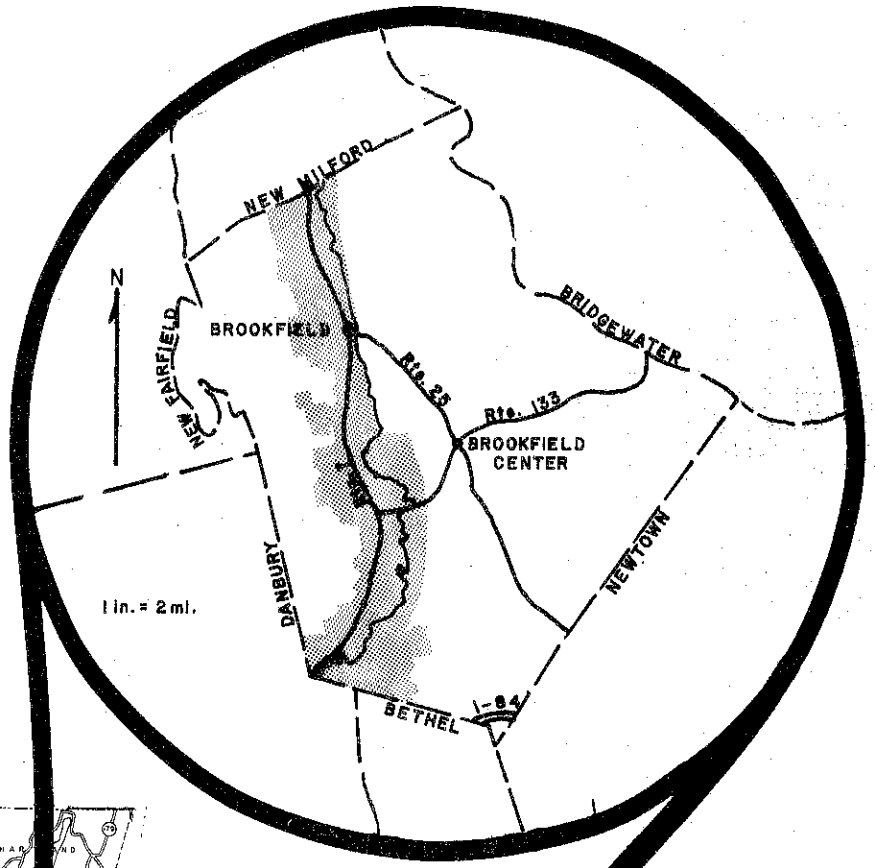
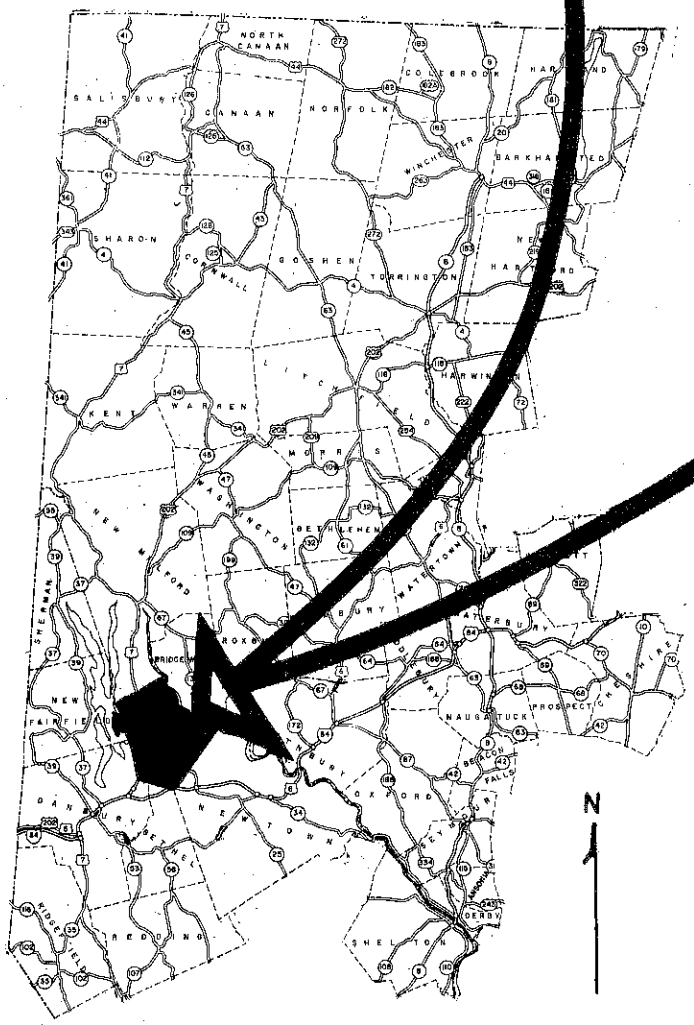
King's Mark Resource Conservation
and Development Area (RC&D)
Environmental Review Team
P. O. Box 30
Warren, Connecticut 06754

LOCATION OF STUDY SITE

GENERAL PURPOSE ZONE
BROOKFIELD, CONN.





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KING'S MARK
ENVIRONMENTAL REVIEW TEAM REPORT
ON THE
GENERAL PURPOSE ZONE
BROOKFIELD, CONNECTICUT

This report is an outgrowth of a request from the Town of Brookfield to the Fairfield County Soil and Water Conservation District (S&WCD). The S&WCD referred this request to the King's Mark Resource Conservation and Development (RC&D) Area Executive Committee for their consideration and approval as a project measure. This request was approved and the measure reviewed by the King's Mark Environmental Review Team (ERT).

The Environmental Review Team draws together a range of experts in the fields of natural resources, engineering and planning, who, based upon existing available data and field investigation, formulate an analysis of a proposed land use activity.

Employing the Environmental Review Team to gather existing natural resource data pertaining to a specific zone within a town is an innovative use of the Team concept. Due to time and financial restraints, a detailed on-site investigation and study of the land within the General Purpose zone was not undertaken. It was decided that the Team could best serve the town by briefly describing significant natural resource features which may have an effect on or be affected by future development within the General Purpose zone. Any decisions to be made regarding future development within the zone rest with the town. It should be emphasized that this report is not intended to be a thorough study of the land within the General Purpose zone.

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, a topographic map showing the boundaries of the General Purpose zone, and a zoning map of the town were provided to all Team members on the day of the review meeting.

The members of the Environmental Review Team consisted of the following: David Thompson, District Conservationist, SCS; Sid Quarrier, Geologist, Connecticut Department of Environmental Protection (DEP); Tony Sullivan, Planner, Connecticut Department of Community Affairs; Stephen Dunn, Draftsman, King's Mark RC&D Area; Carol Youell, Team Coordinator, King's Mark RC&D Area.

The Team met and car-toured the site on Tuesday, September 21, 1976. Reports from each Team member were sent to the ERT Coordinator for review and summarization for this final report.

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

The King's Mark RC&D Area Executive Committee hopes this report will be of value as an informational and educational tool regarding the existing natural resource features in the Still River Valley, and also of value and assistance in making wise land use decisions within the General Purpose zone. If any additional information is required, please contact: Carol E. Youell, Environmental Review Team Coordinator, King's Mark Resource Conservation and Development Area, P. O. Box 30, Warren, Connecticut, 06754, 868-7342.

INTRODUCTION

The Town of Brookfield requested the King's Mark Environmental Review Team to "review" a corridor of land associated with the existing U. S. Route 7 and the new U. S. Route 7 currently under construction through the central portion of town. The land within this corridor has been zoned "General Purpose" by the town. The land lies within the Still River drainage area in Brookfield, and stretches from the northern to the southern border of the town. The land area totals approximately 2,682 acres.*

A mix of residential, commercial and industrial land uses are permitted within the General Purpose zone. As the new U. S. Route 7 is completed, the town anticipates increasing demands and pressures for all kinds of uses of this land within the zone. Development pressures are anticipated because this General Purpose zoned land has many valuable assets and opportunities. It contains some of the levelest land within the town since it is located within the Still River Valley. It also has excellent access and transportation facilities. The land, however, has some negative aspects too for residential, commercial and industrial development. The land may be limited for development because of natural resource features such as the Still River and its flood plain, the wetlands associated with the river, and the steep slopes and shallow to bedrock soils in the valley side and upland areas. The area also lacks a number of the key services necessary to support intensive development, such as a municipal water supply system and extensive public sewerage facilities. At present, for the most part, on-site water supply and on-site waste disposal systems will be required. (It should be noted that a sewer line has been initiated in the southern extremities of the town although it is not yet functional.)

Use of the land within the zone may involve certain trade-offs. The area has certain features which make it desirable for development purposes; however, it also contains many of the town's valuable natural resources, including water and mineral. The town is concerned that development within the General Purpose zone be properly planned and controlled so that the character of the Still River Valley in Brookfield and its human and natural resources are not adversely affected.

The purpose of this review, therefore, was to gather existing natural resource and other data pertaining to the General Purpose zone which will help guide the Town in its future planning and help assess the impact of present and future development within the zone. The data, hopefully, can be used to indicate land capabilities, critical areas, and potential limitations and opportunities for development. This report is intended to serve as a springboard for gathering more detailed and additional information pertaining to the zone.

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* In this report, the General Purpose zone refers to that part of the existing General Purpose zone and the proposed expansions of that zone which occur along the U. S. Route 7 corridor. It does not include the land within the former "Southeast Industrial Area".

This report can be basically broken down into three major components: natural resource features within the zone, significant development limitations, and a zoning and planning analysis of the General Purpose zone. An Appendix follows which describes four large maps that were prepared for the town and designed to accompany this report. Additional sources of resource information are also provided in the Appendix. Comments or recommendations made within the report are presented for consideration by the town and potential developers in the preparation and review of development plans and should not be construed as mandatory or regulatory in nature.

General Description of Study Area

The nature of the land within the General Purpose zone can be described according to general land types. The land type designations are very general and are used for descriptive purposes throughout the report.

Figure 1 shows a subdivision of the land area into three types:

1. Valley bottom lands
2. Terrace and intermediate valley lands
3. Valley side and uplands

To a great extent this subdivision is based on topography and elevation, but in part it is physiographic. The valley bottom lands include much of the flood plain land and much of the wetlands associated with the Still River. Soils are generally fine textured. The terrace and intermediate lands include some level and some steeply sloping land. In some places bedrock is close to the land surface. Soils are generally coarse textured sand and gravel material. The valley side and uplands include much land with moderate to steep slopes. Bedrock is characteristically near the land surface in many areas, and soils are upland (till) soils of stony and variable texture.

In general, the valley bottom and valley side and upland land systems have several and in some cases numerous limiting conditions for general land use. The terrace and intermediate valley lands may generally have more potential for development. However, this land has other potentially valuable resource characteristics.

LAND TYPES MAP

GENERAL PURPOSE ZONE

BROOKFIELD, CONN.

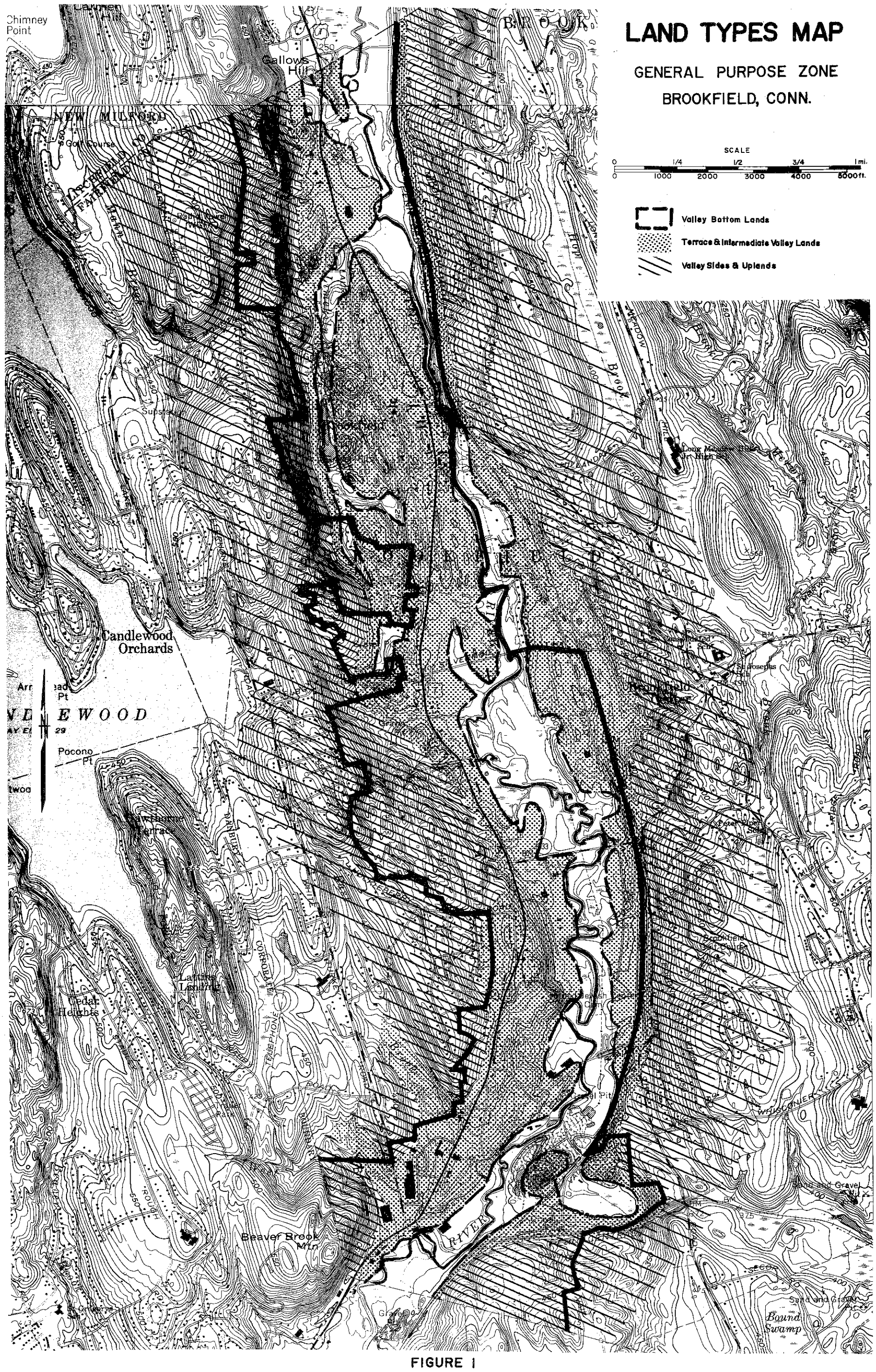


FIGURE 1

NATURAL RESOURCE FEATURES

Topography

The Still River is a major topographical feature lying within or bordering the General Purpose zone. The Still River in Brookfield, Connecticut flows in a distinct valley. The valley may be loosely defined as that area of land between the upper most crests of the steep ridges or hills to the east and west of the river. The valley floor encompasses the lower lands surrounding and including the river. (This includes valley bottom and terrace and intermediate valley land types.) The valley floor has an elevation of about 300 feet above sea level and varies from one-half to one mile wide within Brookfield. The valley walls rise quite abruptly to the crests of the adjacent hills. (The valley walls, for the most part, encompass the valley side and upland land type.) Maximum elevations of the adjacent hills are from 500 to 700 feet above sea level. The valley exists as it does because of the nature of the underlying bedrock (see Bedrock Geology).

Topographic profiles show that the cross section of the valley changes considerably from place to place within Brookfield. In the northern and southern reaches of town the cross section of the valley is quite steep and narrow, and in the central areas it is quite broad and open.

The General Purpose zone lies entirely within the Still River Valley. This valley area is especially critical to the town of Brookfield because it contains some of the levelest land in the town and also has many valuable land use and resource potentials. The topography of the remainder of the town is steeply sloping and it is limited for certain uses because of this steep slope factor.

Surface Water Drainage - Still River System

The Still River flows in a northerly direction through the central portion of Brookfield and drains more than 65 square miles of land (elevated) above or to the south of the Brookfield-New Milford town line. This land includes much of the central part of Brookfield, most of the town of Danbury, most of the town of Bethel, and small parts of the towns of New Fairfield, Newtown, and Ridgefield (see Figure 2). The Still River drainage system eventually empties into the Housatonic River in New Milford.

Topography influences the shape and geometry of the drainage area. Drainage basin divides or boundaries are formed by high points along ridge lines which determine the shape of the basin. Precipitation falls on these high points and the surface runoff drains by gravity via creeks, brooks, and streams to the river below. For this study, the drainage divide was derived very approximately from available topographic base maps. (It should be noted that the drainage area shown on Figures 2 and 3 is the natural drainage area and has not been adjusted to take into account the effects of hydraulic changes man has made in the natural regimens of flow at many points along the way.)

The surface water drainage system for the local Still River drainage area within Brookfield is shown on Figure 3. The map indicates the local drainage ways and their direction of flow within that part of the drainage basin in Brookfield. In most areas of the valley the side streams do not

STILL RIVER DRAINAGE BASIN

Drainage Basin Divide (Approximate)

SCALE : 1 inch = 2 miles

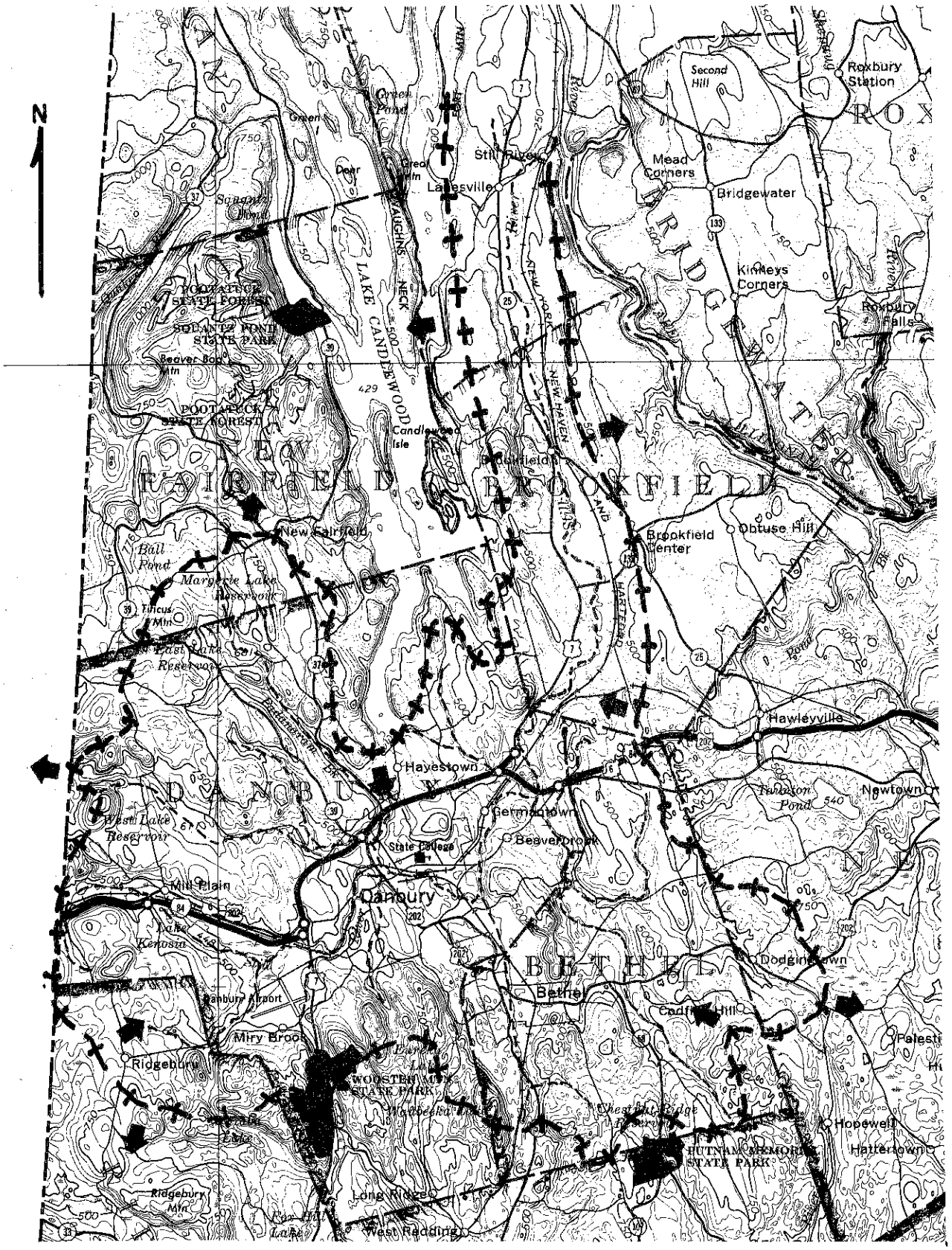


FIGURE 2

STILL RIVER DRAINAGE SYSTEM & FLOOD HAZARD AREA

GENERAL PURPOSE ZONE

BROOKFIELD, CONN.

SCALE

0 1/4 1/2 3/4 1 mi.

0 1000 2000 3000 4000 5000 ft.

- 10 Year Flood Hazard Area
- 100 Year Flood Hazard Area
- Basin Boundary
- Local Divide
- Local Drainageway
- Direction of Flow

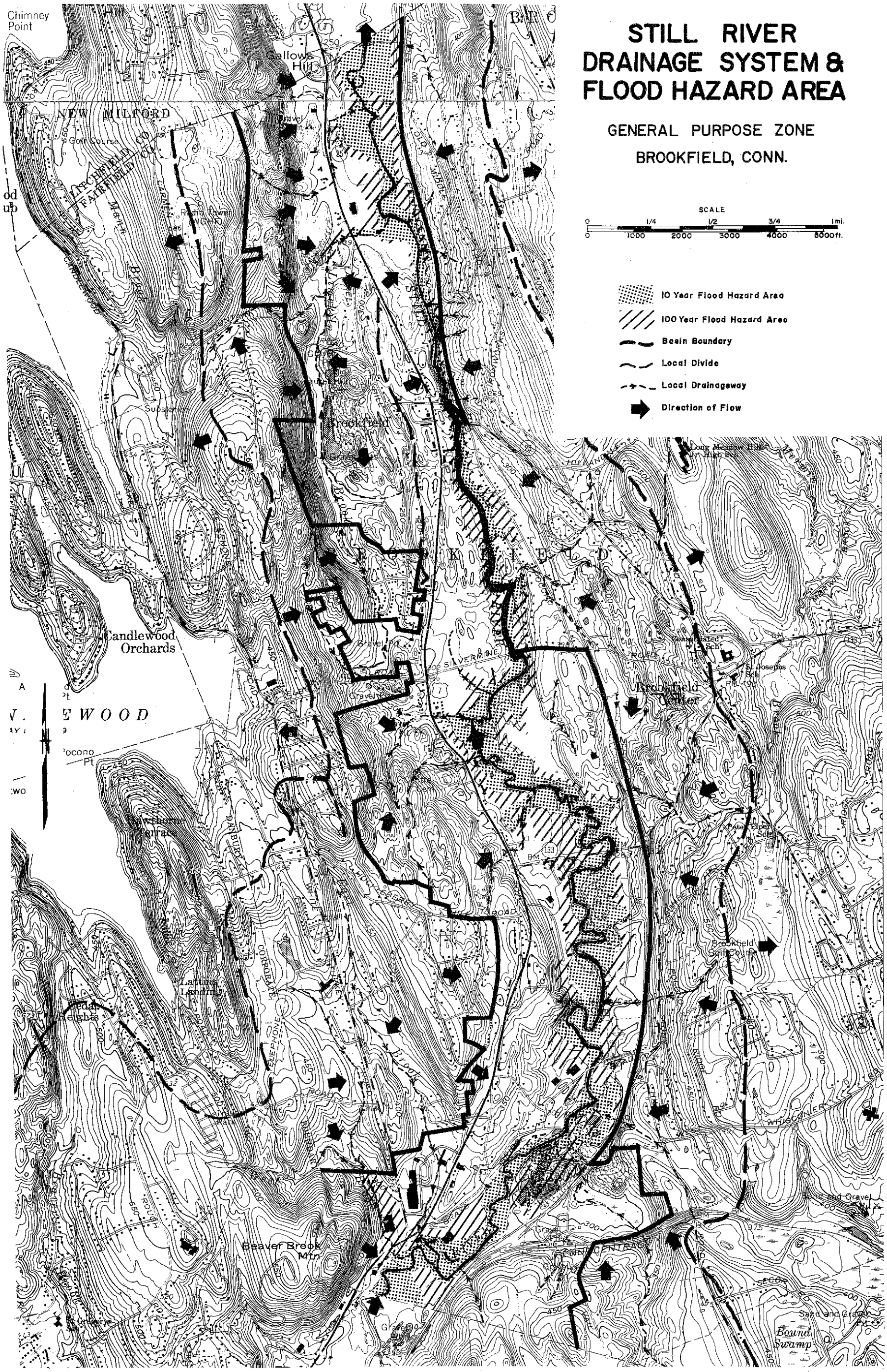


FIGURE 3

drain a very great distance up into the hills. There is a well defined drainage limit on the crest of the ridge lines which forms the basin boundaries. The relatively steep and rugged nature of the land comprising the valley walls tends to make the side streams have an intermittent flow character. These streams have high peak flows during wet periods and dry up rapidly during dry periods. Land development in the valley side and upland areas of the drainage basin will tend to accentuate the high peak flow and intermittent character of the side streams.

The Still River drainage area is characterized by relatively intense development, and continuing development should be anticipated. This has several implications. Water quality conditions in the Still River are determined and affected to a significant extent by upstream, out of town, land uses and discharges. It should be expected that continued urbanization of the Still River drainage basin will maintain a trend towards water quality characteristics typical of urban rivers. Although specific pollution control facilities may solve some specific discharge problems, areal urbanization will negatively affect water quality in other ways. Basin wide coordination of erosion and sediment control, infiltration of storm-water (etc.), are necessary if water quality is to remain at reasonable levels. In addition to water quality, the quantity of water in the Still River flowing through Brookfield may well be significantly affected in the future by land use changes within Brookfield and other parts of the drainage basin.

Flood Hazard

Development pressures within the drainage basin also have implications in terms of the flood hazard potential of the Still River. As land development intensifies less water is able to filter into the ground which in turn results in greater quantities of surface water runoff into nearby streams and rivers. All and any considerations related to flooding must take into account the upstream, out of town areas as the major source of flood water. For example, the Danbury area, which comprises a significant portion of the drainage basin, is already characterized by relatively intense land development. Future changes in land use in this and other areas of the basin will greatly affect flooding problems. In order to lessen or prevent potential flood problems, basin wide coordination will be needed. Controlling, restricting or prohibiting certain types of development within the 100-year flood hazard area or flood plain would be a first step in the right direction toward minimizing flood losses.

Figure 3 shows the approximate 10 and 100-year flood hazard area* for the Still River within Brookfield. This flood plain area is vital to the natural drainage of the Still River system. The flood information on the map was interpreted from the study, Flood Hazard Analyses, Still River, Fairfield and Litchfield Counties, Connecticut, USDA, SCS, 1975. This report identifies and delineates flood hazard areas (on aerial photo mosaics) along the Still River starting in the city of Danbury and ending at its confluence with the Housatonic River. The report also provides floodwater elevations under present flood plain use for the 10, 50, 100, and 500-year frequency floods. It should be noted that the surveys for this study were completed before con-

* Flood Hazard area or flood plain - Lands adjoining a stream (or other body of water) which have been or may be covered with water. A 10-year flood means that the flood has an average occurrence of being equaled or exceeded once every ten years, and that it has a 10 percent chance of being equaled or exceeded in any given year.

struction was started for the relocation of Route 7. Therefore, this study does not (nor does Figure 3) reflect any changes in the flood plain due to the Route 7 construction between Route I-84 and Silvermine Road. Also it should be emphasized that new development within the flood plain may change the flood boundaries.

It is recommended that the towns within the Still River drainage basin use this flood hazard study in formulating a land use policy, adopting and enforcing land use regulations, and providing public information within the Still River flood plain.

Bedrock Geology

The bedrock geologist is interested in the solid bedrock, its structure and composition. Bedrock is the solid rock, commonly called "ledge", that forms the earth's crust. It can be locally exposed at the earth's surface or more commonly buried beneath a few inches to as much as 200 feet of unconsolidated (loose, not firmly cemented or interlocked) deposits. The surficial geologist is concerned with the primary overburden, unconsolidated deposits, lying on top of the solid bedrock that have been relatively unaltered by the weathering process. While, the soil scientist deals with the weathered zone of the surficial deposits, the upper 3 to 5 feet below the land surface.

The bedrock in the area of the General Purpose zone is metamorphic and igneous rocks of early Paleozoic age (approximately 400 to 500 million years old). Some of these rock units may be of Precambrian age. These rocks are mostly quartz and feldspar gneisses, schists, and granites; except for the rocks underlying the Still River Valley floor area which are calcite and dolomite marble (see Figure 4). All of the rocks are intensely folded and deformed and are the eroded roots of the Appalachian Mountains. In general, the rocks lie in parallel layers, striking in a northerly direction and dipping steeply to the west. The narrow belt of marble (metamorphosed and recrystallized limestone) runs discontinuously northward along the western edge of Connecticut.

The belt of marble has some significant properties and is of particular interest to geologists and others. The marble underlying the Still River Valley floor area is distinctly different chemically from the rest of the rocks in the region. The carbonate minerals in the marble weather much more rapidly than do the aluminum silicate minerals common in the gneisses and schists which underlie the adjacent valley side and uplands. The valley floor reflects this more rapid weathering of carbonate rocks. The narrow, steep valley is therefore due primarily to the character of the underlying bedrock. The Still River flows in this valley, but did not carve it per se.

Some geologists believe that this narrow belt of marble running northward along the western edge of Connecticut is the crumpled remains of a carbonate bank which existed at the continental margin during an early stage of North America's history.

Bedrock exposures of marble are not that common due to the rapid chemical weathering nature of the marble. Exposures, where they exist, are of considerable interest to geological scientists. The calcium rich soils in parts of the valley and surrounding some of the infrequent marble outcrops provide restricted habitats for plants and animals which are not commonly found in other parts of Connecticut (see Biological Considerations).

BEDROCK GEOLOGY MAP (GENERALIZED)

GENERAL PURPOSE ZONE

BROOKFIELD, CONN.

SCALE

0 1/4 1/2 3/4 1 mi.

0 1000 2000 3000 4000 5000 ft.

Undifferentiated Calcite & Dolomite Marble

Undifferentiated Gneisses, Schists & Granites

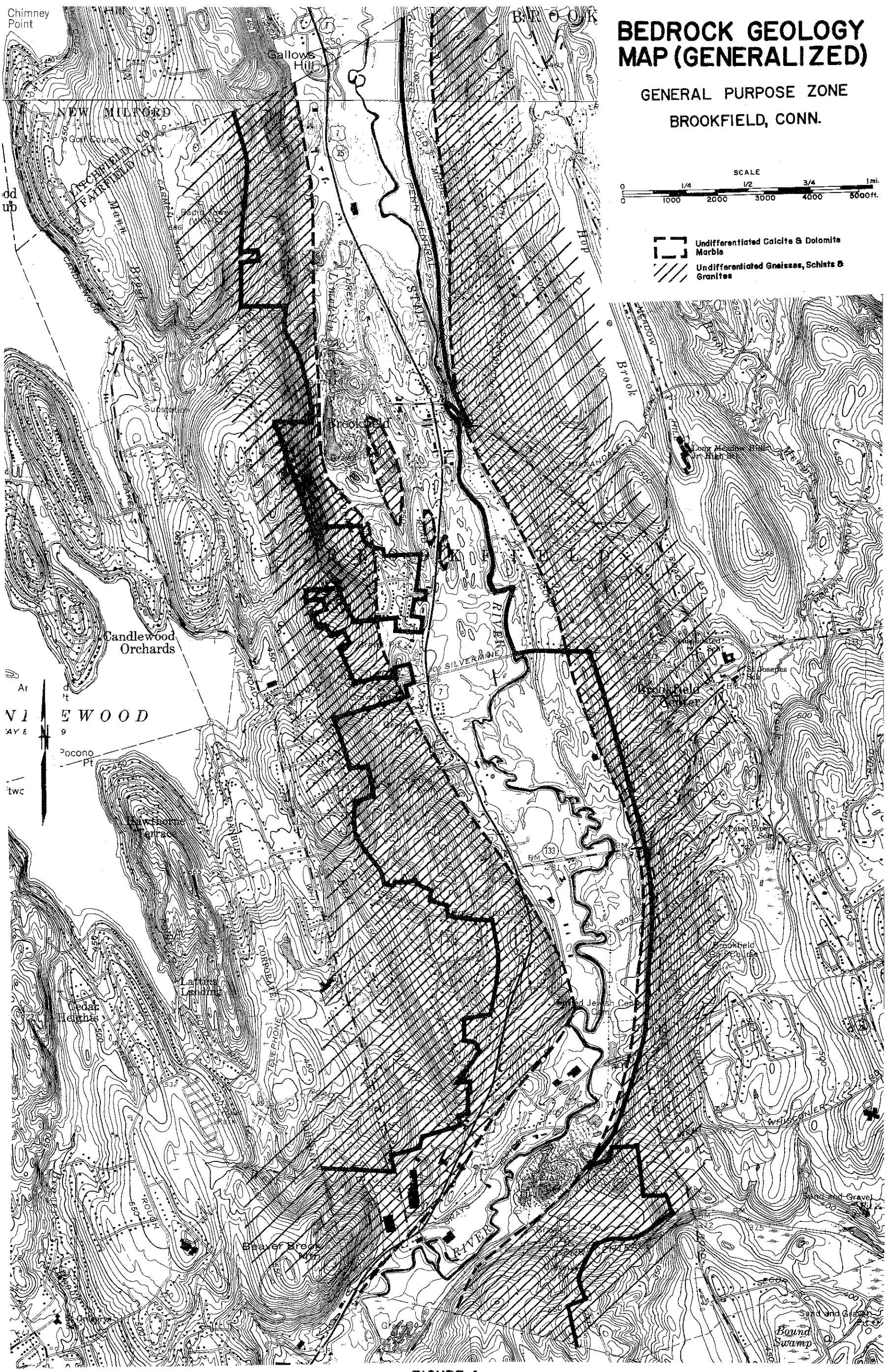


FIGURE 4

UNCONSOLIDATED MATERIALS MAP

GENERAL PURPOSE ZONE

BROOKFIELD, CONN.

SCALE

0 1/4 1/2 3/4 1 mi.

0 1000 2000 3000 4000 5000 ft.

- Till (Upland Soils)
- G — Gravel – 50% Gravel Size or Larger
- Sand, and Sand & Gravel – 50% Sand or Gravel Size
- Fine Grained Materials – 50% Finer than Sand, Includes Silt & Clay
- Bedrock (Ledge) – Rock is at or Near the Surface

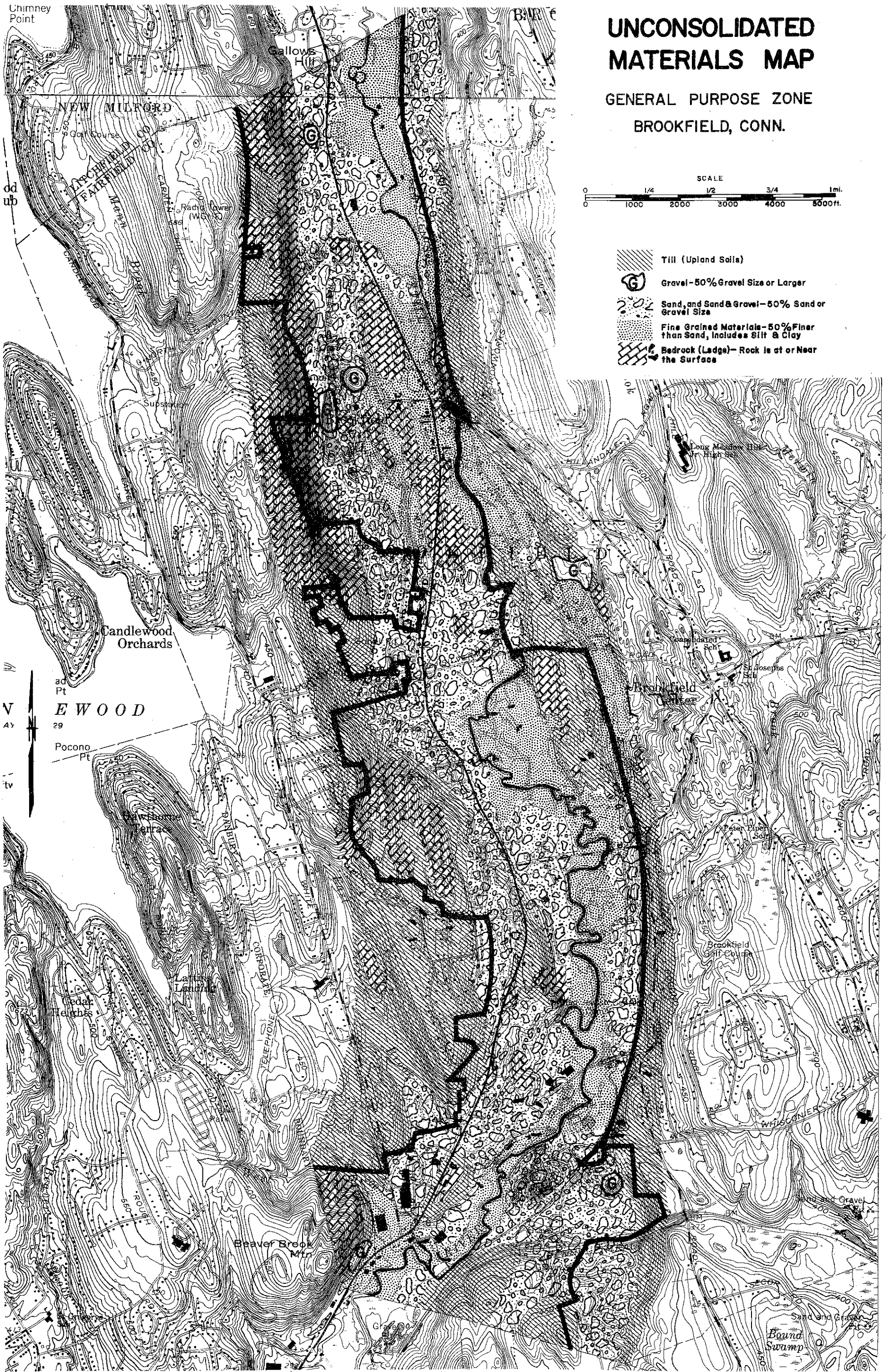


FIGURE 5

Marble has other interesting characteristics. For example, it has some value as a source of lime and calcium metal. Also, ground water produced from wells drilled into the marble bedrock may have relatively high hardness. Hardness of water is the property of water generally attributable to salts of the alkaline earths. "Hard" waters are those which are basic, while "soft" waters are acidic. Hardness has soap-consuming and encrusting properties.

Surficial Geology

Surficial geology can generally be described as the study of the types of unconsolidated materials that were deposited by glacial or later stream and flood plain activity, and the manner of deposition. From this parent material, the various soil types develop in the upper 3 to 5 feet below the land surface when different local physical settings and weathering processes are present.

The Still River Valley has a complicated and very interesting glacial geology history. This history is described in the report, The Drainage and Glacial History of the Still River Valley, Southwestern, Connecticut, by Woodrow Thompson, U. S. Geological Survey (USGS), 1971. The glacial history of the area is primarily responsible for many of the land features and land conditions that exist in the valley today.

The Unconsolidated Materials Map (Figure 5) is a generalization of the information contained on the published geology map for the area and shows the character of only surficial materials. Figure 5 does not indicate the relative thickness of the unconsolidated deposits. The map does indicate areas where the bedrock occurs at or near the earth's surface.

The surficial or unconsolidated materials were deposited by the most recent glacier and its melting approximately 12,000 years ago. These materials include the till or bouldery and rocky hardpan deposits that exist mainly in the valley side and upland areas, and the glacial meltwater deposits (coarse sands, gravels) that are common in the terrace and intermediate valley lands. The valley bottom lands, those associated with the Still River and its flood plain, are underlain by sands and gravels upon which recent stream, lake, and swamp deposits (fine grained silt and clay materials) have formed.

The only non-stratified or non-layered material found is the till. Glacial till is the predominant overburden material found in Connecticut today. It was formed when the glacial ice melted, releasing the debris that was trapped on, in, or that which was pushed along under the active ice. As melting occurred, some of these particles were carried away by the meltwater streams to form the stratified sand and gravel deposits primarily found in stream valleys, but much of the debris just dropped in place once glacial activity ceased. By definition, till is a heterogeneous material composed of various mixtures of boulders, gravel, sand, silt, and clay particles, none of which are significantly sorted or stratified according to particle grain sizes, as in the case with waterlain or windblown deposits. To restate, till is simply the mass of various sized particles that remained in place after all glacial ice melted.

It should be noted that areas underlain by till (upon which upland soils develop) include many areas of steep slopes, rocky soils, shallow depths to bedrock, and other conditions limiting general land use. Areas underlain with

sand and gravel have potential as mineral resource producers. In many areas of the valley these resources have been tapped.

Soils

The physical characteristics of the General Purpose zone together with the natural processes operating within the area, create situations which can be beneficial or problematic to future potential development. In addition to the geologic data, soil classifications provide a good indicator of the suitability of an area for development.

A detailed Soils Map of the General Purpose zone is presented in Figure 6 followed by a "Soils Limitations Chart" on the next page. As the map is a reduction from the original 1320'/inch scale to 2000'/inch, the soil boundary lines should not be viewed as precise boundaries but rather as guidelines to the distribution of soil types within the zone.

The Soils Limitations Chart gives the proportional extent of each of the soils within the General Purpose zone and indicates their probable limitations for various community and recreational development uses including: on-site sewage disposal, buildings with basements, landscaping, streets and parking lots, and athletic fields. An explanation of the numbered ratings for particular land uses is provided on the page entitled "Soil Interpretations for Urban Uses".

Referring to the Soils Limitations Chart, the soils (second column of chart) in the zone have been classified according to the Natural Soil Group in which they belong. There are six Natural Soil Groups found in the zone: A, B, C, D, E, and G (see first column). A few mapping symbols are not classified into Natural Soil Groups and have been assigned a letter "U". These represent "Other Lands" which are variable in nature and require on-site investigation for determining suitability or limitations for any intended use. Specifically, mapping symbols M2 and MU fall within this category and comprise 17.8 percent of the zone. The unit M2 consists largely of coarse-textured borrow or cut and fill areas where nearly all of the soil horizons have been destroyed or removed. Cut and fill areas are common to developments. Land type MU consists of commercial and manufacturing areas and densely populated housing areas where pavement and buildings cover over 50 percent of the land surface.

With the examination of the Soils Map and accompanying Chart, a correlation between the soils and surficial geology can be seen. All soils in Natural Soil Group A are terrace soils underlain by water deposited beds of sand and gravel. In most places a few inches to 3 feet of loamy or fine sandy material cover the older, coarser water deposits. The terrace soils generally occur above flood plains in river and stream valleys. Nearly all sources of sand and gravel, and many of the important sources of water supply are in areas associated with terrace soils. Group A soils comprise a total of 29.1 percent of the General Purpose zone.

Soils in Natural Soil Groups B, C, and D are all upland soils that were formed in areas of glacial till. Group B soils are generally found in thicker, unconsolidated deposits of till occurring on hillsides. Stones and large boulders are common in these glacial deposits and add difficulty when excavating or earth moving operations are needed. Group B soils comprise 3.9 percent of the zone.

SOILS LIMITATIONS CHART
General Purpose Zone
Brookfield, Connecticut

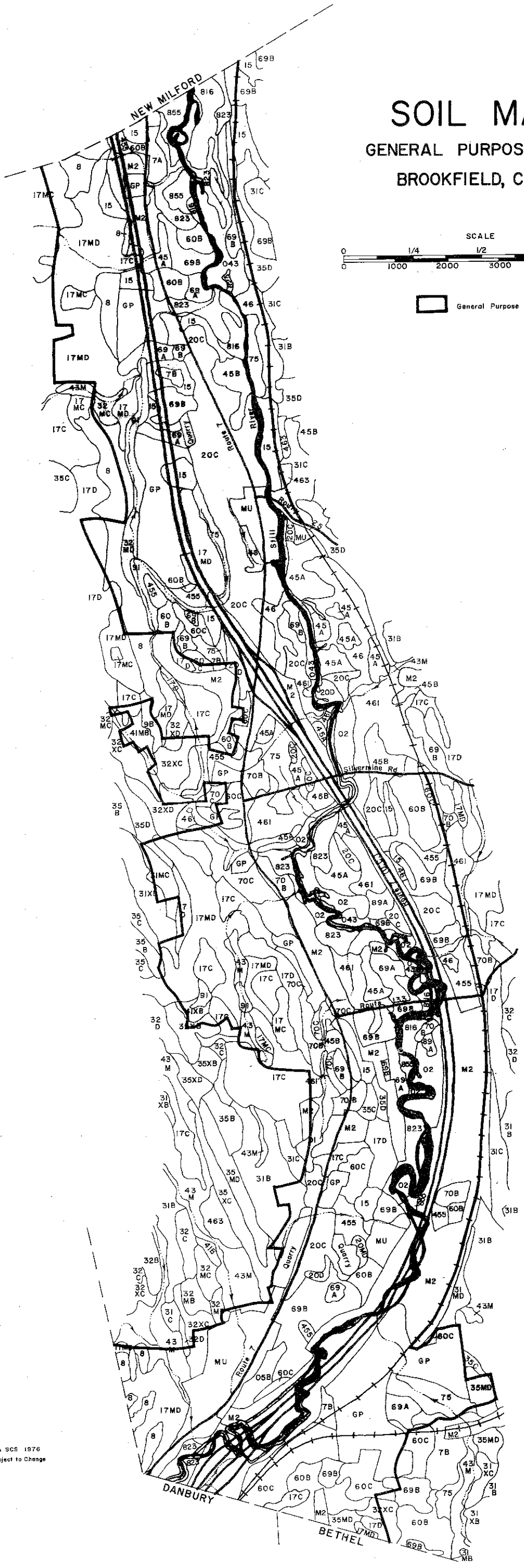
Natural Soil Group	Mapping Symbol	Slope %	Approx. Acres	Percent of Total Acres	Limitation Ratings For: On-site Sewage	Buildings with Basements	Land-scaping	Streets and Parking Lots	Athletic Fields	Principal Limiting Factors For Other Than Slight Limitations
A-1a	7A	0- 3	7.0	0.3	1*	1	3	1	3	droughtiness
	7B	3- 8	11.0	0.4	1*	1	3	2	3	droughtiness, slope
	60B	3- 8	67.0	2.5	1*	1	3	2	3	droughtiness, slope
A-1b	60C	3-15	89.0	3.3	2*	2	3	3	3	droughtiness, slope
A-1c	15	15-35	85.0	3.1	3*	3	3	3	3	slope, droughtiness
A-1d	9B	3- 8	5.0	0.2	1	1	1	2	2	slope
	69A	0- 3	45.0	1.7	1*	1	1	1	1	--
	69B	3- 8	129.5	4.8	1*	1	1	2	2	slope
	70B	3- 8	36.5	1.4	1*	1	2	2	2	slope, droughtiness
A-1e	70C	8-15	38.0	1.4	2*	2	2	3	3	slope
A-2	45A	0- 3	42.0	1.5	2	2	1	2	2	seasonal water table
	45B	3- 8	27.0	1.0	2	2	1	2	2	seasonal water table, slope
	89A	0- 3	8.5	0.3	2	2	1	2	2	seasonal water table
	455	0- 3	62.5	2.3	2	2	1	2	2	seasonal water table
A-3a	•46	0- 3	30.0	1.1	3	3	3	3	3	high water table
A-3b	•75	-	55.0	2.1	4	4	4	4	4	very high water table
	•91	-	46.5	1.7	4	4	4	4	4	very high water table, organic material
B-1a	05B	3- 8	12.0	0.4	1	1	1	2	2	slope
	32XB	3- 8	2.0	0.1	2	2	2	2	2	stoniness, slope
B-1b	32XC	8-15	23.0	0.9	2	2	2	3	3	slope, stoniness
B-1c	32MC	8-15	5.0	0.2	3	3	3	3	3	stoniness, slope
B-1d	32D	15-25	1.0	-	3	3	3	3	3	slope
B-1e	32XD	15-35	15.5	0.6	3	3	3	3	3	slope, stoniness
	32MD	15-35	9.5	0.4	3	3	3	3	3	stoniness, slope
B-2a	41XB	3- 8	3.5	0.1	2	2	2	2	2	seasonal water table, stoniness, slope
B-2b	41MB	3- 8	7.5	0.3	3	3	3	3	3	seasonal water table, slope, stoniness
B-3b	•43M	-	24.0	0.9	4	4	4	4	4	very high water table, stoniness
C-1a	35B	3- 8	1.0	-	3	1	1	2	2	fragipan, slope
C-1b	35C	8-15	5.0	0.2	3	2	2	3	3	fragipan, slope
C-1d	35D	15-25	15.5	0.6	3	3	3	3	3	slope, fragipan
C-1e	35MD	15-35	11.0	0.4	3	3	3	3	3	stoniness, slope
C-2a	31B	3- 8	11.0	0.4	3	2	1	2	2	fragipan, seasonal water table, slope
	31C	8-15	4.5	0.2	3	2	2	3	3	fragipan, seasonal water table, slope
	31XB	3- 8	4.0	0.1	3	2	2	2	2	fragipan, seasonal water table, stoniness, slope
C-2b	31MC	3-15	9.0	0.3	3	3	3	3	3	stoniness, fragipan, seasonal water table, slope
D-1	17C	3-15	65.0	2.4	3	3	3	3	3	shallowness
	20C	3-15	179.0	6.7	3	3	3	3	3	shallowness, slope
D-2	8	15-35	70.5	2.6	4	4	4	4	4	bedrock outcrops, slope
	17D	15-35	52.5	2.0	4	4	4	4	4	shallowness, slope
	17MC	3-15	18.5	0.7	4	4	4	4	4	shallowness, rockiness, slope
	17MD	15-35	214.0	8.0	4	4	4	4	4	shallowness, rockiness, slope
	20D	15-35	7.0	0.3	4	4	4	4	4	shallowness, slope
	20MD	15-35	2.0	0.1	4	4	4	4	4	shallowness, slope
E-2	•043	-	33.5	1.2	3	3	2	3	2	flood hazard, seasonal water table
	•816	-	35.0	1.3	3	3	2	3	2	flood hazard, seasonal water table
E-3a	•02	-	46.0	1.7	3	3	3	3	3	flood hazard, high water table
	•855	-	16.0	0.6	3	3	3	3	3	flood hazard, high water table
E-3b	•823	-	83.5	3.1	4	4	4	4	4	flood hazard, very high water table
G-3a	•461	-	77.0	2.9	3	3	3	3	3	high water table
	•463	-	1.0	-	3	3	3	3	3	high water table
U	M2	-	385.5	14.4	V	V	Probably Poor	Probably Good	Probably Poor	--
	MU	-	92.5	3.4	V	V	V	V	V	--
-	GP Gravel Pit	-	203.5	7.6	-	-	-	-	-	--
-	Quarry	-	20.0	0.7	-	-	-	-	-	--
-	Water	-	132.0	4.9	-	-	-	-	-	--
TOTAL			2682.5 (4.19 square miles)	100.0						

Limitation Ratings: 1 - slight, 2 - moderate, 3 - severe, 4 - very severe.
U - Unclassified - Other Land
V - Variable in nature, on site investigation is required for determining suitability or limitations for any planned use.
• - Inland wetland soils as defined under P. A. 155 - Inland Wetlands and Water Courses Act.
* - Possible pollution hazard.

SOIL MAP

GENERAL PURPOSE ZONE

BROOKFIELD, CONN.



SCALE

0 1/4 1/2 3/4 1mi.

0 1000 2000 3000 4000 5000ft.

General Purpose Zone

Prepared by USDA SCS 1976
Advance Copy, Subject to Change

TABLE 2
SOIL INTERPRETATIONS FOR URBAN USES

The ratings of the soils for elements of community and recreational development uses consist of four degrees of "limitations"; slight or no limitations, moderate limitations, severe limitations, and very 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. Detailed on-site investigations are suggested where the proposed soil use involves heavy loads, deep excavations, or high cost. Limitations, even though very severe, do not always preclude the use of the 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.

1. 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.

2. 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. The additional cost ranges from average to higher than average outlay when such areas are compared with areas rated as having slight limitations.

3. 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.

4. Very Severe Limitations. Areas rated as having very severe limitations are generally not feasible for the specific use or the limitations would require extreme and costly measures to correct.

Group C soils occur mostly on the tops and slopes of drumlins - hills that were smoothed and elongated north to south by the movement of glaciers. These soils are underlain by compact glacial till and have a hardpan or fragipan 16 to 36 inches below the soil surface. Permeability above the hardpan is moderate but the pan drastically reduces percolation. These hardpan soils present various limitations for development. Sewage disposal problems may arise during wet seasons of the year when the pan restricts the downward movement of excess water in the soil. In those times excess water, that from spring thaws or septage effluent from leach fields, may move rapidly downslope over the surface of the pan. This rapidly moving water may pose a threat to nearby water bodies and ground water supplies if it is carrying an overload of nutrients and/or pollutants. Development problems may also arise due to the fact that these till soils are often quite stony which adds difficulty when excavating or earth moving operations are needed. Group C soils comprise a total of 2.2 percent of the General Purpose zone.

Group D soils occur mostly in the rougher areas of the uplands. They may occupy narrow ridge tops but most often are on steep side slopes. These soils are characterized by stoniness and shallow depths to the underlying bedrock. These soils are directly underlain by hard bedrock, and areas may contain barren rock outcrops. In most places hard rock is less than 20 inches below the soil surface; although, occasional pockets of deeper soils can be found and utilized for development purposes. Rock outcrops, soils shallow to bedrock, combined with the steep slopes, impose severe and very severe limitations when developing this land for urban uses. Group D soils comprise 22.8 percent of the zone.

Group E soils are flood plain soils and occur on nearly level flood plains in stream valleys. They are formed in loamy deposits several inches to a few feet thick overlying sand and gravel layers. These soils are subject to flooding with the lower lying, poorer drained soils being flooded most often. The hazard of flooding severely limits these soils for residential, commercial and industrial development. The flood plains and lands adjacent to streams have many ecological values, and their retention for natural resource development is in the public interest. Group E soils comprise 7.9 percent of the zone.

Group G soils are lake terrace soils over strata high in silt and clay. Soils of this group occur in areas where glacial lake sediments accumulated. These sediments have a higher content of clay and fine silt than is common for soil materials in this area. Topography is usually level or gently sloping with slopes above 8 percent occurring only along terrace escarpments associated with stream channels. In most places, the finer-textured lake sediments are covered by coarser loamy or sandy material from several inches to a few feet thick. The two soil types (461, 463) on the site which are classified under Natural Soil Group G are poorly drained and have a water table that is less than 6 inches below the soil surface during the wettest part of the year. Because of these factors, these soils have severe limitations for most urban uses. Group G soils comprise 2.9 percent of the zone.

Other features on the Soils Map including the gravel pits, quarries, and water courses comprise the remaining 13.2 percent of the General Purpose zone.

It should be noted that the soil types in the zone which fall into the category of inland wetland soils as defined under Public Act 155 (Inland Wetlands and Water Courses Act) have been identified on the Chart. The local

Inland Wetlands Commission has the responsibility for overseeing all land uses affecting them.

In summary, a number of the soils in the General Purpose zone present severe and very severe limitations for development. Development limitations in the zone are imposed by such factors as: steep slopes (15 percent and greater), shallow depths to bedrock, bedrock outcrops, stoniness, hardpan layer, high water table, and flood hazard. A severe or very severe limitation rating does not mean that the land cannot be developed into urban uses. It does mean, however, that difficult and costly measures will be needed to properly overcome the principal limiting factor(s) so that the environment will not be adversely affected.

For further explanation of the Natural Soil Groups, refer to the booklet, Know Your Land, Natural Soil Groups for Connecticut, USDA Soil Conservation Service and Connecticut Cooperative Extension Service. For a detailed explanation of individual soil types refer to the booklet, Special Report, Soil Survey and Soil Interpretations for Fairfield County, Connecticut, USDA, Soil Conservation Service, 1973.

Ground Water Supply

Ground water for residential and commercial use can be derived from bedrock wells and from wells drilled into the unconsolidated materials that overlie the solid bedrock. Connecticut Water Resources Bulletin No. 21, Water Resources Inventory of Connecticut, Part 6, Upper Housatonic River Basin, USGS, 1972, has a fairly complete discussion about these two types of ground water supplies. The only real potential for large volume ground water development exists in the Still River Valley and in several adjacent valleys where there is a thick section of saturated sand and gravel deposits. However, in many cases development of high capacity wells in these areas will cause the surface water in nearby streams and rivers to be drawn down into the aquifer and eventually into the well itself. This "induced infiltration" may well compromise or have already partly compromised the potential value of the aquifer adjacent to and hydrologically connected to the Still River.

The feasibility of ground water development in the Still River Valley, will also be considerably affected by the water quality in the Still River, and the intensity and types of land uses permitted in the valley area. Development of ground water in several of the side valley areas may provide the opportunity to avoid contamination problems from the Still River.

If the town is to protect the potential for ground water development and possibly develop a ground water supply from the saturated materials in the valley, it should pursue a detailed investigation of potential areas, development feasibility, water resource alternatives, land use constraints in the water resource areas (etc.), prior to planning for (or allowing) general development in the valley. General development of the valley area without water resources study and planning will very possibly result in the loss of the water resources potential. An important part of a water resource development plan should be the investigation of the potential of the aquifer in the brook system that drains into the Hawleyville section of Newtown. Part of this is in the Southeast Industrial Area of Brookfield, and unregulated development would compromise its water resources potential.

General land development under present conditions which require on-site water supply and waste disposal systems may seemingly serve the town's needs

for the near future. However, it is quite likely that interacting land uses will begin to contaminate on-site water supplies, and a wholesale shift to a municipal water supply will probably be necessary. The town should plan for this shift now, prior to development of the problem.

Figure 7 is a generalized map showing the potential for ground water development from unconsolidated materials. (One should refer to Connecticut Water Resources Bulletin No. 21 for specific detail.) The map generally identifies the areas that warrant further investigation. This information does not provide sufficient data to select the "best" area. Too many other ground water variables, land use variables, economic variables, political variables (etc.), are involved in preparing a specific water resources development plan for the community. Developing this plan is the next step the community should pursue.

Biological Considerations - Aesthetics and Preservation

The Team did not investigate the General Purpose zone in terms of its natural biological characteristics. An investigation of the existing types and conditions of plant and animal species and habitats may be desirable. In this way, important species can be properly managed and critical habitats can be preserved.

It should be noted, however, that what have been identified as "critical habitats" in Connecticut may exist in the Still River Valley area. For detailed information, the Brookfield Conservation and Inland Wetlands Commissions are advised to refer to a recently published study entitled Rare and Endangered Species of Connecticut and Their Habitats, by Joseph J. Dowhan and Robert J. Craig, Connecticut Geological and Natural History Survey, Report of Investigations No. 6, Connecticut Department of Environmental Protection, 1976.

Briefly, critical habitats are described in the study as habitats that rare species require for their survival. "The classification and recognition of 'critical habitat' types aids in identifying actual and potential sites of rare species aggregations in need of monitoring, preservation and/or management as important natural areas." Two habitat types designated in the study which may be relevant to the Still River Valley area are "Calcareous Habitats" and "Flood-Plain Forests".

Calcareous habitats are those underlain by calcareous (calcium-rich or limy) rocks, chiefly calcitic and dolomitic marble. In Connecticut, these are typically found in the western marble valley region from the Massachusetts line at Salisbury and North Canaan south to Ridgefield. The soils derived from these limestones and marbles are generally quite fertile and rich in nutrients, thus they are exceptionally fine agricultural soils. There is a lack of natural and unspoiled calcareous habitats in the state, especially those which are critical to the preservation of certain rare plant and animal species. Especially important are marble ridges and ledges, caves, calcareous wetlands, and marl lakes and ponds. Flood-plain forests occur along the shores and on islands of the state's major rivers, including some parts of the Housatonic River. These fertile habitats are periodically flooded and support a high diversity of plant and animal species, especially songbirds. Clearing of the land has destroyed much of the original flood-plain forests and today only small remnants of second growth forest remain.

"'Critical habitats' may serve as refuges for rare species or as research and educational laboratories for the investigation of genetic, evolutionary, and ecological problems."

GROUNDWATER DEVELOPMENT POTENTIAL

GENERAL PURPOSE ZONE

BROOKFIELD, CONN.

SCALE

0 1/4 1/2 3/4 1 mi.

0 1000 2000 3000 4000 5000 ft.

//// Areas of Moderate Potential (Approximate)

//// Areas of Greater Potential (Approximate)

FIGURE 7

SIGNIFICANT DEVELOPMENT LIMITATIONS

GENERAL PURPOSE ZONE

BROOKFIELD, CONN.

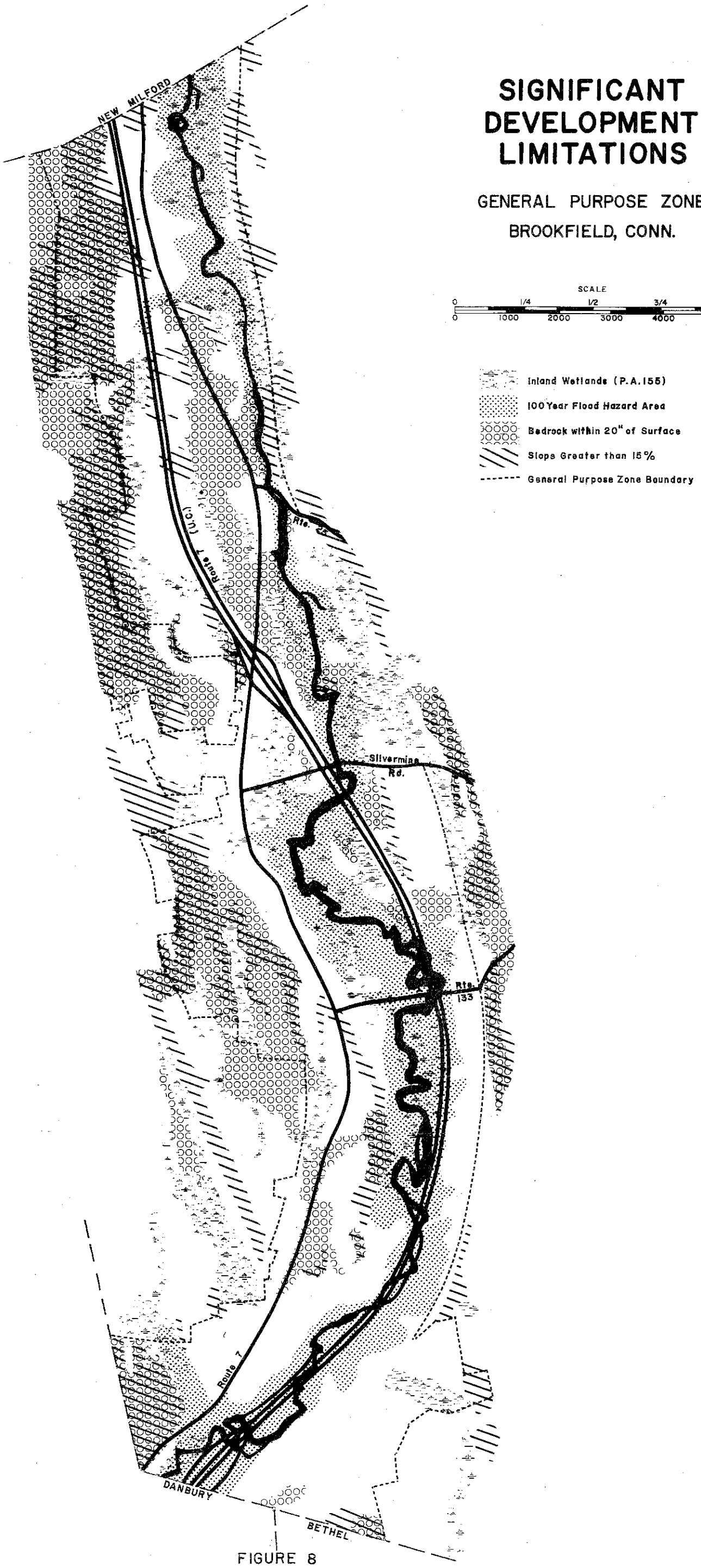


FIGURE 8

SIGNIFICANT DEVELOPMENT LIMITATIONS

This section revolves around Figure 8, the Significant Development Limitations map. The information on the map was interpreted from: the Soil Survey Field Sheets for Fairfield County, Connecticut, USDA, SCS, 1975; the study, Flood Hazard Analyses, Still River, Fairfield and Litchfield Counties, Connecticut, USDA, SCS, 1975; and the New Milford and Danbury USGS Topographic Quadrangles, 1971, 1972. The map shows several of the important existing natural resource features which may impose significant limitations or require special conditions for residential, commercial or industrial development within the General Purpose zone. According to the map, the land may be limited for use because it is steeply sloping (greater than 15 percent), shallow to bedrock, classified as inland wetlands, within the 100-year flood hazard area of the Still River, or any combination of these factors. Clear areas on the map do not have these limiting features and may be more suitable for development. As shown on the map, relationships exist between these limiting resource features. Shallow depth to bedrock conditions often occur in areas of steep slopes. Also, the map portrays the interconnected relationships which exist between the Still River, its flood hazard area (or flood plain) and its associated inland wetlands.

These features on the map may make developing the areas in which they occur more difficult and more costly. However, these areas are not impossible to develop. Although, it may be undesirable to develop the areas for fear of adverse environmental impact to the immediate and surrounding land. Also, activities in some areas, specifically inland wetlands, are regulated by law. These four limiting features are not the only ones that can be found. Other limitations for development may include: hardpan soils, moderately well drained soils, and valuable ground water supply potential, etc. Figure 8, therefore, is for illustrative purposes, and should only be used as a very general conceptual guide in planning for future development within the General Purpose zone.

ZONING AND PLANNING ANALYSIS - BROOKFIELD GENERAL PURPOSE ZONE

The following is a planner's view of the impact of the General Purpose zone and its area on the Town of Brookfield. Comments are directed to the planning and zoning aspect.

Brookfield is quite fortunate, from a physical standpoint, in that it is virtually divided into three separate and distinct areas. Two areas, ideal for residential zoning, are on the east and west sides of town. One is on the shores of Lake Candlewood and the other is on the shores of Lake Lillinonah. Towards the center of town these two areas slope down to the Still River which parallels, and in some places crosses Route 7 (Federal Road). The reason this is fortunate is because it gives the town two outlying residence areas and a central area ideally suited to convenience shopping and industrial development.

The General Purpose zone was conceived to take advantage of this area and its natural development in this vein. At a meeting on September 21, 1976, First Selectman Merrill Walrath stated, "The General Purpose zone is a forthright attempt to attract industry and commerce to the Town of Brookfield".

The Community Development Action Plan, Brookfield, Connecticut, 1972, states, p. 3 and p. 21:

"INTRODUCTION"

"The Central District consists of the Still River Valley. Most of the land in the Valley is zoned commercial or industrial. Much of it is either lightly developed or not developed at all."

"This Central District is in a state of transition. Land use is rapidly changing as business interests seek to acquire large areas of level land in anticipation of the new expressways."

"If this area develops as have so many others, becoming an unplanned jumble of poorly constructed, badly designed roadside commercial buildings, Brookfield will have failed in handling an important part of its future."

"PLAN OF DEVELOPMENT"

"Ten years ago the first Planning and Zoning Commission of Brookfield recognized the basic nature of the land within the boundaries of the Town - two hilly sections separated by a level river valley running the entire length of Town. The appropriate land uses were easily seen - residential for the two hilly areas, and business uses for the valley in between."

Problems

The one overriding problem that arises with the present zoning is that the town will encourage an unhealthy mix of uses when all uses are allowed in one zone. The very purpose of zoning is to separate different classes of land uses. The only guarantee that the town has that different land uses will be separated in the General Purpose zone is the Design Review Procedure. Although this is an effective tool, the size of the lots required in the General Purpose zone are only one acre for commercial uses and two acres for industrial uses. Residential uses are allowed on one acre lots also. In the long run, this system might falter if the frontage of Route 7 were flanked by a motel, next to a house, next to an apartment, next to a filling station, all next to one another on different size lots separated only by shrubs, buffer strips, and fences required by the landscaping regulations or recommended through the Design Review Procedure. This situation would be further aggravated by the appearance of large apartment complexes every 3000 feet along the sides of Route 7 as is the suggestion now.

By way of example, it would be anathema to the Town of Brookfield to imagine a large tract of land on Long Meadow Hill Road being given over to an intense industrial use, because this is an exclusive residential area. To put an industrial land use in an exclusive residential zone would be an imposition on the residents. It would alter traffic patterns, create non-residential noises, would detract from the all around residential atmosphere and might change property values. Surely, what the town would rather do is to leave a residential zone exclusively residential, if possible.

By the same thinking, commercial zones and industrial zones should be exclusive so that they do not encroach on one another with any detrimental effects. However, commercial and industrial uses are more compatible with one another than either are with residences. The uses allowed in the General Purpose zone, excluding residence, could be shuffled in the General Purpose zone so that they would not seriously affect one another.

Recommendations

Three suggestions are offered for this zone:

1. Eliminate residential uses from the General Purpose zone. Residences in Brookfield should be limited to the two areas previously mentioned, on the east and west sides of the General Purpose zone. Residences in Brookfield would then be protected and will most likely develop in a fashion in keeping with the town.

2. Make all residences in the General Purpose zone non-conforming. This will give the town ultimate control because any modifications, whether residential, commercial or industrial, would have to come before some Town Commission or Board.

3. Set up zones for multi-family development within that area planned for the General Purpose zone. Multi-family dwellings might be desirable some place along the area surrounding Route 7 but they should be planned and controlled by the town. The town should designate those areas which it feels are suitable for multi-family uses, such as areas where soils have only slight and moderate limitations for such a use, rather than allow developers to search for parcels every 3000 feet along Route 7.

GENERAL COMMENTS

In summary, the General Purpose zone in the Still River Valley is a very valuable area in many respects. As stated before, it has many significant land use and resource potentials. However, it should also be remembered that it is an environmentally sensitive area. Only through advance and proper planning and controls can the quantity and quality of valuable natural resources be preserved, conflicting land uses be avoided, and the long-term economics of land use be attained.

APPENDIX

I. Description of the Four Large Maps which Accompany this Report

The following maps were prepared at a large scale (1"=1000') and given to the town for use in future planning:

1. Water Resources Map
   This map is for illustrative purposes only. It is a generalization of information contained in the Connecticut Water Resources Bulletin #21, Water Resources Inventory of Connecticut, Part 6, Upper Housatonic River Basin, U. S. Geological Survey, 1972; and the Soil Survey Field Sheets for Fairfield County, Connecticut, USDA, Soil Conservation Service, 1975. This map shows the relationship between the Still River and associated water resources - aquifers, wetlands, streams and ponds within the Still River drainage basin in Brookfield. Only areas of greatest ground water supply potential (stratified drift aquifers) are indicated on the map. Other aquifer types exist. Land use practices may have altered the quality, quantity, or distribution of water resources shown on the map. Present and future land use practices within the entire Still River drainage basin will significantly affect the future potential of these water resources.

2. Soil Map
   This map is an enlargement of the information found on the detailed Soil Survey Field Sheets for Fairfield County, Connecticut, prepared by the USDA, Soil Conservation Service, 1975. The map was enlarged from the original soil mapping scale of 1320'/inch to a 1000'/inch scale. The symbols on the map can be interpreted by referring to the booklet, Special Report, Soil Survey and Soil Interpretations for Fairfield County, Connecticut, USDA, SCS, 1973. The "Soils Limitations Chart" found in the report is also designed to be used with this map. The map and the chart can be used together to determine soils limitations and opportunities for development.

3. Significant Development Limitations (Map)
   Refer to the report description of this topic for all information (p.23). (A similar map appears in the report.)

4. Map Overlay - Existing Residential, Commercial and Industrial Development
   The information on this map overlay was interpreted from the 1970 Land Use Inventory of Connecticut (a 58 category land use inventory map based on 1970 data), Planning and Budget Division, Connecticut Department of Finance and Control; and two maps: "Proposed General Purpose Zone, Brookfield, Connecticut", Zoning Commission, Brookfield, Connecticut, 1976, and "Property Line and Building Map, Brookfield, Connecticut", 1972. The overlay shows the approximate location of existing residential, commercial and industrial development within the General Purpose zone. The overlay can be used in conjunction with the above three maps.

II. Published Data, References and Additional Information Pertaining to the Land Within the General Purpose Zone*

Topographic Information

Topographic Maps: Danbury, Connecticut Quadrangle, Scale 1:24,000, U. S. Geological Survey, 1963, photorevised 1972.

New Milford, Connecticut Quadrangle, Scale 1:24,000, U. S. Geological Survey, 1955, photorevised 1971.

Hydrologic Information

Connecticut Water Resources Bulletin #21, Water Resources Inventory of Connecticut, Part 6, Upper Housatonic River Basin; M. A. Cervione, Jr., D. L. Mazzaferro, and R. L. Melvin, 1972.

Connecticut Water Resources Bulletin #22, Hydrogeologic Data for the Upper Housatonic River Basin, Connecticut; R. L. Melvin, 1970.

Connecticut Department of Environmental Protection Bulletin #1, Gazetteer of Natural Drainage Areas of Streams and Water Bodies within the State of Connecticut; M. P. Thomas, 1972.

Water Resources Data for Connecticut Water Year 1975, U. S. Geological Survey Water-Data Report CT-75-1. (This includes streamflow and water quality data for the Still River for the water year of 1975.)

Housatonic River Basin Plan, Water Compliance Unit, Connecticut Department of Environmental Protection, 1975. (A water quality management plan which includes an analysis of the Still River.)

Geologic Information

Surficial Geologic Map of the New Milford Quadrangle, Connecticut, USGS open file #75-548.

Surficial Geologic Map of the Danbury Quadrangle, Connecticut, USGS open file #75-547.

The Drainage and Glacial History of the Still River Valley, Southwestern, Connecticut, Woodrow Thompson, 1971, USGS open file report.

Bedrock Geology of the Danbury Quadrangle, James W. Clarke, Connecticut Geological and Natural History Survey Quadrangle Report #7.

Soils Information - (soils information can be obtained by contacting the District Conservationist for Fairfield County, Connecticut)

Soil Survey Field Sheets for Fairfield County, Connecticut, USDA, Soil Conservation Service, 1975.

Special Report, Soil Survey and Soil Interpretations for Fairfield County, Connecticut, USDA, SCS, 1973.

Know Your Land, Natural Soil Groups for Connecticut, USDA, SCS, and Connecticut Cooperative Extension Service.

Biologic Information

Rare and Endangered Species of Connecticut and Their Habitats, Joseph J. Dowhan, Robert J. Craig, Connecticut Geological and Natural History Survey, Report of Investigations #6, Connecticut Department of Environmental Protection, 1976.

Other

Flood Hazard Analyses, Still River, Fairfield and Litchfield Counties, Connecticut, USDA, SCS, 1975. (Report can be obtained through the District Conservationist, Fairfield County, Connecticut.)

1970 Land Use Inventory (Map), scale 1:24,000, Planning and Budget Division, Connecticut Department of Finance and Control.

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* Most of this information can be located by contacting the Natural Resources Center, Department of Environmental Protection, State Office Building, 165 Capitol Avenue, Hartford, CT, 06115. (Phone 566-3540). The Natural Resources Center is charged with providing a centralized source of natural resources data, information, and expertise to help towns in their land use planning and decisions.