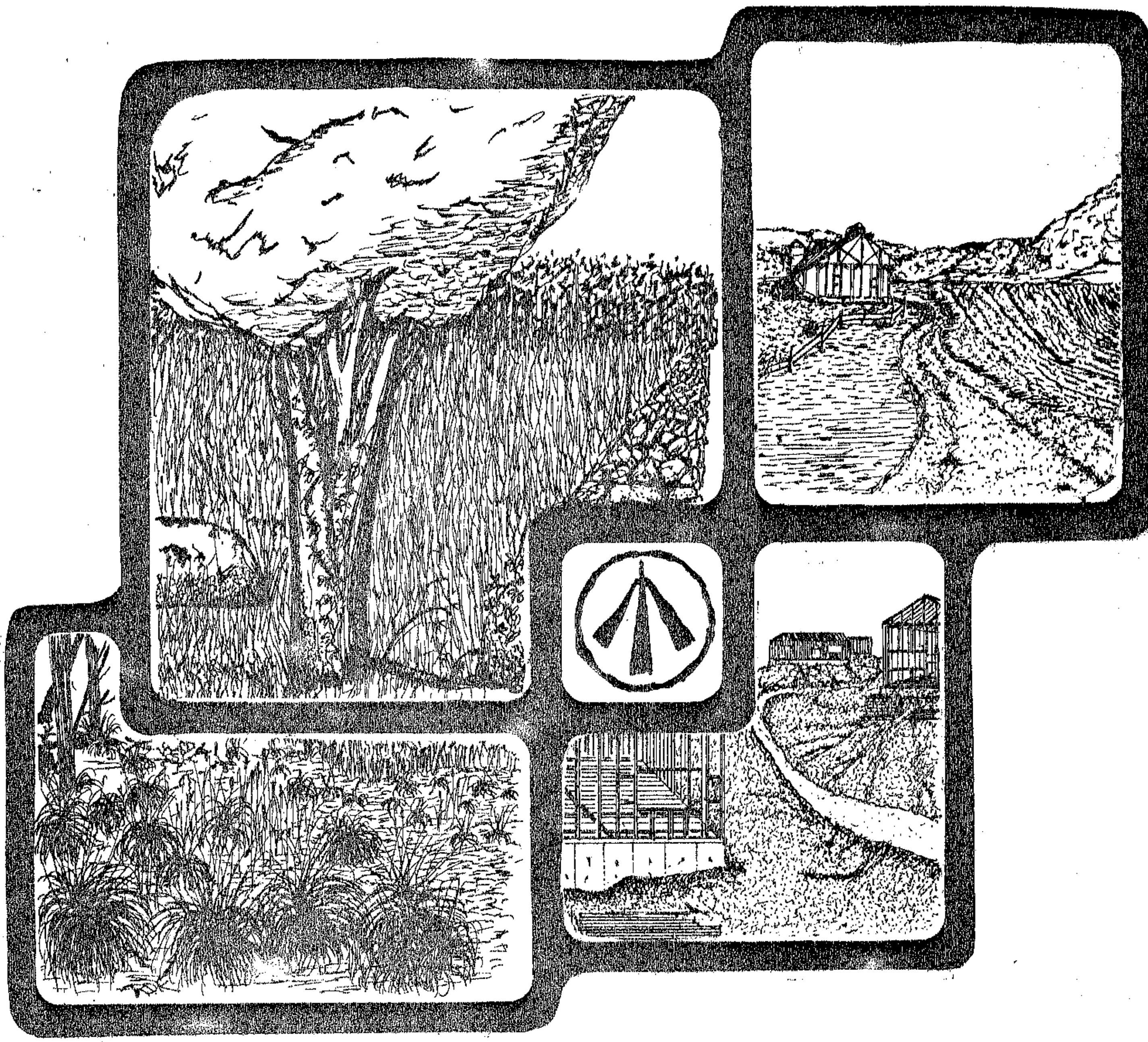
ENVIRONMENTAL REVIEW TEAM REPORT



OXFORD FELLS
MADISON, CONNECTICUT

KING'S MARK
RESOURCE CONSERVATION & DEVELOPMENT AREA

KING'S MARK ENVIRONMENTAL REVIEW TEAM REPORT

ON

OXFORD FELLS MADISON, CONNECTICUT

MARCH 1980

King's Mark Resource Conservation and Development Area

Environmental Review Team
P.O. Box 30
Warren, Connecticut 06754

ACKNOWLEDGMENTS

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

Federal Agencies

U.S.D.A. SOIL CONSERVATION SERVICE

State Agencies

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

Local Groups and Agencies

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

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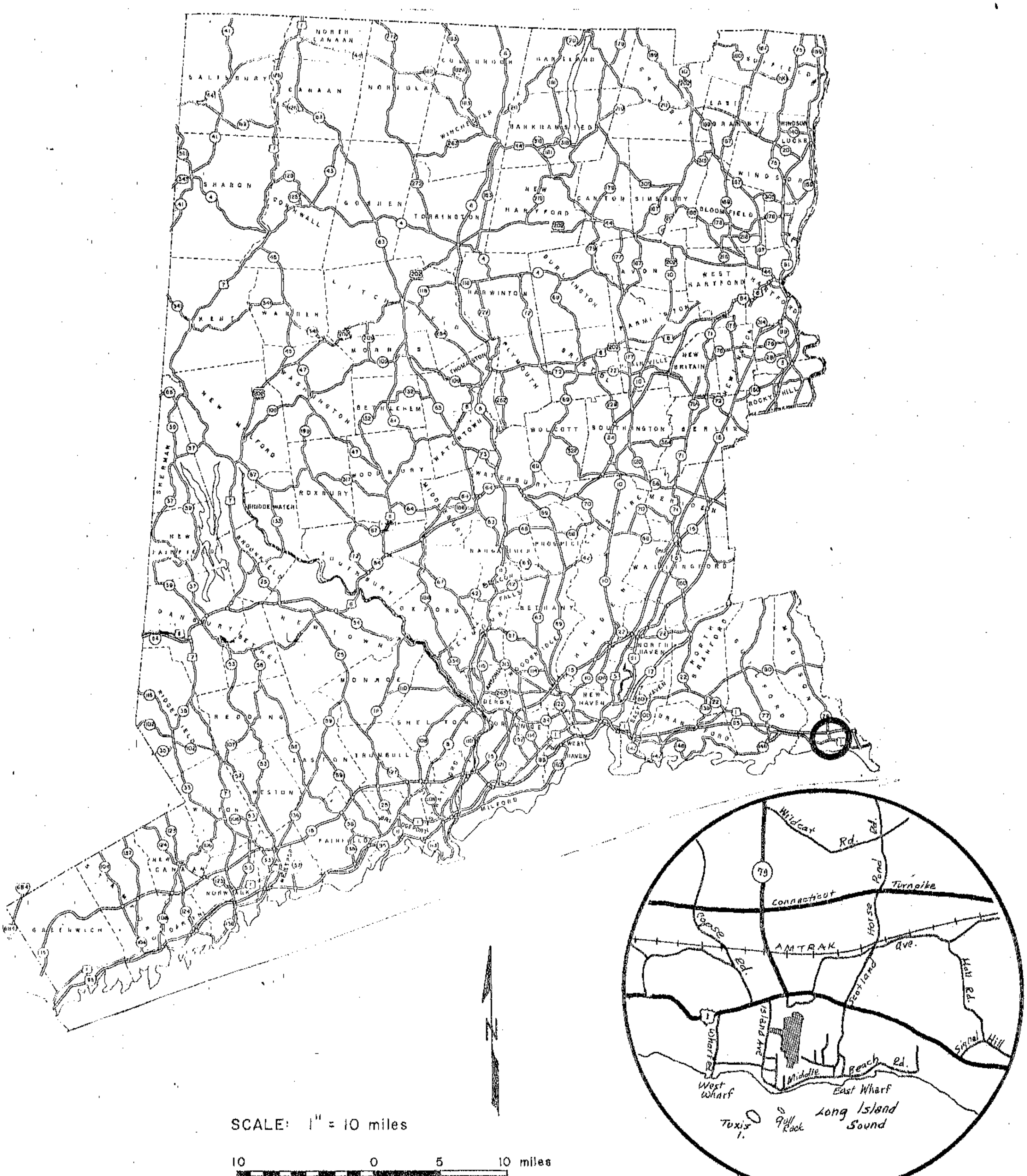
Thomas A. J. McGowan, Director
Richard Lynn, ERT Coordinator
Rebecca West, ERT Draftsman
Irene Nadig, Secretary

TABLE OF CONTENTS

LIST OF FIGURES

LOCATION OF STUDY SITE

OXFORD FELLS
MADISON, CONNECTICUT



ENVIRONMENTAL REVIEW TEAM REPORT

ON

OXFORD FELLS

MADISON, CONNECTICUT

I. INTRODUCTION

The Madison Planning and Zoning Commission is presently considering a request for a zone regulation change to allow, via a special exception permit, the construction of 10 homes on ± 25 acres of land in the south central portion of town. The proposed project is known as Oxford Fells.

The subject property is located east of Island Avenue, west of Cedar Avenue and between approximately 900 and 3,000 feet of the shoreline. The land is mostly wooded and characterized by extensive wetlands. The topography throughout most of the site is nearly flat although the northeast and northwest corners of the property contain steeply sloping bedrock knobs. Figure 1 shows the location and topography of the Oxford Fells property.

The proposed project would create ten homesites in the northern half of the site. The homesites would be served by an interior road constructed off Island Avenue. Although none of the building sites will encroach onto wetland areas (according to project plans and a detailed soils mapping of the property), several road and driveway crossings of inland wetlands and water courses are proposed (see Figure 2). Each of the proposed homesites would be served by individual subsurface sewage disposal systems. Domestic water supply would be provided by tapping a public water main located along Island Avenue.

The Planning and Zoning Commission from the Town of Madison requested the assitance of the King's Mark Environmental Review Team to help the town in analyzing the proposed development. Specifically, the Team was asked to assess the impact of the project on wetlands and drainage, to discuss the suitability of the area for subsurface sewage disposal, and to comment on the general ability of the subject area to support the intended development.

The ERT met and field reviewed the site on February 7, 1980. Team members for this review consisted of the following:

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

Phil Moreschi .... Civil Engineer.............. State Dept. of Environmental Protection

Erin O'Hare ...... Environmental Planner .... Regional Planning Agency of South Central Connecticut

Robert Rocks .... Forester .... State Dept. of Environmental Protection

Ron Rozsa .... Ecologist .... State Dept. of Environmental Protection

Stephen Sasala ... Transportation Planner ...... Regional Planning Agency of South Central Connecticut

Ron Skomro .... Sanitarian .... State Department of Health

Mike Zizka .... Geohydrologist .... State Dept. of Environmental Protection

FIGURE

TOPOGRAPHIC MAP

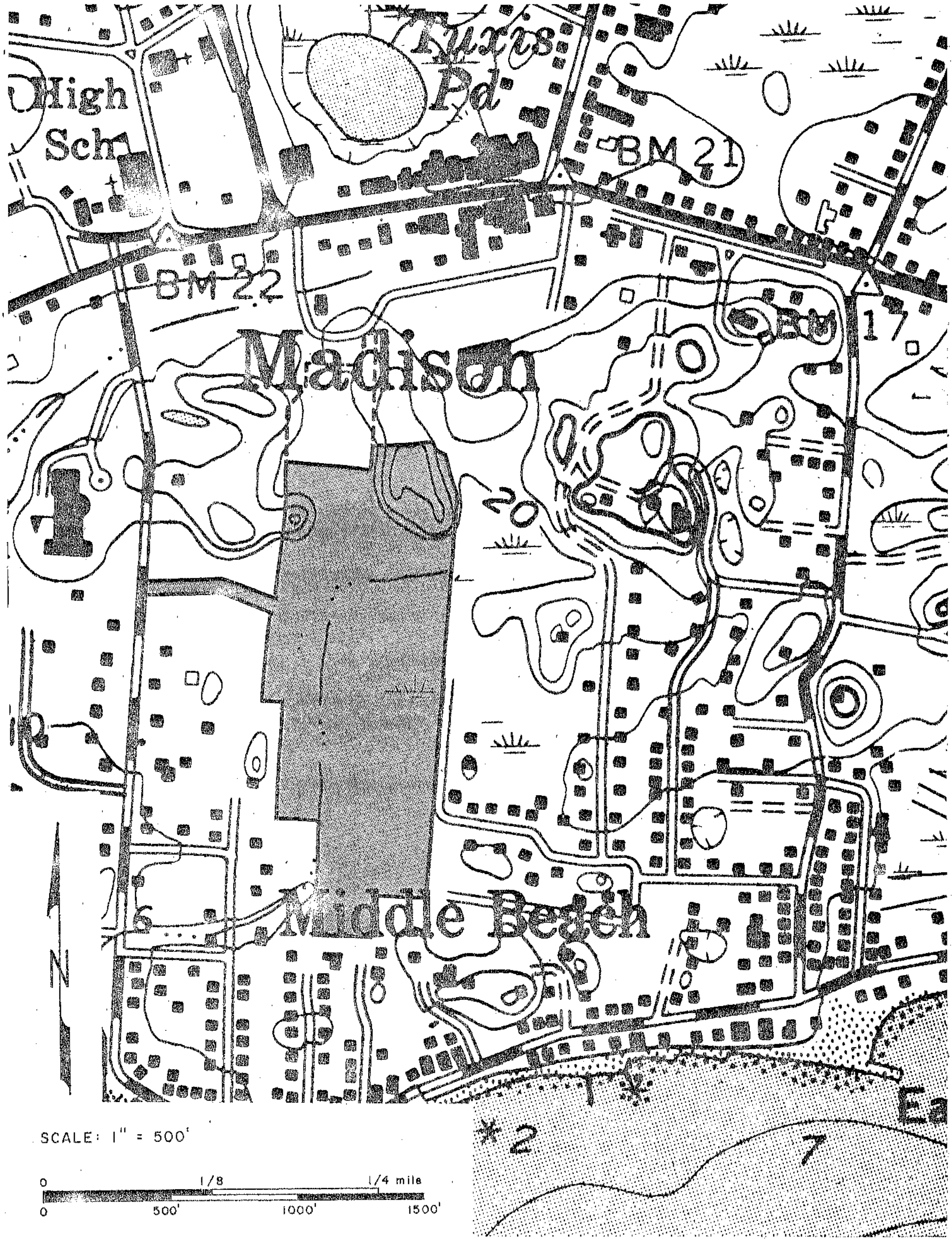
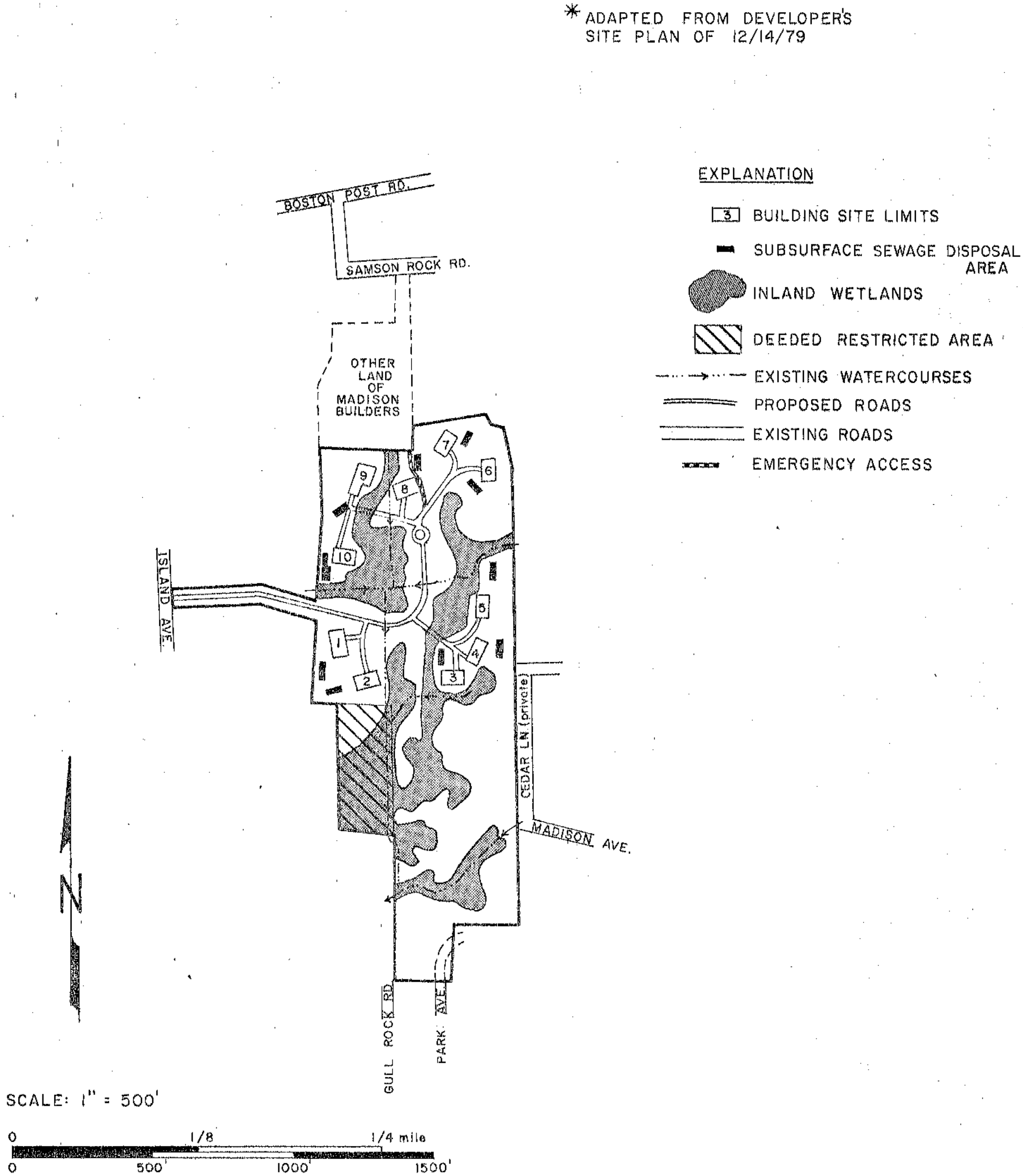


FIGURE 2.

SIMPLIFIED SITE PLAN *



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

This report presents the team's findings and recommendations. It is important to understand 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 with the town and developer. It is hoped the information contained in this report will assist the Town of Madison and the landowner/developer 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, P. O. Box 30, Warren, Connecticut 06754.

* * * * *

II. SUMMARY

- A detailed soils mapping of the Oxford Fells property, conducted by a soils scientist for the developers, was confirmed by the ERT to be reasonably accurate. Inland wetland soils occupy about 30% of the site and soils with a seasonally high water table occupy an additional 50% of the site. According to U.S.D.A. Soil Conservation Service criteria, nearly all of the Oxford Fells site has fair to poor potential for residential development. Although the limitations of the site do not preclude development, they do indicate that careful site planning is required and that costly measures will probably be required to overcome the natural hazards.

- In general, the proposed project avoids wetland soils which is a positive attribute of the plan. The proposed road and driveway crossings, if properly designed and constructed, should not adversely affect wetland functions.

- Most of the proposed road and homesite construction would occur on Ninigret soils. These soils have a seasonally high water table. To avoid frost action and potential water problems, construction on these soils will require filling and/or subsurface drainage measures to further separate the water table from the land surface.

- Present water quality in surface waters on site appears good. The proposed development can be expected to degrade surface waters somewhat, but this is not expected to be significant if efforts are made during construction to minimize erosion and sedimentation.

- Septic systems for buildings Nos. 1, 2, 3, 8, 9, and 10 are proposed to be located within Ninigret soils. Septic systems for buildings Nos. 6 and 7 are proposed within Hollis-Charlton soils. While it is possible to install septic systems in these soil types which function adequately, the soils in their natural condition present severe limitations for subsurface sewage disposal. It is therefore necessary to carefully engineer all septic systems located in these soils. Septic systems proposed for lots 4 and 5 are located in Agawam soils which have good potential for subsurface sewage disposal.

- Several apparent discrepancies or numerical errors were noted by the ERT in a brief study of two engineering reports prepared on the two alternative drainage schemes (i.e. the Park Avenue conduit or the zero additional runoff alternative). The ERT believes that the discrepancies do not appear to be serious enough to affect the viability of either proposed drainage plan. However, since the result of the apparent inconsistencies is to cause peak flows and storage needs to be somewhat <u>understated</u> in the present engineering reports, it is urged that these points (identified in text) be corrected or explained.

- The property may be divided into three vegetation stands. These stands include a hardwood swamp and two ages of mixed hardwoods. No rare or unusual vegetation types were found on the property, however the dormant nature of the vegetation during the time of the ERT's field review precluded a thorough investigation into this matter. The construction associated with this development will obviously destroy the vegetation at the home, road and septic system sites. Significant portions of the site do contain large, healthy trees however, and these should be preserved where possible. Vegetation growth potential is excellent in the mixed hardwood portions of this property, but poor in the hardwood swamp. Windthrow is a potential hazard in the hardwood swamp.

- *The southern portion of the Oxford Fells tract is located within the coastal boundary as defined by the Connecticut Coastal Management Act (CMA). Depending upon the ultimate location of the stormwater drainage system, it appears the Oxford Fells proposal may be subject to the requirements of the CMA. Under this Act, a coastal site plan of the project must be prepared by the developer and reviewed by the town to fully evaluate the impact of the project on coastal resources. Coastal site plan requirements and policies are described in the text of this report. Also included is a brief discussion of how coastal resources may be adversely affected by the proposed project.*

- *The proposed project is generally consistent with state, regional and town plans. The traffic generated by this project would not have a significant impact on existing conditions.*

III. GEOLOGY

The geology of the Oxford Fells property is relatively simple. Most of the site consists of a flat-surfaced series of glacial outwash deposits. These deposits were formed when meltwater from a wasting body of glacier ice dropped part of its suspended load of rock particles. The numerous wet areas on the site suggest that fine-grained materials predominate. Although no deep test pits for the site itself were made, records for test holes in another part of the same outwash plain showed mostly fine to medium sand. It may be presumed that the outwash in the central part of the site is at least 40 feet thick.

Two bedrock controlled hillocks lie partly within the northernmost part of the property. Bedrock is exposed in a few places on these hillocks; the rock consists largely of a medium to coarse grained gneiss whose major mineral components are quartz, plagioclase, and hornblende. Biotite, garnet, and sphene are minor constituents. The hillocks are thinly veneered with till in most places. Till is an unconsolidated glacial sediment containing rock fragments of widely variable shapes and sizes. This sediment was accumulated and transported southward by glacier ice and was redeposited directly from the ice without further transport by meltwater. The thickness of the till is variable but it is probably less than 10 feet at any given place on the site. Figure 3 shows the surficial geology of the property.

IV. SOILS

According to the recently published Soil Survey of New Haven County (U.S. D.A. Soil Conservation Service), most of the subject property is mapped as Walpole sandy loam, an inland wetland soil. The owners of the property had the site remapped in more detail at a larger scale by Walter Gonnick, a retired S.C.S. soil scientist. This re-mapping indicates that considerable portions of the site are not wetlands as previously described. The ERT's field review confirmed that the re-mapping of the site gives a reasonably accurate representation of the soils as they exist on the site.

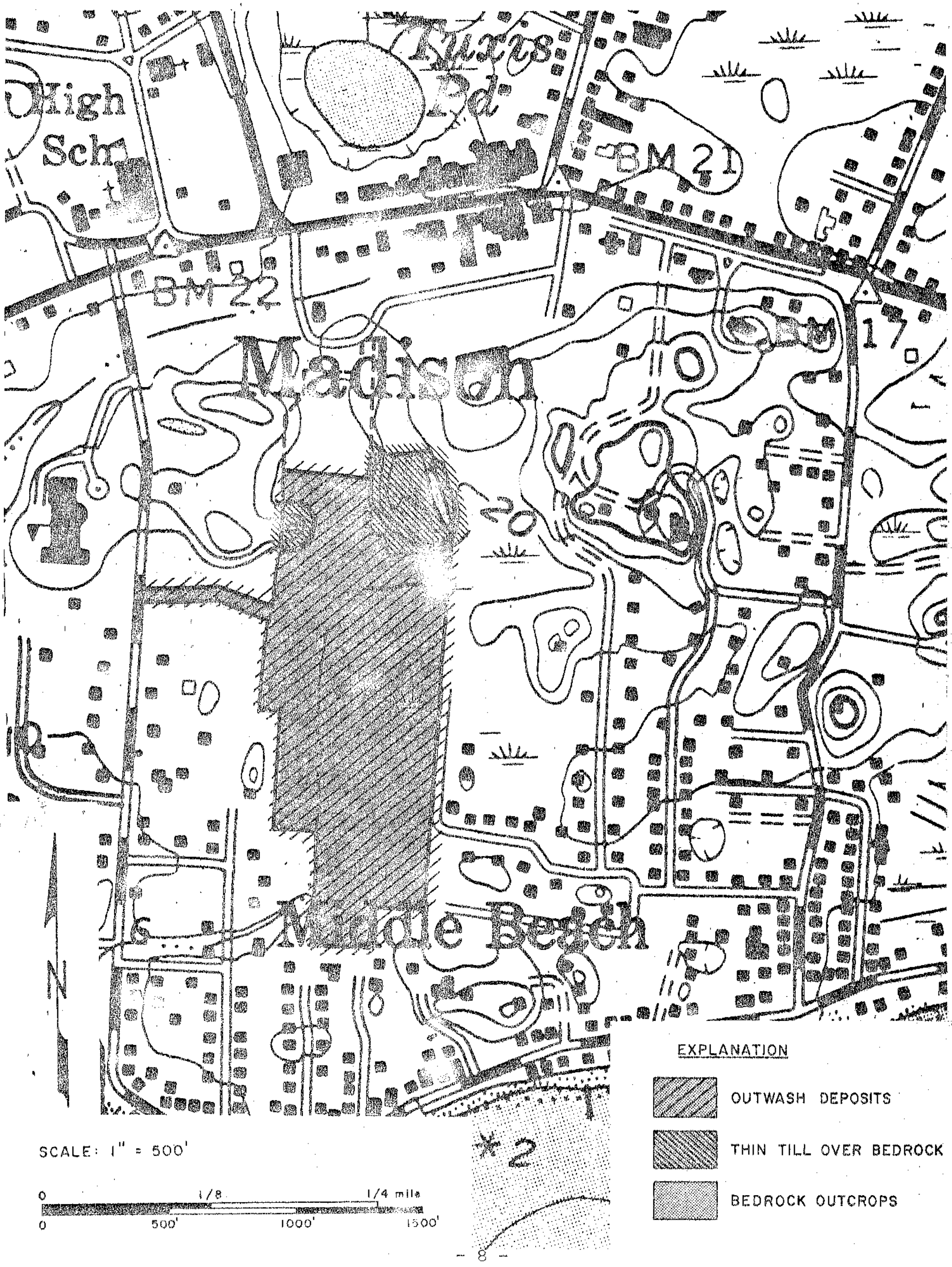
The Appendix of this report contains a map which shows the distribution of soils on the property as determined by Mr. Gonnick. The Appendix also contains a Soils Limitation Chart which identifies limiting factors for various land uses on the individual soil types. By comparing the Soils Map with the Soils Limitation Chart, one can determine the general suitability of the individual soil types for certain land uses.

As shown in the Soils Map, the Oxford Fells property consists of three principal soil types. A brief description of each of these soil types, and their suitability for the proposed land use, is presented below.

Walpole Sandy Loam (Map Symbol: Wa)

This is an inland wetland soil and covers approximately 30% of the site. From late in fall until mid-spring, this soil has a water table at a depth of about 8 inches. Permeability is moderately rapid in the surface layer and subsoil and rapid or very rapid in the substratum. The available water capacity is moderate. Runoff is slow. This soil dries out and warms up slowly in the

FIGURE 3.
SURFICIAL GEOLOGY



spring. It has a low shrink-swell potential. If the soil is not limed, it is very strongly acid through medium acid.

This soil has poor potential for community development. It is easy to excavate, but because of the high water table, excavations are inundated. Steep slopes of excavations are not stable if the soil is saturated. This soil has poor potential for waste disposal systems, such as an onsite septic systems, because of the water table. Septic systems can "flood" and thereby pollute the ground water. In places, this soil is subject to ponding for several weeks during the winter. Much attention needs to be given to properly designing and constructing foundations and basements in these soils to insure a stable foundation and prevent wet basements. This soil is poorly suited to landscaping because of its wetness. During construction of community developments, conservation measures are needed to prevent excessive runoff, erosion and siltation.

The included Ninigret and Ellington soils have greater potential for community development than the Walpole soil because they do not have as high a seasonal water table. The included Raypol soils are poorly suited to community development because they have a water table at a depth of about 8 inches from fall until mid-spring.

<u>Ninigret fine sandy loam</u> (map symbol Nn)

This soil, which covers approximately 50% of the site, has a seasonal high water table at a depth of about 20 inches from late in fall until mid-spring. Permeability is moderately rapid in the surface layer and subsoil and rapid in the substratum. This soil has a moderate available water capacity. Runoff is slow. This soil dries out and warms up rather slowly in spring. It has a low shrink-swell potential. Unless limed, this soil is very strongly acid through medium acid.

This soil has fair to poor potential for community development. It is easy to excavate; however, the steep slopes of excavations are unstable. It has poor potential for waste disposal systems, such as septic tank absorption fields, because of the seasonal high water table. Waste from septic systems may pollute the ground water unless the systems are carefully engineered. Foundations and basements need to be properly designed and constructed to insure a stable foundation and to prevent wet basements. This soil is well suited to landscaping. During periods of construction, conservation measures are needed to prevent excessive runoff, erosion, and siltation.

The included Agawam soils, which occupy portions of the eastern and southern borders of the property, have greater potential for community development than this Ninigret soil. The Raypol and Walpole soils are less suited to community development because they are poorly drained and have a higher seasonal water table for a longer period.

Most of the proposed construction would take place in this soil type. As this soil is characterized by a seasonal high water table, it will be necessary to install an extensive underground drainage system in order to reduce ground water levels and/or add substantial quantities of fill material to the disturbed land.

Charlton-Hollis and Hollis-Charlton Complexes (Map Symbols: CrC, HpE)

These complexes consist of gently sloping to steep, well drained soils on uplands. The land surface is rough with bedrock outcropping in places. In most areas 3 to 25 percent of the surface is covered with stones and boulders.

The Charlton and Hollis soils are present in such a complex and intermingled pattern in these soils that they could not be separated in mapping. The typical Charlton soil has a dark brown fine sandy loam surface layer 2 inches thick. The subsoil is dark brown, yellowish brown, and light olive brown fine sandy loam 24 inches thick. The substratum, to a depth of 60 inches, is grayish brown, gravelly fine sandy loam that has a few firm lenses up to 4 inches thick. The typical Hollis soil has a very dark brown fine sandy loam surface layer 3 inches thick. The subsoil is dark brown fine sandy loam 11 inches thick, and it overlies hard, unweathered schist bedrock.

The Charlton soil has moderate or moderately rapid permeability. It has a high available water capacity. Runoff is medium to rapid. This soil has a low shrink-swell potential. The Hollis soil has moderate or moderately rapid permeability above the bedrock. It has a low available water capacity. Runoff is medium to rapid. Both soils are very strongly acid through medium acid, if they are not limed.

These complexes have fair to poor potential for community development. The Charlton soil has fair potential for community development. It is mainly limited by the steepness of slopes and stoniness. The Hollis soil has poor potential for community development. It is limited mainly by the bedrock at a depth of 10 to 20 inches. Excavations are often difficult on this soil complex because of the shallowness to bedrock in many places. Very careful planning, site location, design, and installation are necessary to insure that onsite waste disposal systems function satisfactorily.

The presence of these soil complexes on the Oxford Fells site is restricted to the northern corners of the property. These areas provide a scenic and picturesque setting for homesites; with careful planning, they may provide a creative opportunity for home design.

During construction on these soils, conservation measures such as temporary vegetation and siltation basins are frequently needed to prevent excessive runoff, erosion, and siltation.

V. INTERIOR ROADS AND FOUNDATION DEVELOPMENT

The soils which will pose potential problems for road construction are the Walpole sandy loam, Raynham silt loam and Ninigret fine sandy loam (see Soils Map in Appendix). Walpole and Ninigret have a visibly high water table from November to April while Rayham has such from November to May. Walpole and Raynham have a high potential for frost action with Ninigret having a moderate potential for frost action. Roadway construction is proposed through swaths of these soil types at various locations. Proper preparation of road subgrades by excavation of existing soil and backfilling with coarse crushed stone raising the grade above the ground water table should suffice to prevent damaging frost action. The soils all have suitable bearing capacity to withstand the force of vehicular traffic without significant subsidence over time. It will, of course, be necessary to install properly sized culverts wherever roads and drives cross defined drainage channels.

It appears that building Nos. 1, 2, 3, 4, 8, 9 and 10 are proposed to be located within the Ninigret soil types. Frost action in addition to potential water problems from the high ground water are concerns for the building foundations. Again, problems should not develop if coarse backfill is used in these soils as well as insuring that the foundation slab is above the maximum water elevation.

VI. SEWAGE DISPOSAL

The soils which will pose potential problems for septic system construction are the Ninigret fine sandy loam and the Hollis shallow to bedrock soils (see Soils Map in Appendix). Hollis soils have bedrock at 10 - 20 inches depth and occassional ledge outcrops exist with this soil and were observed at various locations in the northern portions of the property. Septic systems for building Nos. 1, 2, 3, 8, 9, and 10 will be located within Ninigret soils and those for building Nos. 6 and 7 will be located within Hollis soils (unless a suitably sized pocket of Charlton soil can be found within the Charlton-Hollis complex). Septic systems will function adequately within these types of soils if constructed properly. The primary considerations for successful system operation are proper identification of groundwater and bedrock limitations, and placement of enough suitable fill to bring the leaching system to proper grade according to the State Health Code. There are also concerns for potential surface water pollution from septic systems placed in close proximity to watercourses or waterbodies. Ground water and bedrock limitations may be addressed by testing for these parameters in at least 10 locations within the proposed leaching field area during the wet period of the year, preferably during the early spring. Attention should be paid to soil mottling which may indicate a higher maximum groundwater table than actually exists during the particular year of testing. This year in particular may exhibit low groundwater elevations due to the lack of significant precipitation. Surface water contamination from leaching field effluent shouldn't occur with this project since adequate separating distances between leaching fields and watercourses have been provided. (Note: town zoning regulations require a 50 foot setback from wetlands or watercourses.) Dilution and biological activity should adequately renovate the effluent. Agawam and Ninigret soils do allow for rapid percolation rates which could lead to groundwater pollution near the leaching fields. If development of an on-site water supply system is ever considered on this property (not proposed at this time), shallow wells should be discouraged due to the potential for pollution.

Due to the moderate to severe limitations of most of the site for subsurface sewage disposal, a professional engineer should be retained by the developer to outline site improvements and to develop detailed sewage disposal plans for each building site. It should be recognized that a suitable reserve area must be available for the expansion or repair of each sewage disposal system. This reserve area is of special concern due to the limiting factors of the existing soil. Actual improvement (if necessary) of this reserve area may not be necessary during initial site development.

VII. WATER QUALITY

Present water quality in surface waters on site appears good (visual inspection). No excessive sediment loads were observed within the watercourses nor were there excessive algal growths which might indicate septic system leachate pollution. Iron deposits were observed at various locations within the watercourses but not to an objectionable degree. These deposits are a natural occurrence in wetland areas where anaerobic groundwater laden with soluble iron discharges to a watercourse causing precipitation of insoluble iron upon aeration.

The proposed development could be expected to degrade surface waters somewhat due to use of lawn fertilizers and roadway contaminants from automobiles washing into watercourses during rain storms. These would not be in great enough concentrations to cause significant mortality of aquatic organisms which appear to be scarce in these watercourses. Nor would they be in great enough concentrations to cause groundwater contamination due to the small quantities of storm water to be expected in comparison to the immense quantities of groundwater encountered on site and the resultant dilution.

Efforts should be made during construction to minimize erosion and sedimentation. Standard sediment and erosion controls should suffice to protect the watercourses on site.

VIII. HYDROLOGY AND DRAINAGE CONSIDERATIONS

Historically, circa 1884, the drainage system in the Oxford Fells area consisted of a single primary creek draining Tuxis (formerly Tucks) Pond and discharging into a tidal wetland located behind the town beach and Tuxis Avenue. At some point, the natural wetland channels were replaced by multiple culverts. These, like many permanent structures along the shore, were prone to the vagaries of wave activity and infilling with sand culminating in failure or destruction of the culverts. A fall storm in 1917 seriously damaged the culverts. "The outer section of two were washed away and the one at the east end of the beach had the upper end buried by 3 to 4 feet of sand deposited on the marsh for a distance of 10 to 12 feet."[1]

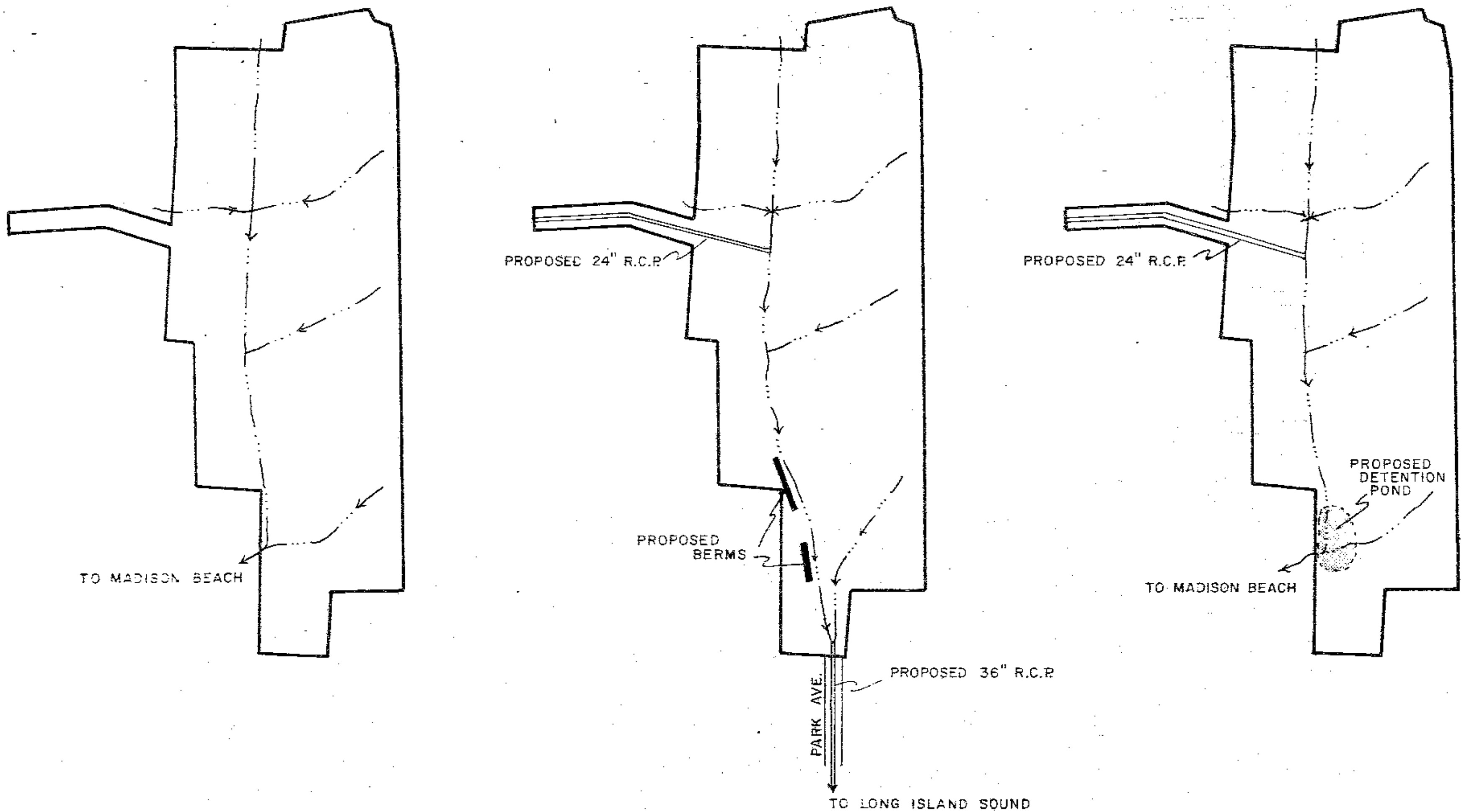
Today, the Oxford Fells site is traversed by several small streams and artificial drainage channels (see Figure 4). The drainage channels were installed in an effort to improve the drainage on the site and in surrounding areas. Natural drainage of the site is impeded by the lack of slope and the high water table, which lies at or near the surface throughout the outwash-covered portion of the site. The artificial drainage measures have improved the local situation to some extent, but poor design has caused ponding problems in several areas.

Storm water discharging from the property enters a narrow open channel and culvert system to the west of the site which is reported to be ineffective causing local flooding and backwater. The outfall for this system is below mean high water levels at the Madison Beach Club. The ERT field visit revealed a storm drainage culvert under Gull Rock Road to be two-thirds inundated with water due to downstream channel restrictions and a headwall at Island Avenue clogged with debris and ice. Historically, an ideal natural system composed of a tidal wetland existed interior to the beach which would have mitigated the adverse impacts of stormwater runoff discharging into coastal waters.

[1] Walden, B. H., 1918. Mosquito work in 1918. Connecticut Experiment Station, Bulletin 211.

FIGURE 4.
ALTERNATE SITE DRAINAGE PROPOSALS

• ADAPTED AND SIMPLIFIED FROM DEVELOPER'S PLAN AND INFORMATION PRESENTED AT ERT FIELD REVIEW



CURRENT SITE DRAINAGE

ALTERNATE DRAINAGE PLAN 1

ALTERNATE DRAINAGE PLAN 2

According to the calculations submitted by the developer's engineer, only 13% of the stormwater that enters the present stormwater drainage system west of the site is generated solely from the property. The various components of the proposed project will contribute a new and additional volume of surface runoff on the order of 8%.

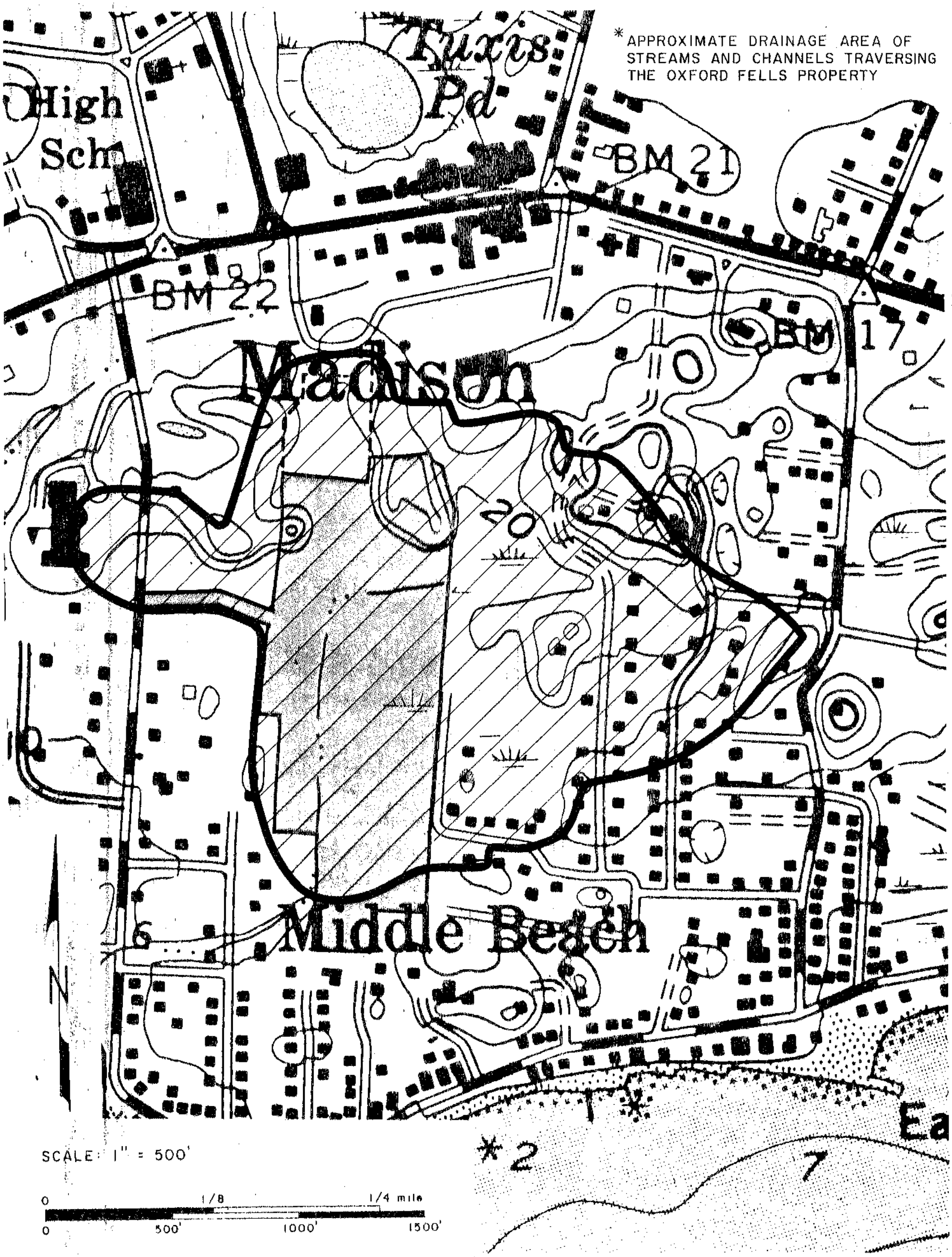
The developers of the proposed project have offered two alternatives to handling stormwater run-off generated by this project (see Figure 4). The first solution entails the construction of a 36" diameter pipe with 4 catch basins along Park Avenue and a berm on the property in order to divert to Park Avenue 70% of the runoff that would have passed under Tuxis Avenue to Madison Beach. This pipe would replace an existing short segment of smaller diameter pipe at the southern end of Park Avenue that presently collects stormwater and discharges through a revetment into coastal waters.

The other alternative would involve construction of a detention basin in the southern portion of the site to intercept storm drainage such that a zero net increase in stormwater runoff would be realized at the receiving watercourse to the west of the property.

Both drainage alternatives will require a certain amount of clearing and grading within the wetland area. It is difficult to assess which will cause a greater degree of alteration to the wetlands since plans are not available for the detention basin proposal. Assuming the detention basin has a metered outlet, there should be no concern for increasing the groundwater elevation in the area. All drainage flowing into the pond will ultimately drain out. The drainage discharge to Park Avenue should not have any noticeable effect on groundwater elevations since the relocated ditch elevations will remain essentially the same as the original ditch allowing water to drain as it does presently. The Park Avenue system appears to be adequately sized to handle at least the 25 year frequency storm flow generated from this drainage area. The detention basin would be adequately sized if it were shown to discharge stormwater at a rate not exceeding the predevelopment rate for all storm events ranging from the 2 to 25 year frequency storm flow, and did not cause water surface elevations to inundate adjacent private properties.

In analyzing the hydrology of the site, the developers' engineering firm, Angus McDonald & Associates, reported that a drainage area of about 60 acres contributes water to the streams and channels flowing through the property. They also calculated that development as planned would increase peak flows by approximately 7 cubic feet per second (cfs) for a 25-year storm event. The size of the drainage area could not be confirmed independently by the Team because of time constraints. A problematic consideration was the effect of urbanization to the east of the site on the natural flow patterns. Information currently available to the Team suggests that the drainage area may be as much as 75 acres in size. Whereas the Team recognizes the limitations of its watershed measurements, it recommends that the engineers reconfirm their own data before submitting further plans. The watershed as determined by the Team is shown in Figure 5. An independent evaluation of the effects of the development on runoff confirmed the engineer's estimate of a peak-flow increase of about 7 cfs for a 25-year storm.

FIGURE 5.
DRAINAGE AREA MAP*



Hydrologic analyses of the present and proposed drainage systems from both McDonald & Associates and ESM Associates were submitted to the Team for review. A brief study of the two analyses has indicated several apparent discrepancies or numerical errors. It is the Team's opinion that these discrepancies or errors would not substantially affect the viability of either of the two proposed drainage schemes (i.e. the Park Avenue conduit or the zero-additional runoff alternatives). However, since the result of the apparent inconsistencies is to cause peak flows and storage needs to be somewhat understated in the present engineering reports, it is urged that these points be corrected or explained. A listing of these points follows:

McDonald Report:

1. Increment A x C for proposed lawn on first legal size page of report should be 2.70, not .27. Hence, total A x C should be 16.42, not 13.97, and average "c" should be .27 not .24.

2. Total area for Drainage Area #2 on last legal size page is given as 35 acres, but the incremental areas add up only to 25 acres. Hence, average "c" for that area should be .28, not .20.

ESM Report:

1. On pages 12, 13, and 14, the same drainage area is alternately addressed as Drainage Areas I & IV, Drainage Areas I & III, and Area I & II.

2. Calculations for "existing" watershed conditions on page 12 include proposed lawn and proposed pavement and roof, but exclude existing pavement and roof.

3. Considering the nature of the drainage improvements, it is unclear how the total T_C for existing conditions on page 12 could be less than the total T_C for proposed conditions on page 14. These improvements seemingly should reduce T_C. Hence, peak runoff should increase, rather than decrease as stated on page 15.

4. Increment A x C for proposed lawn on page 14 should be 2.70, not .27. Hence, total A x C should be 14.86, not 12.43, and average "c" should be .28, not .24.

The Team wishes to emphasize its belief that the discrepancies noted above do not appear to be serious enough to affect the viability of either proposed drainage plan. However, it is recommended that the two engineering firms carefully review and more fully explain the bases for their respective calculations and assumptions. It is also urged that the extent of flooding under each drainage system be clearly delineated on site plans for the 25-year event and the 100-year event.

Some concern was expressed at the ERT's pre-review meeting about the effects of runoff-detention basins on groundwater recharge. The numerous wetlands attest to the fact that the site is more of a discharge area than a recharge area. Moreover, the relatively small volume of water that would be withheld and the infrequent, temporary nature of the detention indicate that the impact on groundwater replenishment would be negligible.

IX. DESCRIPTION OF THE VEGETATION

The Oxford Fells site is located in the Eastern Coastal Ecoregion of the Coastal Hardwoods Zone as identified and defined in Dowhan and Craig (1976).[2] The proximity of the Sound moderates and modifies the Connecticut climate which in turn is manifest in the types and patterns of vegetation exclusive to the region. Seabreezes, penetrating 5 to 10 miles inland, result in a diagnostic maritime climate characterized by warmer and cooler temperatures in the fall-winter and spring-summer periods respectively. Coastal regions experience one of the longest frost free seasons in Connecticut, averaging 195 days.

Mostly stable forest vegetation pervades the site. Virgin forests no longer exist in the State but the vegetation of the site is considered natural in that it developed spontaneously without any engineering by man. As evidenced in the vegetation(namely diversity, presence of rich site indicators, and certain known forest site index values), the Ninigret soil ranks as one of the most fertile and productive soils in the coastal area, surpassed only by the rich silty soils and certain alluvial types.

Several factors prevent a complete investigation and description of the vegetation at Oxford Fells, but key is the dormant state of the vegetation. An accurate analysis of the vegetation must include an identification of the types and abundance of plants in the shrub and especially herb layers. These, in the main, are better indicators of site conditions and quality than tree species. The latter tend to occupy a very broad range of environmental conditions. Presented below is a preliminary classification based mostly upon trees, site conditions, and the few identifiable herbaceous plants.

In general, the property may be divided into three vegetation stands. These stands include a hardwood swamp and two ages of mixed hardwoods. The approximate location of these vegetation stands is shown in Figure 6. The composition of the stands is described below.

STAND A MIXED HARDWOODS

This ± 14 acre stand is generally fully stocked and characterized by trees of 5 to 11 + inches in diameter. The stand actually consists of three different upland vegetation types which grade imperceptibly into one another but generally follow a distinct topographical sequence as shown in Figure 7. A description of each of these vegetation types follows.

Oak-Huckleberry Woodland

This is a ubiquitous community of dry rocky hilltops and ridgelines. Structurally, it is a short-statured, open woodland with trees less than 15 meters high and widely spaced. Shallow soil over bedrock restricts rooting depth and intensifies competition for space and soil moisture, thereby culminating in the woodland qualities. Black birch, pignut hickory, black oak and especially white oak are the conspicuous elements of the canopy. Locally dominant is the evergreen hemlock. The presence of hemlock represents a phase and does not change

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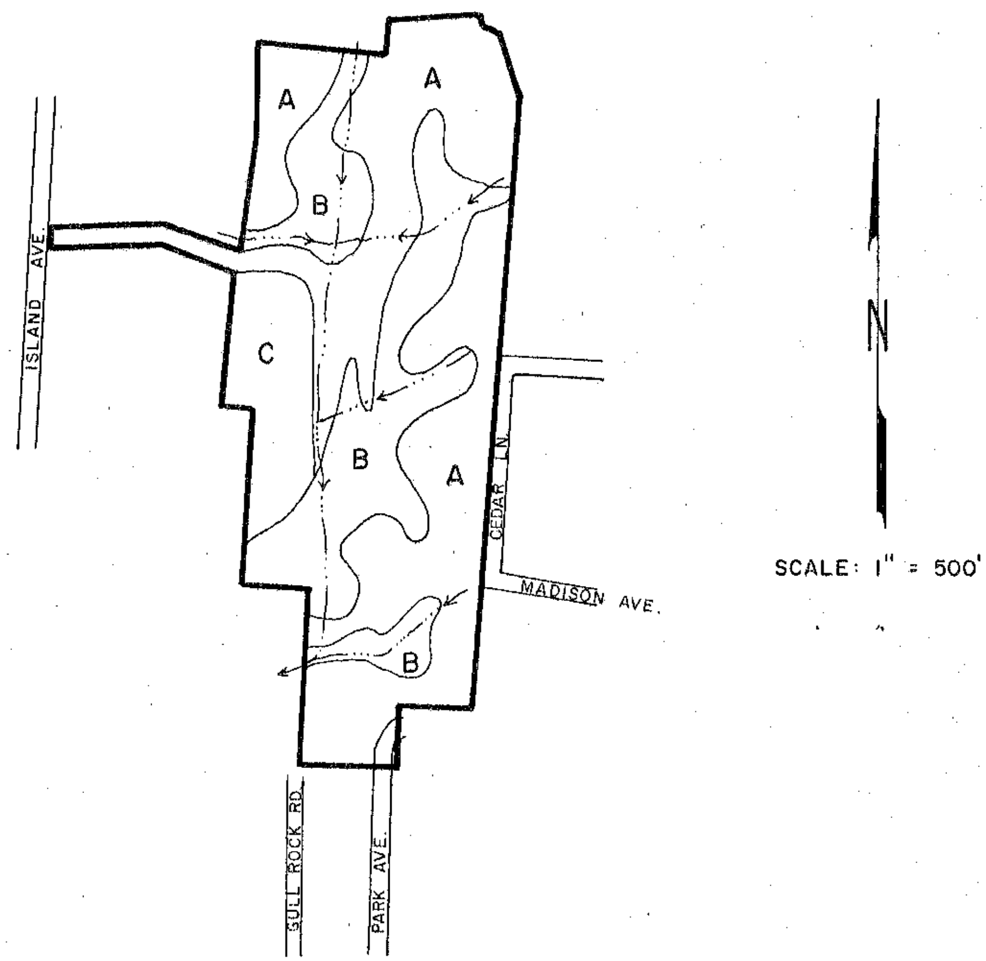
[2] Dowhan, J. J. and Craig, R. J. 1976. Rare and Endangered Species of Connecticut and Their Habitats., Conn. Geol. Nat. Hist. Surv., Rpt. Invest. #6.

FIGURE 6.
VEGETATION STAND MAP



LEGEND

ROAD

PROPERTY BOUNDARY

VEGETATION TYPE BOUNDARY

STREAM/DRAINAGE DITCH

VEGETATION STAND TYPES*

STAND A – MIXED HARDWOODS, POLE TO SAWTIMBER SIZE

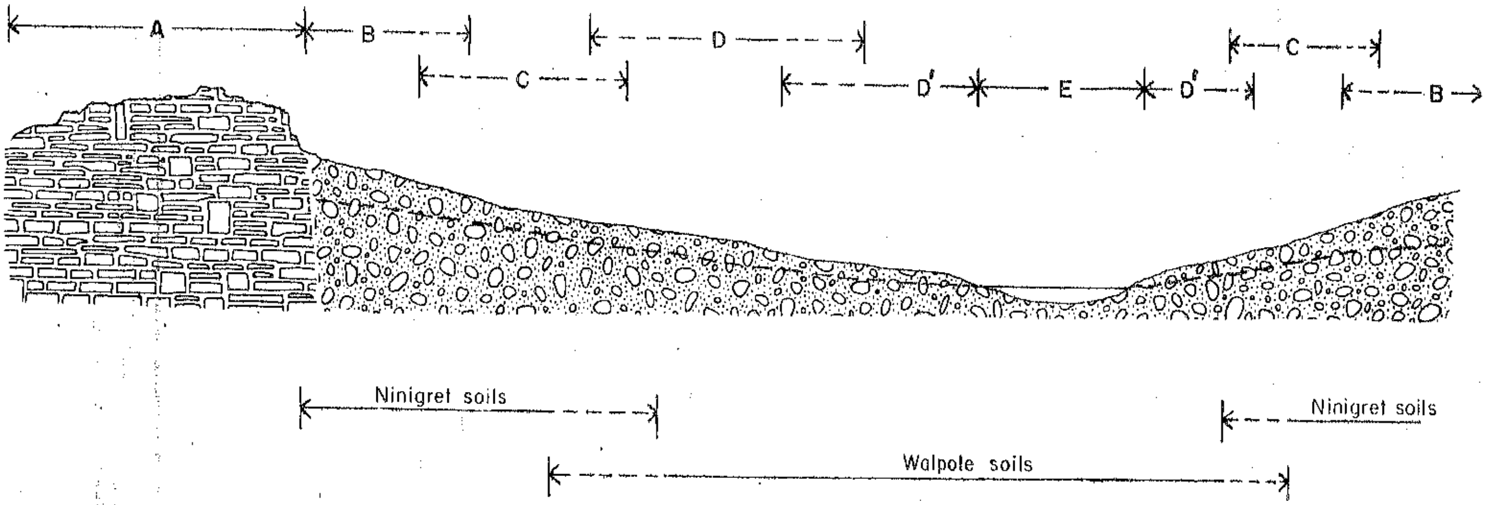
STAND B – HARDWOOD SWAMP, SAPLING TO POLE SIZE

STAND C – MIXED HARDWOODS, SAPLING SIZE

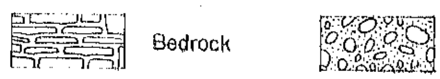
*SAPLING SIZE – TREES 1 TO 5" IN D.B.H. (DIAMETER AT BREAST HEIGHT)
POLE SIZE – TREES 5 TO 11" IN D.B.H.
SAWTIMBER SIZE – TREES 11" AND GREATER IN D.B.H.

FIGURE 7.

VEGETATION TYPES & TOPOGRAPHIC DISTRIBUTION



A Oak - Huckleberry
B Oak - Viburnum
C Tulip - Poplar
D Red Maple, dry phase
D' Red Maple, wet phase
E Swamp White Oak



the quality of the site. Removal of hemlock would permit the development of the more characteristic deciduous woodland.

A conspicuous and often diagnostic feature of this community, is the presence and dominance of ericaceous shrubs especially huckleberry, low bush blueberry and mountain laurel. Present, but abundance not estimated, were huckleberry and patches of a grass (Hairgrass?). Other important but local species include clubmoss, greenbrier and sawbrier (catbriar).

Below is a partial list of plants that were recorded on the Hollis soil of this site. Dominant species in this and subsequent type descriptions are denoted by an asterick:

Tree Layer

*Hemlock
*White Oak
*Black Oak
Black Birch
Pignut Hickory
Hop Hornbeam

Shrub Layer

Greenbrier
Maple-leaved Viburnum

Herb Layer

Goldenrod
Japanese Honeysuckle
Sawbrier
Round-leaved Ground Pine
Moss-Dicranum scoparium
White Cushion Moss - Leucobryum glaucum

Oak-Viburnum Forest

Occupying the most elevated and driest (well drained) portions of the Ninigret soil is this community. The fertile properties and favorable moisture characteristics of the Ninigret soil are manifest in vegetation communities that are diverse and possess a number of rich site indicators and rapidly maturing trees. The forest canopy is a mixture of trees: principally yellow birch, black birch, mockernut, black oak, white oak and red maple. Hop hornbeam and blue beech form a conspicuous understory. Maple-leaved Viburnum is the major shrub and the ground is punctuated by small carpets of the round-leaved ground pine. Principal species observed include:

Tree Layer

White Oak
Black Oak
Black Birch
Yellow Birch
Mockernut
Red Maple
Tulip Tree
Red Oak
Scarlet Oak
Blue Beech
Hop Hornbeam
Sassafras

Shrub Layer

Maple-leaved Viburnum
Hemlock

Herb Layer

Round-leaved Ground Pine
Blackberry
Wood Shield Fern

Tulip Tree Forest

Mesophytic (moist) sites on the Ninigret soils support a rich community dominated by tulip tree. Spicebush and cinnamon fern abound in the shrub and herbaceous layers. Associates include shagbark hickory, yellow birch, and black oak. Locally important are red maple, maple-leaved viburnum and ground pine.

Tabulated below is a list of plants observed in this community:

Tree Layer

*Tulip Tree	White Oak
*Red Maple	Shagbark Hickory
Yellow Birch	Sour Gum
Black Birch	Sassafras
Black Oak	Mockernut

Shrub Layer

*Spicebush	Japanese Honeysuckle
Highbush Blueberry	Greenbrier
Hemlock	

Herb Layer

*Ground Pine	Sedge
*Cinnamon Fern	Wood Shield fern

STAND B HARDWOOD SWAMP

This ± 8 acre stand is overstocked and characterized by trees of 1 to 11 inches in diameter. Two principal wetland types were identified on this property, one a red maple swamp and the other a swamp white oak woodland. The latter is found exclusively in depresssions where the water table regularly exceeds the soil surface for periods of probably six months or less. In contrast, the red maple swamp is infrequently inundated and under average conditions, the water table is below the soil surface thereby permitting better soil aeration at greater depths.

One small stand of Swamp White Oak is located in the central interior. This tree, pepperbush and cinnamon fern are the prevalent components of the tree, shrub and herb layer respectively. Associates include sour gum, spicebush, red maple, and small patches of sphagnum moss.

Red maple dominated swamps consist of a typical member on poorly drained soils and a transition phase between this and the tulip tree community. Gentle sloping lands where the boundaries between soil types are diffuse and broad are often characteristic of outwash plains. On till landscapes, although transitions exist, the slope gradients are steep and such zones are barely perceptible. For the purpose of this report, the transition occupying the higher elevations will be termed the dry phase red maple swamp.

Understandably, the dry phase red maple swamp contains some upland species such as hemlock, gray birch, tulip tree, and black birch. Highbush blueberry is the conspicuous shrub and the understory is an extensive and luxuriant carpet of ground pine with scattered tussocks of cinnamon fern throughout. The typical phase is almost exclusively red maple but occassional yellow birch do occur. Spicebush and cinnamon fern abound in the shrub and herb layers. Of lesser import, but nevertheless present, is ground pine. Indictors of increased moisture availability and a higher water table are sensitive fern, sphagnum moss and the moss Atrichum.

STAND C MIXED HARDWOODS

This ± 3 acre stand is overstocked and characterized by trees of 1 to 5 inches in diameter. The composition of this stand is similar to the oak-viburnum forest described above under Stand A. The most significant difference between the two stands is the smaller tree size of Stand C. The dominant trees present in Stand C include red maple, black birch, hickory, red cedar, white ash, black oak and occasional sassafras. The understory consists of maple-leaved viburnum, blue beech, and hardwood tree seedlings. Ground cover is dominated by grasses, club moss, and saw briar.

X. VEGETATION MANAGEMENT CONSIDERATIONS

Rare and Endangered Species

No rare or unusual vegetation types were found on this property during the ERT's field review. In addition, historical records and voucher specimens disclose no occurrence of rare or endangered species on or adjacent to the property. Understandably, the dormant nature of the vegetation during the time of the ERT's field review precluded a thorough investigation into this matter.

It should be noted, however, that the systematic destruction of stable forest vegetation on outwash lands such as the Oxford Fells property, is creating a condition whereby undisturbed vegetation types, such as those on the subject property, are becoming increasingly rare.

Aesthetics and Preservation

Many of the trees in Stand A (mixed hardwoods) are healthy and are of high quality (trees without damage or excessive defects). These trees have high value for aesthetics and should be preserved unless removal is absolutely necessary for construction.

Trees are very sensitive to the condition of the soil within their drip lines. This drip line zone corresponds to the entire area under a trees crown. Development practices such as excavating, filling, and grading for construction of roadways, buildings, and septic systems may disrupt the balance between soil aeration, soil moisture level and soil composition. These disturbances may cause a decline in tree health and vigor, potentially resulting in tree mortality within three to five years. Mechanical injury to trees may cause the same results. Care should be taken especially during the construction period not to disturb trees that are to be preserved.

In general, healthy and high vigor trees should be favored over unhealthy trees because they are usually more resistant to the environmental stresses brought about by development. When it is feasible, trees should be saved in small groups or "islands". This practice lowers the chances of soil disturbance and mechanical injury. Individual trees and "islands" of trees should be temporarily, but clearly marked so they may be avoided during construction. Recent research has shown that healthy trees on a house lot may enhance the value of that lot by as much as twenty percent.

Limiting Conditions

The soils associated with the hardwood swamp (Stand B) are characterized by a high water table throughout much of the year. These saturated and poorly drained soils limit vegetative growth to species that are tolerant of excessive moisture conditions.

Red maple, the dominant species found in this stand will survive under these conditions, however, growth rates are usually slow and tree quality is poor due to overcrowding. These crowded growing conditions together with a shallow root system cause the trees in this stand to be relatively unstable.

As fuelwood demands rise, it may become feasible to manage this hardwood swamp by periodically harvesting a limited quantity of cordwood. With proper management, such as a "thinning" operation would be beneficial to the health of the stand by stimulating crown and root growth in residual trees.

Potential Hazards and Mitigating Practices

Windthrow is a potential hazard in the hardwood swamp. As a result of the high water table and saturated soils, the trees present are unable to become securely anchored. The crowded condition of the trees in this stand increase the potential for windthrow especially if large scale disturbances occur. If linear openings are made in or along side this stand, the windthrow hazard may be increased. Any openings which would allow wind to pass through rather than over this stand will increase the windthrow hazard and should be avoided if possible.

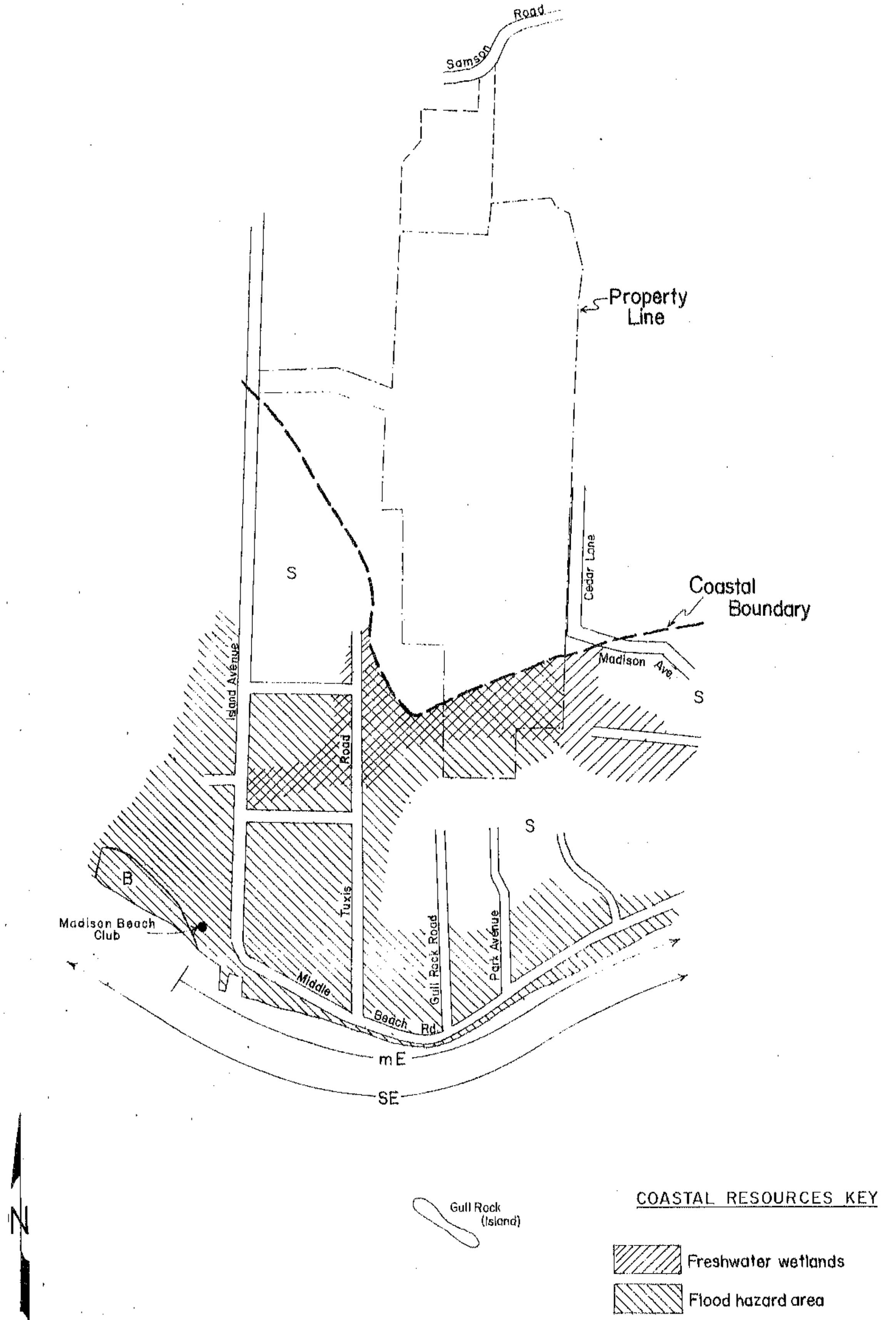
It should be noted that elevating the water table depth in the hardwood swamp areas, by blocking or restricting drainage flows, could cause trees and shrubs in these areas to drown. As a result, alterations which may significantly raise the water table in the hardwood swamp should be avoided if the vegetation is to be preserved.

There are several large dead trees present in Stand A. If these trees are left standing near roadways, houses or utility lines they will become hazardous. It is recommended that these trees be removed and utilized for fuelwood with implementation of the project.

Management Techniques

Any thinning of woodlands on this property should focus on removing poor quality trees and damaged trees. The thinning operation should favor leaving species other than red maple and should be restricted to months when the ground is frozen or months when the ground is dry to lessen environmental impact. No

FIGURE 8.
COASTAL RESOURCES & BOUNDARY MAP



SCALE: 1" = 500'

COASTAL RESOURCES KEY

(diagonal hatching)	Freshwater wetlands
(reverse diagonal hatching)	Flood hazard area
S	Shorelands
B	Beaches and dunes
mE	Modified bluffs and escarpments
SE	Area of significant erosion

more than 1/4 of the total tree growth should be removed from any area during a thinning operation.

All trees thinned from the woods, or removed for construction of roadways, houses and septic fields, should be utilized as fuelwood.

For the purposes of landscaping, it is best to utilize plants that are native to the Connecticut landscape. Introduction of exotics and aliens in this and other states have resulted in the displacement of native vegetation.

XI. COASTAL SITE PLAN REQUIREMENTS AND CRITERIA

As of January 1, 1980, municipal zoning commissions must implement "coastal site plan reviews" for certain activities proposed within designated coastal boundary areas. This is required under the Connecticut Coastal Management Act (CMA). Sections 4(g) and 11(b) of the CMA determine what areas and activities respectively are subject to the provisions and requirements of the act. Only the southernmost portion of the Oxford Fells property is within the boundary and therefore subject to the provisions of the act (see Figure 8). Second, and of import to the determination of whether a coastal site plan is required, section 11(b) states that certain municipal "site plans, plans and applications <u>for activities or projects</u> located <u>fully</u> or <u>partially</u> within the boundary....shall be subject to the requirements of the act." How this relates to the proposal submitted by Madison Builders is as follows:

1. An application has been submitted requesting a zone regulation change in an R-2 district to allow a cluster development by special exception permit.

2. The project, by virtue of the location of one of its parts (i.e. the stormwater drainage system), may be located partially within the coastal boundary. The drainage proposal calling for piping of storm water down Park Avenue is definitely an activity within the coastal zone. The alternate drainage proposal, which would create a detention basin on-site and utilize existing drainage channels, may or may not represent an activity within the coastal zone depending upon final design layout. If the detention basin is ultimately located wholly outside the coastal zone, then the Oxford Fells project, as proposed would not be subject to the requirements of the Coastal Management Act. For discussion purposes, the ERT will assume here that the proposed project <u>is</u> located partially within the coastal boundary and therefore subject to the requirements of the CMA.

At this juncture requesting a zone regulation change, a coastal site plan is not required. However, at the point where a regulation change is granted and the applicant pursues the project by submitting an application for a special exception permit, a coastal site plan must be prepared and reviewed by the appropriate municipal commission. The special exception permit can not be granted prior to this review. Also, the plan must contain all necessary detail to permit a complete evaluation of the impact of the project and its parts on coastal resources. The following two sections of this report go into some detail regarding the requirements and policies of the Coastal Management Act as it relates to this project. Following that is a brief discussion of how coastal resources may be adversely affected by the proposed project.

A. Coastal Site Plan Requirements

The statutory provisions and requirements for coastal site plans and review by appropriate municipal commissions are enumerated in section 11 to 15 of the CMA. Essential and mandatory components of the plan application are found primarily in sections 11c, 12a, and 12c though the applicant must also consult the municipal commissions to determine what additional elements may be required. Note that 1) the burden of proof that the application is accurate and complete is the responsibility of the applicant and 2) building permits can not be issued unless a coastal site plan has been reviewed and approved. Certain key requirements that must be addressed and included in the coastal site plan are outlined below:

1. A plan showing the location and spatial relationship of coastal resources on and contiguous to the site.
2. A description of the entire project with appropriate plans indicating project location, design, timing and methods of construction.
3. An assessment of the capability of the resources to accommodate the proposed use and assessment of the suitability of the project for the proposed site. This includes a) an identification of any and all coastal use policies applicable to the project, b) an identification of any and all coastal resource policies applicable to the project and c) a description of how the project is consistent with these policies.
4. An evaluation of the potential beneficial and adverse impacts of the project and a description of proposed methods to mitigate adverse effects on coastal resources.
5. A description of the impacts or effects that the project will have on future water dependent uses or development on and adjacent to this site. A demonstration that the adverse impacts are acceptable.

If and when this proposal reaches the stage of submission for a special exception permit, then Madison Builders will need to supplement their existing plans and descriptions with the information required above. Sufficient detail must be included to allow a complete evaluation of the impacts upon coastal resources and future water dependent uses.

For the purposes of this project, reflecting the location of the property both within and without the coastal boundary, there are two categories of resources involved. For the portion of property within the boundary, all coastal resources on and adjacent to the site must be indicated on the plan. The impact assessment should focus upon these resources. Land area outside the boundary is composed of typical upland (non-coastal) resources. These resources are not specifically addressed by the CMA although it may be necessary to indicate the type of upland resources on the plan to fully evaluate the effect of indirect impacts on the coastal resources. Possible information that could be included here is the nature and type of soils, location of inland wetlands, and the extent of the flood hazard area. The amount of detail required will obviously depend on the size and nature of the project and the requirements set forth by local commissions.

Coastal resources on and adjacent to the site are depicted in figure These include coastal waters, coastal (flood) hazard area, coastal (erosion) hazard area, coastal bluffs and escarpments (modified), shorelands and freshwater wetlands/watercourses.

B. Coastal Policies

Identification of appropriate and applicable policies follows from the identification of the coastal resources above and the activities that are proposed. Listed below are these policies and relevant guidelines (refer to Planning Report #30*).

Coastal Bluffs and Escarpment Policies:

To disapprove uses that accelerate slope erosion and alter essential patterns and supply of sediments to the littoral transport system.

Use Consistency Guideline:
--Point discharge structures may be consistent with the coast policies when 1) the discharge pipe is for the purposes of stormwater drainage, 2) the discharge pipe and headwall do not alter local surface drainage in such a manner as to accelerate bluff/escarpment erosion, 3) the velocities of discharge stormwater are not sufficient to cause bluff/escarpment erosion or scouring, and 4) the discharging pipe is equipped with catch basins and gas traps which are periodically cleaned (page II-51 of Planning Report #30).

Coastal Hazard (Flood & Erosion) Area Policies:

To manage coastal hazard areas so as to insure that development proceeds in such a manner that hazards to life and property are minimized.

General Use Guidelines:
--Apply the National Flood Insurance Program floodplain management requirements to all activities in designated A-zones and floodways.

--Avoid any use or activity which would significantly increase floodwater elevations or otherwise increase flood or erosion hazards.

--All activities and uses should be consistent with capacity of the soil and subsoil to support such use or activity.

Use Consistency Guidelines:
--Dikes and Berms: May be consistent with the coastal policies when 1) they are designed so as not to increase the flood hazard potential behind the structure due to the effects of ponding or backwater, and 2) all reasonable mitigation measures have been employed to minimize the impact on coastal resources in accordance with the general use guidelines (page 11-97 of Planning Report #30).

--Filling may be consistent with the coastal policies when 1) the flood hazard potential is not significantly increased, and 2) the fill is clean and free of chemical, biological or man-made pollutants which could adversely affect water quality or violate state water quality standards (page 11-97 of Planning Report #30).

*Planning Report #30. Coastal Policies and Use Guidelines. 1979. Connecticut Dept. of Environmental Protection, Coastal Area Management Program.

Shoreland Policies:

To regulate shoreland use and development in a manner which minimizes adverse impacts upon adjacent coastal systems and resources.

General Use Guideline:
--Insure that all activities and uses are consistent with the capacity of the soil and subsoil to support such activities.

Use Consistency Guideline:
--All activities are generally consistent with the coastal policies when conducted in accordance with the general use guidelines, (11-114 of Planning Report #30).

Coastal Waters Policies:

Refer to policy in the Connecticut General Statutes, section 25-54a.

Use Consistency Guideline:
--Point discharge structures may be consistent when the structure is designed, to the maximum extent possible, to minimize disturbance of or adverse impacts to shellfish beds and intertidal flats and the quality of the discharge water does not adversely impact coastal waters or violate state water quality standards (page 11-130 of Planning Report #30).

Freshwater Wetlands and Watercourses Policies:

Refer to policy in the Connecticut Wetlands and Watercourses Act (P.L. 155).

General Use Guidelines:
--Apply requirements and criteria contained in the Inland Wetlands and Watercourses Act and pursuant administrative regulations.

--Maintain and improve water quality in accordance with the highest standards set by federal, state, or local authorities.

--Utilize site and engineering designs which are compatible and harmonious with the natural amenities of wetlands and watercourses and which 1) will not adversely affect or destroy important natural features such as vegetation, landscape, and drainage but will preserve and incorporate these into the design, 2) will not adversely impact unique biologic, geologic or hydrologic features, 3) will minimize the amount of disturbance and extent of clearing, 4) will not reduce or increase the natural ground and surface water retention capacity of the wetland, 5) consider the capability of the soil and subsoil conditions to support the activity, 6) apply Soil Conservation Service erosion/sedimentation guidelines as appropriate, and 7) employ adequate vegetation buffers to protect the wetland from runoff and sedimentation from adjacent upland and wetland sites.

--Employ construction techniques such as the following that avoid or substantially limit impacts to wetlands and watercourses: 1) minimize the area of wetland affected, and 2) restore the disturbed area following construction.

Use Consistency Guideline:
--Filling may be consistent with the coastal policies when 1) all non-wetland alternatives have been considered and demonstrated to be infeasible, 2) the facility is designed and sited so as to minimize the amount of wetland area filled, 3) the flood hazard potential is not significantly increased, 4) the fill is not placed on wetland areas that are unique, unusual, important wildlife habitats for rare and endangered species or important fish runs, and 5) the fill does not contain any chemical, biologic, or man-made pollutants which could adversely affect coastal water quality or violate state water quality standards.

C. Impact Location and Evaluation

To simplify the evaluation of adverse impacts, the proposed Oxford Fells project has been divided into a number of elemental parts. Coastal resources that are affected by these individual activities are identified in the impact matrix below. Note that not all the various elements of the proposed project are included in the matrix; only those elements within the coastal zone are included. The prime concern here is the total but indirect impact emanating from the project in the form of surface runoff on coastal water quality and coastal erosion. The main impacts to coastal resources, if any, will originate in the design and placement of the stormwater drainage system and the possible diversion of 70% of the existing stormwater to Park Avenue.

TABLE 1 COASTAL IMPACT MATRIX

Activity	Shore lands	Coastal (Flood)	Hazard Area (Erosion)	Bluffs Escarpments	Coastal Water	Freshwater Wetland
Open drainage channel	X	X				X*
Berm (filling)		X				X*
Placement of Pipe	X	X		(X**)		
Stormwater discharge volume			X	(X)		
Stormwater discharge quality					X	

*Inland wetland permit required.

**No state structures permit will probably be required for placement of the stormwater pipe into the revetment provided it can be demonstrated that the integrity of the seawall will not be endangered from both placement of the pipe and possible scouring at the base of the wall.

○ Indicates activities that if improperly designed could adversely impact coastal resources.

The applicant must demonstrate that the project is consistent with coastal policies. This includes a demonstration that all impacts in the matrix are acceptable and consistent with the CMA policies. Potential adverse impacts that must be addressed and shown to be acceptable are the following as defined in the CMA:

1. Degrading water quality through the signifcant introduction into either coastal waters or groundwater supplies of suspended solids, nutrients, toxics, heavy metals or pathogens, or through the significant alteration of temperature, pH, dissolved oxygen or salinity.

2. Degrading natural or existing drainage patterns through the significant alteration of groundwater flow and recharge and volume of runoff.

Below is a brief analysis of only those activities that might culminate in significant adverse impacts to coastal resources. The preceding portions of the ERT report should further assist the developer in evaluating adverse impacts and demonstrating their acceptability. In some instances, additional detail and analysis will be necessary especially in regards to the nature, type and location of on-site sewage disposal facilities.

<u>Construction of the berm (filling).</u> Involves filling of a small fragment of wetland, insignificant in areal coverage. Impacts include permanent alteration of wetland surface vegetation at the point of filling, little or no change in the ground water hydrology, and temporary storage of stormwater during major storm events. Intensity of impact--low and inconsequential provided that the area of wetland disturbed is kept to a minimum and the use consistency guidelines discussed previously are followed to the fullest extent practicable.

<u>Open drainage channels (excavation).</u> Excavation is necessary to create two new separate stormwater channels. No significant alteration of the vegetation on contiguous wetland is anticipated except perhaps along the immediate ditch margins. Due to the nature of the wetland soils here, namely the position of the water table about one foot below the surface, impacts on the water table are expected to be small. Intensity of impact--low and inconsequential provided that it can be demonstrated that the impact to groundwater is acceptable, there are no alternative designs with fewer impacts to the wetland, and the area of wetland affected is minimized.

<u>Stormwater discharge (quality).</u> Currently the quality of discharge at the Madison Beach Club has not posed a serious threat to water quality or precluded swimming. The proposed discharge at the end of Park Avenue would be beneficial in alleviating local flooding problems and in mitigating any possible threats to water quality on the water dependent use at the beach club. Provided the septic systems are properly engineered, impacts to the quality of coastal waters at the end of Park Avenue will be intermittent and immeasurable. Impacts to water dependant uses are not conceivable. Water quality problems now or in the future are more likely to result from the intensive shoreline development and multiplicity of septic tanks to the east and west.

Storm water discharge (volume). Improper design and location of the stormwater outfall coupled with the larger proposed discharge volume at the end of Park Avenue has the potential to adversely affect the integrity of the revetment through scouring and erosion. Currently, the existing riprap at the base of the wall may offer adequate protection; however this issue should be addressed in the coastal site plan.

XII. ADDITIONAL PLANNING CONSIDERATIONS

Consistency of Proposed Project with Town, Regional & State Plans

The proposed development appears to be in general accordance with the Madison Town Plan which calls for increased density to be concentrated near the town center. The site is just south of the Town Center, within walking distance to local shops. The area is zoned R-2, minimum lot size 40,000 square feet (32,000 square feet exclusive of wetlands). The developer expressed to the ERT his opinion that the property could accommodate fourteen conventional subdivision lots; however, in order to allow for more imaginative and attractive site design, he is applying for a zone regulation change to allow a "cluster" development. Unlike the existing Planned Residential Cluster Development provision, the proposed amendment would allow clustering on the property without an increase in the overall allowable density. Development of the property would be limited to ten single family homes.

The Regional Plan - "Proposed Land Use Plan--2000" (South Central Connecticut Planning Region), adopted 1968, recommends the area in question as a residential area (1-2 families/acre). Regional goals stress the desirability of concentrating increased density near existing town centers. The accomplishment of this goal must be tempered, of course, by the physical suitability of specific sites for development in the town center area. Taking into account the development restrictions of the Oxford Fells site, and the proposed density, the project is considered to be generally consistent with the Regional Plan.

The State Plan - "State of Connecticut Conservation and Development Policies Plan 1979 - 1982", "Locational Guide Map" indicates the area in question as predominantly a "long term urban potential" area. By definition, a "long term urban potential" area is characterized by "low density development with vacant lands physically suited for intensive development and without major conflict with critical areas of environmental concern" and "lacking existing or programmed urban facilities and infrastructure required for intensive development." The State Action Strategy is to discourage support of premature scattered new urban development which could exceed site carrying capacities or would require public investments in new or expanded public facilities, utilities and services. Applying guidelines for state action to local action, the proposed development would seem to meet these criteria.

Adjacent Land Use

The land use in the surrounding area would be compatible with the proposed residential use. East, south and west of the site are single family homes. North of the site is the town center with a variety of shops and offices. Northeast of one site is the Island Avenue Grade School.

Traffic Considerations

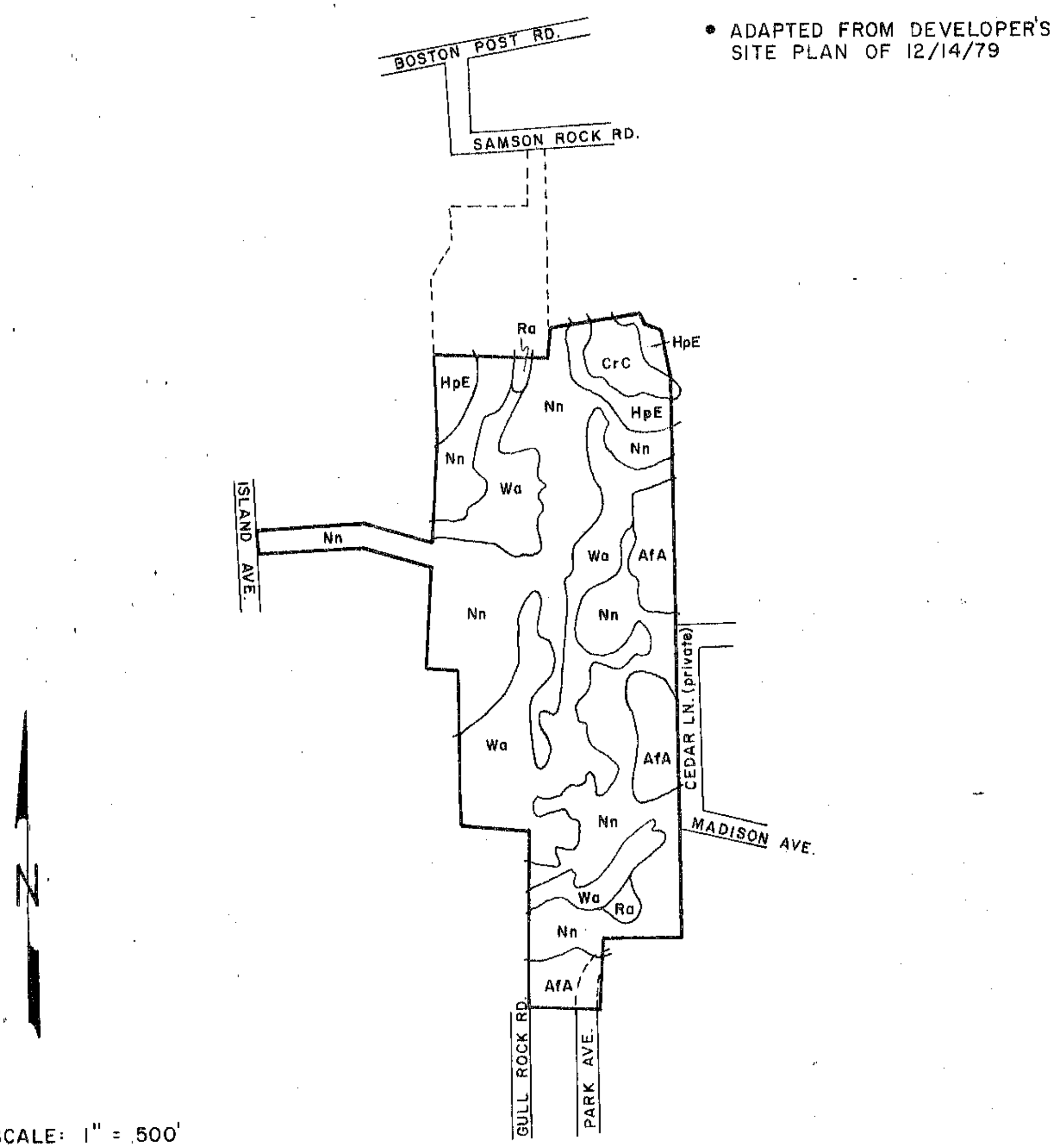
The site is located to the east of Island Avenue, a two-lane, two-way local road in very good condition. Island Avenue intersects Route 1 (a major arterial) just west of town center. This intersection is signalized and operates at a relatively high service level with no capacity problems. Access to I-95 is nearby via Route 79 (also at town center). A near-term parking and circulation study is being concluded at present by the South Central Connecticut Regional Planning Agency which seeks to improve travel conditions at town center and its environs.

Island Avenue carries in the vicinity of 1,800 vehicles per day on the average. The addition of ten single family dwelling units off of Island Avenue should result in perhaps 90 to 100 additional vehicle trips per day into the traffic stream. This represents a negligible impact on existing conditions.

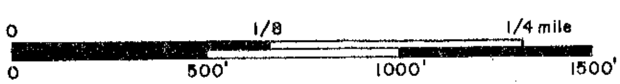
* * * * *

APPENDIX

SOILS MAP



SCALE: 1" = 500'



SOILS LIMITATION CHART

Madison Builders Property - Madison, Connecticut

MAP SYMBOL	SOIL NAME	BUILDINGS & BASEMENTS	SEPTIC SYSTEMS	ROADS & DRIVEWAYS	LANDSCAPING
CrC	Charlton-Hollis fine sandy loam, 3 to 15% slopes				
	Hollis Part	Severe: Depth to rock, Slope	Severe: Depth to rock, Slope	Severe: Slope, Depth to rock	Severe: Slope, Depth to rock
	Charlton Part	Moderate: Slope, Large stones	Moderate: Large stones, Slope	Moderate: Slope	Moderate: Slope, Large stones
HpE	Hollis-Charlton fine sandy loam, 15 to 35% slopes				
	Hollis Part	Severe: Depth to rock, Slope	Severe: Depth to rock, Slope	Severe: Slope, Depth to rock	Severe: Slope, Depth to rock
	Charlton Part	Severe: Slope, Large stones	Severe: Large stones, Slope	Severe: Slope	Severe: Slope, Large stones
Ra	Raynham silt loam	Severe: Wetness	Severe: Percs slowly, Wetness	Severe: Frost action, Wetness	Severe: Wetness
Nn	Ninigret fine sandy loam	Severe: Wetness	Severe: Wetness	Moderate; Frost Action	Slight
Wa	Walpole sandy loam	Severe: Wetness	Severe: Wetness	Severe: Wetness, Frost Action	Severe: Wetness
AfA	Agawam fine sandy loam, 0 to 3% slopes	Slight	Slight	Slight	Slight

EXPLANATION OF RATING SYSTEM:

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

ABOUT THE TEAM

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

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

PURPOSE OF THE TEAM

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

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

REQUESTING A REVIEW

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

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