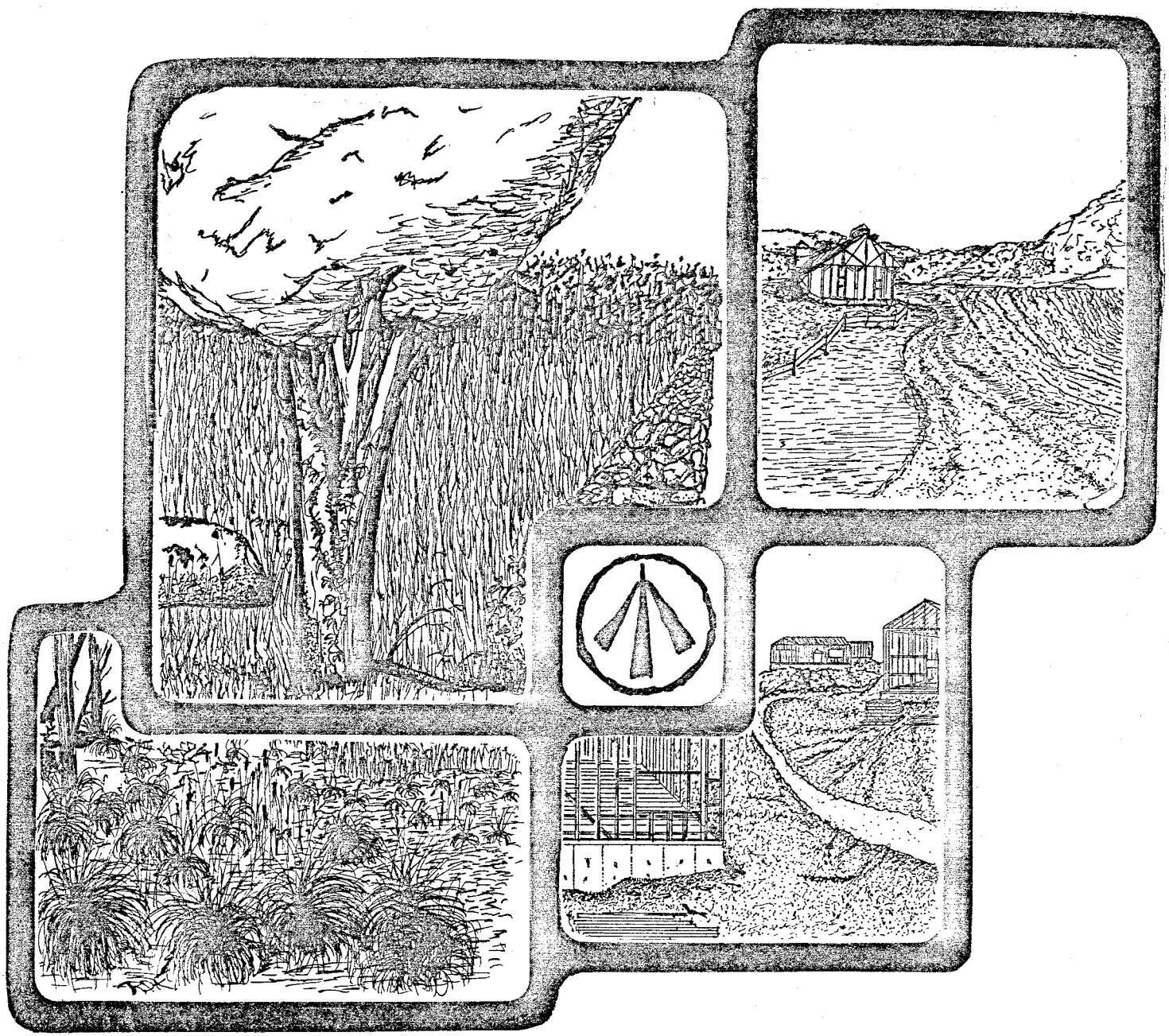
ENVIRONMENTAL REVIEW TEAM REPORT



WOLFE PARK
MONROE, CONNECTICUT

KING'S MARK
RESOURCE CONSERVATION & DEVELOPMENT AREA

KING'S MARK
ENVIRONMENTAL REVIEW TEAM REPORT

WOLFE PARK
MONROE, CONNECTICUT

NOVEMBER 1981

King's Mark Resource Conservation and Development Area
Environmental Review Team
Sackett Hill Road
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
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
Central Naugatuck Valley Regional Planning Agency
Housatonic Valley Council of Elected Officials
Southwestern Regional Planning Agency
Greater Bridgeport Regional Planning Agency
Regional Planning Agency of South Central Connecticut
Central Connecticut Regional Planning Agency
Capitol Regional Council of Governments
American Indian Archaeological Institute

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FUNDING PROVIDED BY
State of Connecticut

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Richard Lynn, ERT Coordinator
Rebecca Williams, ERT Cartographer
Irene Nadig, Secretary

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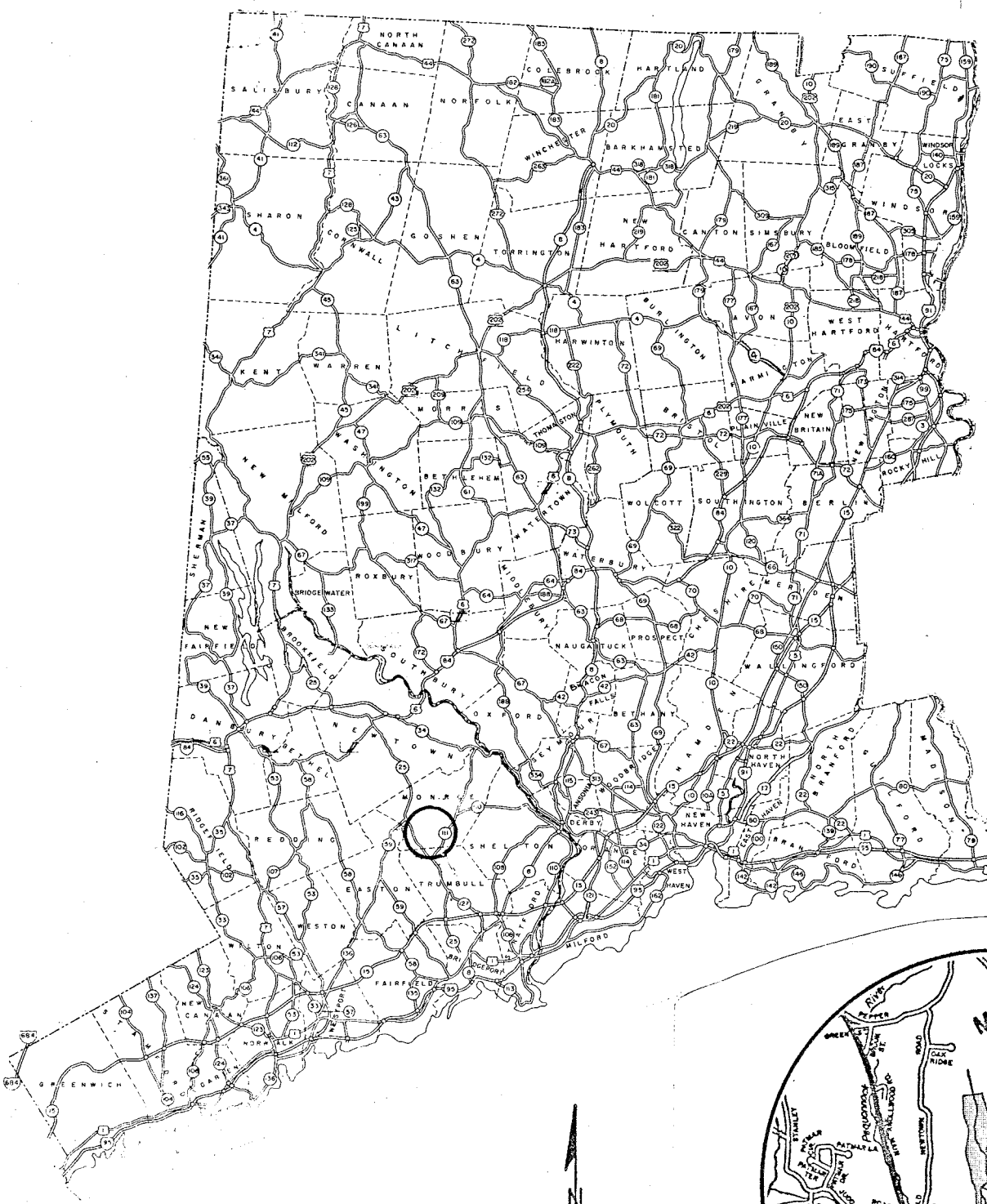
WOLFE PARK
MONROE, CONNECTICUT



ENVIRONMENTAL REVIEW TEAM REPORT
ON
WOLFE PARK, MONROE, CT

I. INTRODUCTION

The Monroe Parks and Recreation Commission is interested in improving Wolfe Park for expanded recreational use. Wolfe Park is about 218 acres in size, town owned, and located in the central portion of town. Cutlers Farm Road abuts the eastern border of the property; Purdy Hill Road abuts the site to the south (see Figure 1).

As shown in Figure 2, the eastern third of the property has already been developed. This area offers a wide range of recreational facilities including a pool, parking lot, tennis courts, ballfields, and playgrounds. The central portion of the property consists of moderately to steeply sloping wooded land. The western third of the site is a former sand and gravel excavation which is now largely occupied by an artificial lake.

The town is now interested in developing additional facilities at the Park. As shown in Figure 2, proposed facilities include a ski slope, new ballfield, nature trail, swimming beach, parking lot and picnicking grounds.

The Monroe Parks and Recreation Commission requested the assistance of the King's Mark ERT to help them in planning the new facilities. Specifically, the Team was requested to prepare a natural resources inventory of the property and to provide an objective evaluation of the feasibility of the proposed improvements as shown in Figure 2.

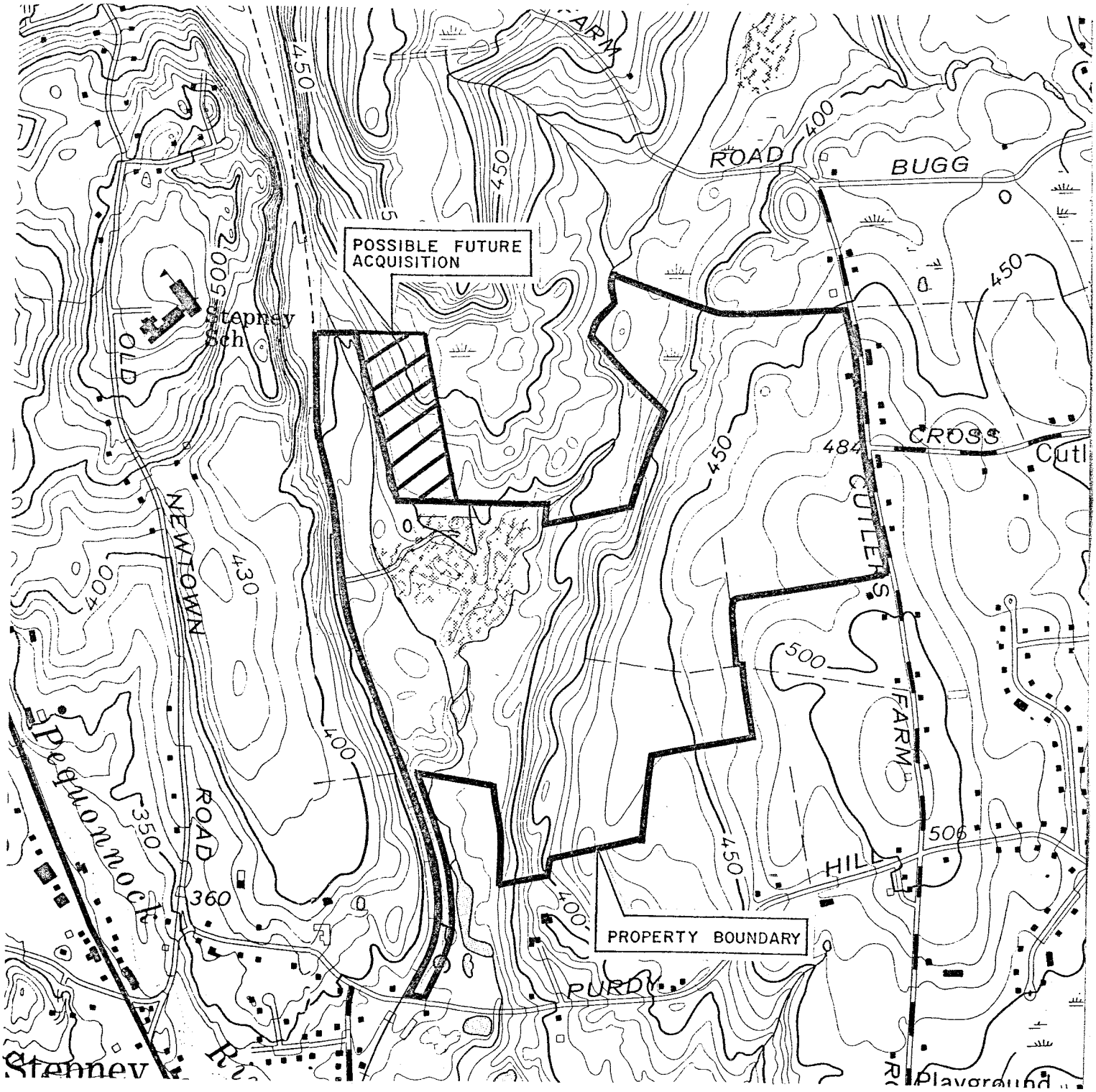
The King's Mark Executive Committee considered the towns request, and approved the project for review by the Team.

The ERT met and field reviewed the site on July 28, 1981. Team members for this review consisted of the following:

Brant Burz	Wildlife Biologist	Ct. Department of Environmental Protection
Andy Petracco	Recreation Specialist	Ct. Department of Environmental Protection
Rob Rocks	Forester	Ct. Department of Environmental Protection
Bill Sawicki	Sanitarian	Ct. Department of Health
Dave Thompson	District Conservationist	U.S.D.A. Soil Conservation Service
James Wang	Planner	Greater Bridgeport Regional Planning Agency
Mike Zizka	Geohydrologist	Ct. Department of Environmental Protection

FIGURE 1.

TOPOGRAPHIC MAP



A - Ballfields(2) and field sports (football, lacrosse, soccer, etc.)
A_1, A_2, and A_3 - Existing ballfields
A_4 - Junior ballfields
B - Beginning skiing and winter sports slope
C - Fishing shelter and dock
D - Pedestrian Bridge
E - Small boat launching bulkhead (sailboats, canoes)
F - Swimming beach
G - Lake pavillion (rest rooms, snack bar)
H - Entrance road
J - Open play area with playground
K - Family picnic grounds
L - Parking field
M - Group picnic grounds
O - Amphitheatre
P - Nature interpretive center and trail system
Q - Maintenance building and storage yard
R - Maintenance storage building
S - Senior citizen's area
T - Existing pool
U - New theme playground
V - New parking area
W - Court games (basketball, platform tennis)
X - Tennis courts (4 lighted) existing
Y - Existing basketball
Z - Existing handball

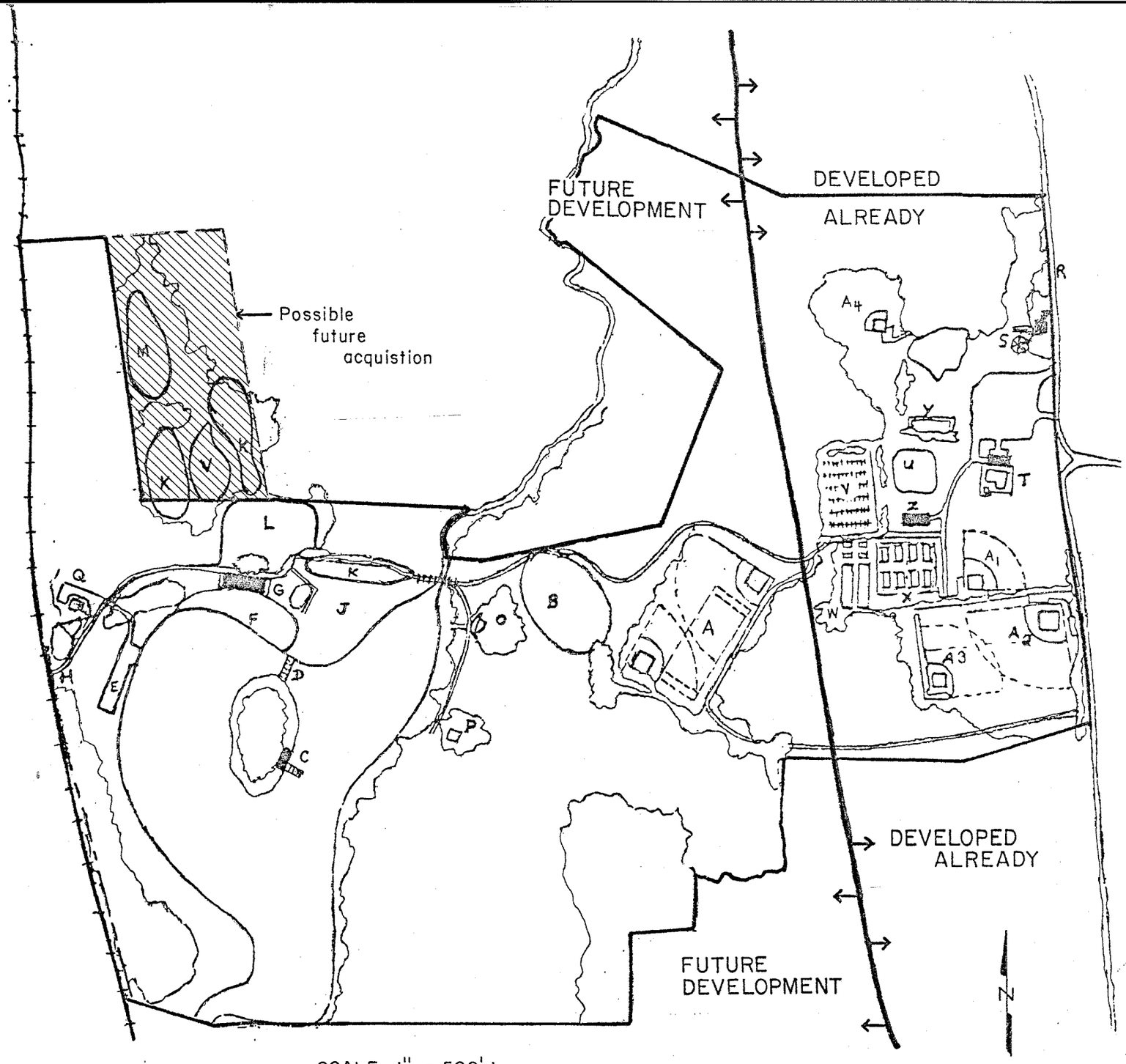


FIGURE 2.
SIMPLIFIED SITE PLAN

This report presents the team's findings. It should be recognized that the ERT is not in competition with private consultants and hence does not perform design work or provide detailed solutions to development problems. Nor does the team recommend what ultimate action should be taken on a proposed project. The ERT concept provides for the presentation of natural resources information and preliminary development considerations. All conclusions and final decisions rest at the local level. It is hoped the information contained in this report will assist the Town of Monroe in making environmentally sound decisions.

If any additional information is required, please contact Richard Lynn, (868-7342), Environmental Review Team Coordinator, King's Mark RC&D Area, Sackett Hill Road, Warren, Connecticut 06754.

* * * * *

II. SUMMARY

1) *Using a Department of Health Services formula, the number of swimmers that could use Wolfe Park Lake each day during typical summer flow conditions is about 689. This assumes that the initial natural quality of the water is acceptable and that other safety factors, such as beach space and lake bottom conditions, are satisfactory. Wolfe Park Lake may thus be a significant recreational resource.*

2) *If septic systems are developed on the north shore of the Lake, as presently planned, care will be needed to prevent pollution of the Lake. Engineered systems will likely be required.*

3) *The conceptual site plan is generally consistent with the soils on the site. Implementation of the plan should include provisions for effective erosion and sediment control.*

4) *The western half of Wolfe Park is suffering from significant erosion and sedimentation. Thousands of tons of soil have been carried into Wolfe Park Lake by surface runoff. Runoff control, erosion control, and stabilization of all disturbed areas should be addressed immediately. The Fairfield County Soil and Water Conservation District (743-5453) is available to provide assistance in erosion and sediment control planning.*

5) *The undeveloped portions of Wolfe Park may be divided into seven distinct vegetation types. These include mixed hardwood stands, open fields, old fields, a hardwood swamp, open land, a northern hardwood stand, and a white pine plantation. At the present time, the trees in many of the forest stands are declining in health and vigor as a result of crowding. Improvement thinnings of these areas are recommended.*

6) *The proposed plan for recreational development appears compatible with the on-site vegetation. The great variety of vegetation types present on this property are a major asset. Efforts should be taken to maintain this vegetation diversity for aesthetic, educational, and wildlife habitat reasons.*

7) *Wolfe Park offers good wildlife habitat. With proper management, wildlife habitat can be improved.*

8) *The conceptual site plan for the central and western sections of this property appears practical and the locations proposed for the facilities to be built appear appropriate.*

9) *Acquisition of the land immediately north of Wolfe Park Lake would enhance the potential for use of the Park. Establishment of picnic areas, a parking lot, and a ballfield could easily be accomplished on this land.*

10) *The proposed nature study trail system should encompass the entire park property. The trails should be laid out with respect to aesthetic and educational considerations, with regard for the terrain, and with an eye toward minimum maintenance.*

11) *The proposed project is compatible with surrounding land uses. Considering the current and projected town population and the size of Wolfe Park, the Park is more than adequate to meet town needs for a community park in the foreseeable future.*

III. GEOLOGY

Outcrops of bedrock on the site were noted only in the excavated area immediately north of the artificial lake (see Figure 3). A few possible outcrops (more probably boulders) were seen in the parcel designated for potential future acquisition. Outcrops were also seen in the channel and banks of Pequonnock River just north of Wolfe Park. Bedrock on and underlying the park has been classified as part of the Collinsville Formation (source: Connecticut Geological and Natural History Survey Quadrangle Report No. 24). The formation is composed primarily of feldspar-quartz-biotite gneiss, but other rocks found in the formation include garnet-mica schist, calc-silicate gneiss, amphibolite, quartzite, marble, pegmatite, and sulfide deposits. Several mines that were developed in the Collinsville Formation in the towns of Monroe and Trumbull during the nineteenth or early twentieth century produced such minerals as bismuth, tungsten, pyrrhotite, chalcopyrite, pyrite, sphalerite, and arsenopyrite. None of the mines appear to have a practical commercial significance today. Moreover, the stratigraphic position of the Collinsville Formation rocks in Wolfe Park makes it unlikely that more than trace amounts of the above-mentioned minerals would be found in them.

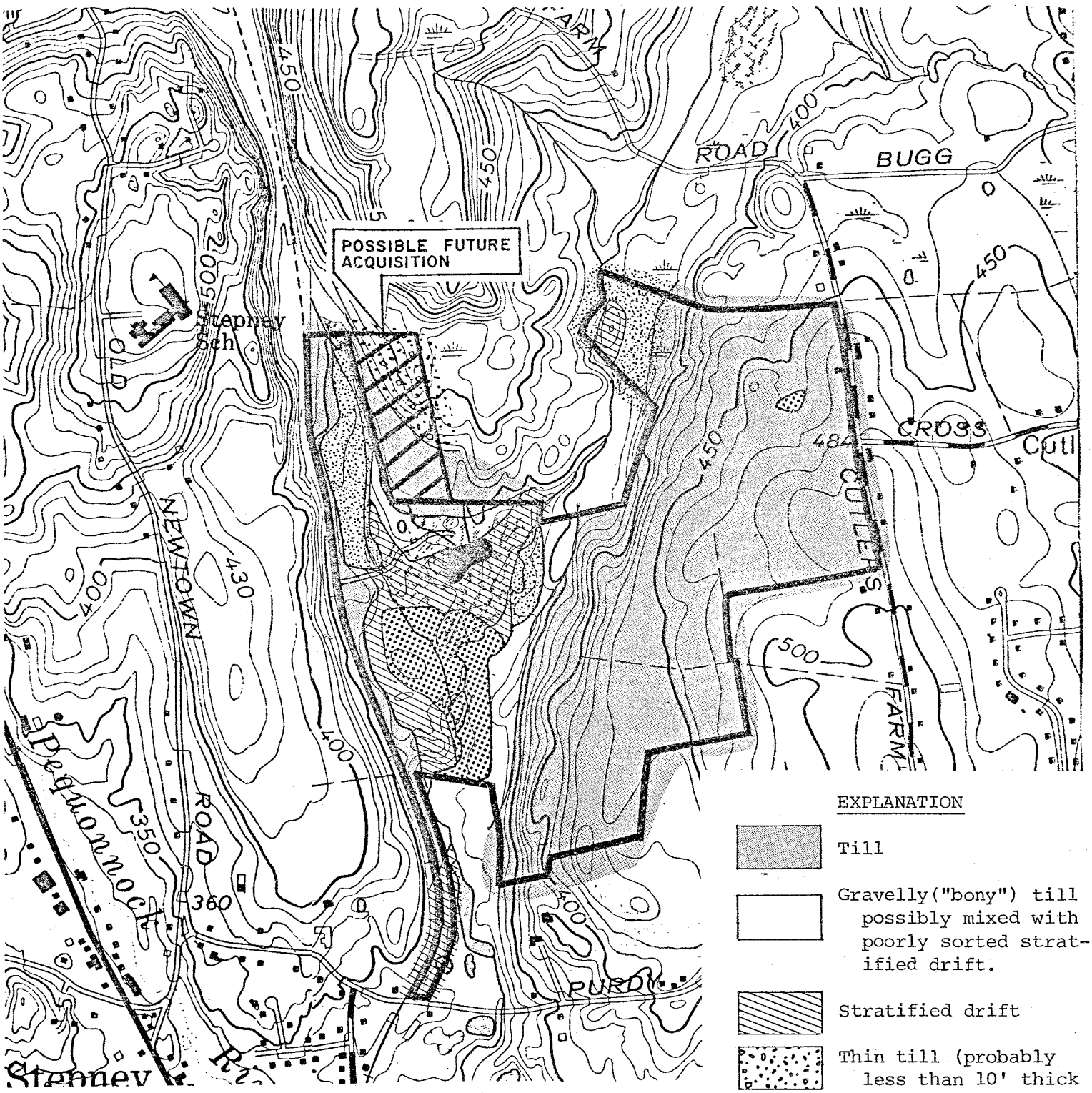
The surficial geology of the park, which includes all those unconsolidated materials overlying bedrock, is dominated by till (see Figure 3). Till is a mixture of clay, silt, sand, gravel, and boulders that was deposited directly from a preexisting mass of glacier ice. Since the textural constituents were not greatly affected by meltwater, there is generally little sorting or stratification in till. Textures may range from coarse, gravelly material to silty, tightly compact material. The finer-grained, more compact type of till is found primarily in the eastern section of the park. Gravelly till is found on the steeper portions of the slopes leading down to the flat lake area.

In the area of excavation, the predominant surficial geologic material appears to be stratified drift. Stratified drift consists of rock particles that were washed out of wasting ice masses by meltwater and redeposited in a generally sorted and layered sequence. Sand is usually the major component of stratified drift, but clean gravelly layers or lenses are also common, particularly in the upper levels of the deposit.

Although till and stratified drift can be technically distinguished on the basis of their different modes of deposition, it is sometimes difficult to distinguish them in the field. The materials surrounding the lake have some of the characteristics of both types of deposit. The soils map accompanying this report identifies stratified-drift based soils only in limited areas adjoining the lake and in the valley of Pequonnock River. The maps accompanying Connecticut Water Resources Bulletin No. 17, on the other hand, indicate that stratified drift extends from the western boundary of the park to a line approximately followed by the 400 foot elevation contour east of the lake. On-site inspection has led the Team geohydrologist to concur with the soils map for most places on the site. The Water Resources Bulletin map, which was based on a less detailed survey of the area, seems to exaggerate the amount of stratified drift.

FIGURE 3.

SURFICIAL GEOLOGY



IV. HYDROLOGY

All drainage from the property flows into Pequonnock River or into one of its tributaries. Most surface drainage in the park flows into the artificial lake; only about 16 acres in the southcentral portion of the park and the narrow portion of the access strip from Purdy Hill Road drain to Pequonnock River below the lake. The overall drainage area, or watershed, of the lake includes approximately 2000 acres (see Figure 4). Pequonnock River is the major inlet to the lake; a smaller stream enters at the lake's northwestern corner and an even smaller, intermittent stream enters at the northeastern corner. A half-acre pond is located in the northeastern section of the park, just north of the basketball courts and northwest of the parking lot.

The Team was asked to assess the potential of the artificial lake for swimming. The Department of Health Services uses the following formula to estimate the maximum number of swimmers per day that should be allowed to utilize a water body: $N = ((V/180 + F/1000)$, where N is the number of swimmers, V is the volume of the water body, and F is the inflow provided by streams or other sources. This formula is useful only if the initial natural quality of the water is acceptable and if other safety factors, such as beach space and lake bottom conditions, are satisfactory. It should be noted in this regard that the water on the day of the field review was strongly tea-colored, indicating possible problems with present water quality. In addition, much of the peripheral lake bottom is extremely steep, particularly along the western and southeastern shores.

In order to use the DHS formula given above, it was necessary to determine the volume of the lake. Since no volumetric information was available, the Team geohydrologist constructed a depth contour map of the lake (see Figure 5) using a plan map and cross-sections submitted to the town by T. J. Hardiman, a registered land surveyor. The Team geohydrologist then estimated the volume by planimetering the various depth contours and using a standard numerical procedure. As a check, the surface area of the pond as it appears on a recent (April 20, 1980) aerial photo was measured. The plan map showed an area of approximately 16.5 acres, whereas the photo indicated an area of about 15.5 acres. The difference is not thought to be significant for the purpose of using the DHS formula.

The volume of the lake was estimated to be about 200 acre feet, or about 65 million gallons. The inflow rate is variable, but the Team geohydrologist used a flow rate that would approximate worst-case conditions (a flow that would be equalled or exceeded 99.9 percent of the time). Because the inflow to the lake is not gaged, it was estimated from data supplied in Connecticut Water Resources Bulletin No. 17. The estimate is 98,500 gallons per day. Using the DHS formula the number of swimmers that could use the lake each day during worst-case conditions is estimated to be 460. During more typical summer flow conditions (an in-flow rate equalled or exceeded 90 percent of the time), the permissible number of swimmers per day would be about 689. These figures suggest that the lake could be an important swimming facility if the other factors mentioned above are, or can be made, acceptable.

V. WATER SUPPLY

If the park is developed as planned, additional water sources may be needed, particularly along the north shore of the lake. Although some stratified drift is present in that area, it is probably too thin to serve as a useful water

FIGURE 4.

WATERSHED OF WOLFE PARK LAKE

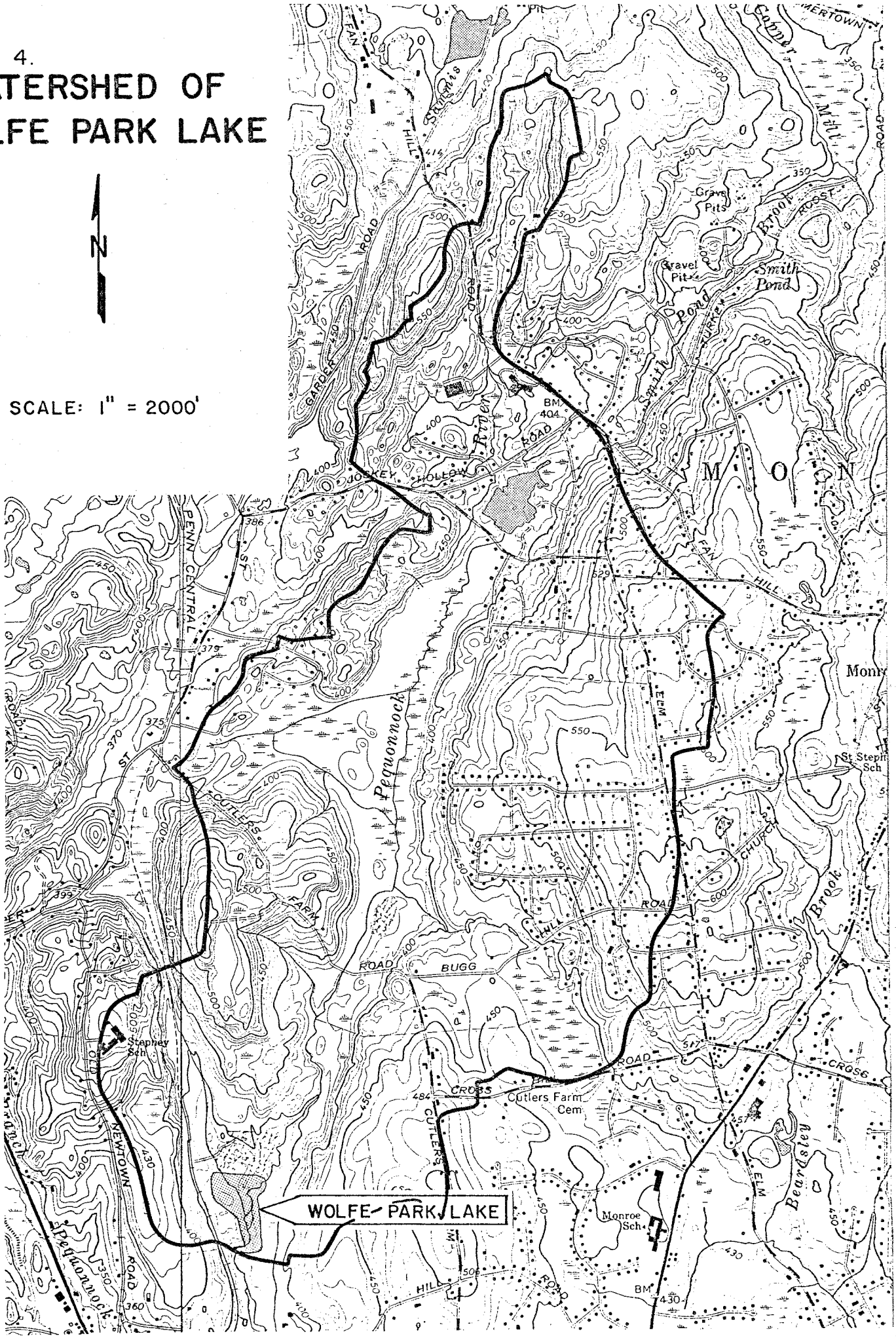
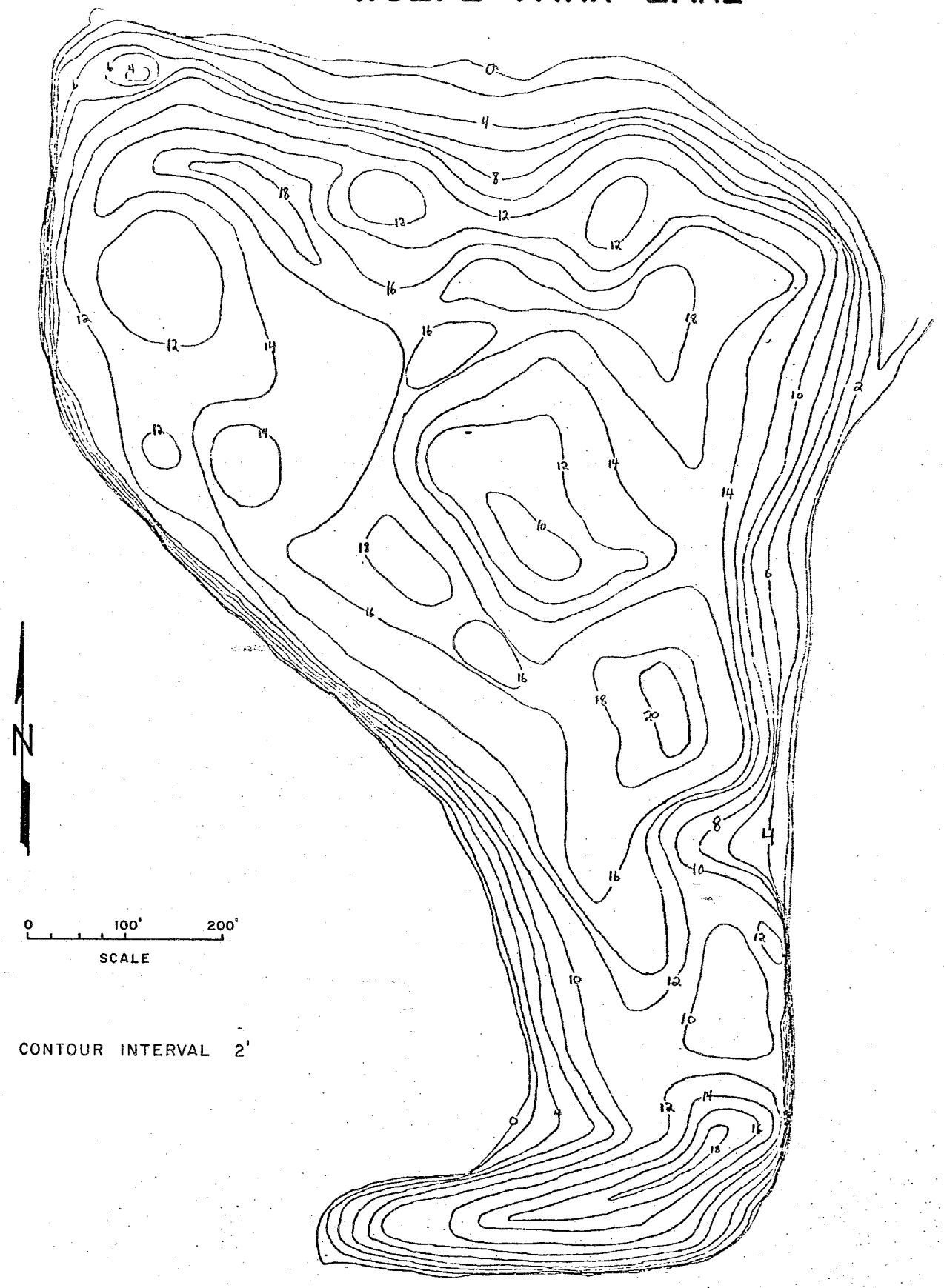


FIGURE 5.

BATHYMETRIC MAP
WOLFE PARK LAKE



Map prepared by M.A. Zizka, using plan map and x-sections submitted by T.J. Hardiman, R.L.S. (Rev. Dec. 1978)

supply source (bedrock is close to or at the surface in that area). The most productive aquifer would probably be the bedrock itself. Water is transmitted through bedrock by fractures. Consequently, the yield of a bedrock-based well depends upon the size and number of water-bearing fractures that are intersected by the well shaft. Since fractures are distributed irregularly in bedrock, it is very difficult to predict the yield of a well drilled in any particular location. Usually, bedrock wells can supply a small but reliable yield. Dry wells or high-yielding wells are possible but unlikely. A yield of no more than 5 gallons per minute would probably be adequate to serve the planned lakeside facilities. The probability of obtaining a 5 gpm yield is approximately 60 to 70 percent. The probability of obtaining at least 3 gpm is about 80-90 percent.

VI. SEPTIC SYSTEMS

If septic systems are developed on the north shore of the lake, as proposed in Figure 2, care will be needed to prevent pollution of the lake. The material remaining after the excavation is thin and coarse-grained, making some areas unsuitable for standard septic systems. The most suitable portion of the north shore for septic systems appears to be the western third, but more detailed testing will be required. The need for engineered systems is likely throughout the north shore.

VII. SOILS

A Soils Map of Wolfe Park is presented in the Appendix of this report. The Appendix also contains a Soils Limitation Chart and a list of soil descriptions.

As can be seen from viewing the Soils Map, Wolfe Park contains a number of different soil types. The soil limitation chart presented in the Appendix discusses the suitability of each of these soil types for various land uses. Further discussion of each soil type can be found in the list of soil descriptions, also presented in the Appendix.

Generally speaking, the plan presented in Figure 2 is compatible with the soils on the site. Droughtiness will be a limitation in landscaping the excavation area, and stoniness and wetness will present limitations in trail development in certain areas. These limitations can be avoided or overcome however with good planning.

Implementation of the plan should include provisions for effective erosion and sediment control.

Presently, the western half of Wolfe Park is suffering from an erosion and sediment control problem. The lake excavation is stalled, and the site is in a state of regression. None of the disturbed areas have been suitably protected, and erosion is uncontrolled. Thousands of tons of soil have been carried into the lake by surface runoff. The present annual erosion rate in the vicinity of the lake is in excess of ten tons per acre. The results of this will be manifested in reduced water quality, weed and algae growth, and increased maintenance costs.

The lake should be completed as originally planned, or properly sloped and graded at its current size. Runoff control, erosion control and stabilization on all disturbed areas should be addressed immediately.

An erosion control plan for the area should include temporary structures at the north end of the lake to arrest the runoff until development of the proposed facilities is begun. Permanent diversions and waterways along with low-maintenance perennial vegetation will be needed along the sideslopes of the lake to collect and convey runoff at critical points, and to stabilize the steep slopes.

The point of confluence of the Pequonnock River and the lake is at present a major source of sediment. If the lake is not extended, this area will have to be shaped and fortified.

The trail connecting the existing parking area and the lake is also a source of a significant amount of sediment. At one point, an intermittent stream has adopted the trail rather than its natural channel. The trail has washed out and the transported soil is now in the lake. Better design and application of erosion control devices are needed along the trail.

It would be very appropriate for the Parks and Recreation Commission to have a detailed map of the property prepared to illustrate drainage patterns, topography, and facilities as a basis for evaluating existing and future facilities planning. A photogrametric topographic map with a two-foot contour interval would be most suitable for this purpose. The next best planning tool would be a recent aerial photograph at a 1" = 200' scale.

The Fairfield County Soil and Water Conservation District office (743-5453) will provide erosion and sediment control planning advice upon request.

VIII. VEGETATION

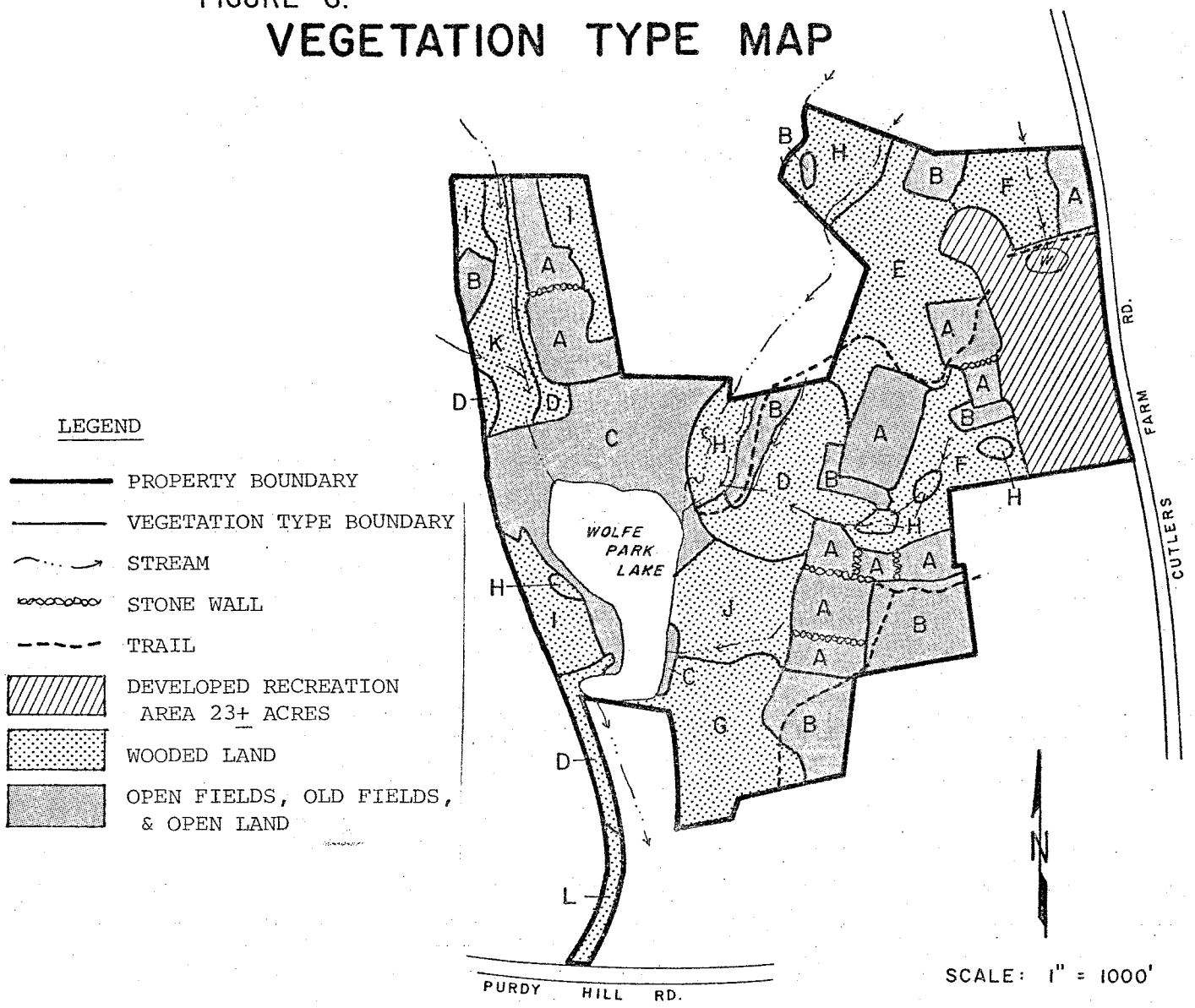
The undeveloped portion of Wolfe Park may be divided into seven distinct vegetation types. These include five mixed hardwood stands which total 77± acres; open fields which total 32± acres; old fields which total 26± acres; hardwood swamps which total 23± acres; gravel/open land which totals 22± acres, a northern hardwood stand which totals 11± acres, and a white pine plantation which totals 2± acres. For the location of these vegetation types, please see the Vegetation Type Map (Figure 6).

Uneven-aged management of vegetation types D, E, G and J will result in a healthy forest made up of a variety of tree species in all size classes. This condition will provide the greatest aesthetic appeal and the best wildlife habitat over an extended period of time. Before this goal is reached, however, thinnings usually used in even aged management must be implemented. These thinnings are discussed below for the individual stands.

At this time, the trees in many of the other stands which are present within this tract are declining in health and vigor as a result of crowding. Improvement thinnings will reduce the competition between residual trees for space, light, moisture and nutrients, resulting over time in healthier more stable forest stands. The prescribed thinnings discussed below, should focus on the removal of unhealthy trees, poor quality trees, damaged trees and trees which are directly competing with healthy high quality trees. Approximately ten years after these stands receive their initial thinnings they should be re-evaluated for future management needs.

FIGURE 6.

VEGETATION TYPE MAP



VEGETATION TYPE DESCRIPTIONS*

TYPE A — OPEN FIELDS, 32± acres.

TYPE B — OLD FIELDS, 26± acres
Understocked sapling to pole size.

TYPE C — GRAVEL/OPEN LAND, 22± acres.

TYPE D — Mixed hardwoods, 19± acres.
Fully stocked, sapling to pole size.

TYPE E — MIXED HARDWOODS, 16± acres.
Fully stocked, sawtimber.

TYPE F — MIXED HARDWOODS, 15± acres.
Over stocked, pole size.

TYPE G — MIXED HARDWOODS, 14± acres
under to fully stocked,
pole to sawtimber size.

TYPE H — HARDWOOD SWAMP, 14± acres.
Over stocked, sapling size.

TYPE I — MIXED HARDWOODS, 13± acres.
2 aged fully stocked sapling
and sawtimber.

TYPE J — NORTHERN HARDWOODS, 11± acres.
Fully stocked, sawtimber size.

TYPE K — HARDWOOD SWAMP, 9± acres, variably
stocked, pole size.

TYPE L — PLANTATION, 2± acres over stocked,
sapling and sawtimber size.

*SEEDLING SIZE = Trees less than 1 inch in diameter at 4½ feet above the ground (D.B.H.)
SAPLING SIZE = Trees 1 to 5 inches in D.B.H.
POLE SIZE = Trees 5 to 11 inches in D.B.H.
SAWTIMBER SIZE = Trees 11 inches and greater in D.B.H.

Revenues provided by these fuelwood and sawtimber harvests could be used to improve the road and trail network, cover boundary marking costs, and cover the costs of a private forester who should be contacted to provide a more comprehensive forest management plan, mark the trees to be removed, and oversee the harvesting operations.

A. Vegetation Type Descriptions and Management Considerations (Refer to Figure 6.)

TYPE A. OPEN FIELDS. Open fields occupy approximately 32 acres of this tract. The vegetation in these areas is dominated by grasses with goldenrod, milkweed, Queen Anne's Lace, horse nettle, ox-eye-daisy, yellow wood-sorrel, wild strawberry, wild madder, Virginia creeper and common burdock intermixed. Along the edges of several of these fields, bayberry, gray stemmed dogwood, red oak seedlings, white oak seedlings and white ash seedlings have become established. Medium quality pole size eastern red cedar, red oak, white oak, red maple, sugar maple, white ash and black cherry are present within the fence rows which divide these fields. Mechanical or chemical means of controlling intrusion of these areas by woody vegetation will be needed to preserve these areas as open fields. Planting conifers within these fields for aesthetics, Christmas tree production, wind or vision barriers is feasible.

TYPE B. OLD FIELDS. Several different stages of old fields in succession from open fields to young mixed hardwood stands are present within this tract. These old field areas total 26± acres and are characterized by varying densities of seedling to sapling size tree species including eastern red cedar, old field juniper, quaking aspen, big tooth aspen, gray birch, black cherry, sassafras, blue beech and red maple. The shrub and woody species which are present include maleberry, highbush blueberry, gray stemmed dogwood, bay berry, barberry, multiflora rose, sweet fern, raspberry and arrowwood. The herbaceous vegetation which is present is dominated by grasses, goldenrod, steeplebush, milkweed, ragweed, horse nettle, field thistle, boneset, hysopleaved boneset, common mullein, yarrow, white clover, bittersweet nightshade and royal fern. Poison ivy, Virginia creeper, Virginia bower and wild yam are the vine species which are present. The old field which is located in the southeastern portion of this property is over-stocked with eastern red cedar. Removal of approximately one half of the total number of trees for use as fence posts would be desirable.

TYPE C. GRAVEL/OPEN LAND. This 22± acre area has recently been mined of its gravel. Rough grading has been done, however no top soil has been spread. Grasses, sweet fern, goldenrod, white clover, Queen Anne's lace, deer tongue, aster, daisy flea bane, cinquefoil, selfheal, St. John's wort, cow vetch, black eyed Susans and common mullein have become established. Several small dense patches of speckled alder are scattered throughout this area especially near the open water. Stabilizing this area with plantings of a combination of white pine, eastern hemlock and larch, approximately 10 feet apart, would be effective, providing seedlings receive full sun and are not out-competed by herbaceous species.

TYPE D. MIXED HARDWOODS. Healthy sapling to pole-size sugar maple, yellow birch, red oak, mockernut hickory, American beech, black birch, red maple, basswood, white ash and big tooth aspen are present in this 19± acre fully-stocked stand. Occassional sawtimber size red oak and tulip tree are scattered throughout, however not in great numbers. There are approximately 15 to 17

cords of wood (total volume) per acre present within this stand. The understory vegetation which is present includes hardwood tree seedlings, shadbush, blue beech, flowering dogwood, hophornbean, gray birch, hazelnut, maple leaved viburnum, azalea, multiflora rose, barberry and eastern red cedar. Ground cover vegetation includes grasses, Pennsylvania sedge, aster, goldenrod, club moss, poison ivy, Christmas fern, hayscented fern, evergreen wood fern, broad beech fern, New York fern and sensitive fern. The trees in this stand are healthy as is, however management needs should be re-calculated within ten years.

TYPE E. MIXED HARDWOODS. This 16± acre fully-stocked stand is made up of high quality sawtimber size tuliptree, red oak, shagbark hickory, sugar maple, yellow birch, black birch, red maple and American beech. The understory in this stand is made up predominantly of hardwood trees seedlings with spice bush, maple leaved viburnum and barberry. Ground cover consists of Virginia Creeper, poison ivy, aster, enchanter's nightshade, wild sarsaparilla, Christmas fern and marginal wood fern. The trees in this stand, although of high quality, are beginning to decline in health and vigor and would benefit by receiving a thinning. The total volume in this stand ranges between 6 and 8 thousand board feet per acre. A commercial thinning which removes one third of the volume in sawtimber size trees, leaving the healthiest and highest quality trees to remain in the stand, will reduce competition between the residual trees and result in a healthier stand. Approximately ten years after this thinning this stand should be re-evaluated.

TYPE F. MIXED HARDWOODS. Pole size red maple, white ash, sugar maple, American elm, tulip tree, black birch, shagbark hickory and red oak are present in this 15± acre over-stocked stand. The total volume which is present ranges between 19 and 21 cords per acre. Hardwood tree seedlings, gray birch, shadbush, high bush blueberry, spice bush, arrowwood, multiflora rose, barberry and widely scattered eastern red cedar and apple trees form the understory in this stand. Ground cover in this area is dominated by poison ivy, Virginia creeper, wild ginger, wild yam, enchanters nightshade, Pennsylvania sedge, dewberry, wild geranium, touch-me-not, jack-in-the-pulpit, Solomon's seal, cinnamon fern, Christmas fern, lady fern and sensitive fern. This stand would benefit from receiving a fuelwood thinning following the "crop tree selection method".

Under the "crop tree selection method", 100 of the highest quality trees in each acre should be identified (trees spaced about 20' x 20' will equal 100 trees per acre), and one, two, or three trees that are in direct competition with each of those identified should be removed. The 100 trees per acre that are selected as crop trees should be healthy, large crowned, and show little or no signs of damage. Trees which are not competing with the 100 selected trees should not be removed, unless they are severely damaged.

TYPE G. MIXED HARDWOODS. This 14± acre,under to fully stocked,stand is made up of pole to sawtimber-size tulip tree, black birch, sugar maple, white ash, red oak, black oak and scattered American beech. The total volume in this stand ranges between 11 and 13 cords per acre. The shrub layer is dominated by blue beech, spicebush, eastern red cedar, witchhazel and barberry. Fox grape, greenbrier, Japanese honeysuckle and poison ivy are the vine species which are present. Pennsylvania sedge, Christmas fern, dewberry and club moss form the ground cover in this stand. At the present time no thinnings are needed in this stand. However, management needs should be re-evaluated in approximately 10 years; conversion to an uneven aged stand should be considered at this time.

TYPE H. HARDWOOD SWAMP. Several hardwood swamp areas which are over-stocked with sapling size red maple and occassional American elm and yellow birch are present within this tract. These areas total approximately 14 acres. The understories in these wetland areas are dominated by spicebush, winterberry and scattered sweet pepper bush. Ground cover consists of tussock sedge, skunk cabbage, sphagnum moss, cinnamon fern, sensitive fern and Canada mayflower growing on the drier areas with larger blue flag widely scattered throughout. The saturated soils cause the growth of these trees to be extremely slow. At present, management of these areas for timber production is not feasible.

TYPE I. MIXED HARDWOODS. These three two-aged stands, which total 14± acres are fully-stocked with sapling size white oak, red oak, black oak, shagbark hickory, mockernut hickory and red maple. These stands are also understocked with sawtimber size red oak, white oak and shagbark hickory which were present when these areas were open land used for grazing or the production of hay. Occasional gray birch, blue beech, eastern red cedar, mountain laurel, hawthorn, quaking aspen, old field juniper, gray stemmed dogwood, sassafras, bayberry and huckleberry are also present. Ground cover vegetation is made up of grasses, Pennsylvania sedge, club moss, Christmas fern, dewberry, aster and cinquefoil. If trails are developed through these areas, it would be desirable to remove the damaged and poor quality sawtimber size trees which are present and could become a hazard to area users.

TYPE J. NORTHERN HARDWOODS. This 11± acre all-aged stand is dominated by sawtimber-size sugar maple with lesser numbers of both white ash and tulip tree intermixed. The total volume which is present within this over-stocked stand ranges between 9 and 12 thousand board feet per acre. The understory is made up predominantly of seedling, sapling and pole-size sugar maple. Blue beech, maple leaved viburnum, spice bush and barberry are included in the shrub layer. Ground cover consists of poison ivy, Christmas fern, lady fern, club moss, enchanters night shade, aster and Solomon's seal.

A light thinning which removes approximately one-third of the total volume (3-4 thousand board feet per acre) leaving the best 2/3 of the volume for the residual stand will result in a healthy uneven aged area.

TYPE K. HARDWOOD SWAMP. Reasonably healthy pole size red maple dominate this 9± acre variable stocked stand. Occasional pole size white ash, yellow birch and red oak are also present. The understory is densely vegetated with spice bush, high bush blueberry, winter berry, swamp azalea, and elderberry. The herbaceous vegetation which is present includes tussock sedge, enchanters nightshade, touch-me-not, skunk cabbage, wild geranium, rough bedstraw, cinnamon fern, royal fern, sensitive fern, larger blue flag, false nettle, violet and tall meadow rue. No timber management is needed in this stand at this time.

TYPE L. PLANTATION. This 2± acre plantation is made up of several rows of sawtimber size eastern white pine with sapling size white pine, red oak, sugar maple, black cherry and white ash growing in the understory. This small stand is over-stocked with white pine and would benefit by receiving a thinning. Ground cover vegetation consists of seedling size sugar maple, wild sarsaparilla, poison ivy, Virginia creepr, barberry, pokeweed, false nettle, dewberry, lady fern, and sensitive fern. The thinning prescribed should remove no more than one-third of the total number of sawtimber size white pine. This thinning should be focused on removal of poor quality trees, damaged trees and trees with less than one-third of their height in healthy crowns.

B. Suitability of the Proposed Plan of Development

The proposed plan for recreational development of this parcel seems for the most part suitable and compatible with the natural resource base in terms of the vegetation. The development as proposed, if properly implemented, should have little negative impact on surrounding vegetation.

Recreational development of this tract should however be harmonized, to the greatest extent possible, with existing vegetation conditions and types. For example:

1. The proposed nature interpretive center should be located in an area where several contrasting vegetation types are in close proximity and easily accessible. Trails developed through these areas should be designed to highlight special vegetation conditions and individual specimens of interest. Careful planning and wise layout of these and all trails is essential to minimize potential problems. Trails should generally follow natural land contours and avoid steep slopes and wet areas. Where wet area crossings are unavoidable, board walks or wooden bridges should be constructed. The trails should be well defined and clearly marked. This should help to limit extensive soil compaction, root injury and trampling of herbaceous vegetation outside the trail system. A typical trail section is presented in the Appendix of this report.

Soil compaction may be reduced by spreading wood chips several inches deep along heavily used foot trails. As wood chips rot they lose their effectiveness and should be replaced. Crushed stone or cinders spread over these areas also reduce soil compaction and are more permanent than wood chips, however they are usually more costly. Eventual loss of some trees caused by soil compaction, even with the addition of wood chips, crushed stone or cinders, is unavoidable. As these trees die they should be removed to prevent a possible hazard.

It is extremely important that provisions for trail maintenance be established prior to actual development. This maintenance should include periodic removal of hazards (fallen or dead trees over the trail), erosion control and frequent trail inspection. If provisions for future maintenance are not made, these areas with increased use may rapidly deteriorate in quality.

2. The new parking areas and proposed athletic fields will have the least impact on vegetation and the least cost, if they are developed in areas where a minimum of tree removal and vegetation clearing will be necessary. This is also true in regards to the development of the winter sports slope. Consideration should be given to establishing the winter sports slope on one or perhaps several of the more steeply sloped open field areas where little or no woody vegetation has become established. This would minimize vegetation clearing.

3. The group and family picnic grounds which are proposed should be located where large trees provide some shade. If these picnic areas are to be located in the open fields, the trees which are present in the fence rows should be retained for this purpose. If, on the other hand, picnic areas are to be developed in locations that are presently wooded, only healthy, high quality trees in adequate numbers to provide the desired amount of shade should be retained. The poor quality trees that represent a potential hazard, should be removed during development of these areas.

Either way, these picnic areas should be located on well drained soils with a slight slope for improved drainage.

C. Aesthetic Considerations

One of the major assets of this property is the great variety of vegetation types which are present. Within this tract a full range of successional stages from open fields to dense forests may be found.

A wide variety of wild flower and weed species may be observed during the spring and summer seasons in the open fields, old fields and cleared areas around the pond. Some attention, in terms of management, will be necessary to preserve the high diversity of herbaceous vegetation in these areas. Periodic mowing will prove effective in controlling the establishment of woody vegetation in selected areas.

Many flowering trees and shrubs, including flowering dogwood, apple trees, and azalea, which have high aesthetic value are scattered throughout many of the old field and mixed hardwood areas. Allowing increased sunlight to reach these trees by removing selected overstory trees will stimulate the flowering, health and vigor of these trees and shrubs. This practice may be particularly desirable where trails pass close to the flowering species.

Located within many of the forest stands (Vegetation Types E, G, I, J and L) are a large variety of healthy, large, high quality trees. These trees have high aesthetic value and would make suitable specimen trees. The stature of many of these trees may be noticed even by the casual observer. Retention of these trees in a healthy condition would be desirable. In most situations the health and vigor of trees can be stabilized and improved by proper forest management which includes periodic thinnings.

IX. WILDLIFE

The 218 acre "Wolfe Park" contains a good combination of woodland, upland, and wetland habitat types. With proper control of land use, along with good wildlife management practices, this area can be a place where wildlife and recreational opportunities can co-exist.

Basic habitat requirements for wildlife such as food, water, nesting areas, and much needed shelter-cover types are found throughout the undeveloped area of this Park. An excellent combination of habitat types creates a well-developed "edge effect". In general, wildlife is a product of the places where two habitats meet. Examples are the borders of woods, fields, ponds, streams, clearings, meadows, and swamps.

The woodland habitat type (see Figure 6) is dominated by a mixed hardwood component. Tree species such as hickories, oaks, beech, maples, tulip, birches, basswood, ashes, and cherry are found throughout the undeveloped area. Scattered about, but not throughout, the woodland habitat are pines, tamaracks, red cedar, and hemlocks which comprise the majority of the softwood types present on the property.

The forested lands adjacent to the wetland habitat types are particularly good wildlife areas. Much of this land offers "evergreen cover". Wildlife such as deer, grouse, squirrels, pheasants, foxes, and small mammals and birds will use these areas as "escape areas" from the elements.

Hickories and oaks are "mast" trees (i.e. nut producing trees) when mature. Using proper forestry techniques, the crowns of these trees can be broadened, developing more food sources for wildlife.

When cordwood or timber cutting, about 5-7 snag trees should be left for cavity nesting wildlife. Snag trees are standing dead trees or live trees with cavities. A few random scattered small brush piles should also be created for small mammals to utilize.

Although only a gray squirrel, a couple of chipmunks, and deer tracks were observed in the forested land during the ERT's field review, wildlife such as white-tailed deer, owls, woodpeckers, ruffed grouse, woodcock, and various small mammals and song birds will utilize these lands.

The upland habitat type is comprised of fields (hay), old fields (4-7 yrs. old), herbaceous openings, and mowed greens (developed areas).

The old fields on the property contain sapling stage growth, mostly red cedar, maple, a few alders (which should be encouraged for ruffed grouse establishments), oaks and occasional beech and cherry trees. The old fields also have an abundance of fox grapes, various berry bushes, greenbriar, and other herbaceous growth which provide wildlife with essential food and cover requirements. Periodic cuttings of these old fields will help maintain a diversified habitat. The more habitat varieties, the greater the chance of wildlife diversities.

Future acquisition of the fields and woodland habitat to the north of the lake would provide an excellent chance for the park to provide picnic areas, and leave a few areas as upland habitat for wildlife. Incorporating these openings into the nature-interpretive trail system would help provide a well-rounded nature trail.

The old apple trees found on a few of the edges of the fields (a few were also observed in the woodland habitat) could be brought back to a wildlife food-producing potential by releasing surrounding trees that are crowding out the apple trees.

Rabbits, woodchucks, deer browse, and a variety of songbirds were observed in the upland habitat during the ERT's field review. Pheasants, doves, foxes, hawks, owls, and a variety of small birds and mammals can also be expected to utilize this upland habitat type.

The wetland habitat type is comprised of a lake in the undeveloped area, various stream beds and a small cattail pond.

The streambelt habitat contains a diversity of wetland-woodland trees, shrubs and herbaceous plants. Hemlocks, cedar, tulip, and oaks dominate the woodland surrounding the streambelt.

In planning the future use of the undeveloped area, an undisturbed buffer strip of vegetation should be left along the streambelts to provide shade, insect food for fish, and dens for aquatic mammals.

The cattail pond located in the northeastern corner of the property would benefit if a diversion drain system was set up to keep runoff from the parking lot out of the pond. Periodically cutting out a great deal of the cattails also would benefit wildlife.

A bittern, little green heron, red-winged blackbirds, and kill deer were observed using the wetland habitat areas. Ducks, woodcock, beaver, muskrat, and a variety of small birds and mammals will also utilize these wetland habitats.

Wolfe Park has a lot of potential for multiple use. It should be recognized that wildlife impacts will result from increased land usage; shy wildlife species will be reluctant to nest or utilize areas with a noticeable human presence. Both recreation and wildlife management can be compatible on this site by sticking to a plan of concentrating active recreational facilities in a limited area, rather than spreading them out over the entire area. The proposal to concentrate active recreational facilities on the eastern and western portions of this site and leave the central portion of the property undeveloped would be consistent with this approach.

X. RECREATION CONSIDERATIONS

As previously mentioned, Wolfe Park is developed on its easterly side for intensive use with a swimming pool, toilet building, tennis, handball, and basketball courts, ballfields, playgrounds, senior citizens' area, and parking lot provided.

The western portion of the park can be reached via a discontinued railroad bed delineating its westerly bound. The most prominent feature on the west side of the park is a 16± acre pond resulting from a stream fed, gravel mining excavation site. The pond and its immediate environs are rather barren looking due to a lack of topsoil and vegetation and exposed substrate. The pond would be suitable for learning how to handle a canoe or rowboat, but certainly of insufficient size to handle any appreciable boating volume. The pond may also be suitable for swimming (see Hydrology section of this report).

The central part of the tract is mostly wooded with the terrain sloping downward to the west. There are paths and there is a gravel road which ties the east and west portions together. The highest ground is located on the east side of the tract. The wooded central portion lends itself well to passive recreational uses such as hiking, jogging, bird watching, nature study, snowshoeing, cross-country skiing, and similar path related activities.

Forest management is being considered. Logging operations and resulting tote roads could expand the trail system and the opportunities for trail related activities. Additionally, a clearcut of trees forming a hillside corridor could create the opportunity for sledding, tobogganing, and learner skiing. This corridor may best be located where favorable access and parking can be provided from the easterly (uphill) side. A comparatively level area exists at the base of the hillside providing a favorable decelleration zone.

The pond currently being used for occasional ice skating and situated at the northeast portion of the tract is fed mostly by surface drainage, much of this coming from the paved parking lot nearby. If salt is being used in snow clearing operations on the parking lot, this would affect the water quality in the pond and the suitability of the water to produce strong ice favorable for skating. Vegetation is encroaching on the perimeter of pond additionally imposing a limitation on its usability.

The south central portion of the property where the slopes are most gentle offers possibilities for youth group camping because of a series of hayfields which are periodically mowed. Church groups, boy and girl scouts, 4-H, and other such non-profit youth groups could avail themselves of the opportunity to camp in these areas. Pit-type toilets could be used here. Kite flying and model airplane flying could also take place in the less rocky fields. Ballfields could be established via cutting and filling to establish more level areas. Such an earth moving operation should, if undertaken, be done according to prescribed S.C.S. guidelines for minimized soil erosion potential which could otherwise have a negative impact on water quality in the watershed. There is a relatively new residential development located near these fields and it may be anticipated that children from this area would make good use of any nearby recreational facilities. It would be desirable to make any pathway network accessible from these fields and by any campers using them.

The gravel excavation pond is, as indicated, accessible from Purdy Hill Road via the discontinued railroad line. Parking area is limited, but could be easily expanded. It appears that swimming may be a possibility in the pond. If it is, the recreational opportunities would be greatly enhanced. Additional excavation and pond enlargement may further enhance recreational opportunities for boating and fishing. Once excavation is completed, it would be desirable to apply topsoil and plant grass and other vegetation to beautify the area and enhance the potential for wildlife habitat while reducing sedimentation in the pond. Acquisition of additional land immediately north of the pond may also enhance the potential for use of this part of the park. Establishment of picnic areas, a parking lot, and a ball field could be easily accomplished if the large open field and adjacent woodland located here are acquired. Such an acquisition would expand the opportunities for accommodating those activities sought for this part of the park. This would also create a park which would be zoned for active use on its east and west sides with a passive use, central zone providing a separator between the two. The western portion could become an alternative area to the highly manicured, heavily used eastern portion. Hiking trails routed through the central part could provide walk access to facilities on either side.

The site plan offered for further development of Wolfe Park appears practical and the location proposed for the facilities to be built appear appropriate. Facility layout in proximity to the pond would depend on the ultimate size of the pond. Motorboat use of the pond has appropriately been ruled out. The boats to be used in the pond are primarily of the car-top variety. Car and boat trailer parking should be provided proximal to the launch ramp. The layout plan suggests that this has, in fact, been planned for.

The proposed nature study trail system should encompass the entire park property. It should be planned to afford people an opportunity to initiate and pursue educational, scientific, cultural and recreational values on an informal basis, as well as to support a highly structured program within the recreation department.

The trails should be created only after an intensive inventory of the property has been conducted to ascertain the nature and location of appropriate points of interest. The trails should be laid out with respect to aesthetic considerations, with regard for the terrain, and with an eye toward minimum maintenance.

Portions of the proposed trail system should be designed to implement a series of self-guided, educational walks, perhaps supplemented by recorded instructive narratives. The walker should receive orientation; be guided to designated learning stations along the trails; and be informed of significant natural phenomena and features.

Typical trail themes might include a story trail, blending a story theme and instruction to increase the user's understanding and retention of information and interpretations; a nature trail concerned with object identification; and a combination trail, combining interpretation, identification, folklore, map reading and other nature-wise information.

An amphitheatre and interpretive center would certainly be bonus features, desirable to incorporate in the park development. The inventory of plant and animal life found in the park can well serve interpretive/educational programs as can information on the past uses of the area by man. Additional information in the natural sciences (e.g. geology) can bolster an interpretive program. Such a program should be presented in a basic, understandable way. Bibliographies can be posted for those persons seeking to delve more deeply into specific topics. Photographic documentation of any forest management program undertaken could be readily incorporated in an interpretive/educational program showing the evolution of a woodlot after man's intervention in the natural process. Photographs taken before, during, and after tree cutting will graphically show the evolution sequence over the years. Such programs can well serve local school systems in a way that is less abstract and sometimes easier for students to relate to.

XI. ADDITIONAL PLANNING CONSIDERATIONS

Surrounding Land Use

The land use surrounding Wolfe Park is low density residential and farming. Zoning in the vicinity is for 1, 2 and 3-acre lot residential use. Thus, it is not expected that future development will detract from the natural features of the park. Likewise, recreational use of the parkland is not likely to detract from the existing rural character of the neighborhood.

Demographic Profile

Monroe is one of the fastest growing communities in the Greater Bridgeport Region, with an absolute gain of nearly 2,000 persons, and a percentage gain of 16.3%, between 1970 and 1980. The town also has the largest household size, 3.39 persons per household, compared with a Regional average of 2.75. This indicates that there are relatively more families with children than in the other towns in the Region. Preliminary state projections predict that Monroe will continue its relatively rapid growth between 1980 and 2000, gaining 3,600 persons (26%). A much slower rate of growth is predicted for all other towns in the Region, except Easton. The Region's total population gain over the 20 year period is predicted to be 6,653 persons (+ 2%)

Preliminary Population Projections*

	Monroe	Greater Bridgeport Region
1980	14,010	300,897
1985	14,920	305,660
1990	15,980	308,540
1995	16,950	309,090
2000	17,610	307,550

*State of Connecticut, Office of Policy & Management, July 1, 1981.

Capacity of Facilities

A community park can be differentiated from a neighborhood or special purpose park in that it contains a variety of facilities for all age groups and, in most cases, provides for some form of water-based recreation. Using this definition, each of the towns in the Region has its own community park, though the ratios of acres to population range from a low of 4ac/1000 persons in Bridgeport to a high of 24ac/1000 persons in Easton.

If Wolfe Park is considered the only community park in Monroe, then the ratio of acres to population is 14 ac/1000 persons. This ratio exceeds the standard of 6ac/1000 persons suggested in the Monroe Plan of Development. Thus, considering simply the gross acreage, Wolfe Park should be more than adequate to meet the towns needs in the foreseeable future.

Access to the Site

Wolfe Park is located at a two-lane substandard country road, Cutlers Farm Road, which has no shoulders and sidewalks. There is only one existing park access with separate ingress and egress points. Since the existing park entrance and parking area is designed to serve the eastern portion of the park, an additional access road to the proposed new park portion is critically needed. It is anticipated that this new access road will be constructed off Purdy Hill Road and along the discontinued railroad bed abutting the western border of the property. Road improvements on Cutlers Farm Road from Cross Hill Road to Purdy Hill Road would be desirable.

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XII. APPENDIX

Soils Map
Scils Limitation Chart
Soil Descriptions
Typical Trail Section

SOILS LIMITATION CHART - WOLFE PARK

MAPPING SYMBOL	SOIL NAME	RECREATIONAL BUILDINGS	PICNIC AREAS	PLAYGROUNDS	PATHS AND TRAILS
AfB	Agawam fine sandy loam, 3 to 8 percent slopes	Slight	Slight	Moderate; Slope	Slight
CfB	Charlton fine sandy loam, 3 to 8 percent slopes	Slight	Slight	Moderate; Slope	Slight
CfC	Charlton fine sandy loam, 8 to 15 percent slopes	Moderate; Slope	Moderate; Slope	Severe; Slope	Slight
ChB	Charlton very stony fine sandy loam, 3 to 8 percent slopes	Moderate; Large stones	Slight	Moderate; Slope, Large stones	Moderate; Large stones
ChC	Charlton very stony fine sandy loam, 8 to 15 percent slopes	Moderate; Slope, Large stones	Moderate; Slope	Severe; Slope	Moderate; Large stones
CnC	Charlton extremely stony fine sandy loam, 3 to 15 percent slopes	Severe; Large stones	Moderate; Slope, Large stones	Severe; Slope, Large stones	Severe; Large stones
CnD	Charlton extremely stony fine sandy loam, 15 to 35 percent slopes	Severe; Slope, Large stones	Severe; Slope	Severe; Slope, Large stones	Severe; Large stones
CrC	Charlton-Hollis fine sandy loams, very rocky, 3 to 15 percent slopes	Moderate; Slope, Large stones, Depth to rock	Moderate; Slope	Severe; Slope, Depth to rock	Moderate; Large stones
CrE	Charlton-Hollis fine sandy loams, very rocky, 15 to 45 percent slopes	Severe; Slope, Depth to rock	Severe; Slope	Severe; Slope, Depth to rock	Severe; Slope
HkB	Hinckley gravelly sandy loam, 3 to 8 percent slopes	Slight	Moderate; Too sandy, Small stones	Severe; Small stones	Moderate; Too sandy, Small stones
Lc	Leicester fine sandy loam	Severe; Wetness, Frost action	Severe; Wetness	Severe; Wetness	Severe; Wetness

MAPPING SYMBOL	SOIL NAME	RECREATIONAL BUILDINGS	PICNIC AREAS	PLAYGROUNDS	PATHS AND TRAILS
PbB	Paxton fine sandy loam, 3 to 8 percent slopes	Moderate; Frost action	Slight	Moderate; Slope, Percs slowly	Slight
PdB	Paxton very stony fine sandy loam, 3 to 8 percent slopes	Moderate; Frost action, Large stones	Slight	Moderate; Slope,Large stones, Percs slowly	Moderate; Large stones
PdC	Paxton very stony fine sandy loam, 8 to 15 percent slopes	Moderate; Slope, Large stones	Moderate; Slope	Severe; Slope	Moderate; Large stones
PeC	Paxton extremely stony fine sandy loam, 3 to 15 percent slopes	Severe; Large stones	Moderate; Large stones, Slope	Severe; Slope, Large stones	Severe; Large stones
Pr	Pits, gravel ----------	S O I L C H A R A C T E R I S T I C S V A R I A B L E			----------
Rd	Ridgebury fine sandy loam	Severe; Wetness, Frost action	Severe; Wetness	Severe; Wetness	Severe; Wetness
Rn	Ridgebury, Leicester, and Whitman extremely stony fine sandy loams	Severe; Large stones, Wetness, Frost action	Severe; Wetness	Severe; Large stones, Wetness	Severe; Wetness, Large stones
Sb	Saco silt loam	Severe; Floods, Wetness, Frost action	Severe; Wetness	Severe; Floods, Wetness	Severe; Wetness
WxB	Woodbridge fine sandy loam, 3 to 8 percent slopes	Severe; Frost action	Slight	Moderate; Slope, Percs slowly, Wetness	Slight
WxC	Woodbridge fine sandy loam, 8 to 15 percent slopes	Severe; Frost action	Moderate; Slope	Severe; Slope	Slight

EXPLANATION OF RATING SYSTEM:

SLIGHT LIMITATION: indicates that any property of the soil affecting use of the soil is relatively unimportant and can be overcome at little expense.

MODERATE LIMITATION: indicates that any property of the soil affecting use can be overcome at a somewhat higher expense.

SEVERE LIMITATION: indicates that the use of the soil is seriously limited by hazards or restrictions that require extensive and costly measures to overcome.

NOTE: Limitation Rating Based Upon U.S.D.A. Soil Conservation Service Criteria.

AfA -- AGAWAM FINE SANDY LOAM, 0 to 3 percent slopes.

AfB -- AGAWAM FINE SANDY LOAM, 3 to 8 percent slopes.

These nearly level, well-drained soils are on plains and terraces in stream valleys.

Typically, the surface layer is dark brown fine sandy loam 9 inches thick. The subsoil is brown fine sandy loam 20 inches thick. The substratum is light yellowish brown and pale olive sand to a depth of 60 inches or more.

Included with these soils may be small areas of excessively drained Hinckley soils, somewhat excessively drained Merrimac soils, well-drained Haven soils, and moderately well-drained Ninigret soils. Included areas make up about 15 percent of this map unit.

The permeability of these Agawam soils is moderately rapid in the surface layer and subsoil, and rapid in the substratum. Runoff is slow, and available water capacity is moderate.

Recreation. These soils have slight or moderate limitations for picnic areas and camp sites. The level soils are favorable for play areas, but limitations for this use increase on soils having slopes above 2 percent. The potential for recreational use of these soils is enhanced by their proximity to streams, ponds, and sites with potential for water development.

Wildlife. Habitat for openland and woodland wildlife species is easily established, improved or maintained on these soils. They are well suited for the dependable growth of a wide variety of desirable food and cover plants. It is impractical to develop habitat for wetland wildlife on these soils.

Woodland. Productivity for wood crops ranges from fair on the sandy loam soils to good on the silt loam soils. Both hardwoods and conifers are well suited. Competition from hardwoods is a problem when managing for pine, spruce, or larch.

Cropland. These soils are suitable for the production of all agricultural crops adapted to the area. Supplemental irrigation is needed to assure necessary production levels for crops with a high cash return. Erosion is a hazard on these soils. Intensive surface water control measures are needed on slopes above 8 percent.

Ce -- CARLISLE MUCK.

This nearly level, very poorly drained soil is in depressions and on plains and terraces. Slopes are less than 1 percent.

Typically, this soil consists of black, dark brown, and dark grayish brown decomposed organic material to a depth of 66 inches or more.

Included with this soil in mapping are small areas of very poorly drained Adrian, Saco, and Scarboro soils that make up about 15 percent of the map unit.

This Carlisle soil is wet most of the year, and the watertable is generally at the surface from early fall to late spring. Runoff is very slow. Some areas have water ponded on the surface. A few areas are subject to flooding. The permeability of the soil is moderate or moderately rapid, and the soil is very strongly acid to neutral.

Most areas of this soil are wooded or are covered by marshgrasses and sedges.

The major limitations of this soil are the high watertable, ponding and the instability of the organic material.

The soil is unsuitable for cultivated crops, recreation, and poorly suited to timber production.

CfB -- CHARLTON FINE SANDY LOAM, 3 to 8 percent slopes

CfC -- CHARLTON FINE SANDY LOAM, 8 to 15 percent slopes

These gently sloping, well-drained soils are on hills and ridges.

Typically, the surface layer is very dark brown fine sandy loam 6 inches thick. The subsoil is strong brown and yellowish brown fine sandy loam 23 inches thick. The substratum is light olive brown gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewaht excessively drained Hollis soils, well-drained Paxton soils, and moderately well-drained Sutton soils and small areas of soils with bedrock at a depth of 20 to 40 inches. Included areas make up about 15 percent of this map unit.

The permeability of Charlton soil is moderate or moderately rapid. Runoff is medium, and available water capacity is moderate.

Recreation. These soils are favorable for picnic areas and camp sites. The level soils have few limitations for play areas, but limitations are more severe on slopes greater than 2 percent.

Wildlife. These soils are well suited for the dependable growth of a wide variety of desirable openland and woodland wildlife food and cover plants. Habitat for woodland wildlife species is easily created, improved, or maintained. On the stony soils and slopes above 8 percent, it is difficult to establish grain, grasses, and legumes for openland wildlife. It is impractical to develop wetland wildlife habitat on these soils.

Woodland. These soils have fair productivity for wood crops. Competition from hardwoods is a problem on the soils formed in loamy till (like Charlton) when managing for pine, spruce, or larch.

Cropland. The soils cleared of stones are well suited to the production of the crops generally grown in the area. The somewhat droughty soils (like Gloucester) are best suited for the production of early vegetables and early grass and legume crops. Erosion is a hazard on these soils. Intensive surface water control measures are needed on slopes above 8 percent.

ChB -- CHARLTON VERY STONY FINE SANDY LOAM, 3 to 8 percent slopes.

This gently sloping, well-drained soil is on hills and ridges. Stones and boulders cover 1 to 5 percent of the surface.

Recreation. These soils are favorable for picnic areas and camp sites, but stone removal is necessary for their use as play areas and limitations are more severe on slopes greater than 2 percent.

Wildlife. Habitat requirements of openland wildlife species can be established, improved, or maintained but stoniness and the steeper slopes add difficulty in management. There are few or no soil limitations that affect the development or maintenance of woodland wildlife habitat. It is impractical to develop wetland wildlife habitat on these soils.

Woodland. These soils have fair productivity for wood crops. Competition from hardwoods is a problem when managing for pine, spruce or larch on the soils underlain by loamy till (like Charlton). Equipment operation is difficult because of stoniness. Attention to erosion control measures is important on skid trails and roads on steeper slopes.

Cropland. When cleared of stone, these soils are suited to the production of the crops generally grown in the area. Erosion is a hazard on the steeper slopes and intensive surface water control measures are needed on such areas.

ChC -- CHARLTON VERY STONY FINE SANDY LOAM, 8 to 15 percent slopes.

This sloping, well-drained soil is on hills and ridges. Stones and boulders cover 1 to 5 percent of the surface.

Typically, the surface layer is brown fine sandy loam 6 inches thick. The subsoil is strong brown and yellowish brown fine sandy loam 23 inches thick. The substratum is light olive brown gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat excessively drained Hollis soils, well drained Paxton soils, and moderately well drained Sutton soils and small areas of soils with bedrock at a depth of 20 to 40 inches. Included areas make up about 15 percent of this map unit.

The permeability of this Charlton soil is moderate or moderately rapid. Runoff is rapid, and available water capacity is moderate. It is very strongly acid to medium acid.

Urban. The permeability of these soils is favorable for the installation and operation of septic sewage disposal systems. On the slopes greater than 8 percent, the design and site selection for absorption fields requires special consideration.

Soil conditions are favorable for homes with basements. On the stony soils and slopes above 8 percent, difficulty is added to site preparation. However, the steeper slopes may present opportunities for a wider choice of architectural design.

Soil conditions are favorable for the establishment and maintenance of grass, trees, and shrubs. The stony soils and slopes above 8 percent add difficulty in landscaping.

Costly stone removal is required on these soils for installation of septage effluent absorption fields, homes with basements, streets and parking lots, and for landscaping.

Recreation. These soils are favorable for picnic areas and camp sites, but stone removal is necessary for their use as play areas and limitations are more severe on slopes greater than 2 percent.

Wildlife. Habitat requirements of openland wildlife species can be established, improved, or maintained but stoniness and the steeper slopes add difficulty in management. There are few or no soil limitations that affect the development or maintenance of woodland wildlife habitat. It is impractical to develop wetland wildlife habitat on these soils.

Woodland. These soils have fair productivity for wood crops, Competition from hardwoods is a problem when managing for pine, spruce, or larch on the soils underlain by loamy till (like Charlton). Equipment operation is difficult because of stoniness. Attention to erosion control measures is important on skid trails and roads on steeper slopes.

Cropland. When cleared of stone, these soils are suited to the production of the crops generally grown in the area. Erosion is a hazard on the steeper slopes and intensive surface water control measures are needed on such areas.

CnC -- CHARLTON EXTREMELY STONY FINE SANDY LOAM, 3 to 15 percent slopes.

This gently sloping to sloping well-drained soil is on hills and ridges. Stones and boulders cover 5 to 35 percent of the surface.

Typically, the surface layer is very dark brown fine sandy loam 6 inches thick. The subsoil is strong brown and yellowish brown fine sandy loam 23 inches thick. The substratum is light olive brown gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat excessively drained Hollis soils, well drained Paxton soils, and moderately well drained Sutton soils and small areas of soils with bedrock at a depth of 20 to 40 inches. Included areas make up about 15 percent of this map unit.

The permeability of this Charlton soil is moderate or moderately rapid. Runoff is rapid, and available water capacity is moderate.

Slope andthe stones and boulders on the surface are the main limitations of this soil.

Recreation. These soils are favorable for picnic areas and camp sites, but stone removal is necessary for their use as play areas and limitations are more severe on slopes greater than 2 percent.

Wildlife. Habitat requirements of openland wildlife species can be established, improved, or maintained but stoniness and the steeper slopes add difficulty in management. There are few or no soil limitations that affect the development or maintenance of woodland wildlife habitat. It is impractical to develop wetland wildlife habitat on these soils.

Woodland. These soils have fair productivity for wood crops. Competition from hardwoods is a problem when managing for pine, spruce, or larch on the soils underlain by loamy till (like Charlton). Equipment operation is difficult because of stoniness. Attention to erosion control measures is important on skid trails and roads on steeper slopes.

Cropland. When clear of stone, these soils are suited to the production of the crops generally grown in the area. Erosion is a hazard on the steeper slopes and intensive surface water control measures are needed on such areas.

CnD -- CHARLTON EXTREMELY STONY FINE SANDY LOAM, 15 to 35 percent slopes.

This moderately steep and steep, well-drained soil is on hills and ridges. Stones and boulders cover 5 to 35 percent of the surface.

Typically, the surface layer is very dark brown fine sandy loam 4 inches thick. The subsoil is strong brown and yellowish brown fine sandy loam 25 inches thick. The substratum is light olive brown gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat excessively drained Hollis soils and well-drained Paxton soils and small areas of soils with bedrock at a depth of 20 to 40 inches. Also included are a few small areas where stones and boulders cover less than 5 percent of the surface. Included areas make up about 15 percent of this map unit.

The permeability of this Charlton soil is moderate or moderately rapid. The erosion hazard is severe. Available water capacity is moderate. The soil is very strongly acid to medium acid.

Slope and the stones and boulders on the surface are the main limitations of this soil.

Urban. Costly measures are required to overcome severe limitations because of slope and stoniness in developing these soils for urban use.

Recreation. These soils have severe limitations for picnic areas, camp sites, and play areas.

Wildlife. Habitat requirements of openland wildlife species can be established, improved, or maintained but slope and stoniness make it very difficult to plant grain, grasses, and legumes. There are few or no soil limitations that affect the development or maintenance of woodland wildlife habitat. It is impractical to develop wetland wildlife habitat on these soils.

Woodland. These soils have fair productivity for wood crops. Competition from hardwoods is a problem when managing for pine, spruce, or larch on the soils underlain by loamy till (like Charlton). Equipment operation is difficult because of steep slopes. Attention to erosion control measures is important on skid trails and roads.

Cropland. The soils, cleared of stones, are suited to the production of cultivated crops in long rotations with grasses and legumes. Because of the high erosion hazard, very intensive surface water control measures are required.

CrC -- CHARLTON-HOLLIS FINE SANDY LOAMS, VERY ROCKY, 3 to 15 percent slopes

This complex consists of gently sloping and sloping, well drained and somewhat excessively drained soils on hills and ridges. They have an undulating topography marked with exposed bedrock, a few drainageways, and a few small, wet depressions. Stones and boulders cover 1 to 5 percent of the surface and exposed bedrock up to 10 percent of the surface.

The complex is about 50 percent Charlton soils, 25 percent Hollis soils, and 25 percent other soils and exposed bedrock. The Charlton and Hollis soils are so intermingled on the landscape that it was not practical to map them separately.

Typically, the Charlton soils have a surface layer of very dark brown fine sandy loam 3 inches thick. The subsoil is strong brown and yellowish brown fine sandy loam 26 inches thick. The substratum is light olive brown gravelly sandy loam to a depth of 60 inches or more.

Typically, the Hollis soils have a surface layer of very dark grayish brown fine sandy loam 3 inches thick. The subsoil is dark yellowish brown fine sandy loam that extends to bedrock at a depth of 17 inches.

Included with this complex in mapping are small areas of well drained Paxton soils, moderately well drained Sutton soils, poorly drained Leicester soils, and a very poorly drained Adrian soils. Also included are small areas of soils with bedrock at a depth of 20 to 40 inches and a few larger areas, mostly in the southern part of the county that have been cleared of stones and boulders.

These Charlton and Hollis soils have moderate or moderately rapid permeability. Runoff is medium to rapid. Available water capacity is moderate in the Charlton soils and low in the Hollis soils. They are very strongly acid to medium acid.

The major limitations of this complex are the shallow depth to bedrock in the Hollis soils, the areas of exposed bedrock, and the stones and boulders on the surface.

Recreation. Picnic areas and camp sites are very difficult to develop and access is usually a severe limitation. However, the terrain provides an attractive setting for these uses.

Wildlife. These soils are poorly suited for the production of openland wildlife habitat. The habitat for woodland wildlife species can be established, improved, or maintained but moderate treatment is required. It is impractical to develop wetland wildlife habitat on these soils.

Woodland. The productivity of most of this land is poor for wood crops. Pockets of deeper soil within these areas have fair productivity. Equipment operation is very difficult because of rock outcrops. Seedling survival and windthrow of trees are problems on the shallower areas.

Cropland. These soils are not suited for the production of cultivated crops because of rock outcrops and shallowness. Scattered areas with deeper soils and less numerous rock outcrops can be used for improved hay, pasture, and orchard.

CrE -- CHARLTON-HOLLIS FINE SANDY LOAMS, VERY ROCKY, 15 to 45 percent slopes.

This complex consists of moderately steep to very steep, well-drained and somewhat excessively drained soils on hills and ridges. They are marked with exposed bedrock, a few drainageways, and a few small, wet depressions. Stones and boulders cover 1 to 5 percent of the surface and exposed bedrock up to 10 percent of the surface.

The complex is about 50 percent Charlton soils, 30 percent Hollis soils, and 20 percent other soils and exposed bedrock. The Charlton and Hollis soils are so intermingled that it was not practical to map them separately.

Typically, the Charlton soils have a surface layer of very dark brown fine sandy loam 3 inches thick. The subsoil is strong brown and yellowish brown fine sandy loam 26 inches thick. The substratum is light olive brown gravelly sandy loam to a depth of 60 inches or more.

Included with this complex in mapping are small areas of well drained Paxton soils, moderately well drained Sutton soils, and poorly drained Leicester soils. Also included are small areas of soils with bedrock at a depth of 20 to 40 inches; a few larger areas that have been cleared of stones and boulders; and a few areas where stones and boulders cover more than 5 percent of the surface.

These Charlton and Hollis soils have moderate or moderately rapid permeability. Runoff is rapid. Available water capacity is moderate in the Charlton soils and low in the Hollis soils. Both soils are very strongly acid to medium acid.

The major limitations of this complex are slope, stones and boulders, areas of exposed bedrock, and the shallow depth to bedrock in the Hollis soils.

Urban. Steep slopes, many rock outcrops, and soils shallow to bedrock impose very severe limitations for urban development. The rugged topography and rock ledges are picturesque and enhance adjoining areas.

Recreation. Picnic areas and camp sites are extremely difficult to develop.

Wildlife. The habitat requirements of woodland wildlife species can be established, improved, or maintained on these soils but the rockiness and steep slopes present severe limitations. Habitat management will be difficult and expensive and results may be unsatisfactory. It is impractical to develop openland or wetland wildlife habitat on these soils.

Woodland. The productivity of this land is poor for wood crops. Equipment operation is extremely difficult because of numerous rock outcrops and steep slopes. Seedling survival and windthrow of trees are problems.

Cropland. These soils are not suitable for the production of cultivated crops.

HkB -- HINCKLEY GRAVELLY SANDY LOAM, 3 to 8 percent slopes.

This gently sloping, excessively drained soil is on terraces, kames, and eskers in stream valleys.

Typically, the surface layer is dark brown gravelly sandy loam 5 inches thick. The substratum is 10 inches thick. The upper 4 inches is strong brown gravelly sandy loam, and the lower 6 inches is dark brown gravelly loamy sand. The substratum is light olive brown gravelly sandy to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat excessively drained Merrimac soils and well drained Agawam and Haven soils. Included areas make up about 15 percent of this map unit.

The permeability of this Hinckley soil is rapid in the surface layer and subsoil and very rapid in the substratum. Runoff is slow, and available water capacity is very low.

Urban. The permeability of this soil is favorable for the installation and operation of septic sewage disposal systems. On slopes above 8 percent, the design and site selection for absorption fields requires special consideration. The percolation rate may allow sewage effluent to pollute water if water sources are nearby.

Soil conditions are favorable for homes with basements. The steeper slopes may add difficulty to site preparation. However, the steeper and irregular slopes present opportunities for a wider choice of architectural design. Conditions are favorable for stability of footings and performance of footing drains.

Land grading for landscaping will expose sand and gravel. Grass, trees, and shrubs are difficult to establish and maintain because of low water-holding capacity and low natural fertility. On the steeper slopes, further difficulty is added to these problems.

When constructing streets and parking lots, earth moving is readily done, but stabilizing and vegetating cut banks is difficult, particularly on the steeper slopes.

Recreation. The potential for recreational uses of these soils is enhanced by their proximity to streams, pond, and sites with potential for water developments. They are favorable for picnic areas and camp sites. Even on level areas these soils present difficulty when establishing or maintaining vegetation for play areas. The soils with steeper and irregular slopes have severe limitations for play areas.

Wildlife. These soils are poorly suited for the production of habitat required by openland and woodland wildlife. Dependable growth of desirable food and cover plants is limited by the low natural fertility and low moisture-holding capacity. Food and cover can be established, improved, or maintained, but it is difficulty and expensive especially for openland wildlife. Results are not always satisfactory. It is impractical to develop wetland wildlife habitat on these soils.

Woodland. Productivity for wood crops is poor on these soils because of low natural fertility and low water-holding capacity. Because of droughtiness, high mortality of natural or planted seedlings can be expected. White pine should produce a greater yield than hardwoods.

HkB -- HINCKLEY GRAVELLY SANDY LOAM, 3 to 8 percent slopes.

Cropland. Droughtiness and low natural fertility severely restrict the use of these soils for crop production. Irrigation with intensive fertilization is essential for satisfactory yields of crops including tobacco, corn, vegetables, and hay. If cultivated crops are grown on the steeper slopes, measures for controlling erosion and runoff are necessary. Wind erosion is a hazard particularly on loamy sands.

Lc -- LEICESTER FINE SANDY LOAM

This nearly level, poorly drained soil is in drainageways and depressi Slopes range from 0 to 5 percent.

Typically, this soil has a surface layer of black fine sandy loam 7 inc thick. The subsoil is 22 inches thick. The upper 12 inches is grayish brown and light yellowish brown, mottled fine sandy loam. The lower 10 inches is light olive brown, mottled gravelly fine sandy loam. The substratum is olive brown, mottled gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Sutton soils, poorly drained Ridgebury and Walpole soils, and very poorly drained Whitman soils. Also included are a few areas of slightly acid soils and a few areas with a surface layer of silt loam. Included areas make up about 15 percent of this map unit.

This Leicester soil has a seasonal high water table at a depth of about 6 inches from fall until late spring. The permeability of the soil is moderat or moderately rapid. Runoff is slow, and available water capacity is moderate It is very strongly acid to medium acid.

Urban. These soils have severe to very severe limitations for most urba uses. Intensive and costly drainage and land fill measures are required to overcome wetness.

Recreation. These soils have severe limitations for picnic aras, camp sites, and play areas but have potential for conservation uses and environmental enhancement. Pond sites are found in these areas, but difficulty of construction increases with the degree of stoniness.

Wildlife. The poorly drained soils in this group are poorly suited for the production of openland wildlife. Habitat required by woodland and wetland wildlife species can be developed, improved, or maintained but moderate treatment is required.

Woodland. Productivity for wood crops is fair on these soils. Stoniness and wetness pose severe problems in the use of equipment. Because of wetness, there are severe problems in the survival of tree seedlings, the windthrow of trees, and competition from other plants.

Cropland. With drainage, the soils cleared of stones are suitable for the production of silage corn and adapted hay crops.

PbB -- PAXTON FINE SANDY LOAM, 3 to 8 percent slopes.

This gently sloping, well drained soil is on drumlins and hills.

Typically, this soil has a surface layer of dark brown fine sandy loam 9 inches thick. The subsoil is brown gravelly fine sandy loam 22 inches thick. The substratum is very firm grayish brown gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well drained Charlton and Stockbridge soils, moderately well drained Georgia and Woodbridge soils, and poorly drained Ridgebury soils. Also included are a few areas of nearly level soils. Included areas make up about 15 percent of this map unit.

The permeability of this Paxton soil is moderate in the surface layer and subsoil, and slow or very slow in the substratum. Runoff is medium, and available water capacity is moderate. It is very strongly acid to slightly acid.

Urban. The design and construction of septage effluent absorption fields that function satisfactorily are very difficult because of the hardpan. Slopes above 8 percent add further difficulty and problems in design and site selection for absorption fields.

Conditions are favorable for excavation of basements of homes on soils with slopes less than 8 percent. Slopes above 8 percent are a moderate limitation; however, the steeper slopes present opportunities for a wider choice of architectural design. Stability of footings is not a problem, but measures such as footing drains are needed to prevent seepage into basements.

Soil conditions are favorable for the establishment and maintenance of grass, trees, and shrubs. The stony soils and slopes above 8 percent add difficulty in landscaping.

Difficulty in constructing streets and parking lots ranges from slight on level areas, to moderate on 3 to 8 percent slopes, to severe on slopes above 8 percent. The hazard of frost heaving because of water accumulation above the hardpan requires special consideration. Also soil slippage on road cuts is a hazard during wet seasons.

Recreation. These soils are favorable for picnic areas and camp sites. The level soils have few limitations for play areas, but limitations for this use are greater on the steeper slopes and stony soils.

Wildlife. These soils are well suited for the dependable growth of a wide variety of desirable openland and woodland wildlife food and cover plants. Habitat for woodland wildlife species is easily established, improved, or maintained. On the stony soils and slopes above 8 percent it is difficult to establish grain, grasses, and legumes for openland wildlife. It is impractical to develop wetland wildlife habitat on these soils.

Woodland. These soils have good productivity for wood crops. Both hardwoods and coni ers are well su ed. Competition from hardwoods is a serious problem when managing for pine, spruce, or larch. Hardwoods to favor on these soils are red oak, white ash, and sugar maple.

Cropland. The soils cleared of stones are suitable for the production of most agricultural crops grown in the area. Erosion is a hazard and on the steeper slopes more intensive surface water control measures are needed.

PdB -- PAXTON VERY STONY FINE SANDY LOAM, 3 to 8 percent slopes.

This gently, sloping, well-drained soil is on drumlins and hills. Stones and boulders cover 1 to 5 percent of the surface.

Typically, this soil has a surface layer of dark brown fine sandy loam 6 inches thick. The subsoil is brown fine sandy loam 22 inches thick. The substratum is very firm, brittle, grayish brown gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well-drained Charlton and Stockbridge soils, moderately well-drained Georgia and Woodbridge soils, and poorly drained Ridgebury soils. Included areas make up about 15 percent of this map unit.

The permeability of this Paxton soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. Runoff is medium, and available water capacity is moderate. The soil is very strongly acid to slightly acid.

Urban. The design and construction of septage effluent absorption fields that function satisfactorily are very difficult because of the hardpan. Slopes above 8 percent add further difficulty and problems in design and site selection for absorption fields.

Conditions are favorable for excavation of basements of homes on soils with slopes less than 8 percent. Slopes above 8 percent are a moderate limitation; however, the steeper slopes present opportunities for a wider choice of architectural design. Stability of footings is not a problem, but measures such as footing drains are needed to prevent seepage into basements.

Soils conditions are favorable for the establishment and maintenance of grass, trees, and shrubs. The stony soils and slopes above 8 percent add difficulty in landscaping.

Difficulty in constructing streets and parking lots ranges from slight on level areas, to moderate on 3 to 8 percent slopes, to severe on slopes above 8 percent. The hazard of frost heaving because of water accumulation above the hardpan requires special consideration. Also soil slippage on road cuts is a hazard during wet seasons.

Recreation. These soils are favorable for picnic areas and camp sites. The level soils have few limitations for play areas, but limitations for this use are greater on the steeper slopes and stony soils.

Wildlife. These soils are well suited for the dependable growth of a wide variety of desirable openland and woodland wildlife food and cover plants. Habitat for woodland wildlife species is easily established, improved, or maintained. On the stony soils and slopes above 8 percent it is difficult to establish grain, grasses, legumes for openland wildlife. It is impractical to develop wetland wildlife habitat on these soils.

Woodland. These soils have good productivity for wood crops. Both hardwoods and conifers are well suited. Competition from hardwoods is a serious problem when managing for pine, spruce, or larch. Hardwoods to favor on these soils are red oak, white ash, and sugar maple.

PdB -- PAXTON VERY STONY FINE SANDY LOAM, 3 to 8 percent slopes.

Cropland. The soils cleared of stones are suitable for the production of most agricultural crops grown in the area. Erosion is a hazard and on the steeper slopes more intensive surface water control measures are needed.

PdC -- PAXTON VERY STONY FINE SANDY LOAM, 8 to 15 percent slopes.

This sloping, well-drained soil is on drumlins and hills. Stones and boulders cover 1 to 5 percent of the surface.

Typically, this soil has a surface layer of dark brown fine sandy loam 6 inches thick. The subsoil is brown fine sandy loam 22 inches thick. The substratum is very firm, brittle, grayish brown gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well-drained Charlton and Stockbridge soils, moderately well-drained Georgia and Woodbridge soils, and poorly drained Ridgebury soils. Included areas make up about 15 percent of this map unit.

The permeability of this Paxton soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. Runoff is rapid, and available water capacity is moderate. The soil is very strongly acid to slightly acid.

Urban. Costly stone removal is required on these soils for installation of on-site sewage disposal systems, homes with basements, streets and parking lots, and for landscaping.

Recreation. These soils are favorable for picnic areas and camp sites, but have severe limitations for play areas.

Wildlife. Habitat requirements of openland wildlife species can be established, improved, or maintained but stoniness adds difficulty in management. There are few or no soil limitations that affect the development or maintenance of woodland wildlife habitat. It is impractical to develop wetland wildlife habitat on these soils.

Woodland. These soils have good productivity for wood crops. Both hardwoods and conifers are well suited. Competition from hardwoods is a serious problem when managing for pine, spruce, or larch. Hardwoods to favor on these soils are red oak, white ash, and sugar maple. Equipment operation is difficult because of stoniness.

Cropland. When cleared of stones these very stony soils are suitable for the production of all agricultural crops grown in the area. Erosion is a hazard and on the steeper slopes intensive surface water control measures will be needed.

PeC -- PAXTON EXTREMELY STONY FINE SANDY LOAM, 3 to 15 percent slopes.

This gently sloping well-drained soil is on drumlins and hill. Stones and boulders cover 5 to 35 percent of the surface.

Typically, this soil has a surface layer of dark brown fine sandy loam 6 inches thick. The subsoil is brown fine sandy loam 22 inches thick. The substratum is very firm, brittle, grayish brown gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well-drained Charlton and Stockbridge soils, moderately well-drained Georgia and Woodbridge soils, and poorly drained Ridgebury soils. Included areas make up about 15 percent of this map unit.

The permeability of this Paxton soil is moderate in the surface layer and subsoil, and slow or very slow in the substratum. Runoff is rapid and available water capacity is moderate. The soil is very strongly acid to slightly acid.

Urban. Costly stone removal is required on these soils for installation of on-site sewage disposal systems, homes with basements, streets and parking lots and for landscaping.

Recreation. These soils are favorable for picnic areas and camp sites, but have severe limitations for play areas.

Wildlife. Habitat requirements of openland wildlife species can be established, improved, or maintained but stoniness adds difficulty in management. There are few or no soil limitations that affect the development or maintenance of woodland wildlife habitat. It is impractical to develop wetland wildlife habitat on these soils.

Woodland. These soils have good productivity for wood crops. Both hardwoods and conifers are well suited. Competition from hardwoods is a serious problem when managing for pine, spruce, or larch. Hardwoods to favor on these soils are red oak, white ash, and sugar maple. Equipment operation is difficult because of stoniness.

Cropland. When cleared of stones these very stony soils are suitable for the production of all agricultural crops grown in the area. Erosion is a hazard and on the steeper slopes intensive surface water control measures will be needed.

Pr -- PITS, GRAVEL.

This unit consists of areas that have been excavated for sand and gravel. Many of the pits have escarpments along the edges.

The permeability of this unit is rapid or very rapid. In a few areas the watertable is at or near the surface most of the year. A few small areas are adjacent to streams and are subject to periodic flooding.

Included with this unit in mapping are small areas of excessively drained Hinckley soils, somewhat excessively drained Merrimac soils, and well drained Agawam and Haven soils. Also included are a few small areas of exposed bedrock and a few small ponds.

Rd -- RIDGEBURY FINE SANDY LOAM

This nearly level to gently sloping, poorly drained soil is in low areas and drainageways on drumlins and hills. Slopes range from 0 to 5 percent.

Typically, this soil has a surface layer of very dark grayish brown fine sandy loam 8 inches thick. The subsoil is brown and brownish gray, mottled fine sandy loam 10 inches thick. The substratum is grayish brown and dark yellowish brown, mottled fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Woodbridge soils, poorly drained Leicester soils, and very poorly drained Whitman and Adrian soils. Also included are a few small areas of soils with a surface layer and subsoil of silt loam and soils that have slopes of more than 5 percent. Included areas make up about 15 percent of this map unit.

This Ridgebury soil has a high watertable at a depth of about 6 inches from fall until late spring. The permeability of the soil is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate and runoff is slow.

The seasonal high watertable and the slow or very slow permeability in the substratum limit this soil.

Recreation. These soils have severe or very severe limitations for picnic areas, camp sites, and play areas but have potential for conservation uses and environmental enhancement. Pond sites are found in these areas, but difficulty of construction increases with the degree of stoniness.

Wildlife. These very poorly drained soils are not suited for the production of openland and woodland wildlife habitat. Dependable growth of desirable food and cover plants is hindered by their wetness. Habitat for wetland wildlife can be developed, improved, or maintained on these soils, but stoniness imposes difficulties in constructing water impoundments.

Woodland. Productivity for wood crops is fair to poor. Wetness poses severe problems in the use of equipment, the survival of tree seedlings, and the windthrow of trees. Competition from other plants is a problem.

Cropland. With drainage, the soils cleared of stones are suitable for the production of silage corn and adapted hay and pasture crops. The stoniness and wetness of these soils make them unsuitable for agricultural crops.

Wildlife. These poorly drained soils are not suited for the production of openland or woodland wildlife habitat. Dependable growth of desirable food and cover plants is limited by their wetness. Habitat for wetland wildlife can be developed, improved, or maintained on these soils, but stoniness imposes difficulties in constructing water impoundments.

Woodland. Productivity for wood crops ranges from fair to poor. Stoniness and wetlness pose severe problems in the use of equipment. Because of wetness, there are severe problems in the survival of tree deedlings, the windthrow of trees, and competition from other plants.

Cropland. With drainage the soils cleared of stones are suitable for the production of silage corn and adapted hay crops. The stoniness and wetness of the soils make them unsuitable for agricultural crops.

Sb -- SACO SILT LOAM

This nearly level, very poorly drained soil is on low floodplains of major streams and their tributaries. Slopes are mostly less than 1 percent.

Typically, this soil has a surface layer of black silt loam 14 inches thick. The substratum is dark gray and is 27 inches thick. The upper 20 inches is silt loam, and the lower 7 inches is very fine sandy loam. The substratum is dark gray gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Pootatuck soils, poorly drained Rippowam soils, and very poorly drained Adrian, Carlisle, and Scarboro soils. Included areas make up about 15 percent of this map unit.

This Saco soil is subject to frequent flooding. The watertable is at or near the surface most of the year. The permeability of the soil is moderate in the surface layer and subsoil and rapid or very rapid in the substratum. Runoff is very slow, and water is ponded on the surface of some areas. Available water capacity is high. The soil is strongly acid to slightly acid above a depth of 30 inches and medium acid to neutral below a depth of 30 inches.

The frequent flooding and high watertable limit this soil for septic systems.

Recreation. These areas have very severe limitations for picnic areas, camp sites, and play areas.

Wildlife. These very poorly drained soils are not suited for the production and management of woodland wildlife habitat. The habitat requirements of wetland wildlife habitat can be developed, improved, or maintained but moderate treatment is required.

Woodland. Productivity of wood crops ranges from fair to very poor depending on the degree of wetness. Wetness causes severe problems in the use of equipment, the survival of tree seedlings, tree windthrow, and competition from other plants.

Cropland. When partly drained, these soils can be used for hay and silage corn. Frequent flooding and the lack of suitable outlets usually make drainage for other cultivated crops impractical. These soils are unsuited to the production of agricultural crops because of wetness and frequent flooding.

SvB --SUTTON FINE SANDY LOAM, 3 to 8 percent slopes.

This gently sloping, moderately well-drained soil is in slight depressions and on the sides of hills and ridges.

Typically, this soil has a surface layer of dark grayish brown fine sandy loam 8 inches thick. The subsoil and substratum are yellowish brown, mottled fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well-drained Charlton and Paxton soils, moderately well-drained Woodbridge soils, and poorly drained Leicester and Ridgebury soils. Also included are a few areas of soils with slopes of less than 3 percent or more than 8 percent. Included areas make up about 15 percent of this map unit.

This Sutton soil has a seasonal high watertable at a depth of about 20 inches from late fall until midspring. The permeability of the soil is moderate or moderately rapid. Runoff is medium, and available water capacity is moderate. It is very strongly acid to medium acid in the surface layer and subsoil and very strongly acid to slightly acid in the substratum.

Urban. The watertable limits successful operation of septage effluent absorption fields unless special measures are used such as drainage and land fill. The very stony soils present problems during installation.

During wet periods, the watertable is a problem in construction of homes and basements. Measures such as footing drains are necessary to prevent seepage into basements. The very stony soils add difficulty in excavation.

Soil conditions are favorable for the establishment of grass, trees, and shrubs. The very stony soils add difficulty in landscaping.

The high watertable is a moderate problem in the design, construction, and maintenance of streets and parking lots. Stone removal during construction is a severe problem on the very stony soils.

Recreation. During the main season of use, the nonstony soils with less than 3 percent slope are favorable for picnic areas and-camp sites. Drainage is needed to overcome the seasonal watertable on playing fields for intensive use and to extend the period of picnicking and camping. The limitations for play areas increase on the steeper slopes and stoniner soils.

Wildlife. These soils are well suited for the dependable growth of a wide variety of desirable openland and woodland wildlife food and cover plants. Habitat requirements of openland wildlife species can be established, improved, or maintained but the stony and very stony soils are more difficult to manage. There are few or no soil limitations that affect the development or maintenance of woodland wildlife habitat. It is extremely difficult and expensive to develop wetland wildlife habitat on these soils.

Woodland. These soils have fair productivity for wood crops. Competition from hardwoods is a problem when managing for pine, spruce, or larch. Hardwoods to favor on these soils are red oak, white ash, and sugar maple. Equipment operation is difficult on the very stony soils.

Cropland. The soils cleared of stones are suited to the production of adapted legumes and grasses, late vegetables, and small fruits. With drainage, these soils are also suitable for the production of alfalfa, corn, orchards and early vegetables. Erosion is a hazard and on the steeper slopes more intensive surface water control measures are needed.

WxB -- WOODBRIDGE FINE SANDY LOAM, 3 to 8 percent slopes.

This gently sloping, moderately well-drained soil is on drumlins and hills.

Typically, this soil has a surface layer of very dark grayish brown fine sandy loam 8 inches thick. The subsoil is yellowish brown fine sandy loam 24 inches thick that is mottled in the lower part. The substratum is firm, grayish brown, mottled fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well-drained Paxton and Stockbridge soils, moderately well-drained Georgia and Sutton soils, and poorly drained Ridgebury soils. Included areas make up about 15 percent of this map unit.

This Woodbridge soil has a seasonal high watertable at a depth of about 20 inches from fall until late spring. The permeability of the soil is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. Runoff is medium, and available water capacity is moderate. It is very strongly acid to medium acid in the surface layer and subsoil, and very strongly acid to slightly acid in the substratum.

Urban. The design and installation of septage effluent absorption fields that function satisfactorily are very difficult because of the hardpan and seasonal high watertable. Installation of disposal systems is more difficult on the very stony soils.

During wet periods the watertable is a problem in construction of homes with basements. Measures such as drainage are needed to prevent seepage into basements. The very stony soils add difficulty in excavation.

Soil conditions are favorable for the establishment and maintenance of grass, trees, and shrubs. The very stony soils and soils with slopes above 8 percent cause problems in landscaping.

The very stony soils and soils with slopes above 8 percent present severe problems in the design and construction of streets and parking lots. The hazard of frost heaving because of watertable and hardpan must be given special consideration in design and construction. Soil slippage on raod cuts is a severe hazard during wet seasons.

Recreation. During the main season of use, the nonstony soils with less than 3 percent slope are favorable for picnic areas and camp sites. Drainage is needed to overcome the seasonal watertable on playing fields for intensive use and to extend the period of picnicking and camping. The limitations for recreational use increase on the steeper and more stony soils.

Wildlife. Habitat requirements of openland wildlife species can be established, improved, or maintained but stoniness adds difficulty in management. There are few or no soil limitations that affect the development or maintenance of woodland wildlife habitat. It is extremely difficult and expensive to develop wetland wildlife habitat on these soils.

Woodland. These soils have good productivity for wood crops. Both hardwoods and conifers are well suited. Competition from hardwoods is a serious problem when managing for pine, spruce, or larch. Hardwoods to favor on these soils are red oak, white ash, and sugar maple. Equipment operation is difficult on the stonysoils.

WxB -- WOODBRIDGE FINE SANDY LOAM, 3 to 8 percent slopes.

Cropland. The soils cleared of stones are suited to the production of adapted legumes and grasses, late vegetables, and small fruits. With drainage these soils are also suitable for the production of alfalfa, corn, orchards, and early vegetables. Erosion is a hazard on these soils and on the steeper slopes intensive surface water control measures are needed.

WxC -- WOODBRIDGE FINE SANDY LOAM, 8 to 15 percent slopes.

This sloping, moderately well drained soil is on drumlins and hills.

Typically, this soil has a surface layer of very dark grayish brown fine sandy loam 8 inches thick. The subsoil is yellowish brown fine sandy loam 24 inches thick that is mottled in the lower part. The substratum is firm and brittle, grayish brown, mottled fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well drained Paxton and Stockbridge soils, moderately well drained Georgia soils, and poorly drained Ridgebury soils. Included areas make up about 10 percent this map unit.

This Woodbridge soil has a seasonal high watertable at a depth of about 20 inches from fall until late spring. The permeability of the soil is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. Runoff is rapid, and available water capacity is moderate. This soil is very strongly acid to medium acid in the surface layer and subsoil, and very strongly acid to slightly acid in the substratum.

Urban. The design and installation of septage effluent absorption fields that function satisfactorily are very difficult because of the hardpan and seasonal high watertable. Installation of disposal systems is more difficult on the very stony soils.

During wet periods the watertable is a problem in construction of homes with basements. Measures such as drainage are needed to prevent seepage into basements. The very stony soils add difficulty in excavation.

Soil conditions are favorable for the establishment and maintenance of grass, trees, and shrubs. The very stony soils and soils with slopes above 8 percent cause problems in landscaping.

The very stony soils and soils with slopes above 8 percent present severe problems in the design and construction of streets and parking lots. The hazard of frost heaving because of watertable and hardpan must be given special consideration in design and construction. Soil slippage on road cuts is a severe hazard during wet seasons.

Recreation. During the main season of use, the nonstony soils with less than 3 percent slope are favorable for picnic areas and camp sites. Drainage is needed to overcome the seasonal watertable on playing fields for intensive use and to extend the period of picnicking and camping. The limitations for recreational use increase on the steeper and more stony soils.

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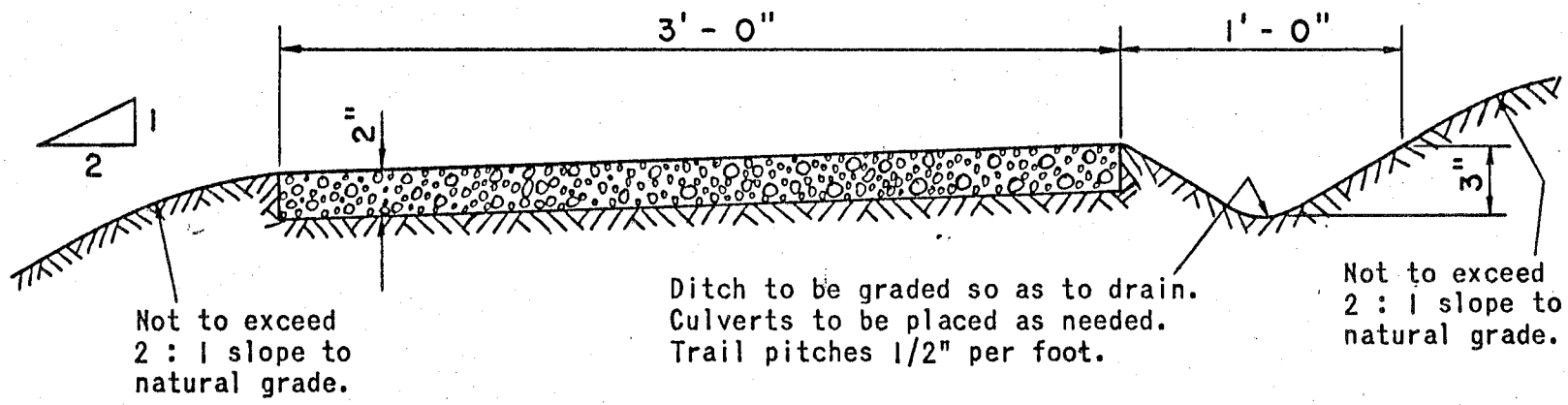
NOTE: Unsuitable material should be excavated and the trail filled with aggregate not exceeding 1" in diameter. Depth of filled aggregate may vary from 0" to 6" according to the soil and its trafficability. In very wet areas artificial walkways or raised embankments may be needed.

Width of trail may be increased in accord with traffic load.



SCS-REC-110
3-71

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

TYPICAL TRAIL SECTION

FROM ORIGINAL DESIGN BY
NEVADA STATE PARK SYSTEM

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.