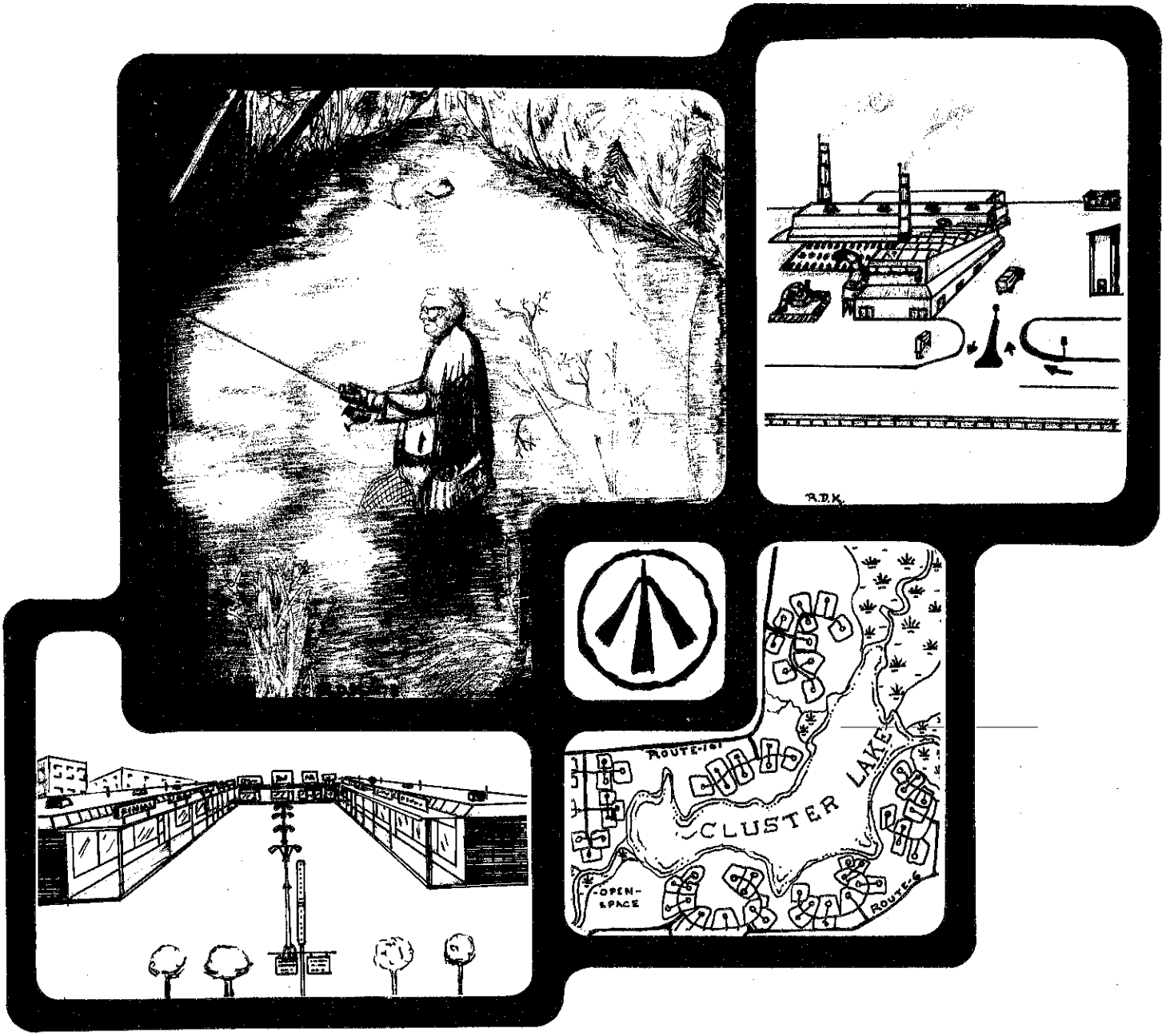
# ENVIRONMENTAL REVIEW TEAM REPORT




## NORTH FARM SUBDIVISION
## MIDDLEBURY, CONNECTICUT

KING'S MARK
RESOURCE CONSERVATION AND DEVELOPMENT AREA

# KING'S MARK
# ENVIRONMENTAL REVIEW TEAM REPORT

On

## NORTH FARM SUBDIVISION
## MIDDLEBURY, CONNECTICUT

APRIL, 1978


King's Mark Resource Conservation & Development Area

Environmental Review Team

P.O. Box 30

Warren, Connecticut 06754

# ACKNOWLEDGMENTS

The King's Mark Environmental Review Team operates through the cooperative effort of a number of agencies and organizations including:

Federal Agencies

U.S.D.A. SOIL CONSERVATION SERVICE

State Agencies

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DEPARTMENT OF HEALTH
DEPARTMENT OF TRANSPORTATION
UNIVERSITY OF CONNECTICUT COOPERATIVE EXTENSION SERVICE

Local Groups and Agencies

LITCHFIELD COUNTY SOIL AND WATER CONSERVATION DISTRICT
NEW HAVEN COUNTY SOIL AND WATER CONSERVATION DISTRICT
HARTFORD COUNTY SOIL AND WATER CONSERVATION DISTRICT
FAIRFIELD COUNTY SOIL AND WATER CONSERVATION DISTRICT
NORTHWESTERN CONNECTICUT REGIONAL PLANNING AGENCY
VALLEY REGIONAL PLANNING AGENCY
LITCHFIELD HILLS REGIONAL PLANNING AGENCY
CENTRAL NAUGATUCK VALLEY REGIONAL PLANNING AGENCY
HOUSATONIC VALLEY COUNCIL OF ELECTED OFFICIALS
AMERICAN INDIAN ARCHAEOLOGICAL INSTITUTE

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Stanley J. Pac, Commissioner

Policy Determined By

KING'S MARK RESOURCE CONSERVATION AND DEVELOPMENT AREA

Victor Allan, Chairman, Executive Committee
Stephen Driver, ERT Committee Chairman
George Sweeney, Coordinator

Staff Administration Provided By

NORTHWESTERN CONNECTICUT REGIONAL PLANNING AGENCY

Warren C. Wilson, Chairman
Thomas A. J. McGowan, Director
Richard Lynn, ERT Coordinator

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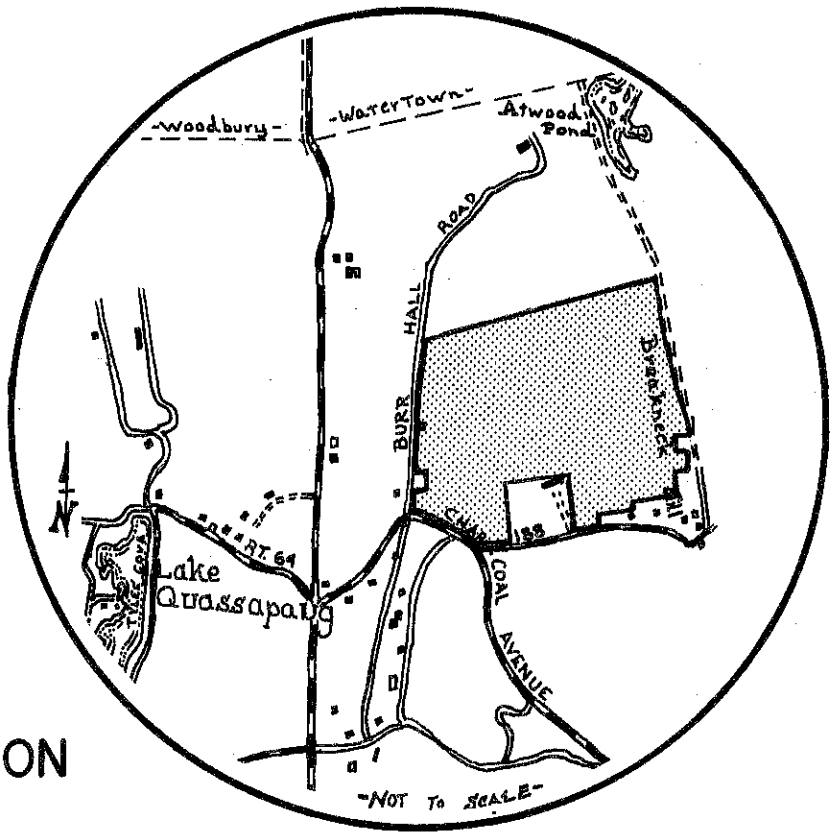
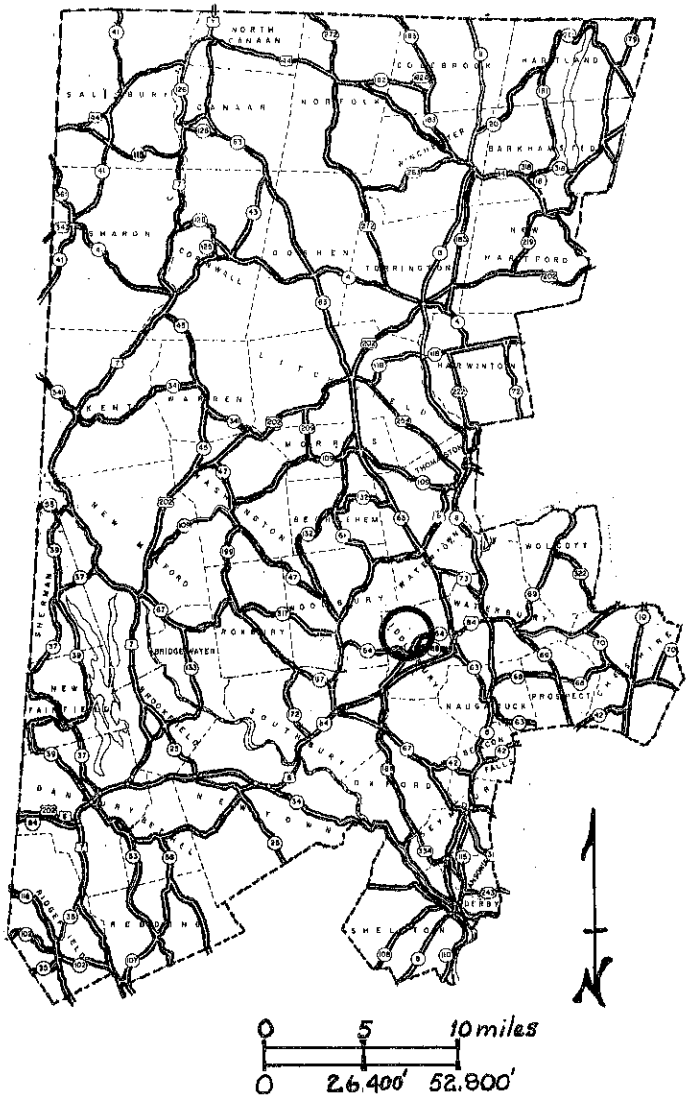



## NORTH FARM SUBDIVISION



# ENVIRONMENTAL REVIEW TEAM REPORT
# ON
# NORTH FARM SUBDIVISION
# MIDDLEBURY, CONNECTICUT

## INTRODUCTION

The Town of Middlebury, Connecticut is considering a proposal to subdivide a ±230 acre parcel of land in northern Middlebury. Present plans call for 63 lots on 150 acres with the remaining 80 acres of the tract given to the Town as open space. The land developer has prepared a preliminary plan map (1" to 100' scale) which shows wetlands (mapped by a soils scientist), 2' contour intervals, access roads, storm drains, and specific lot locations.

The 80 acres designated for open space consists primarily of wetlands. This wetland area is located in the west central portion of the property and bisects the proposed development. Thirteen lots are proposed to the west of this wetland area with access via Burr Hall Road and Charcoal Avenue. Fifty lots are proposed to the east of this wetland area with access via Breakneck Hill Road and Mirey Dam Road. Interior roads are proposed off Breakneck Hill Road and Mirey Dam Road. See Figure 1.

According to the developer's preliminary site plan map, the only wetland area proposed for construction is a small area where the interior road running north off Breakneck Hill Road is proposed. The concept plan also calls for the development of three storm water drains with discharge into the wetland area.

The Conservation Commission from the Town of Middlebury requested the assistance of the King's Mark Environmental Review Team (ERT) to help them in analyzing the proposed development. The ERT was asked to evaluate the site in terms of its ability to support the proposed development--pointing out opportunities, limitations and concerns for site development given the preliminary site plan and other available data. Specific concerns of the request include the impact of the proposed development on the wetland area, suitability of soils for septic system disposal and adequacy of existing and proposed circulation facilities.

The ERT met and field reviewed the site on Wednesday, March 1, 1978. Team members for this review consisted of the following:

Frank Indorf .....District Conservationist..U.S.D.A. Soil Conservation Service

Dwight Southwick..Engineer.....U.S.D.A. Soil Conservation Service

Mike Zizka .....Geologist .....Connecticut Department of Environmental Protection

Jeff Schmaltz....Wildlife Biologist...Connecticut Department of Environmental Protection
Mike Pochan.....Forester.....Connecticut Department of Environmental Protection
Don Smith.....Forester.....Connecticut Department of Environmental Protection
Charles Vidich...Planner.....Central Naugatuck Valley Regional Planning Agency

Prior to the review day, each team member was provided with a summary of the proposed project, a checklist of concerns to address, a soil survey map, a soils limitation chart, and a topographic map of the area. Following the field review, individual reports were prepared by each team member and forwarded to the ERT Coordinator for compilation and editing into this final report.

This report presents the Team's findings and recommendations. It identifies the natural resource base of the site and highlights opportunities and limitations for residential development. It is hoped this information will assist the Town of Middlebury in making decisions regarding the future of the North Farm site.

If any additional information is required, please contact Richard Lynn (868-7342), Environmental Review Team Coordinator, King's Mark RC&D Area, P. O. Box 30, Warren, Connecticut.

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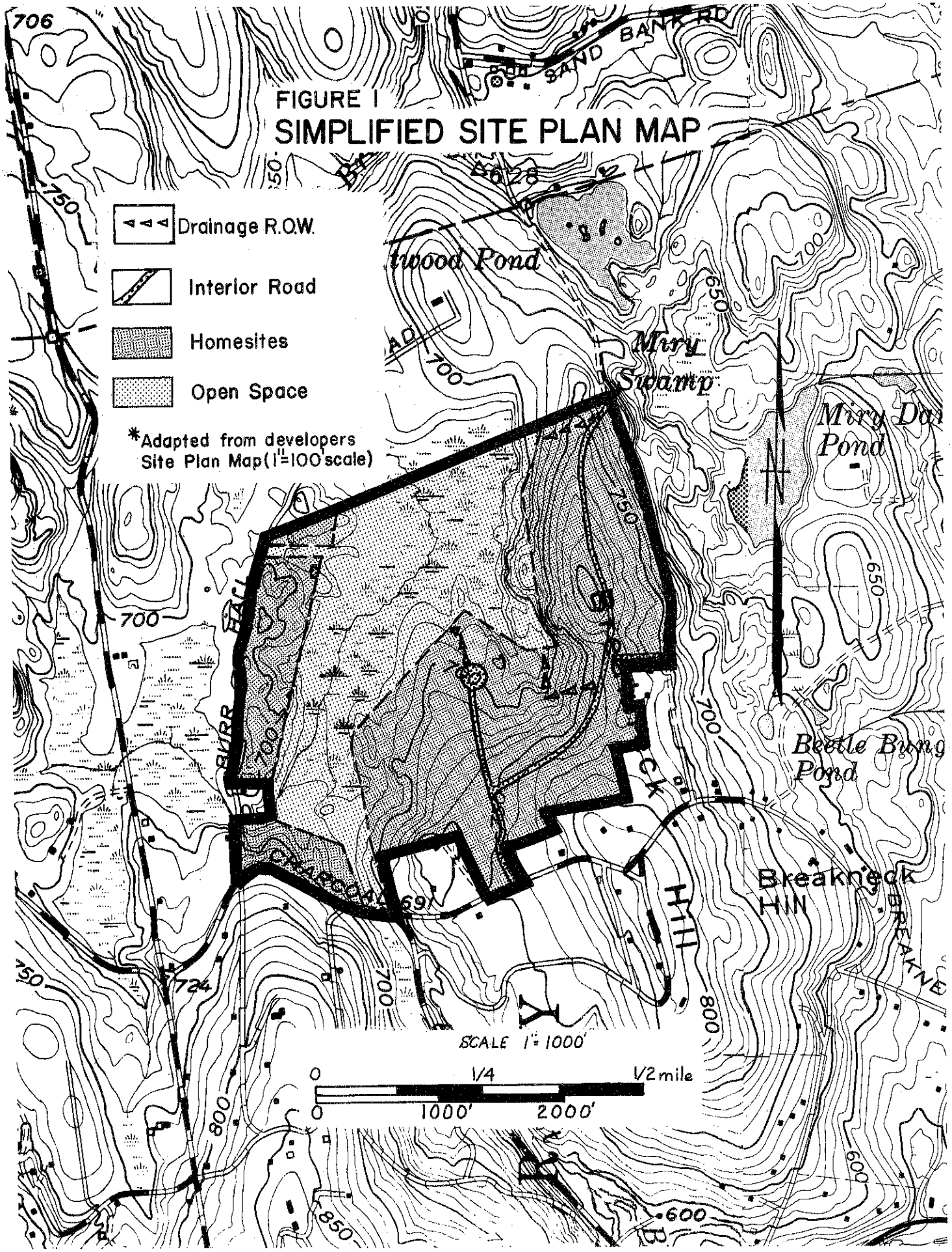


FIGURE 1
SIMPLIFIED SITE PLAN MAP
Drainage R.O.W.
Interior Road
Homesites
Open Space
*Adapted from developers Site Plan Map(1"=100'scale)
SAND BANK RD
twood Pond
Miry Swamp
Miry Dam
Pond
Beetle Bung
Pond
Breakneck
HILL
BREAKNE
CHARCOAL HILL
BURR
SCALE 1"= 1000'
0 1/4 1/2 mile
0 1000' 2000'

## RESOURCE BASE

### SETTING, TOPOGRAPHY, LAND USE

The North Farm property is located at the northern tip of the Town of Middlebury. The ±230 acre tract is generally bounded on the south by Charcoal Avenue and Breakneck Hill Road, on the east by Mirey Dam Road, on the west by Burr Hall Road, and on the north by privately owned openland.

As shown in Figure 2, the North Farm property is bisected by a ±80 acre wetland area. The northeastern portion of the property rises steeply from the wetland area to a broad level area (Breakneck Hill). The southeastern portion of the property is characterized by gently rolling terrain sloping towards the wetland area. To the west of the wetland area the land rises sharply to an area of fairly gentle relief with scattered areas of steep topography.

Most of the land at the North Farm tract is woodland. A few areas to the east of the wetland area have been cleared for agricultural use or timber products.

### SOILS

A detailed soil survey map and soils limitation chart of the tract is presented in the Appendix of this report. Detailed mapping of the wetlands at this site has been performed by a reputable soils scientist and these areas are shown on the developer's site plan.

Basically there are eleven soil types on the property which fall into four natural soil groups:

#### Natural Soil Group A, Terrace Soils - Over Sand & Gravel (5% of site)

These soils occur above the flood plain in river and stream valleys. They are underlain by water deposited beds of sand or sand and gravel. In most places a few inches to three feet of loamy or fine sandy soil material covers the older coarser water deposits.

Group A soils at this site include the following soil types:

466 (Walpole sandy loam): These soils are poorly drained and have a high water table that remains 0 to 6 inches below the soil surface during the wettest part of the year. The high water table usually persists into early summer and may reappear after prolonged or heavy summer rains. These soils are regulated under P.A. 155 - the Connecticut Inland Wetland and Water Course Act.

15A (Ninigret fine sandy loam): These soils have a high water table during wet seasons. In periods of highest saturation, usually in the spring, the water table remains 15 to 20 inches below the soil surface. Permeability is moderate or rapid above the water table.

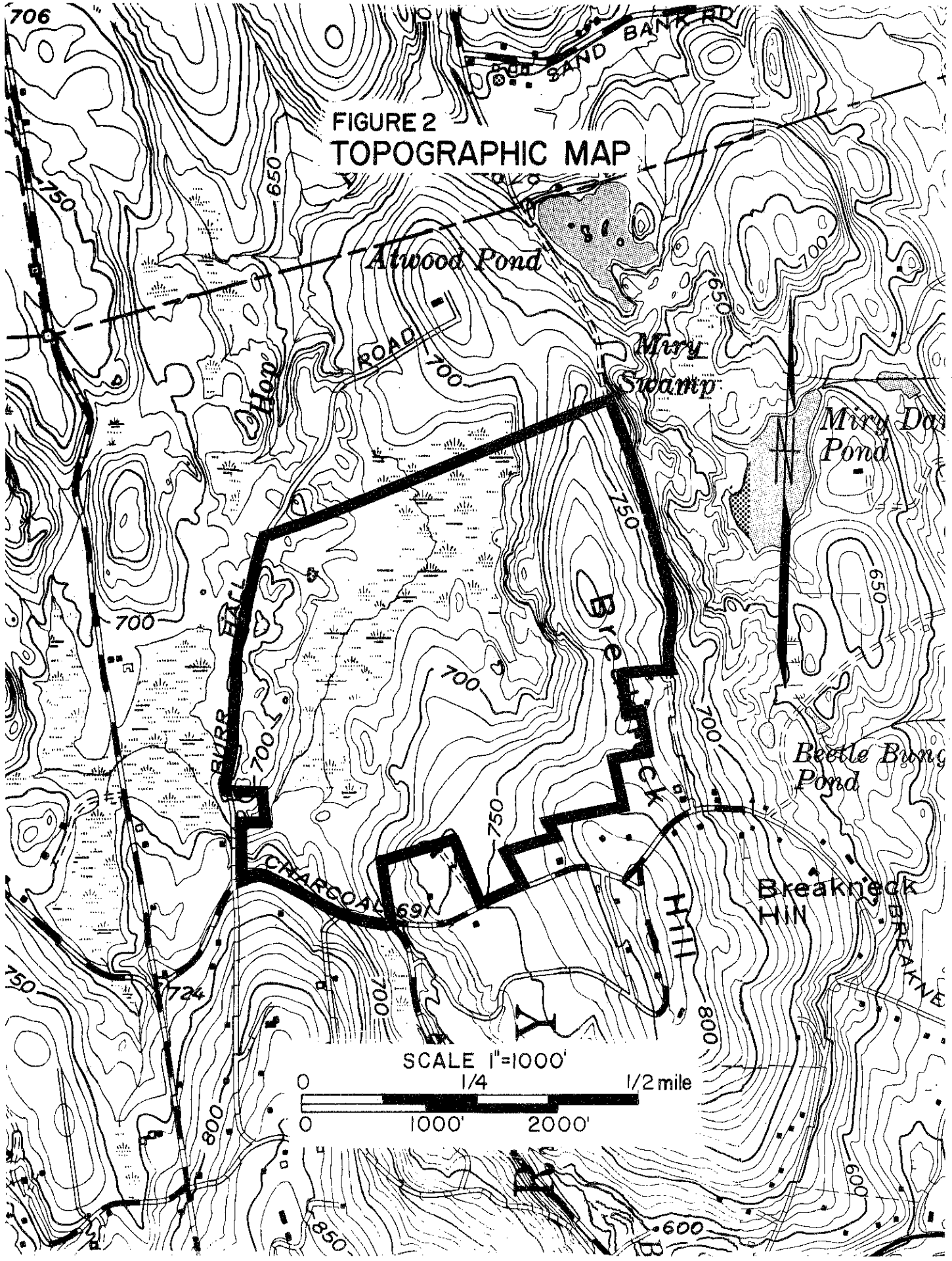


FIGURE 2
TOPOGRAPHIC MAP
SAND BANK RD
Atwood Pond
ROAD
Miry Swamp
Miry Dam Pond
Beetle Bump Pond
Breakneck Hill
CHARCOAL
SCALE 1"=1000'
0 1/4 1/2 mile
0 1000' 2000'

60B (Hinckley gravelly sandy loam): These soils are excessively drained soils with smooth slopes less than 8 percent. Natural fertility is low.

Natural Soil Group C, Upland Soils - Over Compact Glacial Till (Hardpan) (57% of site)

These soils occur mostly on the tops and slopes of drumlins--hills that were smoothed and elongated north to south by the movement of glaciers. The soils are underlain by compact glacial till and have a hardpan 16 to 36 inches below the soil surface. Permeability above the hardpan is moderate but the pan drastically reduces percolation. During wet seasons, excess water in the soil moves downslope above the hardpan. The till commonly contains stones and boulders which add difficulty when excavating or earth moving operations are needed. These soils have good moisture-holding capacity for plant growth. Exceptional panoramic views are afforded from the higher areas.

At this site Group C soils consist of the following types:

43M (Ridgebury, Leicester & Whitman, extremely stony): These soils are poorly drained and have a high water table that remains within 6 inches of the soil surface during the wettest part of the year. The high water table often persists until late spring and may recur after prolonged or heavy summer rains.

31B (Woodbridge, fine sandy loam): Permeability above the hardpan is moderate for these soils, but the pan drastically reduces percolation. As a result, these soils have a high water table during wet seasons. During the period of highest saturation, the water table remains within 15 to 20 inches of the soil surface. Slopes do not exceed 15 percent and those less than 8 percent predominate.

31MC (Woodbridge, extremely stony fine sandy loam): Similar to 31B, but very stony.

35B (Paxton, fine sandy loam): These soils are well drained with a slowly to very slowly draining fragipan at 2 - 3 feet below the surface. During wet seasons excess water in the soil moves downslope above the pan. 3 - 8% slopes.

35C (Paxton, fine sandy loam): Similar to 35B, but with 8 - 15% slopes.

Natural Soil Group D, Upland Soils - Rocky and Shallow to Bedrock (25% of site):

These 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 underlain by hard bedrock and the areas contain barren rock outcrops. In most places hard rock is less than 20 inches below the soil surface. These areas provide contrast in the landscape and scenic overlooks.

On this site, Group D soils consist of the following soil types:

17LC (Charlton-Hollis, fine sandy loan) 3 - 15% slopes

17LD (Hollis-Charlton, fine sandy loan) 15 -35% slopes

Natural Soil Group F, Marsh and Swampy Soils (13% of site):

The soils in this group occur in depressional areas where surface organic deposits are usually 5 or more feet deep. They are saturated most of the time and water ponds on the surface in winter and spring.

On this site, Group F soils consist of:

92 (Carlisle Muck) A deep peat and muck soil with high water table during most of the year. These soils are inland wetlands as defined under Public Act 155.

Soils vs. Proposed Land Use

As shown on the Soils Limitation Chart (see Appendix), many of the soils on the site are rated as having severe limitations for urban uses (on-site sewage disposal, homesites with basements, landscaping, streets). The site presents severe development problems due primarily to steep slopes, hardpan soil conditions,and seasonally high water tables.

The fact that these soils have severe limitations for urban development should not preclude their use for this purpose. All problems on these soils can be mitigated by the use of good engineering and the implementation of proper and necessary conservation measures. Also, since this proposed subdivision has a large lot size (±2 acres) the associated soil problems will be minimized. Techniques to assure that development does not exceed the "carrying capacity" of the land are presented in appropriate sections of Part III of this report.

The present vegetative cover is adequate to control erosion until construction begins. The soils on the site, however, are very erosive when cleared of vegetation, and if left in an open condition for long periods of time severe siltation and sedimentation will take place. An erosion and sedimentation plan should be developed to control erosion and sediment on and off the site. The plan should include silt traps, diversion waterways, hay bale erosion checks and vegetative measures such as temporary and permanent seeding.

The developer has indicated that the rate of development would be slow (about six lots per year). This will buffer the impact of the project on the land and permit road building and lot preparation to be scheduled so that land is not cleared and stripped long ahead of proper surface water control or established vegetation.

GEOLOGY

The bedrock geology of the property, shown in Figure 3, is taken from Bulletin No. 3 of the Connecticut Geological and Natural History Survey, The Bedrock Geology of the Woodbury Quadrangle, by Robert M.

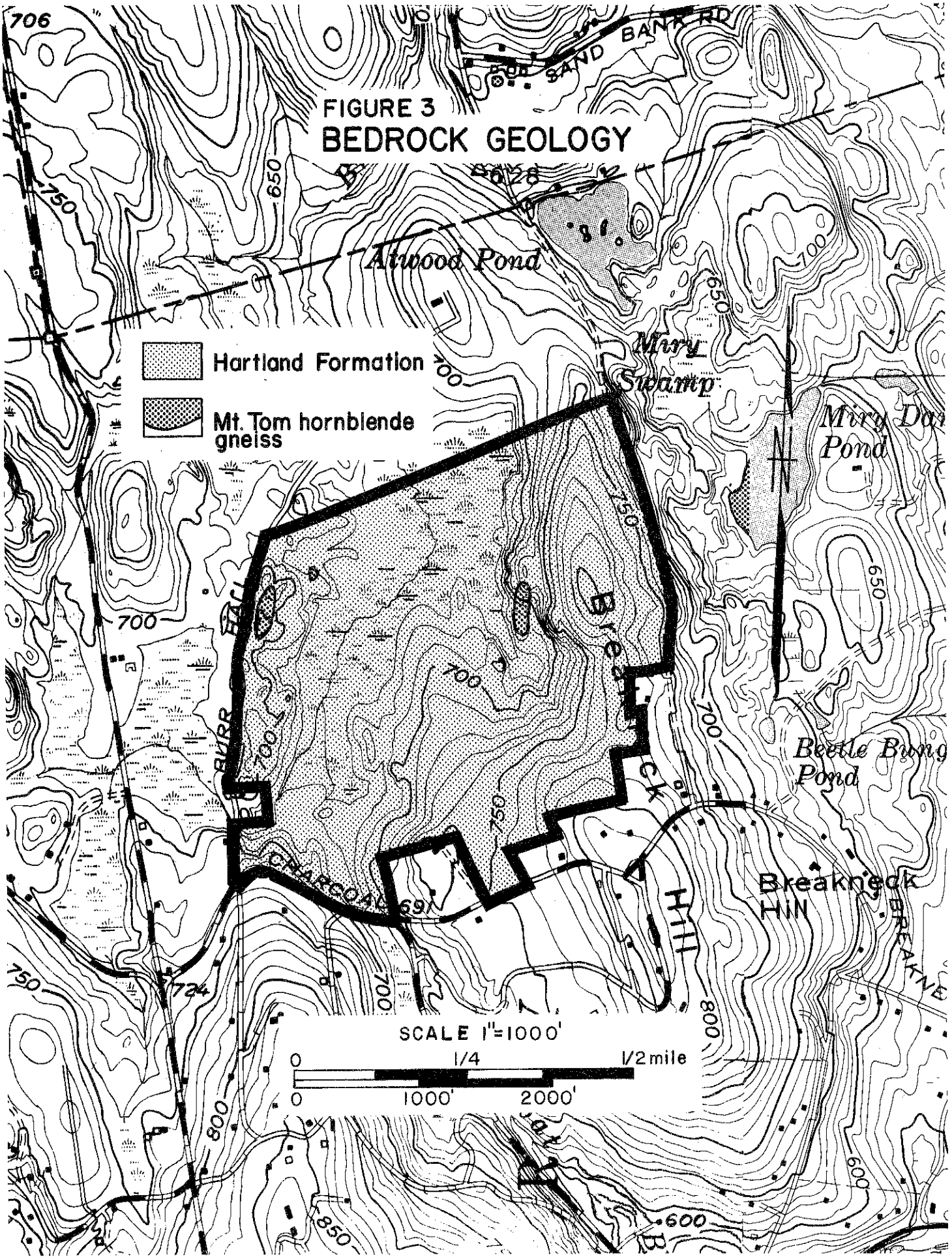


FIGURE 3
BEDROCK GEOLOGY
Hartland Formation
Mt. Tom hornblende gneiss
SAND BANK RD
Atwood Pond
Miry Swamp
Miry Dam Pond
Beetle Bump Pond
Breakneck Hill
BURR HILL
CHARCOAL
SCALE 1"=1000'
0 1/4 1/2 mile
0 1000' 2000'

Gates (1954). Nearly all of the property is underlain by the Hartland Formation, which includes interbedded mica quartzites and mica quartz schists. The metamorphic foliation of the rocks dips steeply to the northeast. Small lenses of Mt. Tom hornblende gneiss, a dark green to black and white mottled gneiss, are found along Burr Hall Road and along the west flank of Breakneck Hill.

The bedrock is overlain by a thin blanket of unconsolidated material, mostly of glacial orgin. The distribution of the various surficial deposits, outlined in Figure 4, is modified slightly from that shown on the Surficial Geologic Map of the Woodbury Quadrangle (U.S. Geological Survey Map GQ-896), by Fred Pessl, Jr. (1970). Although snow cover on the day of the ERT's field review prevented a close examination of the deposits, previous studies in the area suggest the likelihood of certain characteristics.

Till, the most widespread type of overburden, is a poorly sorted mixture of rock fragments deposited directly by glacier ice. Most till on the property is probably olive-brown and compact; this unit may in turn be overlain by a friable, light gray till. The compact variety is commonly called hardpan.

Stratified drift, the second major glacial-age deposit, seems to be restricted largely to the northwest corner of the property. A product of deposition by meltwater streams, stratified drift usually consists of layered sand and gravel. An excavation just east of Burr Hall Road exposed mostly sand and pebbly sand.

The other two deposits shown on Figure 2 are postglacial in origin and probably overlie till or stratified drift. Alluvium consists of sand, gravel, and silt deposited by modern streams. Swamp deposits consist of sand, silt, clay and organic matter deposited in poorly drained areas. The section mapped as alluvium together with that mapped as swamp deposits conforms largely to the area mapped by the developer's soil scientist as wetlands.

The developer reported finding a dry gravelly material in several shallow excavations on lots within the section of Breakneck Hill mapped as till. It is likely that this coarse material is actually the loose, light gray till mentioned by Pessl in GQ-896. Because the excavations were made in an area proximal to a known deposit of stratified drift, it is also possible that the gravelly material is a thin layer of stratified drift resting on or embedded within the till.

At several places within the property, bedrock is exposed or lies close to the surface. Such areas are separately designated in Figure 4.

## HYDROLOGY

The property is drained largely by one brook, which flows northward through the major wetland on the site and ultimately joins Hop Brook. Water flowing in the brook through the culvert on Burr Hall

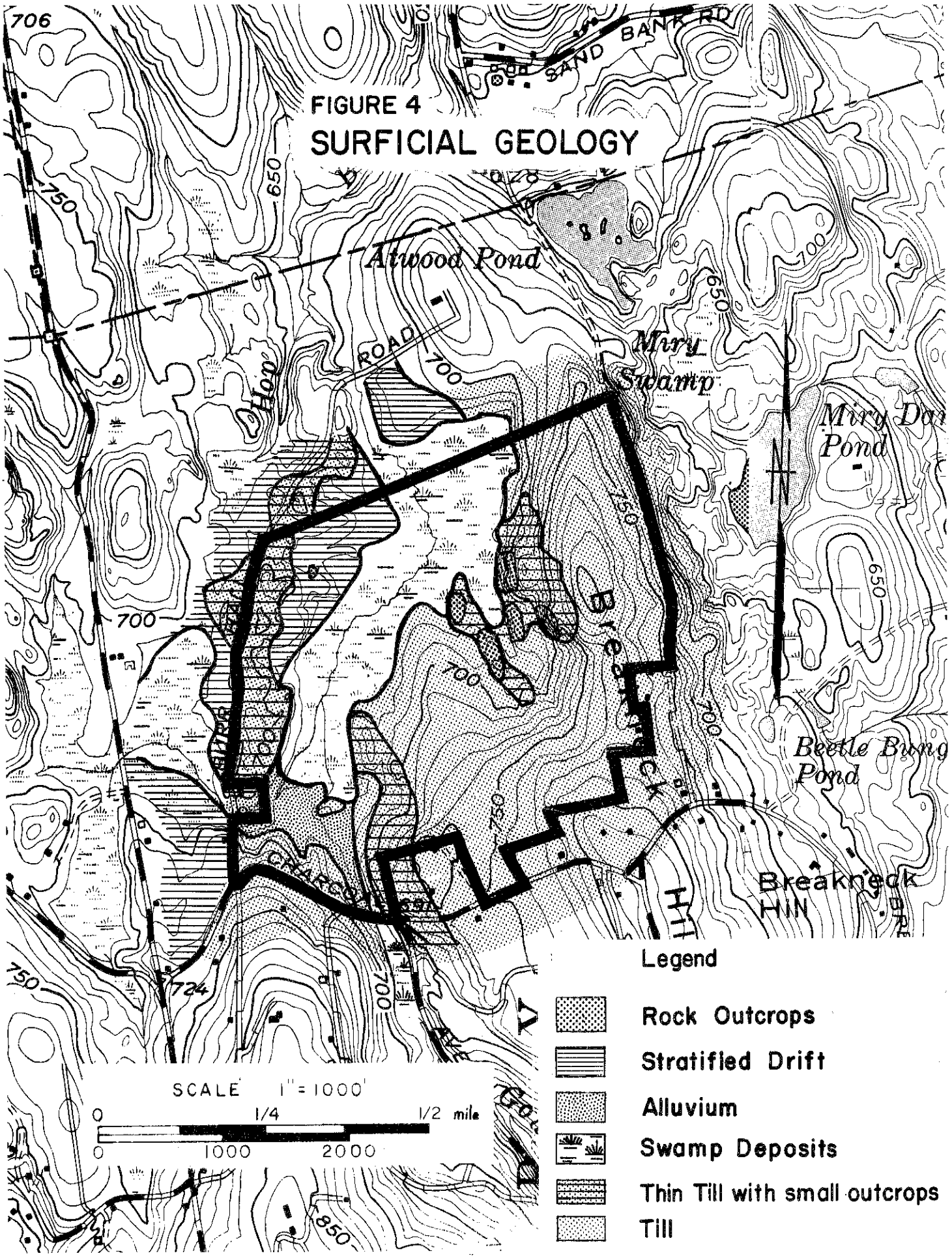


FIGURE 4
SURFICIAL GEOLOGY
SAND BANK RD
Atwood Pond
Miry Swamp
Miry Dan Pond
Beetle Bung Pond
Breakneck Hill
Breakneck Brook
ROAD
706
650
700
750
724
850
SCALE 1" = 1000'
0 1/4 1/2 mile
0 1000 2000
Legend
Rock Outcrops
Stratified Drift
Alluvium
Swamp Deposits
Thin Till with small outcrops
Till

Road originates in a watershed (drainage area) of approximately 680 acres, as shown in Figure 5. The topography of the watershed is irregular and in places quite steep. Because till commonly generates a soil that has only a slight permeability, a large percentage of the precipitation that falls on the steep slopes probably flows into the brook as surface runoff.During sudden heavy or prolonged storms, the brook cannot accommodate all this runoff and must store some of it temporarily in the wetlands. The wetlands therefore, serve the purpose of diminishing the potential peak flow in the brook and reducing the chances for flooding downstream. Consequently, destruction of any part of the wetland increases those chances. The decision to keep the large wetland free from development is a judicious one.

The natural function of wetlands can also be affected by developments elsewhere in the watershed. Altering the usage of the land may change the ratio of surface runoff to total rainfall. In residential developments, these changes stem largely from the construction of impermeable surfaces, such as roofs, driveways and roads, over formerly vegetated, permeable soils. The removal of forest acreage is also important, as trees have great capacities to absorb much of the impact of falling rain and to remove water from the soil by transpiration. The initial stages of development, including forest clearing, excavation of foundations and road beds, and filling, typically produce the most dramatic changes in runoff. These effects can be expected to diminish as vegetation is reestablished, but some effects are likely to be permanent.

The storm drainage system proposed by the developer would affect the wetland in at least two ways. Each storm drain will introduce a rapid, concentrated flow into the lowland area. Moreover, approximately three acres of land (shown in Figure 5) would be added to the actual watershed of the brook. Drainage of the added acres normally would be to the east; however, the storm diversion channel proposed to run along one of the new roads would direct the runoff from those acres into the wetland. The impact resulting from this situation would be not so much from the amount of additional water, which is insignificant in relation to the total flow in the brook, but from its concentrated entry into the wetland. The rapid flow would decrease the lag time between the end of the storm event and peak flow volume in the brook; it might thereby enhance the potential for flooding and erosion downstream. Another major effect of the storm drainage system would be its tendency to flush road sand and salt, as well as chemical fertilizers from adjacent lawns and gardens, into the wetland. These suspended and dissolved constituents might adversely affect the biota of the swamp and, in a chain-reaction, other physical characteristics. Further, the deposition of road debris from these points of discharge would result in the creation of sediment fans over certain sections of the wetland. Measures mentioned in a later part of this report might do much to alleviate most of the aforementioned problems.

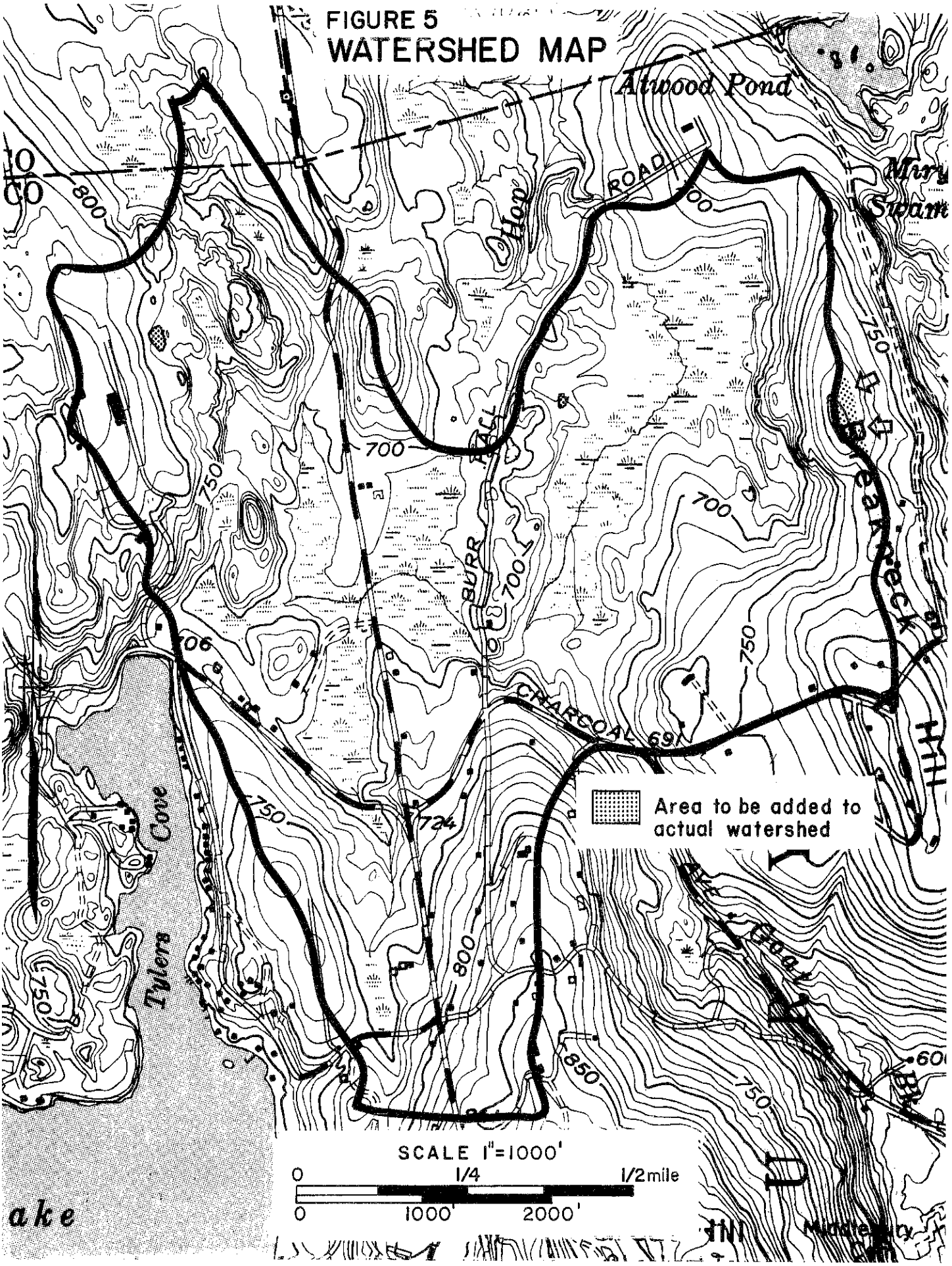


FIGURE 5
WATERSHED MAP
Atwood Pond
ROAD
Hon
BURR
CHARCOAL
Area to be added to actual watershed
SCALE 1"=1000'
0
1/4
1/2 mile
0
1000'
2000'
Cove
Tylers
ake
Mine City

FORESTRY

The property consists of approximately 59 acres of wetland, 106 acres of woodland, 11 acres of overgrown fields, 52 acres of open field and 2 acres of overgrown orchard. The geographic location of these vegetative areas is presented in Figure 6.

Stand descriptions and recommendations for management are presented below (refer to Figure 6).

STAND 1. 52 acres - Open field with some brush and occasional cedar. Some hardwoods, such as red maple, ash and oak are encroaching from the edges but are only seedling size. Hedgerows contain some mature oaks, ash amd maple of sawlog size (up to 20" diameter).

Recommendations - Where possible, hedgerows should remain intact. Dead and dying trees should be removed as they are a potential hazard. Consideration should be given to planting of lot lines and roadsides with conifers such as white pine, larch and hemlock. All interior wire fences should be removed.

STAND 2. 4 acres - Overgrown field. Overstocked medium site with sapling size oaks, maple, birch and ash. Hedgerows contain mature parents of these species of up to 18" diameter.

Recommendations - See Stand 1 recommendations. Effort should be made during development to retain better quality saplings as potential shade trees (minimum 6 per acre).

STAND 3. 3 acres - Overgrown field similar to Stand 2, but drier site with higher proportion of oak and ash saplings. Higher incidence of cedar.

Recommendations - Same as Stand 2.

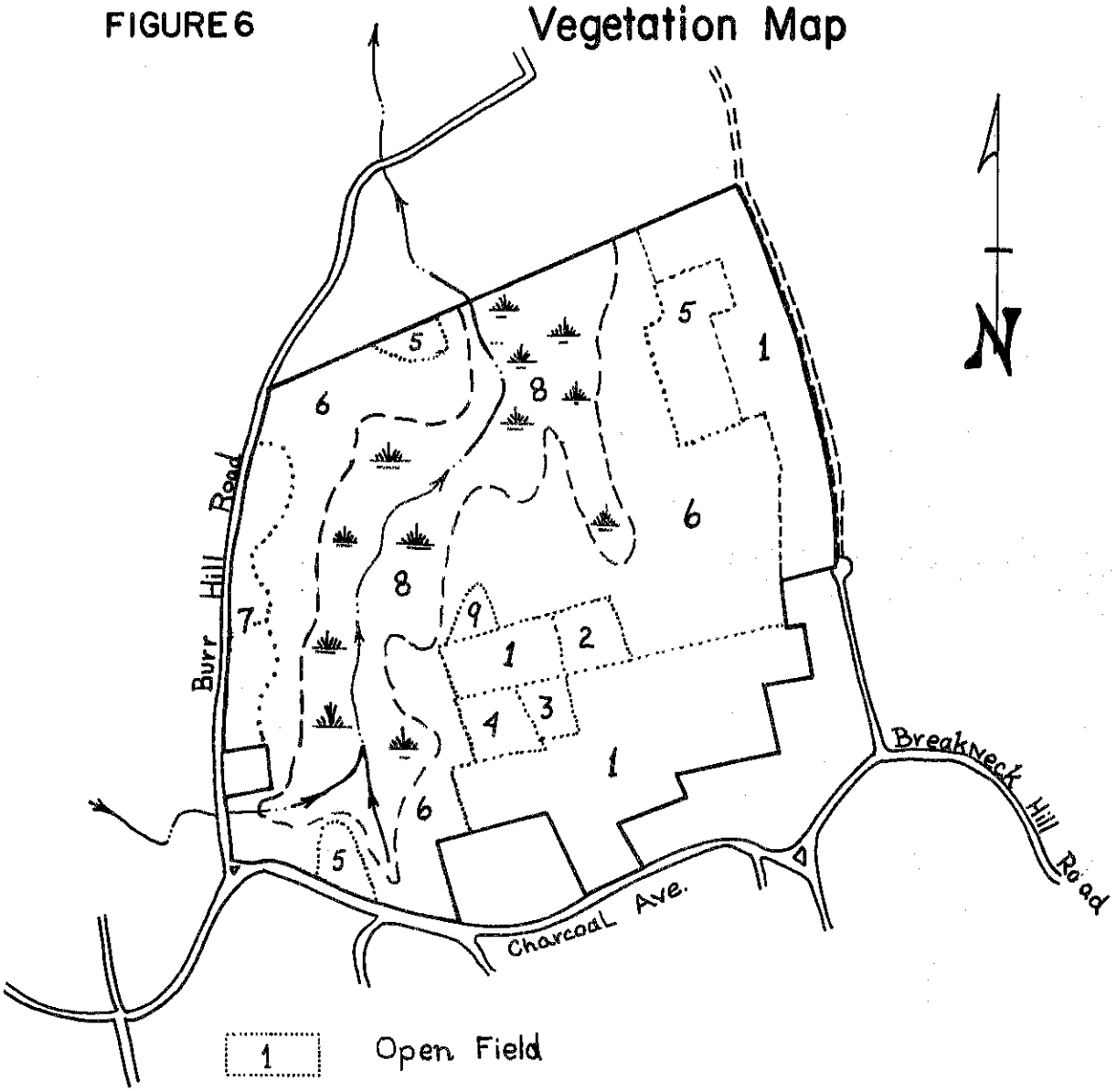
STAND 4. 4 acres - Overgrown field. Fully stocked medium site with pole (75%) to sawlog (25%) size red maple, ash and some cherry. Hedgerows contain some sawlog size trees up to 22" in diameter.

Recommendations - Over 1/2 the volume on this area is defective and could be removed prior to development in a cordwood harvest of 7 - 10 cords/acre. Probable yield - 35 cords. Hedgerows should be left intact where possible. They will act as windbreaks and will reduce wind throw damage after development. Interior wire fencing should be removed.

STAND 5. 16 acres - White pine plantation. Overstocked medium to poor site occupied by pole (25%) to sawlog (75%) size

FIGURE 6

# Vegetation Map




| | |
|---|---|
| 1 | Open Field |
| 2-3-4 | Overgrown Field |
| 5-6-7 | Woodland |
| 8 | Wetland |
| 9 | Overgrown Orchard |

SCALE 1"=1000'

0 1/4 1/2 mile

0 1000' 2000'

white pine. Very little reproduction. Large portion of stand is unbuildable due to terrain considerations.

Recommendations - Consideration should be given to retaining unbuildable acres in open space due to high aesthetic value of stand. Management of this area should include removal of 1/4 of the volume immediately. This will open up the crown and allow more sunlight to reach the ground, stimulating reproduction. At the same time this will stimulate growth in existing stock. A similar harvest should be scheduled 5 to 10 years later and removal of the remaining volume 10 to 15 years following that harvest. This will, in effect, rejuvenate the entire stand. As this stand is of high aesthetic value, consideration should be given to encouraging the owners of these lots to permit others to walk and hike on this land. Cooperation of these lot owners would also facilitate forest management of the area.

STAND 6. 81 acres - Woodland and old pasture. Fully stocked medium site with pole (70%) to sawlog (30%) size red maple, ash, birch and some oaks. Understory consists of maple, ash, viburnums, with spicebush in the wetter areas. Terrain considerations preclude development of approximately 50% of the area and limit forest products harvests on approximately 40% of the area.

Recommendations - Those areas which are inaccessible to forest management and undevelopable should be retained as natural areas. There is not enough sawlog size material on the remainder of the stand to warrant a sawlog harvest, but a cordwood harvest of the poorest quality 1/3 of the volume is feasible. This would yield approximately 5 cords per acre or approximately 250 cords. At the same time this harvest would improve the overall health of the area. All hedgerows should be maintained intact where possible and any interior wire fences should be removed.

STAND 7. 9 acres - Woodland. Understocked poor site occupied by oak and some birch with dense mountain laurel undergrowth. Hardwoods on the area are primarily sapling size. Larger sawlog trees have, for the most part died and those standing represent a hazard.

Recommendations - Removal of all dead and dying material as cordwood should yield 3 cords/acre or 27 cords. Planned development should eliminate much of the laurel undergrowth and landscaping plans here should favor softwood species such as white pince, larch and hemlock rather than hardwoods. Consideration should be given to planting along lot lines with these species.

STAND 8. 59 acres - Wetland. Poor site fully occupied with red maple and other species associated with wetlands.

Recommendations - High water table precludes forest products harvests.

STAND 9. 2 acres. Overgrown orchard. Medium site occupied by degenerating fruit trees and thick brush.

Recommendations - This area could have high value as a wildlife area. Pruning of fruit trees would increase fruit yield as would removal of brush competion from around these trees. Development plans should attempt to preserve as much of this area as possible.

## WILDLIFE

The North Farm Subdivision contains four major wildlife habitat types: hardwood forest, red maple swamp, old field, and conifer planation. The location of these four habitat types can be determined from Figure 6.

The tree species of the hardwood forest include oaks, maples, birch and ash. The understory is fairly sparse but contains some shrubs of value to wildlife such as virburnams. White-tailed deer, grey squirrels, ruffed grouse, box turtles, songbirds including black-capped chickadees are examples of wildlife species that utilize this habitat type.

In addition to red maple and scattered trees of other species the swamp contains many valuable wildlife shrubs such as nine-bark, grey dogwood, spicebush, and shadbush (also called serviceberry and juneberry). This area is important as a breeding area for some frogs, toads, and salamanders. Racoons and muskrats are found here and a variety of songbirds nest in both the shrub layer and the higher tree layer.

The old field areas were once open farmlands and are now at various stages of returning to woodland. Tree species are the same ones found in the adjacent hardwood forest but are younger and smaller. Sun-loving growth includes raspberries and cedars. Grasses and other seed-producing annuals still cover some areas. Cottontail rabbits and foxes live and feed here. Red-winged blackbirds, cardinals and other birds nest in the fields and old fencerows. Hawks and owls hunt small rodents in these open areas. Deer, grouse, and other woodland wildlife will use these areas for feeding.

The quality of the three above habitat types on this area is good. The red maple swamp is especially valuable as this habitat type is not as widespread as the other two.

The conifer plantations consist of white pine. The dense canopy shades out any understory. This habitat is of low value to wildlife

but some species of birds do nest in this type, purple grackles are one example.

The major impact of this development will be the direct loss of habitat where the houses and roads will be built. The increased human presence, vehicular traffic and roaming cats and dogs will also drive less tolerant wildlife species from the remaining habitat, even though it has not been physically changed. Another problem could arise from sediment and road salt washing into the maple swamp from the storm drains. Without proper controls (sediment control measures, discretion in road salting) this could adversely impact the value of this area for wildlife by damaging and killing food and cover plants.

Steps can be taken to maintain and enhance some wildlife habitat on this area. The low area near Charcoal Avenue should be maintained as open space to provide a corridor for wildlife travelling through the red maple swamp. Open space is of little value to wide-ranging species such as deer, fox and raccoon unless access is provided to other areas of undisturbed habitat. The $\pm 2$ acres of overgrown orchard (see Figure 6) can be preserved and managed to increase fruit yield via pruning and removal of brush competition from around the trees. Houses and roads should be constructed with care and with as little disturbance of unbuilt areas as possible. Homeowners can enhance their yards, and the surrounding area, as wildlife habitat by planting shrubs which provide food and cover (seedlings available from DEP), erecting birdhouses, and by keeping dogs and cats under control. Some dead trees should be left standing as food and den trees for woodpeckers and other cavity nesters.

There is some potential for wildlife problems if vegetable gardens are planted and if garbage can lids are not secured.

## DEVELOPMENT ACTIVITIES

### POTABLE WATER

Lot location and spacing indicate that homes developed on the property would be supplied by individual wells tapping bedrock. The amount of water available from such wells depends upon the number and size of the water-transmitting fractures that are encountered by the drill. Commonly the yields of bedrock wells are not large, but they are sufficient for most residential uses. However, yields can vary widely from one lot to another, as fractures may appear, disappear, or shrink in size within a given rock unit.

The quality of water from bedrock-floored wells on the property is likely to be acceptable for drinking and other household purposes.

### WASTE DISPOSAL

There are no sewer lines in or near the property. The closest sewer line ends about one and one third miles away on the bottom of Breakneck Hill Road. Since neither the Middlebury nor the Regional Plan of Development have identified this area as suitable for high density development an effort must be made to ensure that house lots are sited so that septic systems offer a safe long term means of sewage disposal.

As mentioned previously, most of the soils on the site are rated as having severe limitations for on-site sewage disposal. These limitations are due to steep slopes, seasonal high water tables due to fragipan (hardpan), and shallow depth to bedrock.

Shallow depth to bedrock conditions might hamper the placement of septic tanks and leaching fields in lots along Burr Hall Road. Lots on Breakneck Hill generally avoid the thin till areas and will probably not be adversely affected by shallow bedrock. However, hardpan may prove a more formidable challenge on the hill. The developer reported finding both hardpan and a gravelly material in shallow excavations in the area. This is not surprising, as till commonly varies from point to point, but it does suggest the need for close inspection of the surficial materials in each lot before a location for the septic system is proposed.

Effluent that is restricted in its downward movement by either hardpan or bedrock may flow laterally along the surface of the obstruction and reemerge downslope to cause a nuisance and, perhaps to pollute the swamp. This problem would undoubtedly be greatest on steep sections of lots. Moreover, effluent reaching bedrock might be introduced into fracture systems that could otherwise support a potable water supply.

Another serious problem that may result from shallow overburden or hardpan is a high water table. This condition can cause backup

and failure of the septic systems, leading to severe health problems. The developer found a high water table in only a few excavations, primarily in the southeast section of the property. He recommended lowering the water table by curtain drains. This may be a realistic solution, but the efficiency of such engineering measures should be checked before any septic systems are located in a high water table area. In any event, the bottom of any leaching system should be at least 18 inches above maximum ground water level.

In general, most septic system problems can be avoided by careful planning and testing. In the tricky, complex land characteristics of this site, it is important that septic systems be designed by a professional engineer or sanitary engineer. It is also important that percolation tests and other analyses be done under conditions of adverse wetness, as may be encountered commonly in spring and fall. The relatively large lot size chosen by the developer will be advantageous to waste disposal on the site.

STORM WATER MANAGEMENT

As mentioned earlier, increased development within the watershed could cause increased surface water run-off and enhance the protential for flooding, erosion and sedimentation. These conditions can be minimized by implementing suitable storm water and erosion/sediment control measures.

The developer's proposed storm drainage system seems reasonable. To ameliorate the damaging effects of rapid discharges from storm drains into the wetlands, each outlet pipe should be carried down beyond steep slopes to a safe outlet and also have some sort of an energy dissipator to reduce the energy of flowing water. In addition, holding basins should be constructed at the end of each basin. These basins would consist of a small reservoir with a pipe to regulate outflow. The holding basins would accumulate storm water temporarily and diminish the peak flow in the brook. Also, they would collect most of the sediment carried in the drains and would thereby prevent the formation of sediment fans. These basins would require regular cleaning and maintenance.

Good engineering needs to be exercised in the construction of the outlet pipe going down over the slope near lot 20. This area has a steep slope and is eroding at the lower end of its natural drainage. It appears that two or more manholes would be required for alignment and grade purposes. These manholes should also have catch basins to collect surface water run-off and in turn, control erosion of the drainageway.

Additional natural drainageways on the site should be studied for possible run-off control. Grassed waterways and rock-lined drainageways are two techniques which can help control run-off and subsequent erosion and sedimentation of sensitive areas.

Flat graded grassed swales might be preferable as storm drainage channels to underground pipes in areas where run-off is moderate (less than 5 cfs). The more natural swales would help reduce flow speed of storm water run-off and would be aesthetically pleasing. Furthermore, the open swales would offer immediate observation of changes in the run-off, perhaps pointing to problems with nearby septic systems, and would promote quick attention to such problems.

With proper installation and maintenance of the above engineering/conservation measures, it is projected that the swamp is large enough to handle any increase in run-off flow from the proposed development without significant adverse impacts.

FOUNDATION DEVELOPMENT AND GRADED CONDITIONS

The major limiting factors concerning foundation development are steep slopes, shallow depth to bedrock, and the existence of a seasonal high water table above the hardpan on portions of the property. With proper site location and sound engineering and conservation measures, these limitations can be minimized.

On lots on Breakneck Hill, houses should be constructed as close to the summit as possible, as slopes are least in that area. The grading of some of the steep lots (especially 20 and 21) may be difficult with steep cuts and fills resulting. House foundations on such lots should be placed completely on excavated land and not on a cut and fill unless special precautions are taken.

Special care should also be taken in locating houses on lots along Burr Hall Road where bedrock proximity is indicated.

Houses should not be located on land affected by a high water table unless artificial drainage is first proved to be adequate.

It is also recommended that footing drains be installed around all homesites with basements for protection against flooding. All footing drains should have suitable free-flowing outlets.

With the predominant soils being fragipan soils and shallow to bedrock soils, special precautions are required for roads. The roads should have a good gravel sub-base with positive (pipe) drainage along the side. The requirements of surface drainage is also indicated because of lot location. The land also may require special cut slope protection because of water seepage along bedrock or fragipan surfaces which may cause erosion.

To relieve streets from hydrostatic pressure which will cause streets to crack, freeze and heave during fall, winter and spring months, street drains should be slotted and pipes or joints cracked to pick up subsurface water. In addition, driveways may need tile drainage--particularly those on the downslope side of the streets.

ROAD SYSTEM IMPACT

One of the principal impacts of the proposed subdivision will be on the road system of Middlebury. The subdivision as proposed will have 63 lots of which the majority can be expected to use the proposed southern access road to Breakneck Hill Road as the principal means of travel. Based on trip generation intensity factors prepared by the United States Department of Transportation, a high value single family dwelling (the U. S. Department of Transportation has defined high value single family houses as those valued at greater than $50,000) could be expected to generate 11.4 vehicle trips per day. The overall trip rate for the proposed North Farm Subdivision could therefore be expected to reach about 720 vehicle trips per day.

The proposed North Farm subdivision will inevitably increase traffic volume on Route 64. In 1975 Route 64 at the intersection with Tyler Road had an average daily traffic count (ADT) of 7,400 and an ADT of 10,100 west of the intersection with Route 63. The ADT on Route 64 just north of West Street was 5,500 in 1975. These traffic volumes are approaching or within the range of 7,000 to 12,000 ADT's which is considered the level at which the capabilities of a rural two lane arterial begin to be taxed.

The increased traffic on Breakneck Hill Road may require substantial improvements in pavement surface and usable shoulders if the subdivision is developed for 63 lots. With ADT's of 400 to 750 the American Association of State Highway Officials recommends that there be a minimum of six feet of usable shoulders (three feet on both sides). It would also seem that Burr Hall Road would need to be widened to support the added traffic.

The developer has indicated that the proposed subdivision road would extend to the unimproved portion of Mirey Dam Road and may be improved to the town line of Watertown. If this should occur some of the traffic generated by the subdivision may be diverted to Bunker Hill Road in Watertown.

## PLANNING CONSIDERATIONS

The proposed subdivision is consistent with both the Regional Plan of Development and the Middlebury Plan of Development. Middlebury's Plan of Development indicates that most of the proposed subdivision falls into an area classified for medium residential densities (40,000 square feet/dwelling unit) while a smaller portion (on the north side of Breakneck Hill Road immediately west of Mirey Dam Road) has been designated for rural residential densities (80,000 square feet/dwelling unit). The proposed 80 acre open space area in the North Farm subdivision is consistent with the 1968 open space plan for Middlebury. The Regional Plan of Development identifies the proposed North Farm subdivision as an area suitable for residential limited development with 0.5 (or less) dwelling units per net acre.

The proposed development is compatible with surrounding land uses and there are no proposed developments which would be incompatible with the North Farm subdivision.

The zoning regulations of Middlebury require a minimum of 1,300 square feet of floor area per dwelling unit but according to the developer there will be deed restrictions requiring all dwelling units to have at least 2,200 to 2,400 square feet of floor area. This will result in costs of $125,000 to $150,000 (including the lot and the house).

There are no known federal, state or local historical sites on or near the property which would be endangered by this development. The nearest historic sites and structures are located to the east of Breakneck Hill Road and include the Rochambeau Monument (1915), The Nathaniel Richardson House and the Bronson Tavern (1738).

The Town of Middlebury should be able to provide sufficient public safety (fire and police services) to the development and the Regional School District should be able to accommodate the additional demand placed on the Regional School District. Based on past studies done by the Connecticut Public Expenditures Council, the average dwelling unit can be expected to generate about 0.6 school age children per potentially available bedroom. It is expected that dwellings in this development will have four bedrooms which (excluding one bedroom for the parents) results in three potentially available bedrooms or about 1.8 school age children per dwelling. In total this results in about 113 school age children for the proposed 63 lot subdivision.

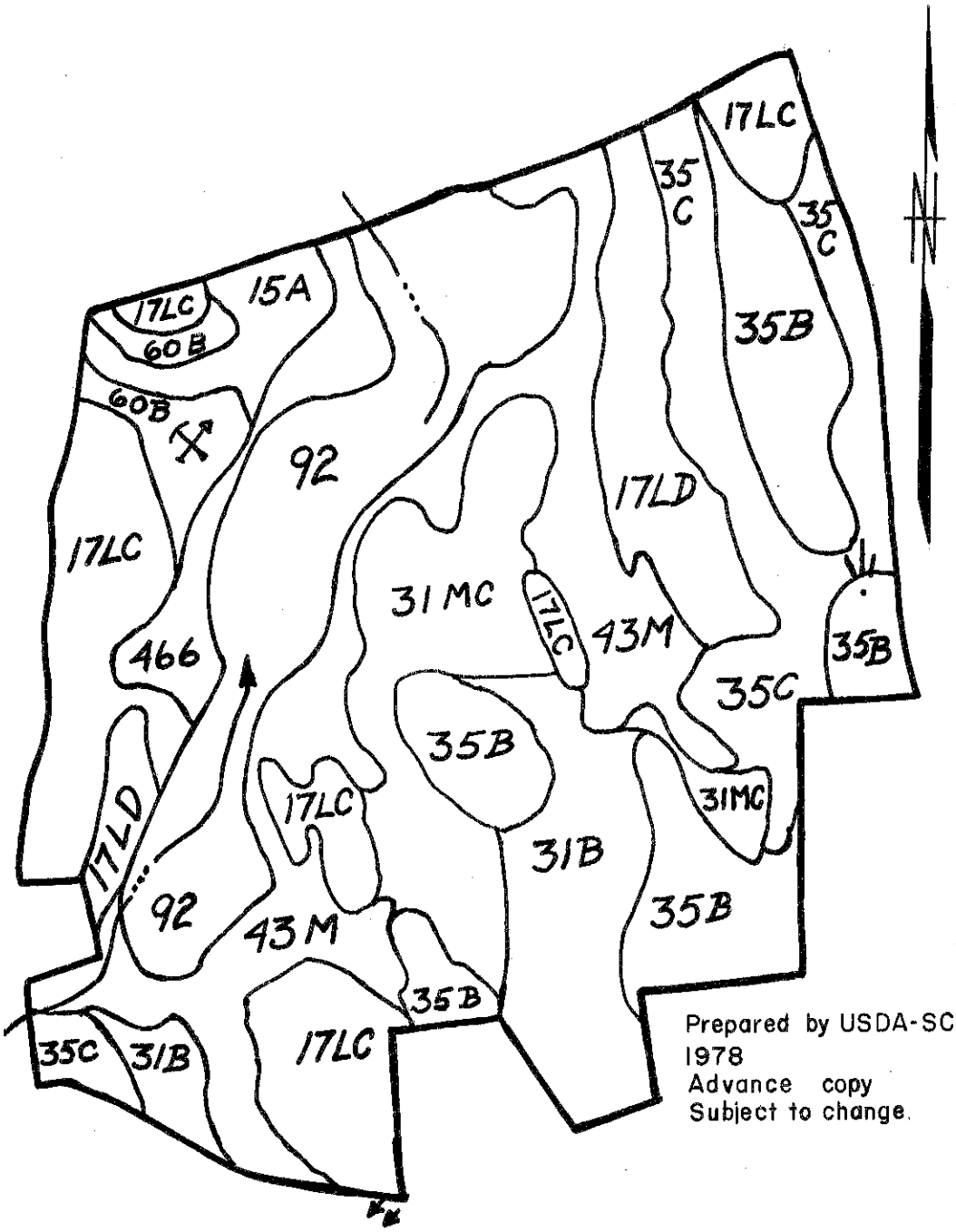
Residents of the proposed subdivision will probably seek their employment in Waterbury. However, Timex and Uniroyal (both of Middlebury) may be the employer of these future homeowners since it is probably reasonable to expect that many of them will be high paid professionals and executives. One possible outcome of the proposed subdivision may be an increased interest in expanding existing commercial and recreation facilities in Middlebury. Except for some convenience goods most Middlebury residents shop in Waterbury. The addition of as many as 63 upper income families to Middlebury could easily stimulate the growth of commercial activities in the Middlebury town center.

As mentioned previously, much of the 150 acres proposed to be subdivided falls into natural soil groups which have severe limitations for urban development. Although these limitations can be mitigated by sound engineering and conservation practices another technique to consider is allowing for some clustering within those areas where soil conditions are favorable. The Middlebury zoning regulations currently do not allow for clustered development in any zone however, and hence clustering will be possible only if the Middlebury Planning and Zoning Commission adopts cluster regulations in the very near future.

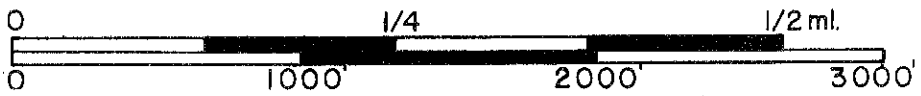
To conclude, the North Farm subdivision has the potential of being one of the most attractive and well planned neighborhoods in Middlebury. There is ample open space provided for residents of the subdivision. Furthermore, other residents of Middlebury will be able to make use of the 80 acre wetland area through right of ways on Burr Hall Road and Charcoal Avenue.

APPENDIX

# SOILS MAP




SCALE 1"= 660'



# Soils Limitations Chart
## NORTH FARM - MIDDLEBURY, CT.

| Natural Soil Group* | Mapping Symbol | Slope (%) | Acres | Percent of Total Acres | Limitations For:* On-site Sewage | Bldg. w/base-ment | Land-scaping | Streets and Parking | Reason for Limitation |
|---|---|---|---|---|---|---|---|---|---|
| D-1 | 17LC | 15-35 | 35 | 15.2 | 3 | 3 | 3 | 2 | Large stones, slope |
| C-3a | 43M | 0-5 | 26 | 11.3 | 3 | 3 | 3 | 3 | Wetness, large stones, frost action |
| C-2a | 31B | 3-8 | 17 | 7.4 | 3 | 3 | 3 | 3 | Wetness, large stones, frost action |
| C-1b | 35C | 8-15 | 21 | 9.1 | 3 | 2 | 1 | 2 | Slope, frost action |
| D-2 | 17LD | 15-35 | 19 | 8.3 | 3 | 3 | 3 | 3 | Depth to bedrock, large stones |
| F-1 | 92 | - | 31 | 13.5 | 3 | 3 | 3 | 3 | Wetness, unstable organic material |
| A-3a | 466 | - | 11 | 4.8 | 3 | 3 | 3 | 3 | Wetness, frost action |
| A-2 | 15A | 0-3 | 6 | 2.6 | 3 | 3 | 1 | 2 | Wetness, frost action |
| A-1a | 60B | 3-8 | 6 | 2.6 | 1 | 3 | 3 | 1 | Droughtiness, small stones |
| C-2b | 31MC | 3-15 | 15 | 6.5 | 3 | 3 | 3 | 3 | Large stones, wetness, frost action |
| C-1a | 35B | 3-8 | 43 | 18.7 | 3 | 1 | 1 | 2 | Frost action, wetness |
| TOTALS | | | 230 | 100.0 | | | | | |

*EXPLANATION OF RATING SYSTEM

1. SLIGHT LIMITATION: indicates that any property of the soil affecting use of the soil is relatively unimportant and can be overcome at little expense.
2. MODERATE LIMITATION: indicates that any property of the soil affecting use can be overcome at a somewhat higher expense.
3. SEVERE LIMITATION: indicates that the use of the soil is seriously limited by hazards or restrictions that require extensive and costly measures to overcome.

# ABOUT THE TEAM

The King's Mark Environmental Review Team (ERT) is a group of environmental professionals drawn together from a variety of federal, state, and regional agencies. Specialists on the team include geologists, biologists, foresters, climatologists, soil scientists, landscape architects, recreation specialists, engineers, and planners. The ERT operates with state funding under the aegis of the King's Mark Resource Conservation and Development (RC&D) Area - a 47 town area in western Connecticut.

As a public service activity, the team is available to serve towns and developers within the King's Mark Area --- free of charge.

## PURPOSE OF THE TEAM

The Environmental Review Team is available to help towns and developers in the review of sites proposed for major land use activities. To date, the ERT has been involved in the review of a wide range of significant activities including subdivisions, sanitary landfills, commercial and industrical developments, and recreation/open space projects.

Reviews are conducted in the interest of providing information and analysis that will assist towns and developers in environmentally sound decision-making. This is done through identifying the natural resource base of the project site and highlighting opportunities and limitations for the proposed land use.

## REQUESTING A REVIEW

Environmental Reviews may be requested by the chief elected official of a municipality or the chairman of an administration agency such as planning and zoning, conservation, or inland wetlands. Requests for reviews should be directed to the Chairman of your local Soil and Water Conservation District. This request letter must include a summary of the proposed project, a location map of the project site, written permission from the landowner/developer allowing the team to enter the property for purposes of review, and a statement identifying the specific areas of concern the team should address. When this request is approved by the local Soil and Water Conservation District and the King's Mark RC&D Executive Committee, the team will undertake the review. At present, the ERT can undertake two reviews per month.

For additional information regarding the Environmental Review Team, please contact your local Soil Conservation District Office or Richard Lynn (868-7342), Environmental Review Team Coordinator, King's Mark RC&D Area, P.O. Box 30, Warren, Connecticut 06754.