NATURAL RESOURCES INVENTORY
PHASE 1

BOROUGH OF ROOSEVELT

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Prepared for:

Environmental Commission
Borough of Roosevelt
P.O. Box 128
Roosevelt, N.J.   08555

Prepared by:

Jean Marie Hartman, Ph.D.
Robert Jordan, M.S.
Kate John-Alder, M.S.
Ariane Delafosse

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PHASE I

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# NATURAL RESOURCES INVENTORY
PHASE I
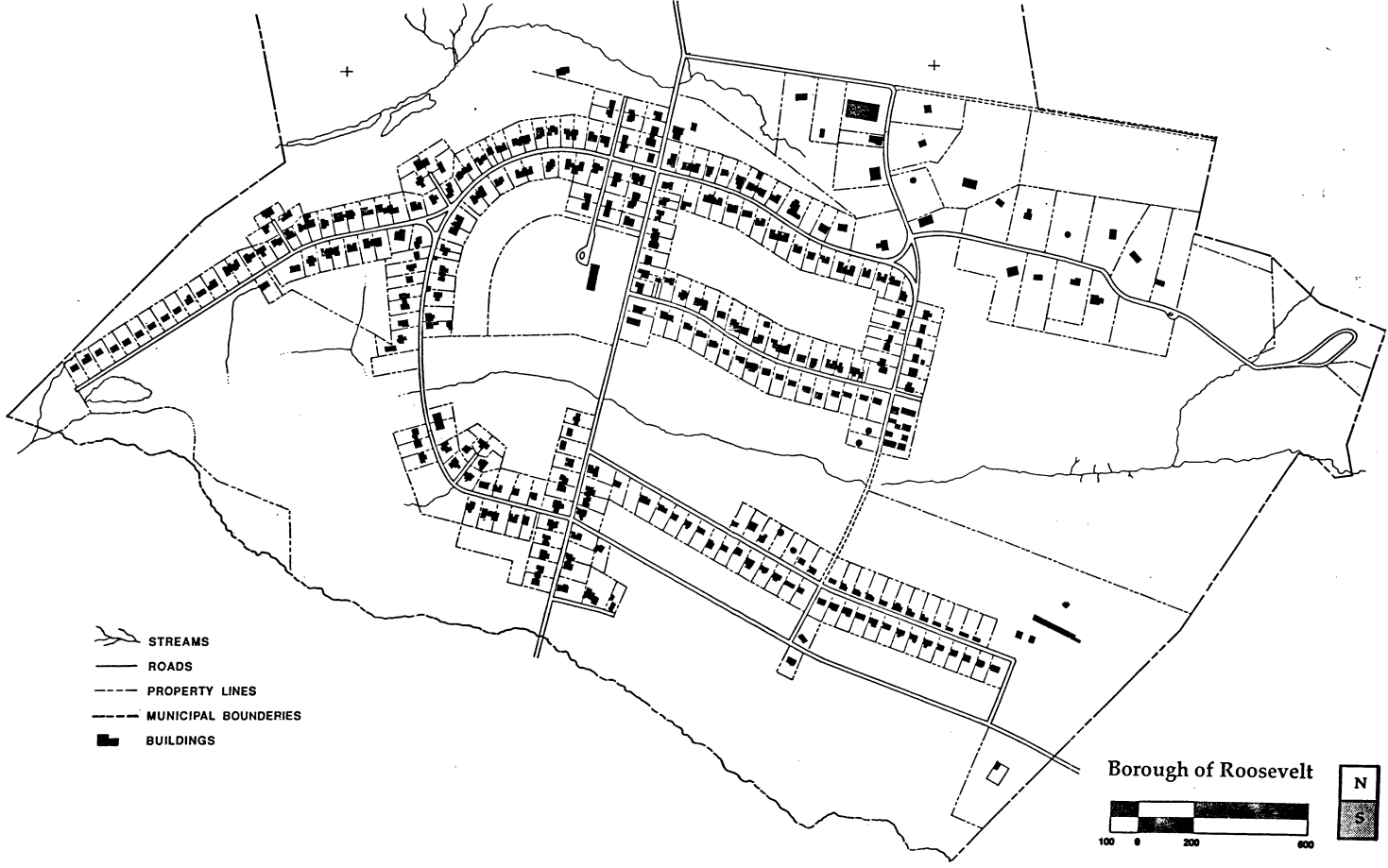## ROOSEVELT BOROUGH

INTRODUCTION

This report summarizes the results of the first phase in the development of a comprehensive resources analysis of Roosevelt Borough. The first step was to review and synthesize existing information and develop a base map at 1"=200'. This map was divided into a northern and southern section, because it would have been very awkward to use at this scale if the entire borough was shown on a single sheet at this scale. The base map illustrates the municipal boundaries and the roads and was drafted from mylars of air photos at the same scale. A series of overlays were then made, including:

> buildings,
> elevation,
> soils,
> vegetation,
> streams, and
> wetlands.

Within this report, each map is show as a composite of the base and one or more selected overlays.

The overall goal of this study was to develop a set of overlay maps that could be used by the Environmental and Planning Commissions of the Borough. This report provides a reference for these maps by discussing the sources used to compile the information, the categories listed on the maps and a general interpretation.
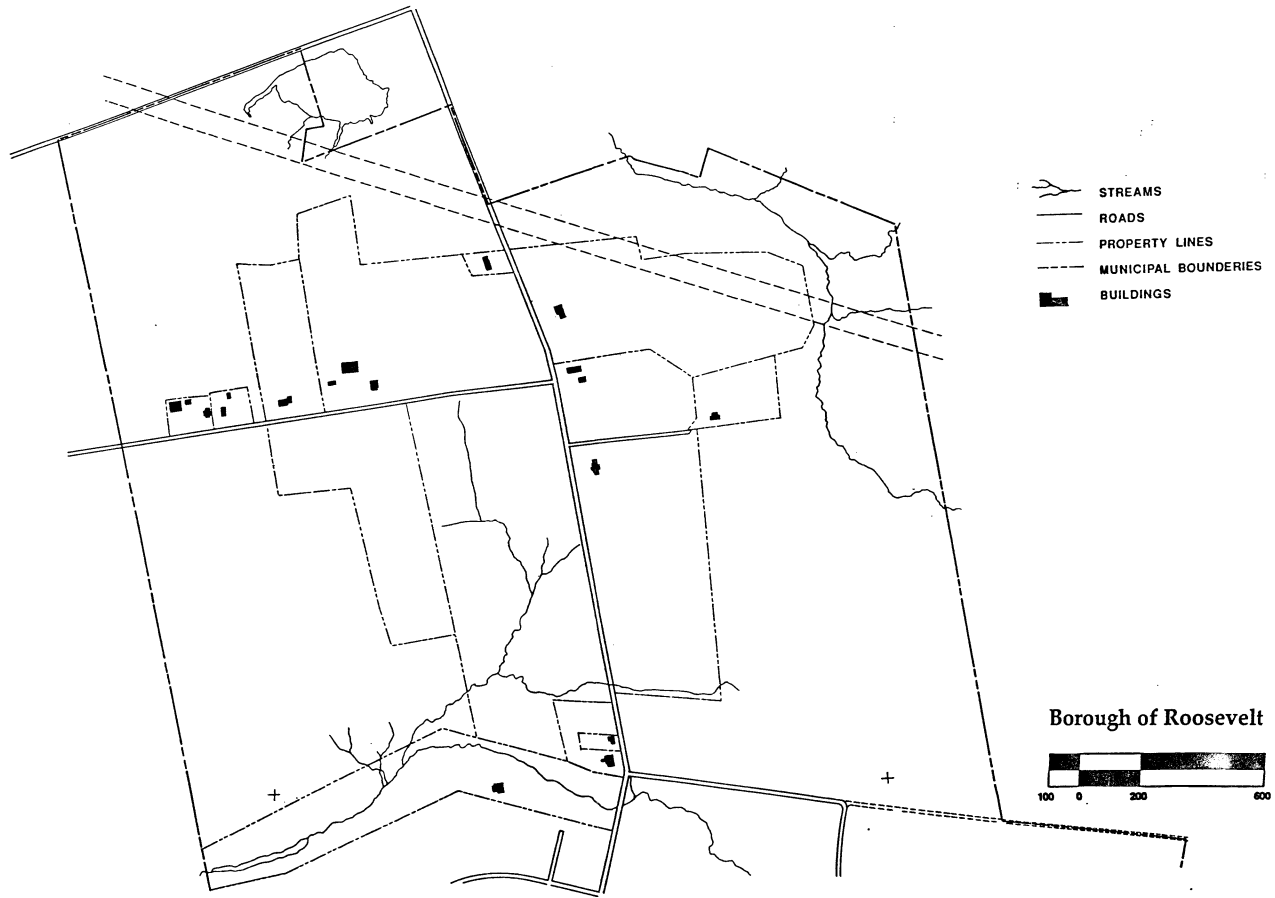
STREAMS
ROADS
PROPERTY LINES
MUNICIPAL BOUNDERIES
BUILDINGS

Borough of Roosevelt

N
S

100   0   200   600

STREAMS
ROADS
PROPERTY LINES
MUNICIPAL BOUNDERIES
BUILDINGS

Borough of Roosevelt

N
S

100   0   200   600

Borough of Roosevelt

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CONTOURS
ROADS
MUNICIPAL BOUNDERIES

Borough of Roosevelt
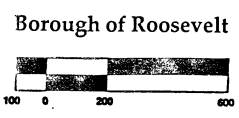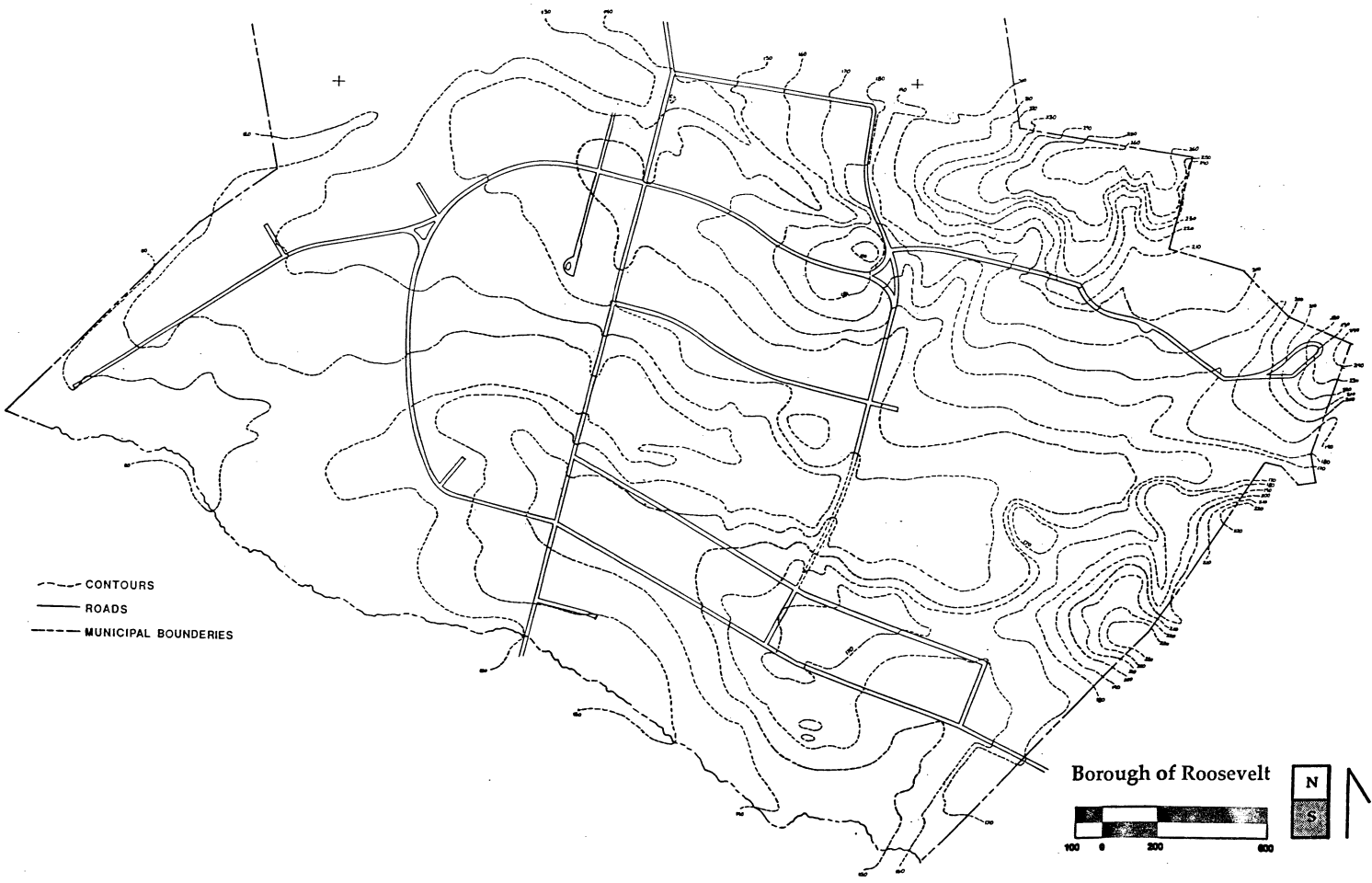
BUILDINGS

The air photos were searched for buildings. The "footprint" or shape of each building was drawn. Only permanent structures were included. Therefore, some small sheds or garages may not be included. Although several homes have swimming pools, these were difficult to identify in some cases. Therefore, swimming pools were not included.

TOPOGRAPHY

The elevation contours are based on enlargement of the U.S.G.S. 7.5 minute quads. The U.S.G.S. map was enlarged to 1"=200', then transferred onto an overlay. Errors were checked by comparing vegetation and other landmarks to topographic patterns. Limited field checks were performed.

SOILS

The soils map presented here is based on information in the Soils Survey of Monmouth County (Jablonski and Baumley 1989). The map was developed through a combination of enlarging the county soils map and field checking. Few changes were intentionally included in this map. Primarily, lines were corrected to follow vegetation and other landmarks on the air photos.

Soil is the thin surface coating of the earth capable of supporting vegetation. Because many environmental processes are linked within the soil zone, soils themselves can often reveal substantially more about an area than any other natural factor. Consequently, accurate soils mapping is an important planning tool (Steiner 1991).

Soils which overlie similar parent material or bedrock have similar physical and chemical characteristics which are used to classify them into soil series: soils which all share a similar vertical profile, but may differ in texture of the surface layer or subsoil material (Tedrow 1986). Different soils demonstrate different suitability and potential for human uses. Within a series, soils may vary in slope, wetness, degree of erodibility, and other characteristics related to their use and management (Jablonski and Baumley 1989).

Landscapes generally have a distinctive proportional pattern of soils, called a soil association, which defines the overall characteristics of the soil types found in the area (Jablonski and Baumley 1989). A soil association normally consists of one or more major soil series and at least one minor soil series and is named for the major soils.
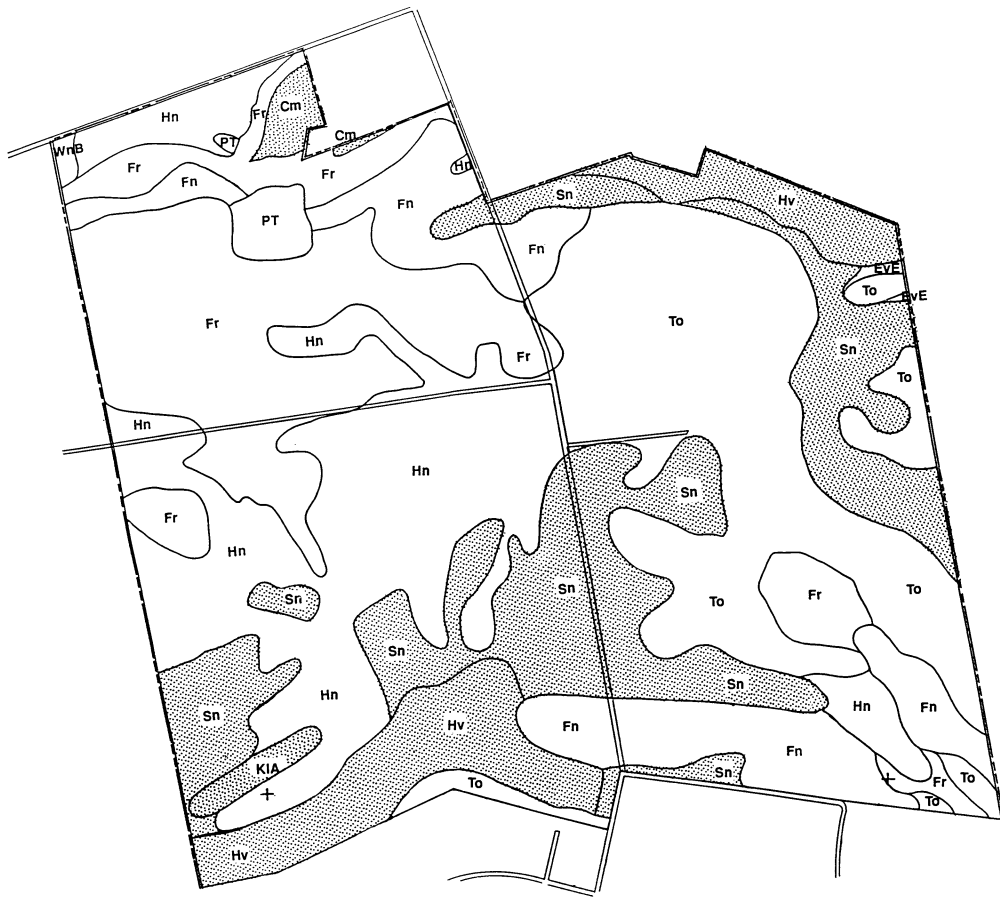
2

DRY SOILS:

Cn	COLLINGTON
EvE	EVESBORO
Fr	FREEHOLD (SANDY LOAM)
Fn	FREEHOLD (LOAMY SAND)
FUB	FREEHOLD (URBAN LAND COMPLEX)
Hn	HOLMDEL
HUA	HOLMDEL (URBAN LAND COMPLEX)
To	TINTON
WnB	WOODSTOWN
PT	PITS

WET SOILS:

Cm	COLEMANTON
Hv	HUMAQUEPTS
KIA	KLEJ
Sn	SHREWSBURY
UA	UDORTHENTS

----- MUNICIPAL BOUNDERIES

——— ROADS

Borough of Roosevelt

100 0 200 600

DRY SOILS:

Cn	COLLINGTON
EvE	EVESBORO
Fr	FREEHOLD (SANDY LOAM)
Fn	FREEHOLD (LOAMY SAND)
FUB	FREEHOLD (URBAN LAND COMPLEX)
Hn	HOLMDEL
HUA	HOLMDEL (URBAN LAND COMPLEX)
To	TINTON
WnB	WOODSTOWN
PT	PITS

WET SOILS:

Cm	COLEMANTON
Hv	HUMAQUEPTS
KlA	KLEJ
Sn	SHREWSBURY
UA	UDORTHENTS

———— ROADS
------- MUNICIPAL BOUNDERIES

Borough of Roosevelt

100 0 200 600

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S
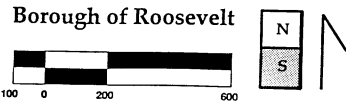
The Borough of Roosevelt is described by the U.S.D.A. Soil Conservation Service as consisting of two primary soil associations (Jablonski and Baumley 1989):

Freehold-Shrewsbury-Tinton Association

Freehold soils make up 35 percent of the association. These are nearly level to steep and well drained. Found primarily on divides and side slopes, the surface layer is loamy sand, sandy loam, and loam. The subsoil is sandy loam and sandy clay loam.

Freehold soils generally have moderate to moderately rapid percolation, slow runoff, low to moderate erosion hazard, and a water table below 6 feet year around. Well suited to agriculture, Freehold soils are classified as capability class II or III by the SCS indicating high value for cultivation. The primary limitations for development uses are slow percolation, caving, cut banks, and frost action. In some cases, high slopes imposed greater restrictions for most uses.

Shrewsbury soils, 30 percent of the association, are nearly level and poorly drained. Found on broad flats and in depressions and drainageways, the surface layer is sandy loam with a sandy loam and sandy clay loam subsoil.

Tinton soils, 15 percent of the association, are nearly level to steep and well drained. Found on divides and side slopes, the surface layer is loamy sand with a sandy loam and sandy clayey loam subsoil.

Permeability of Tinton soils is moderate to moderately rapid, with low runoff and slight erosion hazard. The water table is found below 6 feet all year around. Development limitations include cutbanks caving and slope, in some cases.

As shown on the accompanying soils map, Freehold, Shrewsbury, and Tinton soils comprise about 80 percent of this association in the Borough. Minor soils in the association, making up 20 percent of the mapping unit, that are found within the Borough include Holmdel and Collington soils, both well drained to moderately soils.

Humaquepts, Frequently Flooded-Manahawkin Association

The mapping unit is generally 85 percent Humaquepts, frequently flooded, 10 percent Manahawkin soils, and 5

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percent minor soils. Humaquepts are poorly drained to
very poorly drained soils found in flood plains of
perennial and intermittent streams. The surface layer
and the subsoil are stratified sandy loam, loam, and
silt loam. Manahawkin soils are very poorly drained
soils found in wide depressions and on broad flats of
lowland situations. The supper layers are muck with a
substratum of loamy sand and sand. Manahawkin soils
are not mapped within the Borough.

Humaquepts generally demonstrate seasonal high water
table between the surface and 1.5 feet. The soil is
subject to frequent flooding during the early spring or
after heavy rains. These soils tend to be found in
narrow bands along stream courses where the high water
table and flooding make them unsuitable for both
agricultural and development uses.

The accompanying soils map overlay indicates that
Humaquept soils make up more than 80 percent of this
association within the Borough. Minor soils of the
association are limited to Colemantown loam, a poorly
to very poorly drained clay loam stained gray-green by
glauconite.

Other Soils

The soils overlays show several minor soil types not
normally classified in the major soil associations
described above. These include Evesboro and Klej soils
and as well as Udorthents. Evesboro soils are
typically excessively well drained, sandy soils found
on slopes. The water table is found below 6 feet year
around, but the sandy, highly permeable nature of these
soils may cause some development limitations. Klej
soils tend to be nearly level, moderately well drained
or somewhat poorly drained soils found in depressions
and on low divides. Because the water table may be
found within 1.5 feet from the surface during the early
spring, wetland vegetation may become established on
these soils. The poorly drained upper horizons may
cause some development limitations.

Udorthents are a special soil type that represents
areas which have been altered by excavation or filling.
The physical and chemical properties of these soils are
very variable and are determined largely by the nature
of previous alteration. On-site investigation and
evaluation of these disturbed soils is necessary for
most proposed uses.

Both Humaquepts and Shrewsbury soils are found on state

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and federal lists of hydric soils. Hydric soils are defined as soils that either: 1) are saturated at or near the soil surface with water that is virtually lacking in free oxygen for significant periods during the growing season, or 2) are flooded frequently for long periods during the growing season. This definition attempts to identify soils that support wetland vegetation (Tiner 1985). Hydric soils in the Borough are found primarily along existing stream channels, Humaquepts, and in broad areas adjacent to streams and in the gently sloping northern half of the municipality. The broadest areas of hydric soils are found at the confluence of Empty Box Brook and Assunpink Creek in the southwestern portion of the Borough associated with the Roosevelt Marshes bordering the Assunpink. A second large wetland area is found in the northeastern corner of the Borough associated with a tributary of Rocky Brook.

The water table is the top of a layer of soil saturated by groundwater. It is not the same as groundwater, which is held in geologic formations or aquifers. The water table is an important environmental resource. It is replenished by direct runoff and rainfall, but also by stormwater runoff from developed areas and by septic effluent. It is also the water source which maintains vegetation and helps maintain groundwater, the source of stream flow during low flow periods. Consequently, degradation of the water table may impact not only overall groundwater quality, but ultimately affects surface water quality as well.

Clearly, hydric soils pose severe limitations on development activities while also providing tangible benefits themselves. The soils of floodplains are critical to the stream's ability to absorb flood waters during high flow periods. They allow the stream channel to shift and move and their high permeability allow them to store flood waters and then release them gradually over time.

However, if poorly managed, even the best soils may be subject to erosion hazards. Erosion is a naturally occurring process which involves the dislodgement and movement of soil by water, wind, or gravity. The natural process can be accelerated by man's activities. Development which removes vegetation can result in greater runoff carrying topsoil down slope into waterways. Soil sedimentation smothers stream vegetation and animal life. Turbidity disrupts aquatic life and productivity. Slope can impose severe restrictions on development. Slopes less than 10 percent may pose no significant restriction on most land uses. However, slopes between 10 and 15 percent may require grading or special design of septic systems. Where slopes are greater than 15 percent, extensive grading and filling is often

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required for most development purposes. Clearing of such slopes can result in severe erosion problems if runoff is not tightly controlled.

Great care should be exercised in the disturbance of the sandy soils found in Roosevelt. Even on fairly level ground, stormwater runoff can result in significant siltation from construction sites. Under steeply sloping conditions the problem is exacerbated. Steep slopes in the Borough are primarily limited to slopes adjacent to Empty Box Brook and in forested areas in the southeastern portion of the municipality.

VEGETATION

The Borough of Roosevelt is characterized by a relatively high diversity of vegetation types. The maintenance of this diversity helps to ensure the perpetuation of indigenous wildlife species. Large areas of undisturbed natural vegetation also contributes to the overall environmental quality of the Borough. Detailed descriptions of each vegetation type was beyond the scope of this report. Instead, broad habitat categories are recognized, each including similar community types. Habitats were identified by general successional age (eg., mature forest, successional, meadow/pasture). Land that was recently tilled is categorized as agricultural. Areas residential or similar land use showed as a distinct vegetation type, listed as lawn.

Plant associations reflect the underlying slopes, soil types, and their moisture levels. Several stream corridors pass through parts of the Borough creating gradients in relief and soil moisture, particularly in the southern half of the Borough. Habitats range from wetlands to upland forest, often within several tens of yards of one another. Ridges and side slopes, which have escaped recent disturbance, support upland mixed hardwoods, the most mature successional stage. This is in contrast to upland areas on gentler slopes where vegetation communities reflect previous disturbance or development. For example, good agricultural soils, Freehold and Tinton in the northern half of the Borough, have been in cultivation for many years. Finally, lands along streams or with less productive, poorly drained soils have been allowed to mature into a lowland hardwood forest.

The upland mixed Hardwood community includes both relatively mature stands and forest in various stages of succession. The successional communities occur on sites that were previously cultivated or otherwise disturbed and subsequently abandoned. Upland forests were grouped together for the purposes of this inventory due to the coarseness of the mapping and the intergrading of the different successional types.
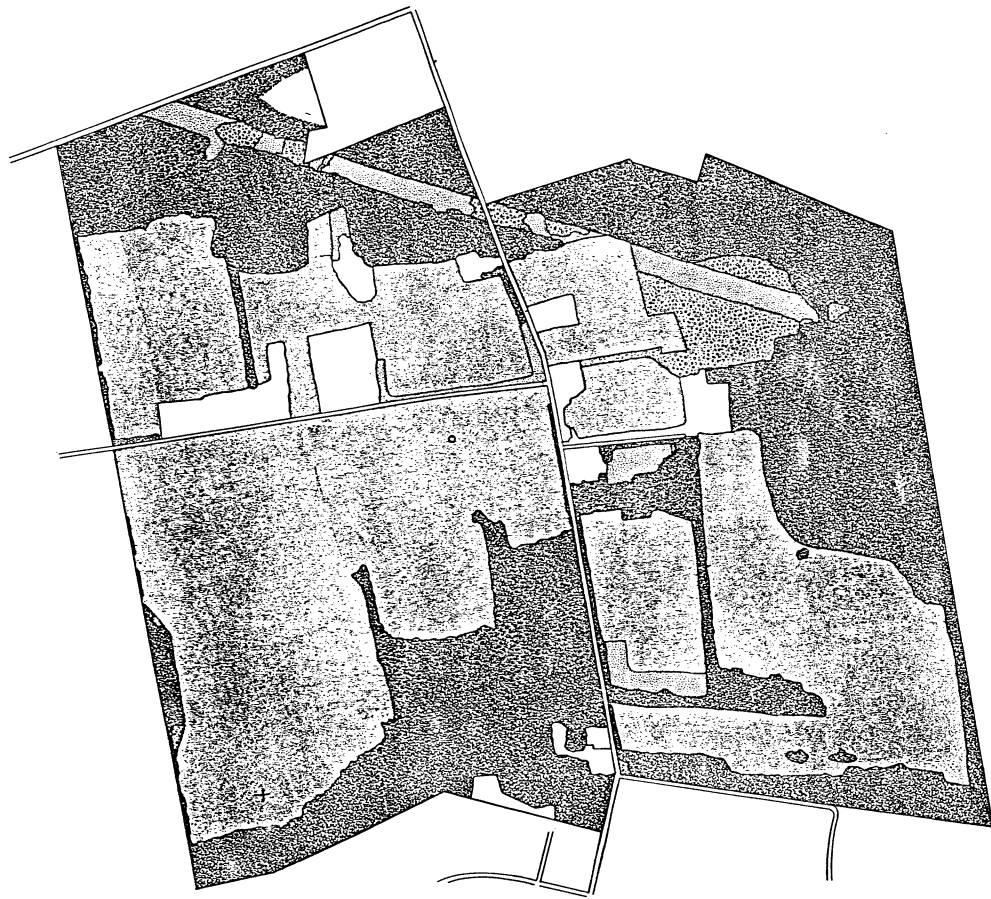
6

VEGETATION:

MATURE FOREST

SUCCESSIONAL

MEADOW / PASTURE

AGRICULTURAL

LAWN

ROADS

Borough of Roosevelt

N

S

100   0   200   600

VEGETATION:

MATURE FOREST

SUCCESSIONAL

MEADOW / PASTURE

AGRICULTURAL

LAWN

ROADS

Borough of Roosevelt

N

S

100   0   200   600
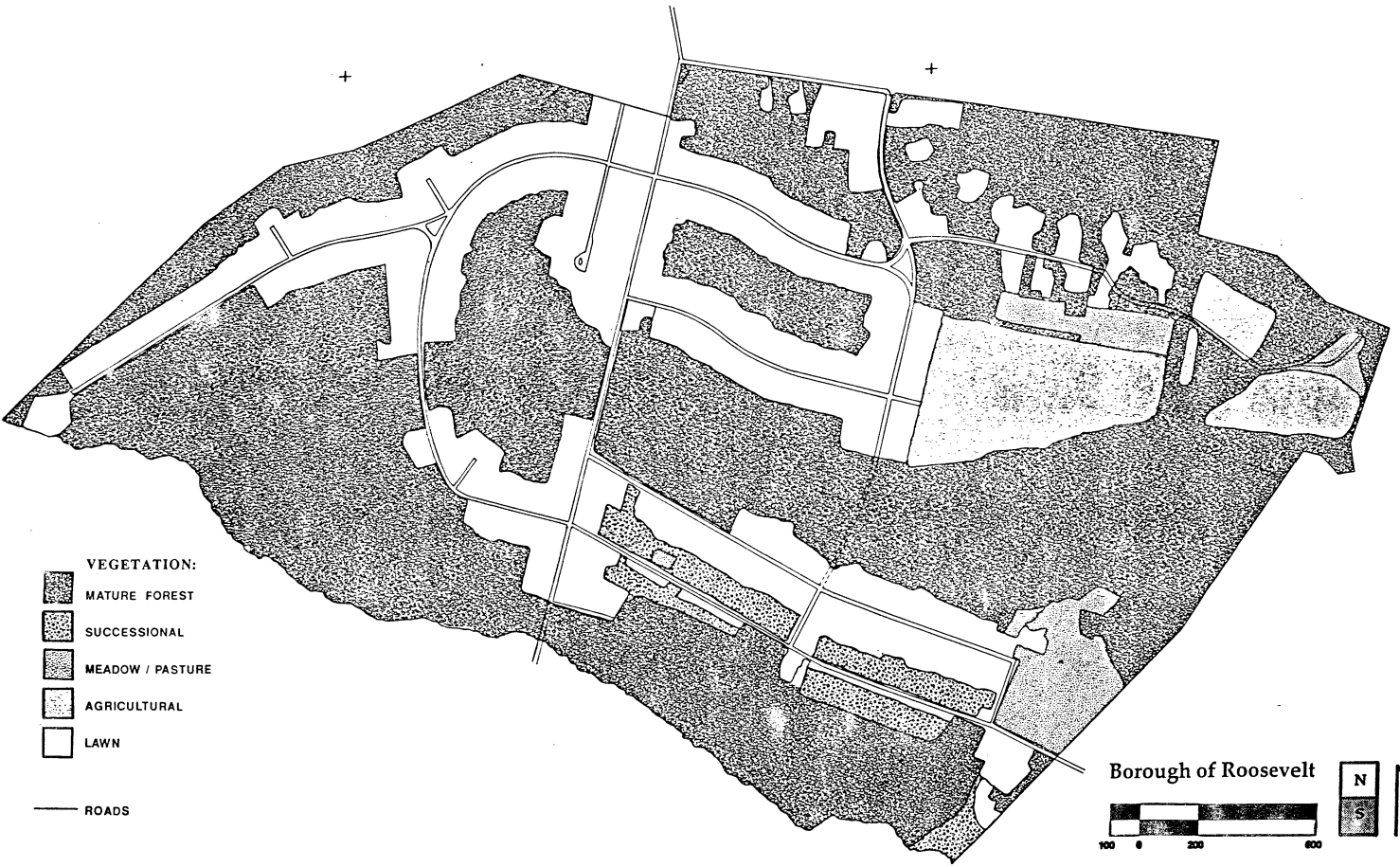
Successional forest communities on moist sites typically include red maple (*Acer rubrum*), black cherry (*Prunus serotina*), and gray birch (*Betula populifolia*). Associates include black locust (*Robinia pseudo-acacia*), sassafras (*Sassafras albidum*), and black walnut (*Juglans nigra*) on drier slopes. Yellow poplar (*Liriodendron tulipifera*) and sweet gum (*Liquidambar styraciflua*), abundant in younger stands, are shade intolerant species and are generally out competed in older stands.

More mature forest stands are found on drier side slopes and steep situations, particularly in the southern portions of the Borough, which have not been recently developed or cut. The canopy is dominated by red oak (*Quercus rubra*), white oak (*Q. alba*), and shagbark hickory (*Carya ovata*). Associates include pignut hickory (*C. glabra*), yellow poplar, and American beech (*Fagus grandifolia*). American beech shares dominance in older stands on moist flats. Driest sites in the south and southeastern areas of the Borough feature black birch (*Betula lenta*) and chestnut oak (*Q. prinus*).

Spicebush (*Lindera benzoin*) is the dominant shrub in the successional communities and persists in all stages. Other early successional species include southern arrowwood (*Viburnum dentatum*) and coastal sweet pepperbush (*Clethra alnifolia*). In the older forests the shrub layer tends to be a sparse association of tall huckleberry (*Gaylussacia frondosa*) and flowering dogwood (*Cornus florida*). Herbaceous species common throughout the upland forest in the Borough include may apple (*Podophyllum peltatum*), jack-in-the-pulpit (*Arisaema atrorubens*), violets (*Viola* spp.), and asters (*Aster* spp.).

Abandoned fields and oldfields are found in various stages of natural succession, a natural process of transition from field to forest. Oldfields are important habitats for foraging songbirds and small mammals. Early oldfield situations tended to be dominated by horseweed (*Erigeron canadensis*), common ragweed (*Ambrosia artemisiifolia*), chicory (*Cichorium intybus*), and foxtail grass (*Setaria glauca*). Older oldfields, 10 to 15 years since abandonment, begin to be colonized by woody species and perennial forbs, including winged sumac (*Rhus coppalina*), raspberry (*Rubus idaeus*), switchgrass (*Panicum virgatum*), bluestem (*Andropogon virginicus*), and goldenrods (*Solidago* spp.).

Intact vegetation helps to conserve soils against erosion because dense root structures slow the rate of runoff. Large stands of forest help to moderate local climate by breaking the force of prevailing winds and trapping heat radiated from the ground surface at night. The existing forest and stream corridors with naturally occurring wetland vegetation make the Borough an aesthetically pleasing place to be.

While it is important to maintain the greatest possible

vegetation community diversity, some kinds of vegetation are more important and more valuable for wildlife and because of their role in protecting other environmental resources. Planning should direct development away from these sensitive areas toward less sensitive or valuable habitats.

Designation of an area as environmentally sensitive does not necessarily preclude development in that area. Instead, these areas suggest the necessity of special performance standards or best management practices to ensure the maintenance of environmental values. For example, altering vegetative cover over soils with high runoff or erosion potential will increase runoff, and may increase flash flooding in streams, degrade surface water quality, and reduce percolation to groundwater. If water is encouraged to runoff, over impervious cover for example, little is allowed to percolate and recharge the groundwater. Using vegetated drainage ways, retention ponds, and pervious pavements helps to retain water on developed sites and allows gradual percolation through the soil column.

WETLANDS

The approximate extent of wetlands within Roosevelt Borough is 412 acres (i.e. approx. 30% of the Borough). This was determined from examination of the Monmouth County Soil Survey, the National Wetlands inventory maps, NJDEPE freshwater wetlands maps, Monmouth County aerial photography, and field surveys. Mapping was prepared primarily from SCS soils maps and the NJDEPE wetlands maps. We caution that the actual extent of wetlands on any property within the Borough can only be determined using a detailed field delineation following guidelines set down in The Federal Manual for Indentifying and Delineating Jurisdictional Wetlands (January 1989) and adopted under the New Jersey Freshwater Wetlands Protection Act (N.J.S.A. 13:9B-1 et seq.) as the technical basis for delineating wetlands in New Jersey.

Wetland community classification based on the U.S.Fish and Wildlife Service National Wetland Inventory classification system. This system recognizes broad classes of wetland communities on the basis of the successional age of the dominant vegetation. On the accompanying overlay maps the wetland class may be inferred from the nature of the prevailing vegetation types, as described below.

In certain cases, the exact extent of wetland communities could not be accurately estimated. This may have been due to the presence of questionable soil (for example, Klej soils are sometimes associated with wetlands, sometimes not) or to the fact that the prevailing vegetation was significantly disturbed. Such areas have been labelled "Potential Wetlands" on the accompanying overlays. These areas require more detailed analysis before
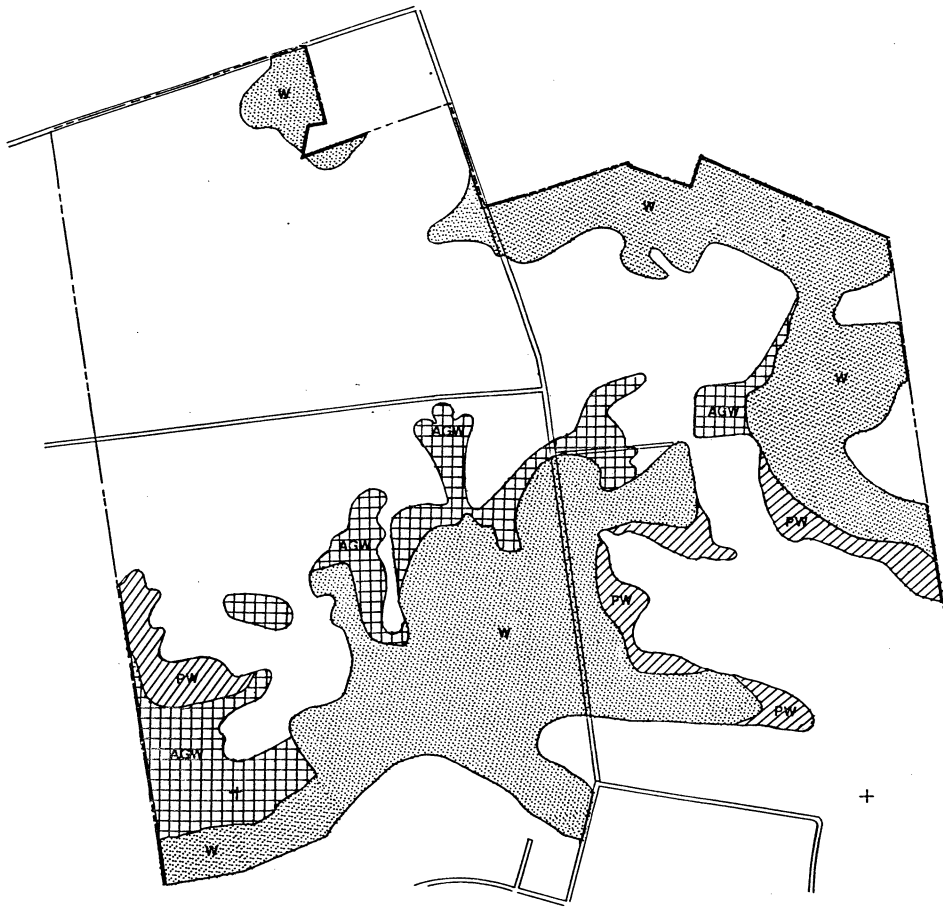
WETLAND:

AGW   AGRICULTURAL WETLANDS

W   WETLANDS

PW   POTENTIAL WETLANDS

——————— ROADS

----------- MUNICIPAL BOUNDERIES

Borough of Roosevelt

100   0   200   600

N

S

WETLAND:

AGW   AGRICULTURAL WETLANDS

W   WETLANDS

PW   POTENTIAL WETLANDS

――――― ROADS

――――― MUNICIPAL BOUNDERIES

Borough of Roosevelt

| N |
| S |
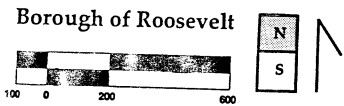
100   0   200   600

designation as wetlands, however their proximity to extensive wetland areas suggests that wetland conditions may prevail in them during some part of the growing season.

Agricultural Wetlands

Broad areas of poorly to very poorly drained Shrewsbury soils occur in the northern half of the Borough in areas currently in agricultural production. Both the U.S. Army Corps of Engineers and the New Jersey Department of Environmental Protection and Energy (NJDEPE) recognize these hydric soil areas to be wetlands, even though they are typically devoid of vegetation. If allowed to go fallow, they would revert to naturally occurring wetland vegetation types.

Normal farming operations are not regulated in agricultural wetlands. However, once there is a change in proposed use (eg.conversion of farmland into residential development), then these wetland areas are subject to all applicable State and Federal regulations. Because these areas are not typically vegetated, their locations should be noted by the Environmental Committee and taken into consideration in planning environmentally sound growth within the Borough.

Emergent Wetlands

Emergent wetland systems in the Borough are generally associated with late successional situations in powerline and sewer rights-of-way, abandoned farm fields, or forest openings. Herbaceous freshwater wetlands are one of the least understood and appreciated of our natural landscapes. They support an amazing array of invertebrate life which provides the base of the food web of many of our most important wildlife species. They are critical habitat for several of our most threatened species, including the wood turtle (*Clemmys insculpta*) and bog turtle (*Clemmys muhlenbergi*), both known in the local watersheds. The wetland soils and vegetation help to maintain water quality by filtering suspended solids and utilizing nutrients in the water to create one of the most productive habitats on the planet. Because of the high permeability of wetland soils and their location along streams, they play important role in reducing flood peaks and recharging groundwater.

In areas that are permanently saturated but rarely flooded, wet meadow communities have become established. This can be seen along field borders in the Borough where fallow agricultural wetlands are being reclaimed by wetland vegetation including soft rush (*Juncus effusus*), woolgrass (*Scirpus cyperinus*), and smartweeds (*Polygonum* spp.). In more regularly flooded areas, including the broad marshy areas associated with Assunpink Creek in the southwestern portion of the Borough, the wetlands are dominated by such species as common skunkcabbage (*Symplocarpus*

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foetidus), cinnamon fern (*Osmunda cinnamomea*), tussock sedge (*Carex stricta*), spotted jewelweed (*Impatiens capensis*), and halberd-leaved tearthumb (*Polygonum arifolium*).

Shrub Wetlands

Shrub or shrub-scrub wetlands are dominated by woody vegetation less than 20 feet in height. In Roosevelt, they occur primarily in wet areas along powerline and sewerline rights-of-way, in forest gaps, and along the edges of fallow fields. They are a late successional form of the emergent wetland already described, since woody species have invaded emergent communities and often share dominance with saplings of forested wetland species. The most prevalent species in the Borough include southern arrowwood (*Viburnum dentatum*), silky dogwood (*Cornus amomum*), highbush blueberry (*Vaccinium corymbosum*), and sapling red maple (*Acer rubrum*) and sweet gum (*Liquidambar styraciflua*). The herbaceous layer tends to be lush and includes jewelweed, woolgrass, soft rush, seedbox, sensitive fern (*Onoclea sensibilis*), and joe-pye-weeds (*Eupatoriadelphus* spp.).

Forested Wetlands

Forested wetlands are dominated by woody vegetation greater than 20 feet in height. They are the most abundant and most widespread wetland type in New Jersey (Tiner 1985). In the Borough of Roosevelt, the floodplains of the major streams provide the low slopes and shallow channels which favor the establishment of lowland forests. Because the streams follow a very low topographic gradient, water flows slowly and does not cut a deep channel in the sandy sediments. The stream banks are thus easily overflowed during periods of heavy rain. In Roosevelt, these forests are a mix of hardwood species comprising two principal forest types.

The first type are the seasonally flooded forest communities associated with the channels of Rocky Brook, Assunpink Creek, Empty Box Brook, and their tributaries. They are established on mucky Humaquept soils and are extensively flooded during the spring months. The canopy is dominated by red maple and sweet gum, in association with black gum (*Nyssa sylvatica*), river birch (*Betula nigra*), and sweetbay (*Magnolia virginiana*). The shrub layer is typically very dense and thicket-like. Dominant species include coastal sweet pepperbush (*Clethra alnifolia*), southern arrowwood, highbush blueberry, and greenbriar (*Smilax rotundifolia*). The herbaceous layer tends to be somewhat sparse, with most emergent plants established on hummocks and other local micro-elevations. The most numerous species include common skunkcabbage, cinnamon fern, tussock sedge, and scattered common arrowhead (*Sagittaria latifolia*).

The other major lowland forest type found in the Borough is drier, only temporarily flooded or only permanently saturated, and associated with broad areas of Shrewsbury soils found in the southern portions of the Borough. These are much more diverse stands with gradual transitions into the adjacent upland forest types. Because they are rarely flooded, it is not uncommon to find typically upland species doing very well in these communities. The canopy tends to be dominated by red maple and sweet gum as before, however the list of common associates is much longer and includes pin oak (*Quercus palustris*), white oak (*Q. alba*), shagbark hickory (*Carya ovata*), tulip poplar (*Liriodendron tulipifera*), American holly (*Ilex opaca*), and American beech (*Fagus grandifolia*). Common spicebush (*Lindera benzoin*) dominates a fairly open shrub layer in association with common winterberry (*Ilex verticillata*), sweet pepperbush, and highbush blueberry. In drier areas, Canada mayflower (*Maianthemum canadense*) and trout lily (*Erythronium americanum*) often carpet the ground. Other common herbaceous species include mayapple (*Podophyllum peltatum*), false nettle (*Boehmeria cylindrica*), wild garlic (*Allium* spp.), sedges, jack-in-the-pulpit (*Arisaema* spp.), and clubmosses (*Lycopodium* spp.).

Wetland Values

As discussed above, floodplain soils are essential to a stream's ability to maintain equilibrium with its channel, allowing adjustments in size and shape during high energy events during high flow and flooding. Floodplains themselves are of high ecological value because the naturally occurring lowland forest vegetation provides valuable habitat for wildlife. Proximity to water enhances habitat value, and the intact overhanging vegetation acts to shade the stream, maintaining water temperatures and stabilizing the stream banks with their interlocking roots.

Forested and shrub wetlands are important habitats for breeding songbirds in New Jersey, including neo-tropical migrant species whose summer ranges in the tropics are rapidly being destroyed (Leck 1975, 1984). Forested wetlands provide critical nesting habitat for large numbers of breeding species (Wander 1980, DeGraaf and Wentworth 1981). Both the endangered bog turtle and threatened wood turtle depend on undisturbed wetland habitats (Cromartie 1982). The threatened barred owl (*Strix varia*), an inhabitant of mature hardwood forests, has been increasingly forced to rely on existing wetland forests because the easier to develop upland forests are lost. Stream side wetlands, because they are linear features which often join otherwise widely separated forest tracts, provide valuable movement corridors for large numbers of birds and mammals in developing landscapes (Forman and Godron 1986, Adams and Dove 1989).

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The New Jersey Freshwater Wetlands Protection Act places all of the State's wetlands into one of three levels of "resource value" and applies more or less stringent regulatory restrictions on development activities in and adjacent to them in accordance with their "resource value classification". The most stringent regulation applies to "exceptional resource value wetlands", defined as wetlands which provide habitat suitable for endangered or threatened species.

The accompanying overlay maps designate several areas with potential for supporting State listed threatened wildlife species. These include the extensive forested wetlands found in the northeastern and southwestern portions of the Borough. These fairly mature forest appear to provide habitat suitable for the barred owl. In addition, portions of the wetland forest along Empty Box Brook between North Rochdale Avenue and North Valley Road appear to be suitable as habitat for the wood turtle (*Clemmys insculpta*).

Some wetlands may act as sources of groundwater recharge, allowing water to seep slowly into and replenish underlying aquifers. Increasingly, people are becoming aware of the water quality functions provided by intact wetlands. Wetlands effectively trap or convert large amounts of point and non-point pollutants, including sediments, organic matter, suspended solids, metals, and excess nutrients. During periods of excessive rain, wetlands act as storage basins, retaining water and releasing it slowly, reducing flooding and erosion and increasing the wetland's ability to remove pollutants.

WILDLIFE

Wildlife diversity contributes to overall quality of life. Wildlife acts as environmental monitors. For example, if a stream is too polluted to support aquatic insects and the fishes that feed on them, then it very likely cannot act as a drinking water source for people. If an area is too developed to support many species of animals, then we too are under pressure to compete for diminishing resources.

It is therefore important to maintain a variety of vegetation types for aesthetic, educational, and ecological reasons. Different wildlife species differ in their requirements for food and shelter. The types and diversity of wildlife found in an area are directly related to the vegetation-water-soil relationships already described. An area of diverse vegetation and wildlife habitat can support a wide variety of wildlife species. Maintenance of this wide spectrum of vegetation types helps to ensure the perpetuation of native wildlife species.

Whenever land is developed or primary habitat destroyed, the

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wildlife species that depend on it are crowded into competition with others for increasingly limited resources, ultimately threatening survival. Certain species require minimum intact acreage as suitable range for food, shelter, and escape from predators. Therefore, when large tracts are completely developed or fragmented, most of this wildlife is eliminated. This is particularly true if there are no alternative sites preserved or no protected means for animals to reach alternative sites.

Some vegetation types are, however, more valuable than others because of their role in protecting other resources and their wildlife habitat potential. Lowland forests, for example, tend to support the highest overall diversity of bird species. Sensitive planning should encourage development in least environmentally significant areas. Woodlands and other important areas could be incorporated into planned residential developments as open space or zoned for other low density uses. Maintenance of available habitats is dependent on future development patterns. Urbanization will eliminate most species of wildlife and may encourage the increase in problem species.

It is beyond the scope of this project to report on the populations of different species found in the Borough. Rather, what follows is a description of the animal life typically reflected in the vegetation, water, and soil relationships found there.

Mammals

Sampling for the presence of mammalian species is typically a time-consuming and labor-intensive enterprise requiring extensive trapping and/or long-term censusing of the target habitats. Most mammalian species are primarily nocturnal and their use of a given habitat must often be inferred from indirect evidence or "sign" (e.g., scat, active burrow openings, deer rubs, etc.). All available habitats in the Borough were investigated for the presence of mammalian species.

Most of the mammals common in central New Jersey are likely to be found in the Borough. White-tailed Deer (*Odocoileus virginianus*), the largest mammal expected to be found in Roosevelt, were abundant in all habitats, from mature forest to residential landscaping. This is also true of Raccoons (*Procyon lotor*) and Opossums (*Didelphis marsupialis*), habitat generalists and omnivores which have adapted readily to residential developments in rural Monmouth County. Woodchucks (*Marmota monax*) and Eastern Cottontail Rabbits (*Sylvilagus floridanus*) appear to be prevalent throughout edge habitats and field areas, while Eastern Gray Squirrels (*Sciurus carolinensis*) and Eastern Chipmunks (*Tamias striatus*) were numerous in forested areas.

Smaller mammals tend to demonstrate more habitat preference than larger mammals. The dominant species in forested situations is likely to be the White-footed Mouse (*Peromyscus leucopus*), while the Meadow Vole (*Microtus pennsylvanicus*) is most numerous in grassy areas and oldfields. Low numbers of the Masked Shrew (*Sorex cinereus*) and Short-tailed Shrew (*Blarina brevicauda*) are likely to be found in edge situations. Shrews tend to be secretive and difficult to census, although the Short-tailed Shrew is often prevalent in landscape areas and lawn edges.

Rarer mammals that are likely to be found in the Borough include the Striped Skunk (*Mephitis mephitis*) and Red Fox (*Vulpes fulva*). The fox, the largest predator common in central New Jersey, is widely seen in agricultural areas in western Monmouth County where development intensity is low or moderate. Less common predators that have been found in stream and forest situations in surrounding Millstone Township include Mink (*Mustela vison*) and Gray Fox (*Urocyon cinereoargenteus*). The Little Brown Myotis (*Myotis lucifugus*) can be expected in moderate numbers to forage above the Borough in most seasons.

Birds

Assessment of the avian populations using a given set of habitats is difficult after only limited field inspection. Avian communities are dynamic, particularly in developing areas where available habitats are in a state of transition, and vary appreciably in response to the changing seasons. For example, summer breeders which would be expected to use oldfield and successional habitats would include the Field Sparrow (*Spizella pusilla*) and Eastern Kingbird (*Tyrannus tyrannus*), while the Dark-eyed Junco (*Junco hyemalis*) and White-throated Sparrow (*Zonotrichia albicollis*) are common in early successional situations during the winter months.

Breeding avian populations will vary from habitat to habitat and year to year. The most common summer residents would include the Rufous-sided Towhee (*Pipilo erythrophthalmus*), Red-eyed Vireo (*Vireo olivaceus*), Wood Thrush (*Hylocichla mustelina*), and Black-and-White Warbler (*Mniotilta varia*). Nesting species in woodlands would include Carolina Chickadee (*Parus carolinensis*), Tufted Titmouse (*P. bicolor*), Blue Jay (*Cyanocitta cristata*), and Red-bellied Woodpecker (*Centurus carolinus*). The edge habitats between wooded areas and oldfield situations would be expected to support a number of species including the Gray Catbird (*Dumetella carolinensis*), Redstart (*Setophaga ruticilla*), and Northern Mockingbird (*Mimus polyglottos*). Possible nesting species in grassy oldfield areas may include the American Goldfinch (*Carduelis tristis*), and Common Yellowthroat (*Geothlypis trichas*).

The nonbreeding season can be divided into migratory and winter periods. During migratory periods in the spring (March-May) and fall (August-October), terrestrial bird populations moving through the site would be dominated by warblers, thrushes, and sparrows, notably Blackpoll Warbler (*Dendroica striata*), Swainson's Thrush (*Catharus ustulatus*), and Prairie Warbler (*D. discolor*). The species most typical of early successional habitats may include the Purple Finch (*Carpodacus purpureus*) and Brown-headed Cowbird (*Molothrus ater*). During these periods some 180 species can be expected to migrate over or through inland habitats in New Jersey.

Winter populations will have both the lowest population levels and species diversity. The most numerous and conspicuous species would be the White-throated Sparrow, Dark-eyed Junco, and Northern Cardinal (*Cardinalis cardinalis*). Woodland species would include mixed foraging flocks of Tufted Titmouse, White-breasted Nuthatch (*Sitta carolinensis*), Downy Woodpecker (*Picoides pubescens*), Hairy Woodpecker (*P. villosus*), and Brown Creeper (*Certhia familiaris*).

A number of species may be expected to forage on the site throughout the breeding and non-breeding seasons. The most conspicuous would include the Turkey Vulture (*Cathartes aura*), Common Crow (*Corvus brachyrhynchos*), Common Grackle (*Quiscalus quiscula*), Red-winged Blackbird (*Agelaius phoeniceus*), and European Starling (*Sturnus vulgaris*). Woodland species would include the Eastern Screech Owl (*Otus asio*) and Great Horned Owl (*Bubo virginianus*). Other raptors typical of forest edge situations would include Red-tailed Hawks (*Buteo jamaicensis*), Sharp-shinned Hawk (*Accipiter striatus*), and American Kestrel (*Falco sparverius*).

Reptiles and Amphibians

Census for reptiles and amphibians is made difficult by the secretive nature of most species. Survey of the Borough for the presence of these animals had, of necessity, to be conducted via a catalog of the available habitats and an assessment of the suitability of those habitats for the various herpetofauna expected to be found using them.

Amphibian habitats tend to be limited by the presence or absence of available water. Wet grassland areas in successional wetlands would provide habitats for the Southern Leopard Frog (*Rana sphenocephala*), Green Frog (*Rana clamitans*), and Spring Peeper (*Hyla crucifer*). Wooded wetland areas would support the Green Frog, Wood Frog (*Rana sylvatica*), Red-spotted Newt (*Notophthalmus viridescens*), and Red-backed Salamander (*Plethodon cinereus*). Drier areas, notably early spring agricultural fields and grassy swales are habitats for Fowler's Toad (*Bufo

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woodhousei).

Reptiles tend to have somewhat broader habitat affinities
and can occur in notably more xeric situations. The most common
species of woodland and woodland edges are the Eastern Box Turtle
(*Terrapene carolina*) and Eastern Garter Snake (*Thamnophis
sirtalis*). Larger snakes common in successional and agricultural
areas include Northern Black Racer (*Coluber constrictor*) and
Black Rat Snake (*Elaphe obsoleta*).

Rare and Endangered Species

In addition to the surveys of the Borough described above,
particular emphasis was given to the evaluation of the available
habitats for their suitability to support State and federally
listed threatened and endangered species. A literature search
was conducted to determine known species habitat preferences and
comparisons were made to the existing vegetation associations on
the project site. Also, contact was made with the New Jersey
Natural Heritage Program to request their data on recorded
sightings of species of concern within the project area.

The Natural Heritage Program lists a total of nine species
of wildlife that are either threatened or endangered from
Roosevelt Borough (correspondence attached). Of these, the
species that are most likely to be found in the Borough in
significant numbers are the Wood Turtle (*Clemmys insculpta*) and
Barred Owl (*Strix varia*).

The Wood Turtle is a fairly large terrestrial species which
favors deciduous woodlands associated with clear, unpolluted
streams. It wanders widely in adjacent habitats, but during the
spring breeding season requires small, rapidly flowing, hard-
bottomed streams in relatively undisturbed, fairly mature lowland
forest. These habitats appear to be present along both Assunpink
Creek and Empty Box Brook in the southern and central portions of
the Borough, respectively.

Throughout its North American range the Barred Owl requires
extensive forested areas containing mature, large-diameter trees
which provide cavities suitable for secure nesting. In New
Jersey, the owl is uncommon, locally distributed, and apparently
restricted to the forest interior in lowland situations. This
preference for forested wetlands appears to reflect the fact that
such forests have not recently been cleared, with the result that
they are characterized by mature trees, rather than any real
affinity for wetland habitats *per se*. The observed preference
for mature forest appears to be related to lower stem densities
and a more open subcanopy which provide unimpeded flightpaths for
foraging owls. Where the forest becomes fragmented, the Barred
Owl seems to be outcompeted by the larger, and more aggressive,

Great Horned Owl. Good habitat for the Barred Owl appears to be found in the northeastern portions of the Borough, along Assunpink Creek, and in the adjacent Assunpink Wildlife Management Area just south of the Borough.

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APPENDIX I

WOOD TURTLE HABITAT

Robert A. Jordan
97 Fifth Street
Edison, New Jersey   08837

May 11, 1992

Mr. Jim Carnevale, Chairman
Roosevelt Borough Environmental Commission
P.O. Box 656
Roosevelt, New Jersey   08555

RE: Wood Turtle Habitat Suitability
        Borough of Roosevelt, Monmouth County, New Jersey

Dear Mr. Carnevale:

        I have been assisting Dr. Jean Marie Hartman in the preparation of a natural resources inventory for the Borough of Roosevelt. Dr. Hartman requested that I write you concerning the possibility that habitats along the permanent stream channels in the Borough may provide habitat for the Wood Turtle (*Clemmys insculpta* LeConte). Dr. Hartman informs me that several sightings of Wood Turtles had previously been reported in the Borough. In addition, the Office of Natural Lands Management, New Jersey Department of Environmental Protection and Energy (NJDEPE), have several recorded sitings of Wood Turtles within 3 miles of the Borough listed on its Natural Heritage Database (copy attached).

        The Wood Turtle is a fairly large terrestrial species. In New Jersey, the largest populations of the turtle occur in Morris, Warren, and Sussex counties, but it has been found in all but the southern one-third of the State. The Wood Turtle apparently particularly favors deciduous woodlands associated with clear, unpolluted streams, but is known to wander widely in a variety of upland habitats (Conant 1975, Ferrell and Zappalorti 1979). Published information on this species is scant but suggests a preference for small, rapidly flowing streams in relatively undisturbed forested habitats. Older published accounts suggest that the Wood Turtle has no strict habitat requirements, being found as often in dry upland woods as lowland areas along streams during summer and often frequenting meadows and cultivated areas (Ditmars 1942, Carr 1952, McCoy 1982 and citations there-in).

        The majority of the published information is anecdotal at best, but suggests that the Wood Turtle returns to streams in order to breed and for hibernation, generally in steep, undercut stream banks and tree roots, or in abandoned muskrat (*Ondatra zibethica*) burrows. Clear-water, hard-bottomed streams flanked by grassy meadows in relatively narrow floodplains appear to be most preferred by the species in Wisconsin (Ewert 1982). Similarly, Cook (1984) indicated that the species prefers hard-bottomed, gravelly or sandy streams with

clear, rapidly flowing waters. During the early spring it is often found in wooded wetland situations among common skunk-cabbage (*Symplocarpus foetidus*) and sensitive fern (*Onoclea sensibilis*) where it can be observed basking on exposed logs or other such elevated sites.
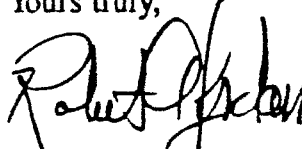
Unpublished accounts concerning the species in New Jersey indicate its preference for hibernacula located in steep, overhanging steambanks or in muskrat burrows, and selection of oviposition sites in open areas with few trees and good drainage (Farrell and Zappalorti 1979 cited in Cromartie 1982). Additionally, it is known to be found in association with an array of species, including the bog turtle (*Clemmys muhlenbergii*), painted turtle (*Chrysemys picta*), snapping turtle (*Chelydra serpentina*), and brook trout (*Salvelinus fontinalis*). These associations suggest a species of fairly wide habitat tolerances.

The species is given a State element rank of S3 by the New Jersey Natural Heritage Program indicating that it is rare in the State, but not yet imperiled. However, it is threatened by the continuing loss of its required breeding and over-wintering habitats through the clearing of wetland forests and the cleaning and straightening of small streams.

In the Borough of Roosevelt, the wetland habitats associated with Empty Box Brook appear to meet published requirements for this species of State concern. The stream channels themselves tend to be broad with well-defined banks. Several stretches of the channel are characterized by well-undercut banks with exposed roots providing suitable potential hibernation sites. The surrounding forested wetlands are relatively open with adequate available sunlight reaching the forest floor and with vegetation which provides adequate cover for the turtles.

Without a detailed census of the available habitats, it is impossible to say definitively that the Wood Turtle occurs within the Borough. However, given the quality of forested wetlands along Empty Box Brook and the history of sitings described above, it seems reasonable to conclude that there is a high probability that the Borough's wetlands provide habitat for this species of State concern. If you have any questions concerning the above information, or if I can be of any further assistance, please do not hesitate to contact me.

Yours truly,

Robert A. Jordan

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APPENDIX II

NATURAL HERITAGE DATA BASE

NATURAL LANDS MANAGEMENT

CAUTIONS AND RESTRICTIONS ON NATURAL HERITAGE DATA

The quantity and quality of data collected by the Natural Heritage Program is dependent on the research and observations of many individuals and organizations. Not all of this information is the result of comprehensive or site-specific field surveys. Some natural areas in New Jersey have never been thoroughly surveyed. As a result, new locations for plant and animal species are continuously added to the data base. Since data acquisition is a dynamic, ongoing process, the Natural Heritage Program cannot provide a <u>definitive</u> statement on the presence, absence, or condition of biological elements in any part of New Jersey. Information supplied by the Natural Heritage Program summarizes existing data known to the program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. The attached data is provided as one source of information to assist others in the preservation of natural diversity.

This office cannot provide a letter of interpretation or a statement addressing the classification of wetlands as defined by the Freshwater Wetlands Act. Requests for such determination should be sent to the DEP Division of Coastal Resources, Bureau of Freshwater Wetlands, CN 402, Trenton, NJ 08625.

This cautions and restrictions notice must be included whenever information provided by the Natural Heritage Database is published.

GENERAL VICINITY OF PROJECT SITE
RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN
THE NEW JERSEY NATURAL HERITAGE DATABASE

NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK	DATE OBSERVED	IDENT.
*** Vertebrates								
AMMODRAMUS SAVANNARUM	GRASSHOPPER SPARROW		T/T		G4	S2	1987-SUMMR	Y
AMMODRAMUS SAVANNARUM	GRASSHOPPER SPARROW		T/T		G4	S2	1987-SUMMR	Y
AMMODRAMUS SAVANNARUM	GRASSHOPPER SPARROW		T/T		G4	S2	1987-SUMMR	Y
AMMODRAMUS SAVANNARUM	GRASSHOPPER SPARROW		T/T		G4	S2	1987-SUMMR	Y
AMMODRAMUS SAVANNARUM	GRASSHOPPER SPARROW		T/T		G4	S2	1988-SUMMER	Y
BARTRAMIA LONGICAUDA	UPLAND SANDPIPER		E		G5	S1	1975-??-??	Y
BARTRAMIA LONGICAUDA	UPLAND SANDPIPER		E		G5	S1	1983-05-14	Y
CLEMMYS INSCULPTA	WOOD TURTLE		T		G5	S3	1983-03-24	
CLEMMYS INSCULPTA	WOOD TURTLE		T		G5	S3	1978-SUMMR	Y
CLEMMYS INSCULPTA	WOOD TURTLE		T		G5	S3	1987-05-31	Y
CLEMMYS INSCULPTA	WOOD TURTLE		T		G5	S3	1987-05-13	Y
CLEMMYS MUHLENBERGII	BOG TURTLE	C2	E		G3	S2	1979-04-27	
CLEMMYS MUHLENBERGII	BOG TURTLE	C2	E		G3	S2	1990-06-19	Y
MELANERPES ERYTHROCEPHALUS	RED-HEADED WOODPECKER		T/T		G5	S3	1986-05-30	
PASSERCULUS SANDWICHENSIS	SAVANNAH SPARROW		T/T		G5	S2	1988-SUMMER	Y
PODILYMBUS PODICEPS	PIED-BILLED GREBE		E/S		G5	S1	1983-07-??	Y
POOECETES GRAMINEUS	VESPER SPARROW		E		G5	S2	1981-??-??	Y
POOECETES GRAMINEUS	VESPER SPARROW		E		G5	S2	1988-SUMMER	Y
STRIX VARIA	BARRED OWL		T/T		G5	S3	1984-05-??	Y

19 Records Processed

EXPLANATIONS OF CODES USED IN NATURAL HERITAGE REPORTS

FEDERAL STATUS CODES

The following U.S. Fish and Wildlife Service categories and their definitions of endangered and threatened plants and animals have been modified from the U.S. Fish and Wildlife Service (F.R. Vol. 50 No. 188; Vol. 55, No. 35; F.R. 50 CFR 17.11 and 17.12). Federal Status codes reported for species follow the most recent listing.

LE Taxa formally listed as endangered.

LT Taxa formally listed as threatened.

PE Taxa already proposed to be formally listed as endangered.

PT Taxa already proposed to be formally listed as threatened.

C1 Taxa for which the Service currently has on file substantial information on biological vulnerability and threat(s) to support the appropriateness of proposing to list them as endangered or threatened species.

C1* Taxa which may be possibly extinct (although persuasive documentation of extinction has not been made--compare to 3A status).

C2 Taxa for which information now in possession of the Service indicates that proposing to list them as endangered or threatened species is possibly appropriate, but for which substantial data on biological vulnerability and threat(s) are not currently known or on file to support the immediate preparation of rules.

C3 Taxa that are no longer being considered for listing as threatened or endangered species. Such taxa are further coded to indicate three subcategories, depending on the reason(s) for removal from consideration.

3A Taxa for which the Service has persuasive evidence of extinction.

3B Names that, on the basis of current taxonomic understanding, do not represent taxa meeting the Act's definition of "species".

3C Taxa that have proven to be more abundant or widespread than was previously believed

S   Stable species-a species whose population is not undergoing any long-term increase/decrease within its natural cycle.

U   Undetermined species-a species about which there is not enough information available to determine the status.

Status for animals separated by a slash(/) indicate a duel status. First status refers to the state breeding population, and the second status refers to the migratory or winter population.

Plant taxa listed as endangered are from New Jersey's official Endangered Plant Species List N.J.S.A. 131B-15.151 et seq.

E   Native New Jersey plant species whose survival in the State or nation is in jeopardy.

REGIONAL STATUS CODES FOR PLANTS

LP   Indicates taxa listed by the Pinelands Commission as endangered or threatened within their legal jurisdiction. Not all species currently tracked by the Pinelands Commission are tracked by the Natural Heritage Program. A complete list of endangered and threatened Pineland species is included in the New Jersey Pinelands Comprehensive Management Plan.

EXPLANATION OF GLOBAL AND STATE ELEMENT RANKS

The Nature Conservancy has developed a ranking system for use in identifying elements (rare species and natural communities) of natural diversity most endangered with extinction. Each element is ranked according to its global, national, and state (or subnational in other countries) rarity. These ranks are used to prioritize conservation work so that the most endangered elements receive attention first. Definitions for element ranks are after The Nature Conservancy (1982: Chapter 4, 4.1-1 through 4.4.1.3-3).

area of the state. Also included are elements which were formerly more abundant, but because of habitat destruction or some other critical factor of its biology, they have been demonstrably reduced in abundance. In essence, these are elements for which, even with intensive searching, sizable additional occurrences are unlikely to be discovered.

S2 Imperiled in New Jersey because of rarity (6 to 20 occurrences). Historically many of these elements may have been more frequent but are now known from very few extant occurrences, primarily because of habitat destruction. Diligent searching may yield additional occurrences.

S3 Rare in state with 21 to 100 occurrences (plant species in this category have only 21 to 50 occurrences). Includes elements which are widely distributed in the state but with small populations/acreage or elements with restricted distribution, but locally abundant. Not yet imperiled in state but may soon be if current trends continue. Searching often yields additional occurrences.

S4 Apparently secure in state, with many occurrences.

S5 Demonstrably secure in state and essentially ineradicable under present conditions.

SA Accidental in state, including species (usually birds or butterflies) recorded once or twice or only at very great intervals, hundreds or even thousands of miles outside their usual range; a few of these species may even have bred on the one or two occasions they were recorded; examples include european strays or western birds on the East Coast and visa-versa.

SE Elements that are clearly exotic in New Jersey including those taxa not native to North America (introduced taxa) or taxa deliberately or accidentally introduced into the State from other parts of North America (adventive taxa). Taxa ranked SE are not a conservation priority (viable introduced occurrences of G1 or G2 elements may be exceptions).

SH Elements of historical occurrence in New Jersey. Despite some searching of historical occurrences and/or potential habitat, no extant occurrences are known. Since not all of the historical occurrences have been field surveyed, and unsearched potential habitat remains, historically ranked taxa are considered possibly extant, and remain a conservation priority for continued field work.

.1   Elements documented from a single location.

Note: To express uncertainty, the most likely rank is assigned and a question mark added (e.g., G2?).
A range is indicated by combining two ranks (e.g., G1G2, S1S3).

IDENTIFICATION CODES

These codes refer to whether the identification of the species or community has been checked by a
reliable individual and is indicative of significant habitat.

Y   Identification has been verified and is indicative of significant habitat.

BLANK   Identification has not been verified but there is no reason to believe it is not
indicative of significant habitat.

?   Either it has not been determined if the record is indicative of significant habitat or
the identification of the species or community may be confusing or disputed.

DEFINITION OF ACRONYMS

FEDERAL STATUS

LE=listed endangered.
LT=listed threatened.
PE=proposed endangered.
PT=proposed threatened.
C2=candidate for listing.

STATE STATUS

LE=listed as endangered. (short-eared owl winter pop. listed as
      stable:S)
LT=listed as threatened.

COUNTY OCCURRENCE

Y=present year-round, breeds.
N=present year-round, not recorded breeding.
B=present during the summer, breeds.
W=present during the winter.
T=present as a transient.
?=present status undetermined.
*=indicates that the county is within the species known breeding
   range.

NEW JERSEY NATURAL HERITAGE PROGRAM
POTENTIAL THREATENED AND ENDANGERED VERTEBRATE SPECIES
IN MONMOUTH COUNTY

AMERICAN BITTERN   FEDERAL STATUS: COUNTY
BOTAURUS LENTIGINOSUS   STATE STATUS: LT   OCCURRENCE: ?

HABITAT COMMENTS
Fresh water bogs, swamps, wet fields, cattail and bulrush
marshes, brackish and saltwater marshes and meadows.

BALD EAGLE   FEDERAL STATUS: LELT COUNTY
HALIAEETUS LEUCOCEPHALUS   STATE STATUS: LE   OCCURRENCE: T*

HABITAT COMMENTS
Primarily near seacoasts, rivers, and large lakes.

BARRED OWL   FEDERAL STATUS: COUNTY
STRIX VARIA   STATE STATUS: LT   OCCURRENCE: Y

HABITAT COMMENTS
Dense woodland and forest (conif. or hardwood), swamps, wooded
river valleys, cabbage palm-live oak hammocks, especially where
bordering streams, marshes, and meadows.

BLACK RAIL   FEDERAL STATUS: COUNTY
LATERALLUS JAMAICENSIS   STATE STATUS: LT   OCCURRENCE: B

HABITAT COMMENTS
Salt, brackish, and freshwater marshes, wet meadows, and grassy
swamps.

BLACK SKIMMER   FEDERAL STATUS: COUNTY
RYNCHOPS NIGER   STATE STATUS: LE   OCCURRENCE: B

HABITAT COMMENTS
Primarily coastal waters, including bays, estuaries, lagoons and
mudflats in migration and winter.

BOBOLINK   FEDERAL STATUS: COUNTY
DOLICHONYX ORYZIVORUS   STATE STATUS: LT   OCCURRENCE: B

HABITAT COMMENTS
Tall grass areas, flooded meadows, prairie, deep cultivated
grains, alfalfa and clover fields. In migration and winter also
in rice fields, marshes, and open woody areas.

BOG TURTLE
CLEMMYS MUHLENBERGII

FEDERAL STATUS: C2   COUNTY
STATE STATUS: LE   OCCURRENCE: Y

HABITAT COMMENTS
Slow, shallow rivulets of sphagnum bogs, swamps, and marshy meadows; sea level to 1200 m in Appalachians. Commonly basks on tussocks in morning in spring and early summer. Hibernates in subterreanean rivulet or seepage area.

COOPER'S HAWK
ACCIPITER COOPERII

FEDERAL STATUS: COUNTY
STATE STATUS: LE   OCCURRENCE: W*

HABITAT COMMENTS
Primarily mature forest, either broadleaf or coniferous, mostly the former; also open woodland and forest edge.

GRASSHOPPER SPARROW
AMMODRAMUS SAVANNARUM

FEDERAL STATUS: COUNTY
STATE STATUS: LT   OCCURRENCE: B

HABITAT COMMENTS
Prairie, old fields, open grasslands, cultivated fields, savanna.

GREAT BLUE HERON
ARDEA HERODIAS

FEDERAL STATUS: COUNTY
STATE STATUS: LT   OCCURRENCE: N*

HABITAT COMMENTS
Freshwater and brackish marshes, along lakes, rivers, bays, lagoons, ocean beaches, mangroves, fields, and meadows.

LEAST TERN
STERNA ANTILLARUM

FEDERAL STATUS: COUNTY
STATE STATUS: LE   OCCURRENCE: B

HABITAT COMMENTS
Seacoasts, beaches, bays, estuaries, lagoons, lakes, and rivers.

LOGGERHEAD SHRIKE
LANIUS LUDOVICIANUS MIGRANS

FEDERAL STATUS: C2   COUNTY
STATE STATUS: LE   OCCURRENCE: W

HABITAT COMMENTS
"Open country with scattered trees and shrubs, savanna, desert scrub and, occasionally, open woodland, often found on poles, wires or fenceposts (Tropical to Temperate zones)".

2

MERLIN   FEDERAL STATUS: COUNTY
FALCO COLUMBARIUS   STATE STATUS: LT   OCCURRENCE: W

HABITAT COMMENTS
During the breeding season inhabits coniferous or deciduous open
woodlands, wooded prairies. At other times of the year found in a
wide variety of habitats including: marshes and deserts,
seacoasts, open woodlands, fields, etc.

MUD SALAMANDER   FEDERAL STATUS: COUNTY
PSEUDOTRITON MONTANUS   STATE STATUS: LT   OCCURRENCE: ?

HABITAT COMMENTS
Muddy springs, slow floodplain streams, and swamps along slow
streams. Nonlarval forms usually found beneath logs and rocks, in
decaying vegetation, and in muddy stream-bank burrows.
Occasionally disperses from wet muddy areas.

NORTHERN HARRIER   FEDERAL STATUS: COUNTY
CIRCUS CYANEUS   STATE STATUS: LE   OCCURRENCE: Y

HABITAT COMMENTS
Marshes, meadows, grasslands, and cultivated fields. Perches on
ground or on stumps or posts.

OSPREY   FEDERAL STATUS: COUNTY
PANDION HALIAETUS   STATE STATUS: LT   OCCURRENCE: B

HABITAT COMMENTS
Primarily along rivers, lakes, and seacoasts, occurring widely in
migration, often crossing land between bodies of water.

PIED-BILLED GREBE   FEDERAL STATUS: COUNTY
PODILYMBUS PODICEPS   STATE STATUS: LE   OCCURRENCE: Y

HABITAT COMMENTS
Lakes, ponds, sluggish streams, and marshes; in migration and in
winter also in brackish bays and estuaries.

PINE BARRENS TREEFROG   FEDERAL STATUS: C2   COUNTY
HYLA ANDERSONII   STATE STATUS: LE   OCCURRENCE: Y

HABITAT COMMENTS
Swamps, ponds, cranberry bogs, and other wetland habitat. Post-
breeding habitat the surrounding woodlands.

PINE SNAKE   FEDERAL STATUS: COUNTY
PITUOPHIS MELANOLEUCUS   STATE STATUS: LT   OCCURRENCE: Y

HABITAT COMMENTS
Lowlands to mountains; desert, prairie, brushland, woodland, open
coniferous forest, farmland, marshes. Terrestrial, fossorial, and
arboreal. Underground in cold weather.

PIPING PLOVER   FEDERAL STATUS: LELT COUNTY
CHARADRIUS MELODUS   STATE STATUS: LE   OCCURRENCE: B

HABITAT COMMENTS
Sandy beaches, especially where scattered grass tufts are
present, sparsely vegetated shores and islands of shallow lakes,
ponds, and impoundments. In migration and winter also mudflats,
flooded fields.

RED-SHOULDERED HAWK   FEDERAL STATUS: COUNTY
BUTEO LINEATUS   STATE STATUS: LT   OCCURRENCE: Y

HABITAT COMMENTS
Moist and riverine forest, and in e. N. Am. in wooded swamps,
foraging in forest edge and open woodland.

ROSEATE TERN   FEDERAL STATUS: PEPT COUNTY
STERNA DOUGALLII   STATE STATUS: LE   OCCURRENCE: B

HABITAT COMMENTS
Seaccasts, bays, estuaries.

SAVANNAH SPARROW   FEDERAL STATUS: COUNTY
PASSERCULUS SANDWICHENSIS   STATE STATUS: LT   OCCURRENCE: Y

HABITAT COMMENTS
"Open areas, especially grasslands, tundra, meadows, bogs,
farmlands, grassy areas with scattered bushes, and marshes,
including salt marshes in the BELDINGI and ROSTRATUS groups
(Subtropical and Temperate zones)".

SHORT-EARED OWL   FEDERAL STATUS: COUNTY
ASIO FLAMMEUS   STATE STATUS: LE/S   OCCURRENCE: W*

HABITAT COMMENTS
Open country, including prairie, meadows, tundra, moorlands,
marshes, savanna, dunes, fields, and open woodland. Roosts by day
on ground or on low open perches.

TIMBER RATTLESNAKE

FEDERAL STATUS: COUNTY

CROTALUS HORRIDUS

STATE STATUS: LE   OCCURRENCE: Y

HABITAT COMMENTS
Wooded rocky hillsides in north; swampy areas, canebrake thickets, and floodplains in south. Near streams in late summer in some areas (B83DEG01NA). Often hibernates in burrows and crevices of rock outcroppings.

UPLAND SANDPIPER

FEDERAL STATUS: COUNTY

BARTRAMIA LONGICAUDA

STATE STATUS: LE   OCCURRENCE: B

HABITAT COMMENTS
Grasslands, especially prairies, dry meadows, pastures, and (in Alaska) scattered woodlands at timberline; very rarely in migration along shores and mudflats.

VESPER SPARROW

FEDERAL STATUS: COUNTY

POOECETES GRAMINEUS

STATE STATUS: LE   OCCURRENCE: Y

HABITAT COMMENTS
"Plains, prairie, dry shrublands, savanna, weedy pastures, fields, sagebrush, arid scrub and woodland clearings".

WOOD TURTLE

FEDERAL STATUS: COUNTY

CLEMMYS INSCULPTA

STATE STATUS: LT   OCCURRENCE: Y

HABITAT COMMENTS
Vicinity of streams and rivers. In streams and in wooded areas and fields adjacent to streams in summer. In streams in spring and fall. Hibernates in banks or bottoms of streams in winter.

NATURAL RESOURCES INVENTORY
BOROUGH OF ROOSEVELT
PHASES II & III

Prepared by

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NATURAL RESOURCES INVENTORY
BOROUGH OF ROOSEVELT
PHASES II & III

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GOALS

The comprehensive resources analysis of Roosevelt Borough involved three phases. The goal of the first phase was to develop a set of overlay maps for the Environmental Commission of the Borough. The descriptions, sources of information and interpretation of those maps were provided in the first report. The goal of the second phase was to elaborate on the first phase's natural resource data, and to add cultural resource information. The details of the second phase are outlined in this report. The third phase involves the synthesis of findings from phases one and two into a set of guidlines that will be useful in planning for Roosevelt's future growth. These recommendations are found at the conclusion of this report.

APPROACH

A team of ecology and landscape architecture students participated in collecting and analyzing information for presentation to the Roosevelt Environmental Commission under the direction of Dr. Jean Marie Hartman, Department of Landscape Architecture, Cook College, Rutgers - The State University. The data collected falls broadly into two separate categories: natural resources and cultural resources. Whenever possible, information was represented on maps. These maps were digitized onto a geographic information system (GIS) and then used to analyze the location of significant resources within the borough. Use of GIS technology is new to municipalities. This study was used to test the applicability of GIS to resource inventory and planning at the municipal scale. Roosevelt was an excellent test case because of its complex environmental system, its cultural features, and its small size.

This report summarizes and interprets the results of our efforts in two separate sections. A final section includes specific recommendations for use of this information by various municipal commissions and boards.

-i-

ACKNOWLEDGEMENTS

BACKGROUND

Geographic Information Systems (GIS)

Geographic information systems (GIS) are made up of groups of computer programs that can store, analyze and display spatial information. Spatial information refers to any type of information that can be mapped. A GIS database is a powerful tool for analyzing and mapping landscape characteristics.

The work described in this report relied on GRASS, the Geographical Resources Analysis Support System. This software is "Public Domain" and available through:

> Grass Information Center
> U.S. Army CERL
> P.O. Box 9005
> Champaign, Illinois 61826-9005
>
> (217)373-7220

We used the computer facilities at the Cook College Remote Sensing Center, Rutgers - The State University of New Jersey.

The four basic steps in using this system are:

1.) **input information**
Maps can be input to the computer system as digital data (such as the output from a satellite) or by digitizing existing maps. Each type of information is entered as a separate layer. For example, five of the Roosevelt layers are the boundary, soils, vegetation, property lines, and roads.

2.) **align information**
Maps of the same area cannot always be overlaid onto one another because of discrepencies in the survey or base-map used to produce them. The computer can re-align the maps so that landmarks such as road intersections, buildings, etc. can be precisely overlaid. In the Roosevelt data, the topography was based on a U.S. Geologic Survey quad map whereas the vegetation was based on aerial photos.

These sources of information were not only
at different scales, but after they were
reduced and enlarged to the same scale
they could not be laid over each other so
that the roads would line up. The
computer system includes software that
"stretches" the maps over the same base so
that the information from different
sources can be aligned.

3.) **look for patterns**
     The next phase analyzes the information on
     various combinations of map layers. For
     instance, we looked for the relationship
     between soil types and vegetation or
     between slope and soil erodibility.

4.) **model**
     GIS allows the use of observed patterns to
     predict potential scenarios for the
     future. For instance, wetland regulations
     will prevent development of property in
     wetlands and highly regulate property
     within a surrounding buffer. By mapping
     the location of wetlands and buffer zones,
     we can show areas where development is
     restricted.

The great benefit of GIS is that a variety of scenarios can
easily be explored. This allows a planner to study the
effects of changing regulations and land use patterns.

The danger of GIS is that convincing models can be put
together to meet almost any goal. In each case where a map is
presented, it is important to understand what information was
used, how exactly it was combined and how it was categorized
in order to judge the validity of the results.

SECTION I:

NATURAL RESOURCES

The following natural resources were inventoried and mapped
during the first phase of this study:
- soils and slope
- vegetation
- streams
- wetlands

Maps illustrating this information were digitized for GIS
during this study.

The vegetation types designated in phase I were broad habitat
categories which included several community types. In phase
II, these designations were expanded to more detailed
descriptions based on dominant species in the canopy and
understory.

The field technique used in gathering the detailed information
is called "Vegetation Entitation". This phase of mapping
occurred during April 1993. During the field survey,
management concerns such as dumping and invasive species were
also identified for these units. The detailed vegetation
information was combined with the natural resource maps noted
above, using GIS. Analysis of these maps provided a basis for
animal habitat assessment.

Vegetation Entitation

Methods

A vegetation survey method from the New York City Department
of Parks and Recreation called "entitation" was borrowed and
modified for this project. Entitation is a method for
describing and delineating discrete vegetative "entities" or
units. Teams of two students would begin by first walking
through a portion of the forest and deciding where one
community type changes into another. Communities were defined
as a successional stage or vegetation formation (e.g. meadow,
woodland, forest) with a distinct species composition.

Criteria for these decisions are outlined on a worksheet (see
Appendix A) which the teams used to document overall
formation, understory vegetation, as well as dominant and
associated species. The vegetation of an area must remain
true to these characteristics in order to be included within
the boundaries of a single unit.

Blueprints of aerial photos of Roosevelt were used for mapping
the approximate boundaries of these units. North lines were

drawn onto the photos so that compasses could be used in the field to check location relative to visible landmarks such as roads, houses, or even individual trees. A species list of common plants and animals encountered within a unit was also completed.

The finished entitation map on the air photo was redrafted onto a mylar basemap of the borough and reduced to a 1":400' scale. This map was then digitized onto the GIS at the Cook College Remote Sensing Laboratory. All analyses on the GIS were performed using the GRASS system program.

<u>Results</u>

The first entitation map (Map 1a) represents Roosevelt with 167 distinct units, including areas such as housing and a few anomalous designations for a sand pit and bamboo stand. Although each entitation unit represents an area of vegetation distinct from areas immediately adjacent to it, a unit type may occur repeatedly in disjunct areas throughout Roosevelt. For example, a bottomland forest with a predominantly red maple canopy and an understory of spicebush characterizes several units of forest cover across Roosevelt. In order to easily interpret the landscape and resources of the borough, it was desirable to consolidate structurally and functionally similar habitat under a single category. To accomplish this, a series of regroupings or reclassifications were undertaken using GRASS. The units were first reclassified according to formation, dominant canopy species, and understory vegetation. This reclassification resulted in 57 community categories (Map 1b). Only the categories of formation and dominant species were selected for a second round of reclassification which resulted in 27 categories (Map 1c). A third and final regrouping resulted in 10 categories of formation (Map 1d); this corresponds well with the map generated during Phase I.

Various analyses of spatial data were performed using GRASS. For example, Roosevelt contains 1197.9 acres on the digitized map; the majority of this area is forested. An analysis of cover by formation and dominant species reveals, that of the forested areas, 40 percent or 246 acres are dominated by red maple and 19 percent by sweetgum. Since these two canopy trees are more often present in association with each other than in monospecific stands, nearly 60 percent of Roosevelt's forests are wet bottomlands of red maple and sweetgum.

Understory vegetation may vary beneath this canopy: wetter areas contain mostly herbaceous vegetation such as skunk

MAP 1A

Entitation

MAP 1B

Scale 1 : 20,000

Legend

- □ no data
- ▫ Forest—Aspen
- ▣ Forest—Beech
- ▣ Forest—Cherry
- ▣ Forest—Black Birch
- ▣ Forest—Blacklocust
- ▪ Forest—Juniper
- ▪ Forest—PinOak
- ▪ Forest—Pine
- ▪ Forest—Red Maple
- ▣ Forest—Red Oak
- ▪ Forest—Sassafras
- ▣ Forest—Sweet Gum
- ▣ Forest—Tulip Poplar
- ▣ Forest—White Oak
- ▣ Forest—Yellow Birch
- ▣ Scrub—Trees
- ▣ Scrub—shrubs
- ▪ Scrub—Juniper
- ▪ Herbs/Grass—Dry
- ▪ Herbs/Grass—Wet
- ▪ Vineland
- ▪ Bamboo
- ▪ Lawn
- ▪ Agricultural
- ▪ Meadow
- ▪ Sand Pit
- ▪ Pond
- — Municipal Boundary
- — Property Lines
- — Roads

Vegetation Reclass #2

MAP 1C

1) Forest
2) Scrub
3) Herbs/grass
4) Vineland
5) Bamboo
6) Lawn
7) Agricultural
8) Meadow
9) Sand Pit
10) Pond

1   2   3   4   5   6   7   8   9   10

Scale 1 : 20,000

Vegetation Reclass #3

MAP 1D

1) Forest
2) Meadow, Scrub and Lawn
3) Agricultural
4) Pond

Scale 1 : 20,000

1   2   3   4

Vegetation Reclass #4

cabbage while less saturated areas contain a shrub layer of spicebush and arrowwood.

Less than a quarter of the forested areas are upland stands. Of these, red oak associations account for 119 acres and black birch comprises roughly 40 acres. These drier forests tend to be more diverse in composition and have fairly open understories.

Disturbances and management concerns were evaluated in the field for each unit and this information has also been incorporated into the GIS. For each sample unit, the survey teams noted if ther was any evidence of these problems. Four main categories exist: dumping, invasive/exotic species, herbivory, and erosion/compaction.

> **Dumping** was defined to include excessive litter or trash, piles of yard waste, construction materials, and any other extraordinary deposits such as car batteries or furniture.

> The observation of **exotic or potentially invasive species** earned mention as a management concern. No standard of abundance for such species was followed here and a unit under this category is not necessarily threatened by species turnover or decreased diversity. The purpose was to indicate presence or absence and, given the management problems posed by these species in other parks and municipalities, provide the opportunity to investigate possible removal of individuals from vulnerable areas. Species include Norway maple, Japanese barberry, Phragmites, Japanese knotweed, mugwort, Japanese honeysuckle and catbriar.

> **Herbivory** was listed when deer browse was so intense that woody species were not able to reproduce.

> **Erosion/compaction**, typically associated with the above categories, was defined most often by hooves or vehicular traffic, especially on slopes, as well as by the presence of excavations.

MAP 2
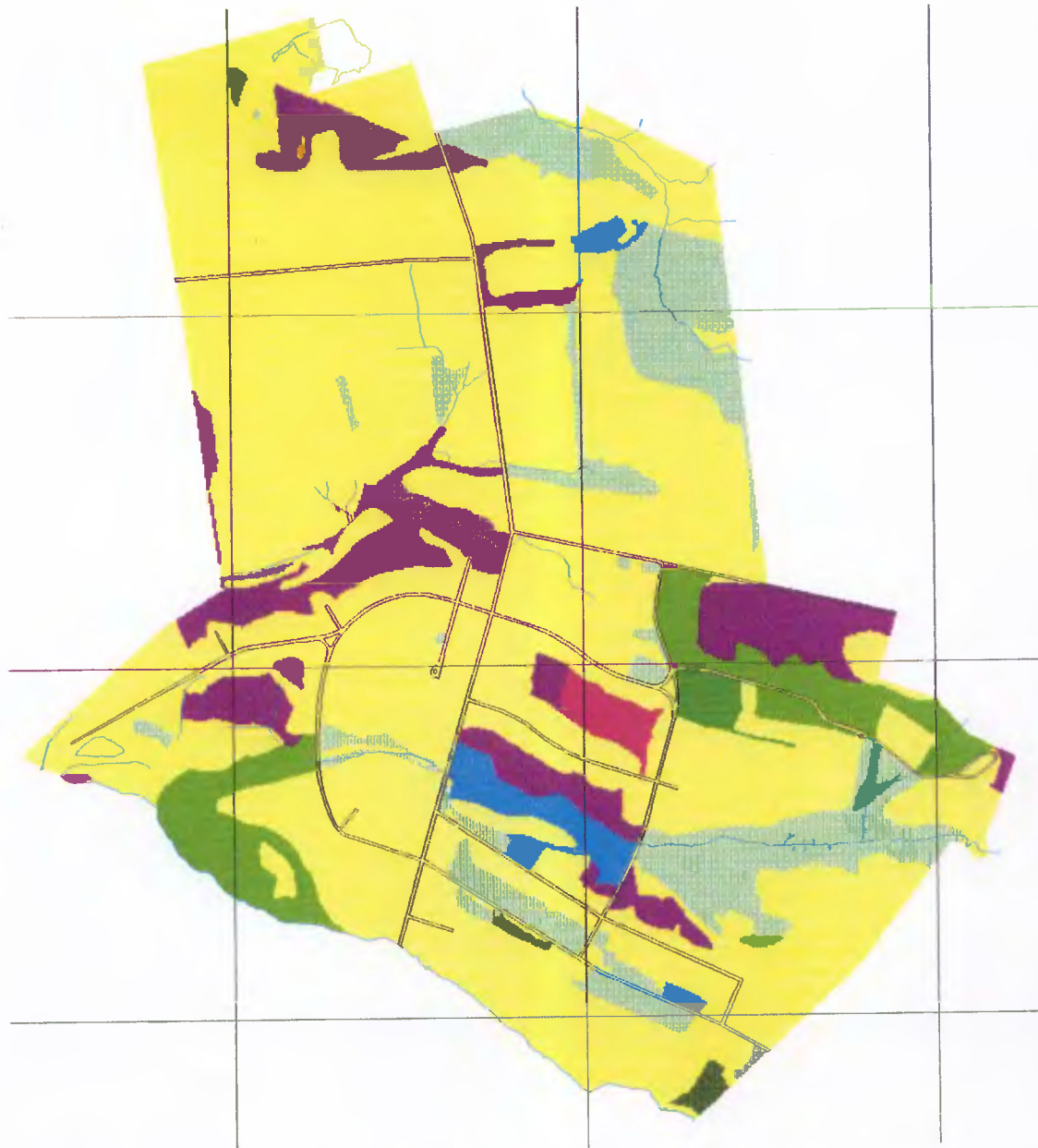
1) None reported
2) Erosion
3) Compaction
4) Dumping
5) Herbivory
6) Invasive species
7) Erosion, Compaction and Herbivory
8) Erosion, Compaction and Invasives
9) Dumping and Invasives
10) Herbivory and Invasives

1   2   4   5   6   7   8   9   10

Scale 1 : 20,000

Disturbance

These management concerns are presented on Map 2. The
reclassification on the GIS shows where these existed alone or
in combination. Caution should be used when interpreting this
map. Because the area that is shaded is defined by community
formation and not by the actual space occupied by an invasive
species or dump site, the impression of the magnitude of the
problem is exaggerated. It is also important to point out
that some types of dumped materials such as wood panels and
boards may enhance habitat for reptiles and amphibians.

Roosevelt's natural areas are by and large in good shape -- no
problems were reported in the largest category, i.e. areas
colored yellow. Invasives alone and invasives in combination
with dumping are the prevalent problem categories.

Wildlife Habitat Assessment

Phase I of the Natural Resources Inventory for Roosevelt
describes in general terms the species of wildlife that may
occur within the borough. Phase I also makes note of the
possible occurrence of New Jersey State threatened and
endangered species within the borough.

Methods

Time constraints prevented us from performing sampling of
animal populations for habitat assessment of the entire
borough. However, we can draw some generalizations from the
detailed vegetation survey and analysis using the GIS.

Since over half the borough still contains natural areas, it
provides a relatively large amount of wildlife habitat. Even
more importantly, these tend to be a few fairly large areas,
rather than many small patches. This enhances their value for
species that require such large contiguous areas. Finally,
Roosevelt's proximity to the Assunpink Wildlife Management
Area also results in increased value for wildlife.

For this phase of the project, we used the GIS to characterize
the location of potential habitat for the two threatened
species, the Wood Turtle (*Clemmys insculpta*) and the Barred
Owl (*Strix varia*) that have historically been recorded in the
vicinity. In addition, we used the GIS to model habitat
appropriate for mink (*Mustela vison*), an indicator species of
floodplain forests. Finally, we identified the extent of
forest-field edges, an important habitat component in a
community (Mapset 3).

MAP 3A

N
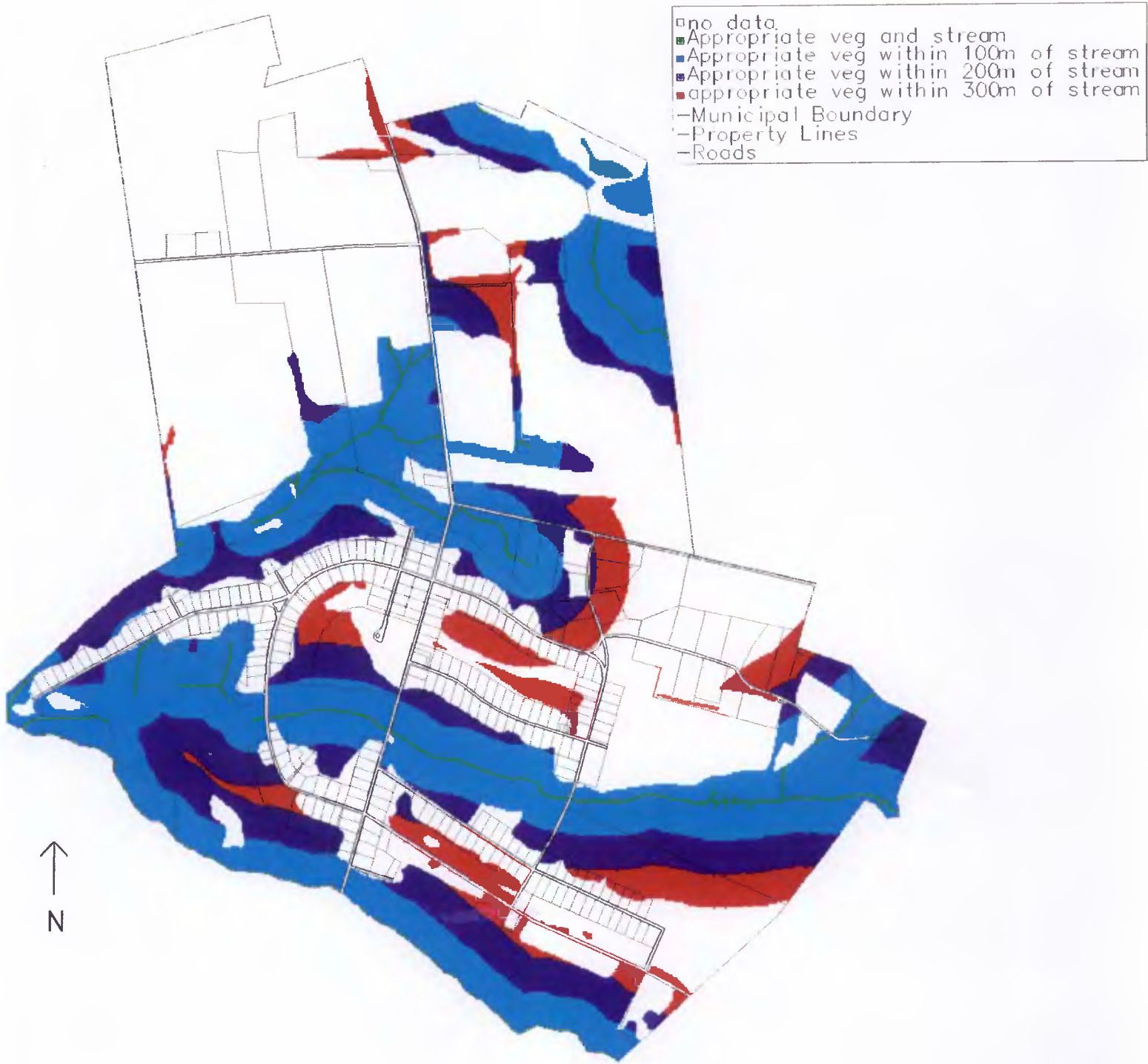
Potential Wood Turtle Habitat

MAP 3B

Potential Barred Owl Habitat

MAP 3C

Legend:
- wetlands and wet forests
- Municipal Boundary
- Property Lines
- Roads

N

0   1 kilometers

Potential Mink Habitat

MAP 3D

Legend:
- no data
- Forest
- Field
- 25 m from edge
- 50 m from edge
- Municipal Boundary
- Property Lines
- Roads

N
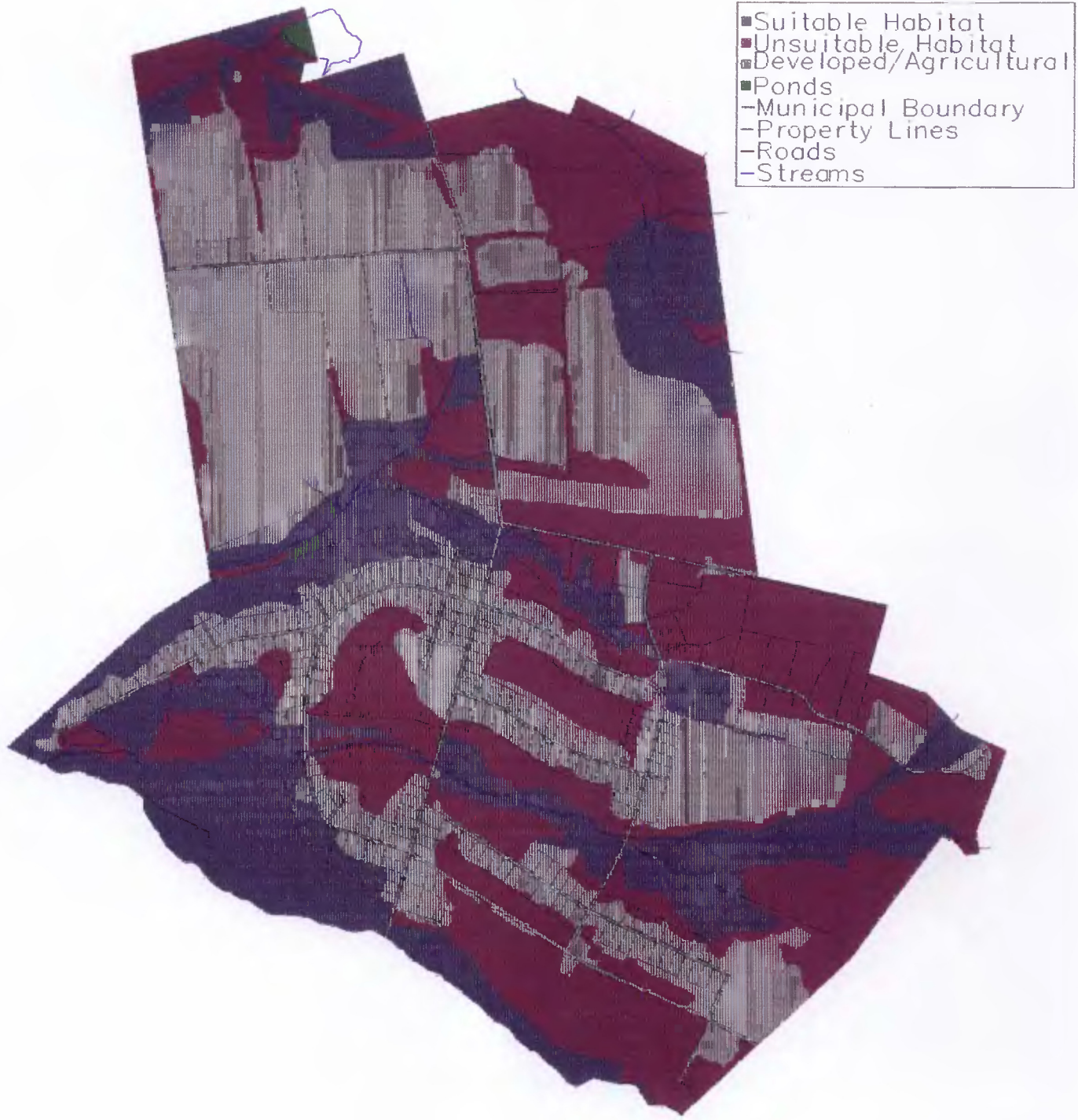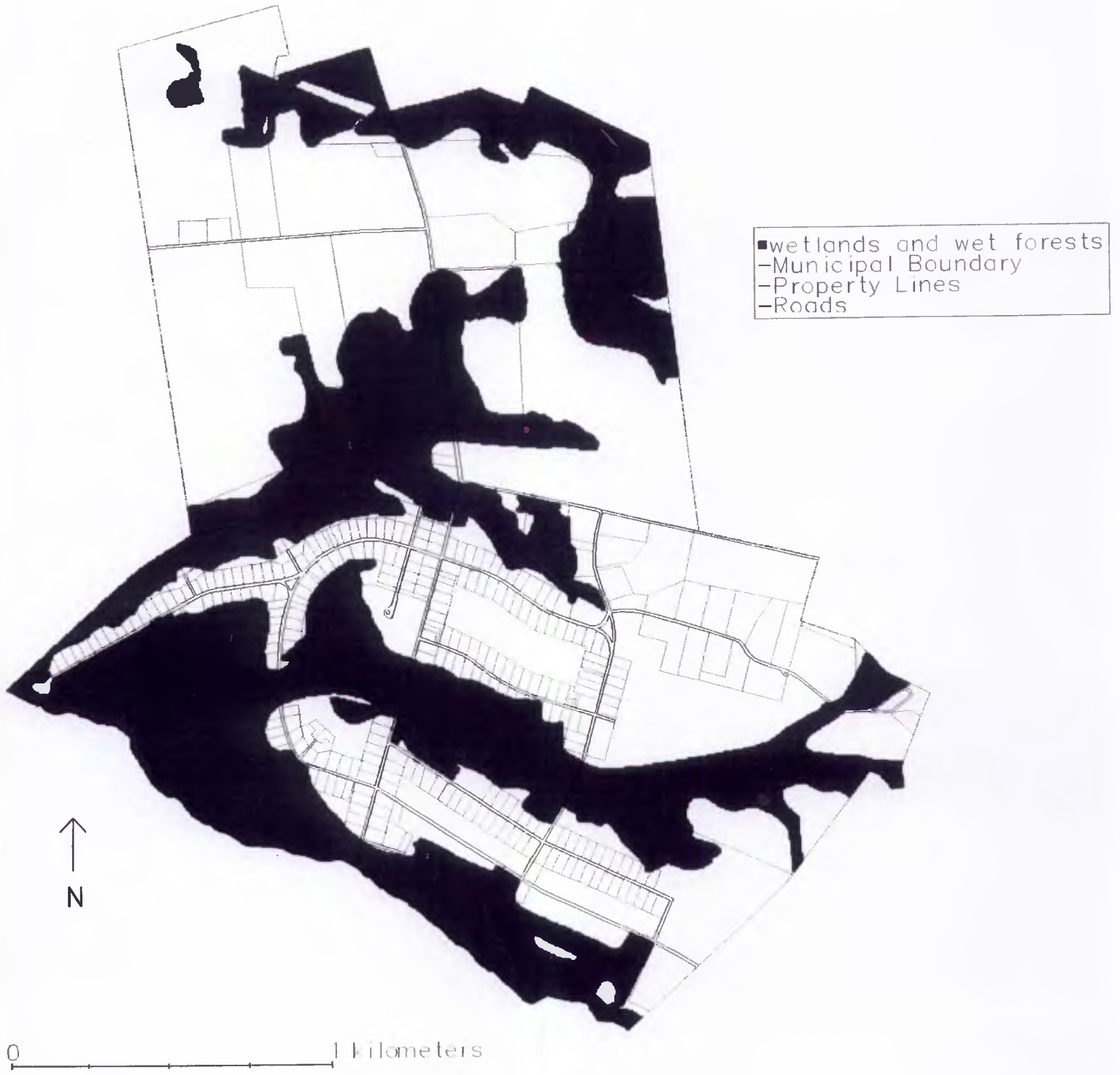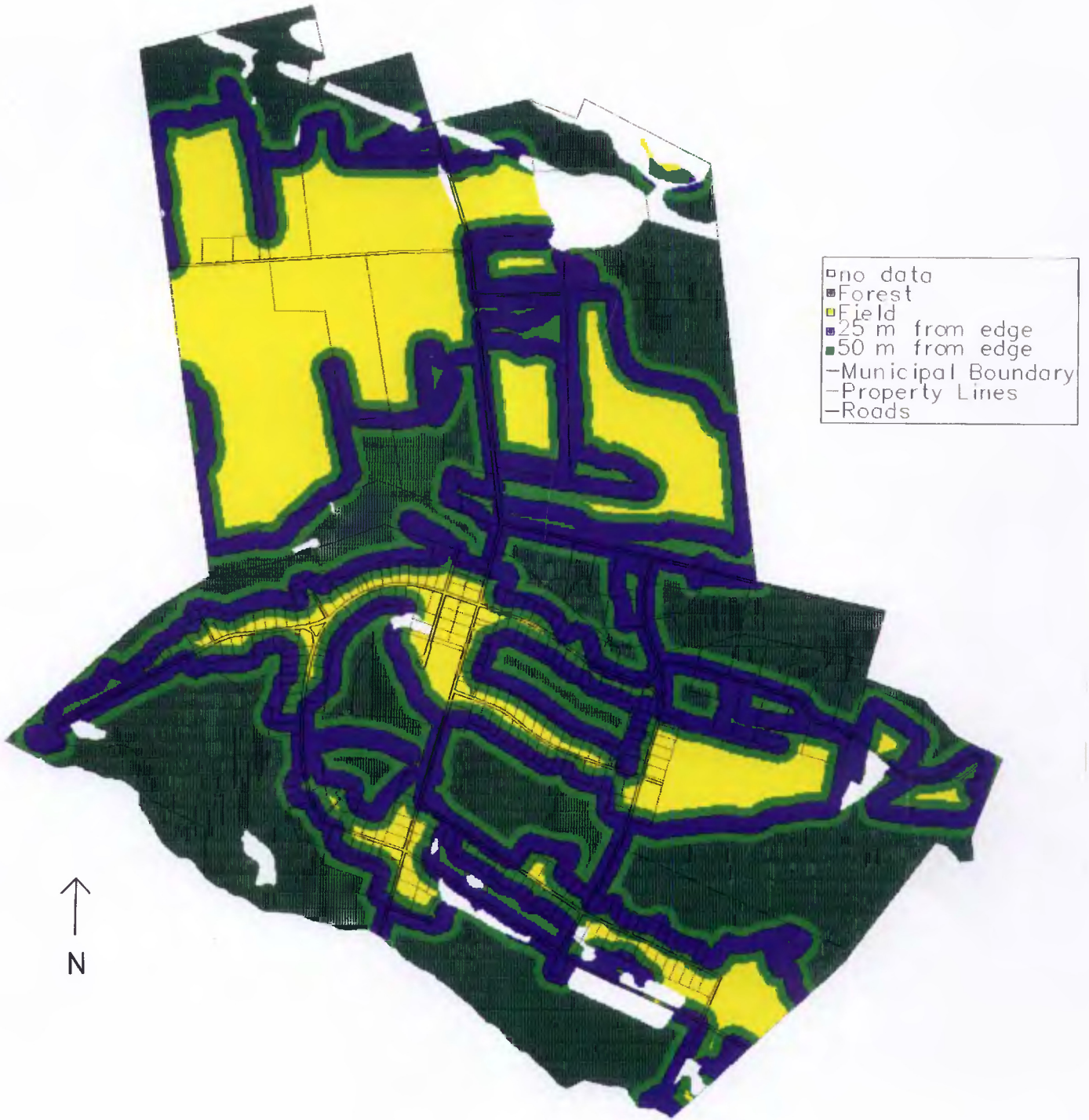
Edge Habitat

Results

Wood Turtle

Wood Turtles are officially listed as threatened by the state
of New Jersey. A summary of Wood Turtle information (Holt
1993) indicates that this species requires two habitat
components: small flowing streams for mating and hibernation,
and any of a variety of terrestrial habitats at other times.
These terrestrial habitats can include forests, fields, and
even agricultural areas. A recent study (Holt 1993) comparing
Wood Turtle sites and typical wetland sites show that this
species prefer streams adjacent to fairly open wooded areas.

Potential Wood Turtle habitat was identified using the GIS
database, combining stream and vegetation data to map those
areas which may be turtle habitat (Map 3a). A 150 meter
buffer was placed around all streams within the borough. This
buffer was then matched with areas of wooded vegetation and
fields which appear to correspond with Wood Turtle
requirements. Of the identified areas, several small isolated
patches deemed unlikely were removed from the map.

The main areas that were identified include the wooded areas
and greenbelts along Assunpink Creek and Empty Box Brook.
These areas correspond to those in which Wood Turtles have
been sighted in the borough in the past. A dead Wood Turtle
was found during the vegetation survey along Empty Box Brook
between Farm Lane and Lake Drive. Potential Wood Turtle
habitat as identified in this report includes 507 acres of the
borough.

Barred Owl

The Barred Owl is also listed as a threatened species in New
Jersey. It was more difficult to identify potential Barred
Owl habitat within the borough due to the owl's need for large
contiguous tracts. Much of the potential habitat within
Roosevelt lies along the borough's borders, making it
difficult to ascertain whether these forest tracts as a whole
are large enough to support Barred Owls. The main areas
likely to be Barred Owl habitat are the wooded areas along
Assunpink Creek (due to its proximity to Assunpink Wildlife
Management Area), and the Wooded areas along the eastern
border of the borough which are contiguous with similar
forested land in Millstone (Map 3b).

Mink

Mink (*Mustela vison*) are lively amphibious carnivores which occur throughout much of North America. Minks are found along streams, lakes and standing waters. They prefer forested, log-strewn and thicketed areas and are indicator species of Eastern floodplain forests. Nocturnal and solitary, minks are active throughout most of the year and are known to wander far along water courses and shorelines in search of prey. The home range of females is about 20 square miles while that of males may be several square miles. Minks construct below-ground dens typically under stumps or logs and along stream banks, or take over abandoned muskrat houses. Main prey items are birds, crayfish, frogs, fish and muskrats. Mink will also consume mice, voles, rabbits and squirrels, especially during winter when they will roam farther from water in search of food. Dogs, coyotes and great horned owls are potential predators of mink.

Minks have been spotted only rarely by residents of Roosevelt (Phase I). Within the Borough's woodlands, there are several streams, ponds, and seasonal wet depressions which are home to healthy populations of frogs and birds and would provide excellent habitat for mink. The GIS map of potential mink habitat (Map 3c) highlights wet forests within or adjacent to wetland designated areas. This habitat measures approximately 480 acres. The habitat along the southern border is especially important as it is sizable, contains several streams and depressions, and borders the Assunpink Wildlife Management Area which contains substantial wetlands. Roosevelt's mink habitat provides a valuable corridor for foraging and dispersing minks from the Assunpink Wildlife Management Area to habitat outside the borough.

Edge habitat

Edge habitat was identified and mapped within the borough using the GIS database. Buffers were created around all forested and field areas. Overlapping buffers were then identified as edge habitats. Edges were first identified around natural fields. Agricultural fields were then included, and finally lawn areas were included. Each subsequent pass identified more edge habitat (Maap 3d).

Historically, edge areas have been considered an asset because they provide important habitat for many game species, such as deer. Because the deer population is at such high level in Roosevelt at this time, the prevalence of edge habitat could be considered more of a problem than an asset.

In addition, fragmentation of large areas of forest is now recognized as detrimental to many of the less common animal species that currently utilize these areas. In addition, some songbird species may be negatively impacted by cowbird parasitism, which increases with greater amounts of edge.

SECTION II:

CULTURAL RESOURCES

lasted for about an hour. Individuals were encouraged to voice their feelings and opinions about what they saw during the walk and offer any background information that they felt was important to the study. Notes and photographs were taken by study members during the walk.

Results

The physical features discussed during the walk are listed in Appendix B. A review of the list shows that the residents were very aware of the structure and character of the community. In addition, a number of the observations reflected their image of how Roosevelt ought to look.

Some of the results were not specific features or locations that can be pinpointed on a map, as they describe overall feelings and opinions about the quality of living, general appearance, etc. One opinion that was prevalent among the participants is that the bauhaus architecture should be preserved. In addition, there was a general concern that greenway and forest resources of the community could be better managed. There was also discussion concerning the importance of the community addressing needs as a whole rather than the needs of individuals. However, no specific examples or problems were explained relative to this point.

Generally, the participants in the community walk noted numerous positive aspects of living in Roosevelt. The high level of community involvement seemed particularly important. This was related to many aspects of social/cultural character of the small community. Repeatedly, the post office, school, and amphitheater were pointed out as community focal points or as landmarks of the town center. Both the affordable housing and safety of community were appreciated, as was the site plan of the village with its greenbelts, streams and trails.

A broad range of concerns were expressed by the participants. Some that were repeated in more than one group or seemed to receive consensus in group discussion were:

> - The litter in the greenbelts and along roads must be cleared.
> - There is a lack of youth activities and public amenities.
> - The presence of ticks has diminished outdoor activities.
> - The water and sewage bills are too high, and payment does not reflect usage due to the lack of water meters.

- The influx of newcomers has lessened the sense of community.
- Concerns that the high deer population causes car accidents and damage to vegetation conflict with concerns over safety hazards related to hunting.
- Curbs and sidewalks are desirable for children's safety, but they change the small town look.
- The wastewater treatment plant is unattractive.
- The appearance of Rossi's Deli is disjointed with local architecture, although its function is considered essential.
- Uniform housing setbacks and large lot zoning are contrary to the existing style of the community plan.

Although numerous problems were pointed out, there was a positive tone throughout the discussion. This indicated to us that, although improvements could be made, the participants were genuinely fond of their community.

Resident Employed Photography

The purpose of the Resident Employed Photography was to obtain both good and bad views of Roosevelt as perceived through the eyes of its residents. This method of gathering cultural information differs from the community walk and other survey methods by allowing residents to focus on any particular area in Roosevelt as they wished. Residents were free to photograph scenes wherever they chose, from their own backyards to remote areas of Roosevelt that might otherwise have been overlooked by the study team. As stated in the provided survey form (Appendix C), "it could be as personal as the tree where you first kissed or an ideal view or scenic corridor".

Methods

Residents who attended the Borough Hall Clean-up/Community Walk, as well as others, were provided with disposable cameras for the resident employed photography phase of the study. Participants were instructed to take photos in Roosevelt over a period of several weeks and then return the cameras to a designated drop-off at the post office, from which they were collected for processing.

Results

A total of 211 photographs were taken. Photographs were ranked in categories based on the number of pictures taken of any particular setting, object or activity of concern. The following five general categories describe both positive and negative scenes.

Architecture

Issues raised by residents concerning Roosevelt's architecture focus on recent construction that does not conform with the original Greenbelt design and Bauhaus architecture. The residents that participated in this survey felt that the greenbelts and Bauhaus architecture are what make Roosevelt unique. Ranch and geodesic styles, as well as "non conforming" modifications to original bauhaus homes, were included in sets of negative images.

School/Amphitheater/Playground/Park

This whole area provides passive and active recreation for all ages. The area's close proximity to the town's central public facilities and commercial area make it an important feature of the town center. However, comments indicated a desire that efforts made to make the town center more cohesive visually.

North-Rochdale Entry

The vast open fields, punctuated by the presence of the picturesque oak tree, make this entry to Roosevelt distinct, peaceful and welcoming.

Condition of Public and Private Land

These photos focused on conditions of abandoned homes and household debris. Remote roads such as Witch's Hollow were photographed to illustrate improper disposal of construction waste. Natural features, such as the greenbelts, were pictured as unmanaged with fallen branches and other debris.

Streetscapes

On the subject of curbs and sidewalks, controversy stems from the difficult choice between practical needs, aesthetics and safety issues. Benefits of sidewalks and curbs include increased child safety and the reduction of soil erosion. However, this may not only lead to a less rural/ more suburban

appearance, but curbs tend to cause debris to accumulate and clog sewers. One resident's reaction to new curbing was "Why was this done? The timeless character of a sleepy and beautiful country road was utterly destroyed by this single act of development!"

Written Survey

A written survey (Appendix D) was conducted to build on our initial database. Our goal was to detail the resources of Roosevelt from the residents' perspectives, and to place them in historical and cultural context. A comparison of the results of the written survey with those collected using previous methods generated higher confidence in the initial data collected.

The specific goals of the survey were:

> - To understand the cultural and historic elements of Roosevelt and their relative importance to the community.

> - To understand how the residents perceive and interact with their natural and built environment.

> - To understand what the residents prefer to see in terms of preservation and growth.

> - To collect general background information for use in more detailed analyses such as visual preference survey, visual corridors and genius loci analysis.

Analysis

Of 400 surveys that were mailed we received 63 responses, a response rate of sixteen percent. Although the sample size was small, we confirmed that it was representative by comparing the mean responses from surveys received early and late and finding that they were essentially the same. In addition, we compared responses to similar questions and found that they were consistent. Due to the small sample size, statistical analysis of some questions was not feasible. However, we did find trends in responses to a number of issues, some of which were statistically significant.

A profile of survey respondents was compared to 1990 census data, revealing that a higher percentage of long term (5-20

year) residents returned surveys. In relation to the relative
proportion of income levels in the census data, a higher
percentage of survey respondents in the $50,000 or greater
income bracket responded. Also, more households with children
responded than what was expected based on the census.
Subsequently, the profile of our survey respondent was not
typical of the Roosevelt resident depicted by the census data.
Therefore, we analyzed the responses by different groupings to
see if the data was biased. For the analysis, responses were
grouped based on length of residency, household income, and
presence/absence of children.

When we looked at the responses to questions concerning
growth, plans to stay in Roosevelt, land conversion and
Bauhaus architecture we found no significant differences
between the groupings.

Appendix D includes the results from the survey. Each
question number is noted so that the reader may refer to the
survey directly. The questions for which consistent response
patterns were found are discussed below.

Historical and Cultural Elements

Q4a When asked to write in a natural feature of historical
and/or cultural significance, it was found that:

> "Greenbelt" had the largest response rate
> at 49%. This was more than three times
> the response for any other natural
> feature. This response is particularly
> meaningful because the survey question did
> not prompt a particular response: the
> selection was written in by those
> answering the survey.

Q4b When asked to write in a man-made structure with
historical and/or cultural significance, it was found that:

> the Shahn mural and the Roosevelt bust
> received the most responses.

Natural Features

Q3   When asked to independently rate the importance of a list
of natural features on a scale of most important to least
important it was found that:

Greenbelt, woodlands and streams were
rated highly. 98%, 92% and 87%
(respectively) of respondents considered
them most important and no one considered
them unimportant.

Meadows and farmland were also considered
important but less so, and a small
percentage (9% and 11% respectively) of
respondents rated them as least important.

Q7   When asked what types of activities in the natural
environment residents participate in, it was found that:

92% watch wildlife, 87% walk, 76% garden
and 73% bird watch.

These results emphasize the high level of
interaction that respondents have with
their natural environment.

Preservation and Growth

Q16   When asked to identify places, structures or features
they value and would like to see stay the same a wide variety
of responses were received. They were:

Greenbelt 14%; school 11%; other elements
of note included woodlands, the cemetery
and Bauhaus architecture.

Q15   When asked to independently rate a list of land use
conversions from unacceptable to desirable, it was found that:

Conversion of forest to housing or forest
to farm was most frequently considered
unacceptable.

Conversion of farms to woodland was found
to be 69% acceptable and 20% desirable.

Conversion of farms to housing received a
more ambivalent response, with 47%
unacceptable, 48% acceptable and 5%
desirable.

These results suggest that respondents are
more willing to allow conversion of
farmland than forest.

Q11   When asked how they think the borough is growing, results
showed:

70% answered about right, 17% too fast and
13% too slow.

Q1   When asked to rate the overall quality of life in
Roosevelt:

65% rated it excellent to outstanding, 31%
rated it good, 5% rated it as fair and no
one rated it as poor.

The strongly positive responses to both Q1 and Q11
suggest that respondents like living in Roosevelt.

The compilation of data from the written survey, interviews
and the community walk was used in to develop the visual
preference survey. This information was also utilized to set
up the visual corridors analysis and to create the final
overlays for the genius loci analysis.

Visual Preference Survey

The purpose for the visual preference survey was to allow
Roosevelt residents to express what they perceive to be either
appropriate or inappropriate images for their borough's
future.

Methods

A visual preference survey of Roosevelt residents was
conducted at the Borough Hall on the evening of April 7, 1993.
The survey followed a scheduled Environmental Commission
meeting. Twenty-four residents participated in the survey.
Two control groups were also surveyed prior to April 7 for
comparison. One group was a class of junior landscape
architecture students at Rutgers who were unfamiliar with
Roosevelt. The other group included the study team members,
who were non-residents but familiar with Roosevelt due to
their involvement in this project.

The survey involved a 40 minute slide show displaying 160
slides at 10-second intervals. Scenes from within Roosevelt
were randomly mixed with scenes from outside of the borough.
The wide variety of scenes displayed during the survey were
meant to provide residents with a mechanism for expressing
their basic reactions to various visual elements.

In the process of selecting the slides for the survey, the
first step was to outline the general characteristics for the
slides. Of the many slides available for each category, 160
were then selected in a stratified random manner for the
survey. The ten main categories are listed below:

-Residential	-Passive/Active Recreation
-Commercial	-Managed/ Unmanaged
Landscape	
-Industrial	-Woods
-Institutional	-Signage
-Corporate	-Roadway

First impressions of survey participants during each 10-second
slide display were recorded on a scantron so that numerical
results could be easily tabulated and interpreted.
Participants were asked to rate each slide in terms of its
appropriateness to Roosevelt on a scale of 1-5. The results
were cross-referenced with a list of 40 significant elements
that were visible in the slides, as noted by study team
members. Some of these visual elements included:

            -overall exposure/composition of photo
            -time of year/weather
            -sense of openness
            -condition of built and natural features
            -type of natural feature or overall site
            -type of built feature
            -presence of people/animals/utilities

Results

By using the visual elements outlined above and comparing
Roosevelt residents' responses with non-residents' responses,
inferences were made regarding how certain visual elements
within a whole scene affected the viewers' perceptions. The
following are the general results of the visual preference
survey based on resident responses:

Five of the top 10% (most appropriate) images for Roosevelt:

Field with silo - residents found that slides with an agricultural character extremely appropriate. Certain elements such as openness, forest edge, and even good weather may have played some role in the high score.   More likely, the setting's close similarity to the fields along N. Rochdale and the farm houses on Nurko Road may have resulted in the high score.

Horse Farm - typically, rural settings such as the horse farm were ranked highly in appropriateness. Again, the resemblance of this scene to Roosevelt's own horse farm may have resulted in its high rating. The presence of certain visual elements such as openness, the wooded backdrop, and the building type also may have had a positive visual impact.

Dirt Path - this intimate path set in a naturalistic landscape resembles many of the unpaved, uncurbed, and naturalistic trails found in Roosevelt.   Some examples include the ascent to the cemetery, the trail to the school, and Witch's Hollow Road.

Stream - the close similarity of this natural setting to Roosevelt's Greenbelts and Empty Box Brook, as well as visual elements including water, was likely to have resulted in a high score.

Cemetery - in contrast to the preceding scenes, the Roosevelt cemetery image appeared pale and grey (therefore lacking the good weather element). This scene's high rating was presumably due to its significant cultural/social value for the Roosevelt community. This assumption can be validated by the fact that the same scene was rated poorly by the control group that was non-resident and unfamiliar with Roosevelt.

All of these five slides have one thing in common: they either closely resemble scenes in Roosevelt or, as in the fifth slide of the cemetery, are an actual place in town. A sense of familiarity would appear to be the foremost reason for their high rating. Another observation may be that these are all passive, serene, rustic settings that are virtually timeless. Intrusive visual elements such as modern amenities,

Field With Silo - images with agricultural character scored well.

Horse Farm - images of intimate, rural settings with wooded backdrops scored well.

Walking Path - the image of walking trails through naturalistic landscapes scored well.

Stream Through The Woods - images similar to Empty Box Brook scored well.

Roosevelt Cemetery - familiar images with historic/social value to residents scored well.

Large Corporate Office/Industrial Buildings - large scale, non-residential images scored poorly.

Small Commercial Mall - strip malls, including their paving and cars, scored poorly.

Colonial Streetscape - images that contrast with the Bauhaus-based residential design of Roosevelt scored poorly.

Elevated, Embellished House - imposing homes scored poorly.

High Density Housing - images of anonymous, dense housing with parking lots scored poorly.

utilities etc, or even people do not exist in these scenes. Weather conditions and quality of photography seem to have had little impact on survey results.

Five of the lowest 10% (most inappropriate) images for Roosevelt:

Large Corporate Office/Industrial Buildings - residents found all large scale buildings inappropriate, whether they were in an urban or a rural setting. The negative score for this image was probably increased by the presence of cars and extensive paving.

Small Commercial Mall - large and small strip malls with their cars and paving also scored low. This suggests that the scores for the deli/liquor store area were lowered by its resemblence to these commercial areas.

Dense Streetscape - Though more intimate than the mall scene and without images of car use, this row of stores was still considered inappropriate. The assembled residents believed that this more 'colonial' townscape did not belong in their Bauhaus-based residential neighborhood.

Elevated Embellished Residential Home - Imposing houses scored poorly with residents. Control group response data suggests that the score for this particular house may have been even lower if there was no backdrop of trees, because the absence of trees would have made the image even more imposing.

High Density Housing Units - Though somewhat similar to the high scoring elderly housing units existing in Roosevelt, all other high density housing units received a negative score from residents. This inconsistency may have arisen from the feeling that elderly housing is appropriate for Roosevelt while, in general, high density units with their larger building masses and their parking lots are not appropriate.

All the slides with low scores have one thing in common, dominating built structures. Many of these structures are foreign or unfamiliar to Roosevelt. Some lack architectural style, others represent uncomfortably high levels of usage density.

While these findings may seem simplistic and obvious, they were useful in bringing to light some of the conflicts Roosevelt residents may be facing in deciding on a course for Roosevelt's future. The largest discrepancy is between what they find visually appropriate for Roosevelt and what they think needs to be done to alleviate the town's current development pressures. For example, based on the Visual Preference Survey, residents' prefer agricultural settings the most. However, this strongly contrasts with the results of this study's Written Survey, where resident's prefer to see rural areas developed over woodland and greenbelt areas.

Phone Interviews

After the written survey was returned and its results tabulated, phone interviews (Appendix E) were conducted. These interviews served as a final method for collecting detailed background information about Roosevelt's cultural resources and were also a means for verifying the results of the written survey.

Over a period of several weeks, 12 Roosevelt residents were telephoned by a member of our study group. Each resident was asked the same list of questions, which took about 15-20 minutes to complete. Questions were divided into four sections:

1.) Brief background information of the interviewee
2.) Whether the respondent had turned in a written survey
3.) Whether the person being interviewed agreed or disagreed with the written survey results
4.) Descriptions by the interviewee of significant cultural social features/events and positive/negative aspects of Roosevelt, etc.

Of the 12 residents interviewed by phone, seven had received the preceding written survey and two of the seven had responded. In general, residents interviewed agreed with the results of the written survey.

SECTION III:

INTERPRETATION AND RECOMMENDATIONS

Genius Loci

All places, including Roosevelt, have a spirit of place which
refers to its individual uniqueness, character, and identity.
This was referred to as "Genius Loci" by ancient Romans and
the term is currently used in community planning. Genius Loci
has particular value and meaning to a town's inhabitants.
While the interaction of the actual attributes that comprise a
town's Genius Loci are often not recognized or understood by
its residents, the overall sense of uniqueness in a place is
apparent and can bring forth strong mental images. Unplanned
change can lead to the irretrievable loss of attributes that
comprise the Genius Loci. Without proper planning, the Genius
Loci and the quality of life in a town is diminished.

The factors that produce the attributes are based upon:

>   -aspects of the existing natural environment
>   -cultural expressions which are a relation to
>   landscape, social history, physical location, human
>   activities, and place as a cultural artifact
>   -the sensory experience (primarily visual) which
>   results from the interaction of culture with the
>   existing landscape.

The attributes that define Genius Loci are grouped into three
major components:

1.) **Physical Features**
    The actual physical structure of a place.
    The reality of its buildings, landscape,
    climate and aesthetic quality, e.g.

    a) design and location of spaces
    b) natural and manmade landmarks
    c) open space and natural habitats

2.) **Observable Activities and Functions**
    How a place's people interact with it, how
    their cultural institutions have affected
    it, and how the buildings and landscapes
    are used, e.g.

    a) cultural diversity and history
    b) town-wide activities
    c) daily interactions between residents

3.) **Symbols and Meanings**

A more complex aspect, primarily the
result of human intentions and
experiences. Much of a place's character
will be derived from peoples' relation to
its physical and functional aspects.

Identifying Genius Loci is not a simple matter, since these
attributes may be difficult to pinpoint. For town residents,
some of these attributes may be so commonplace that they may
be taken for granted, or seem self-evident. Other attributes,
though, may be hidden or uncommon and therefore may be easily
overlooked by both residents and outsiders. Furthermore, an
outsider's unique perspective may have an impact on his/her
perception of an unfamiliar town's genius loci.

In consideration of these possible inconsistencies in
perceptions it is necessary to gather a broad spectrum of
information about a town through several sources including,
most importantly, its residents as well as literature and
field surveys.

To attain the best possible account of Roosevelt's genius
loci, our analysis of Roosevelt needed to be as thorough,
candid, and unbiased as possible. For the written survey only
certain questions were relevant to the Genius Loci of
Roosevelt. As with the rest of the survey the results are
consistent, with two exceptions. Perceptions of the
importance of both meadows and farms in this community are
contradictory based on the survey. However through other
sources, the importance of these features to Roosevelt's
Genius Loci can be verified.

Based on the surveys, the significant features can be
organized into the three basic elements:

1.) **Physical Features**
    Greenbelt, ruralness, architectural design, streams
    (especially Empty Box Brook), woods, mural and
    school, bust and amphitheater, cemetery, the turkey
    vultures on the watertower, entrance near Nurko Road

2.) **Observed Activities**
    Art/culture, community involvement, post office as a
    meeting place

3.) **Symbols/Meanings**
    People (historic, public and familiar figures),
    sense of small community (anything that implies
    ruralness, such as uncurbed roads), any symbol

recognized as part of history (e.g. school mural).

This information impacts our analysis of future development
scenarios for Roosevelt and how they would effect the town's
Genius Loci.

Planning Issues

Roosevelt has changed in size and shape from its original
plan. However, enough of the garden community character is
still in place that it is listed in the National Register of
Historic Places.

Much of what gives the community its character is the result
of the original design. For instance, the alignment of
buildings along the roads creates a unique set of views as one
walks or drives along the streets. The high environmental
quality of the area is still intact because of the greenbelt
system that protected extensive wetland areas. The rural
character of the community results from the uncurbed roads and
the informal social gathering that occurs around the post
office.

Suitability Analysis

In order to assess the suitability of land for additional
development we developed a GIS model. We list here the
specific categories we used in order to develop the model.
This will allow the residents of Roosevelt to agree or
disagree with elements of the model, and the model can be run
additional times to test its sensitivity to changes in the
criteria.

The criteria used to generate the GIS suitability map were
based on legal and environmental considerations, property
ownership and current land use, building constraints, and
scenic and visual corridors. Thirteen classes differing in
their level of restriction to development are weighted from
'highly restricted' to 'unrestricted'. The fourteen classes
and four levels are as follows:

1.) **Primary wetlands** - <u>Highly restricted</u> both
     legally and ecologically.
2.) **Agricultural wetlands** - <u>Highly restricted</u> both
     legally and ecologically. Legal restrictions
     instituted when changes in zoning or development
     occur.

3.) **State property** – <u>Highly restricted</u> both legally and ecologically. All state owned property in the Borough protected in the Assunpink Wildlife Refuge.

4.) **Wetland buffers (45 m)** – <u>Restricted</u> both legally and ecologically. Under less stringent regulation than designated agricultural wetlands.

5.) **Agricultural wetland buffers (45 m)** – <u>Restricted</u> both legally and ecologically. Under less stringent regulation than designated wetlands.

6.) **Potential wetlands** – <u>Potentially highly restricted</u> both legally and ecologically. May actually be agricultural wetlands.

7.) **Potential wetland buffers (45 m)** –<u>Potentially restricted</u> both legally and ecologically. May actually be agricultural wetland buffers.

8.) **Severe slope (>15%)** – <u>Moderately restricted</u> by engineering constraints, soil erodability and water quality considerations.

9.) **Open municipal** – <u>Moderately restricted</u> by overlap with identified visual and scenic corridors.

10.) **Open agricultural** – <u>Moderately restricted</u> by overlap with identified visual and scenic corridors.

11.) **Municipal** – <u>Unrestricted</u> to development. Must be redeveloped for other uses.

12.) **Developed** – <u>Unrestricted</u> to development.

13.) Agricultural –<u>Unrestricted</u> to development.

14.) **Other/Forested** – <u>Unrestricted</u> to development.

Four maps were generated that illustrate each of the general criteria used to determine suitability to development. A final map indicates the sites most likely suited to development based on eliminating areas that show some degree of restriction (this includes both municipal and developed areas, which are primarily greenbelt and previously developed property, respectively). In all maps, regions of overlap that constitute combinations of restriction levels are automatically assigned to the most restrictive class.

Map 4: **Wetlands and Wetland Buffers** – Primary wetlands, agricultural wetlands and potential wetlands with their respective 45m buffer zones.

Map 5: **Property Ownership and Land Use** – State, municipal, developed, and agricultural land.

Map 6: **Visual and Scenic Corridors** – Municipal and agricultural areas considered to have visual and scenic value.

MAP 4

N

Wetland Restrictions on Development in Roosevelt

MAP 5

Legend:
- State
- Municipal
- Developed
- Agricultural
- Municipal Boundary
- Property Lines
- Roads

N

Property Ownership and Land Use

MAP 6

Legend:
- Municipal Viewshed
- Agricultural Viewshed
- Municipal
- Agricultural
- Other
- Municipal Boundary
- Property Lines
- Roads
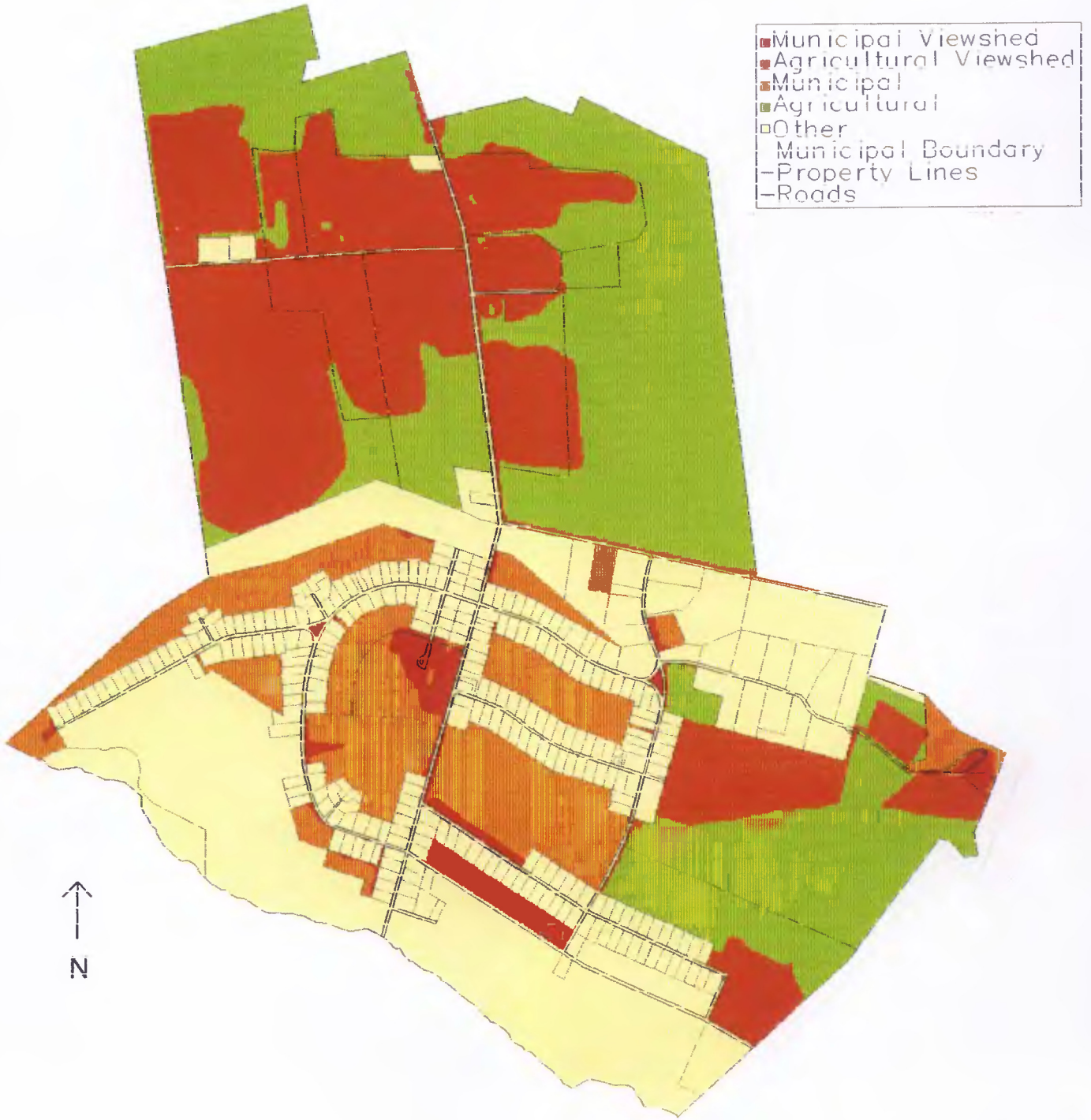
Municipal and Agricultural Viewsheds in Roosevelt

MAP 7

Legend:
- ■ Restrictive Slopes (>15%)
- □ Unrestrictive Slopes (<15%)
- – Municipal Boundary
- – Property Lines
- – Roads

N

0   1 kilometers

Slope Restrictions on Development in Roosevelt

MAP 8

Legend:
- Suitable Sites
- Unsuitable Sites
- Municipal Boundary
- Property Lines
- Roads

N

0   1 Kilometers
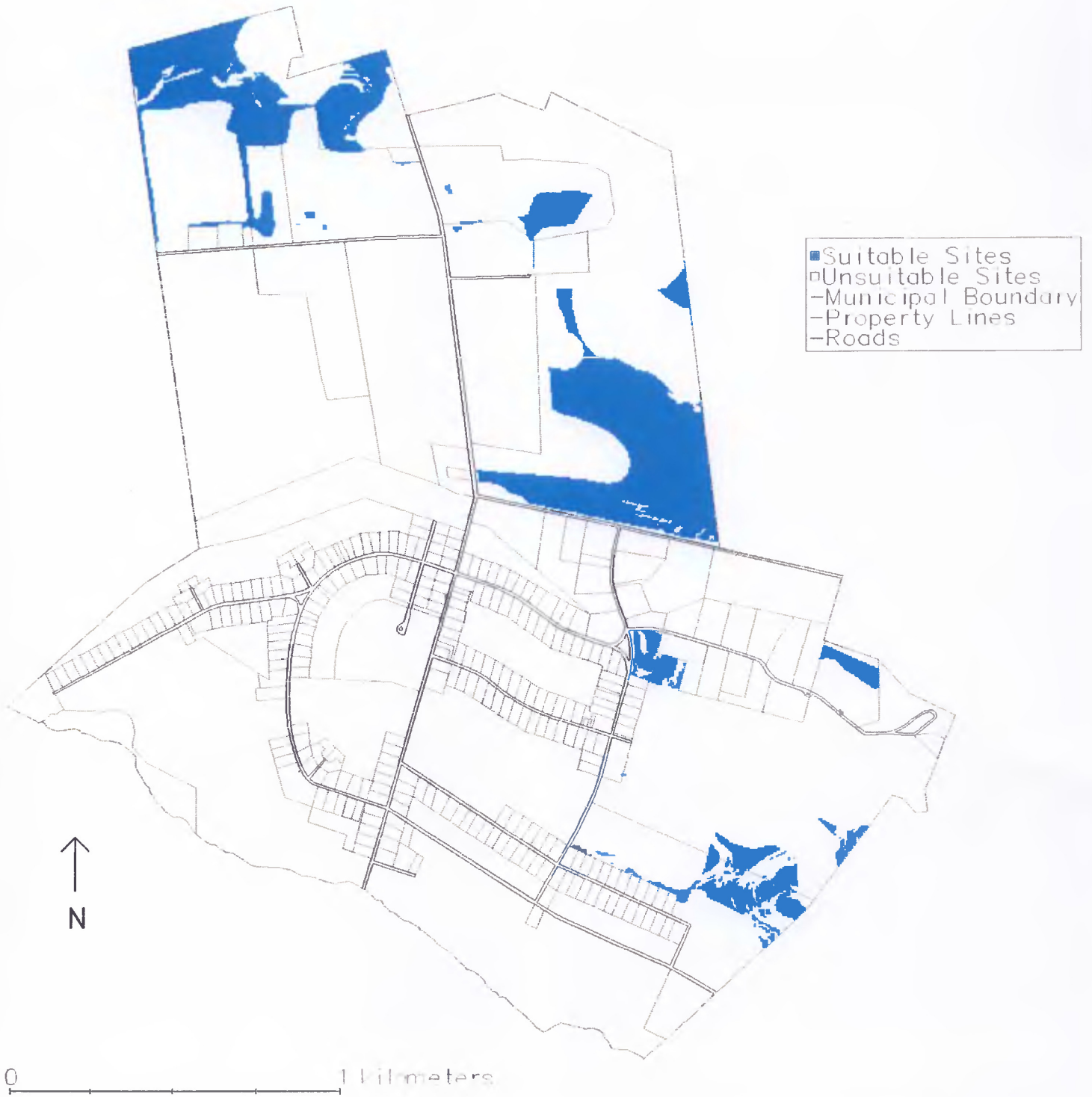
Potential Suitable Development Sites in Roosevelt

Map 7: **Building Constraints** - Areas with slopes greater than 15% are shown along with all above restrictions.

Map 8: **Suitable Development Sites** - Unrestricted areas, excluding municipal (i.e. greenbelts) and developed property.

Resource Management

Roosevelt is rich in cultural and natural resources. It will benefit the community over the long term if these resources can be carefully managed while the inevitable changes and growth occur.

The community's history and heritage are part of Roosevelt's genius loci. The first steps towards protecting these have taken place with their documentation and inclusion in the Historic Register. Based on the survey results, we suggest that discussion regarding subdivision design and building design be included in the Planning Board's agenda before additional growth occurs.

Visual characteristics were consistently rated as important by residents. The sequence of spaces upon approaching Roosevelt from the north were repeatedly mentioned as a significant gateway to the community. Changes in land use along the visual corridor will severely impact the rural character of the community. The impact of such changes will become increasingly important as adjacent areas become subdivisions. A detailed review of visual impact should be required in conjunction with any development proposals.

The natural resources of the community have largely been managed with a "hands-off" approach. Litter removal, fines for dumping garbage and yard waste, and removal of exotic species will become increasingly important as the population density in and around Roosevelt continues to increase. Most of this effort can be focused at the forest edges, since the forest and wetland interior are in good repair at this time. We understand that there is an ongoing, voluntary, litter removal effort. Additional support for this effort might be beneficial. Removal of exotic species from the forest edge must also be given priority. Several invasive vines and woody species are beginning to dominate the forest edge. These will become increasingly difficult to manage as they become more common. Eventually, they will also impact the forest interior as they invade naturally occurring disturbance gaps.

There was discussion concerning removal of some of the dead
plant material during one of the Environmental Commission
Meetings. This must be undertaken with care. If the material
is yard waste, it is reasonable and desirable to remove it.
If the material is the result of natural regeneration of the
forest, its removal may be detrimental to a variety of animals
and some plants that utilize dead plant material during part
of their life cycle.

APPENDICES

APPENDIX A

**DATA SHEET
FOR
VEGETATION ENTITATION**

BOROUGH OF ROOSEVELT VEGETATION SURVEY
Section / Unit #___   INITIALS_____

Classification___   DATE_____

FORMATION   TOPOGRAPHY

   1. Closed Forest   1. Level
   2. Woodland   2. Depression
   3. Scrub   3. Slope
   4. Herbaceous Community   4. Knoll
   5. Aquatic   5. Undulating
   6. Vineland

DOMINANT WOODY PLANTS   SOIL CONDITIONS

   1. Deciduous   1. Dry
   2. Mixed   2. Dry/Moist
   3. Evergreen   3. Moist
                                                    4. Wet
VEGETATION < 15′   5. Surface Water

   1. Trees
   2. Shrubs   DISTURBANCE &
   3. Grasses   MANAGEMENT CONCERNS
   4. Annual herbs   1. Fire
   5. Perennial herbs   2. Erosion
   6. Vines   3. Compaction
   7. Moss   4. Dumping
   8. Hydrophytes   5. Herbivory
                                                    6. Invasive sp
                                                    7. Other_____

DOMINANT PLANT SPECIES   >30′   5′-30′   <5′   Exotic
   1._____

   2._____

   3._____

   4._____

   5._____

   6._____

Other noteworthy species_____

Regenerating species_____

COMMENTS AND OBSERVATIONS: note wildlife habitat / sighting

APPENDIX B

SITES NOTED DURING COMMUNITY WALK

Northern Section (2 residents)

1.) Road and Water Tower - growth disturbing
2.) Commercial building - appears vacated
3.) Residential and Commercial buildings- represent conflicting   uses, residential architecture is atypical of the   borough
4.) Berm - provides screening, area behind it may also be good   for development
5.) Water Works Plant and Road - Bauhaus style architecture of   the plant and the woods south of the road are
     appreciated
6.) Nurko Road - point at which one feels one has arrived home
7.) Tree viewed from Nurko Road - oak tree is beloved
     landmark
8.) Disliked View - area where curbs were pointed out as
     being out of character with the rest of the community
9&10)Area near pond - lacks Roosevelt identity, not perceived
          as part of borough

West Section (3 residents)

11.) Wastewater Treatment Plant - negative view, however
     innocuous since it is at the end of Pine Street
12.) Forest - highly regarded for its scenic and recreational
     value; used to have a pond that was used for iceskating
     but is currently overgrown; thick briar needs to be
     removed because it prevents the preferred open view
     through the woods; common ownership of land leads to
     selfish disregard of this resource which is often used as
     a dumping ground for garden waste, etc.
13.) Cul de sacs - provides privacy for those residents yet
     considered less social because fewer people stroll
     through; parking sometimes a problem; odd garage
     arrangements
14.) 1980 State Autistic Home - fit into initial premise of
     Roosevelt but failed due to state mismanagement
15.) School - culturally significant as a meeting place, for
     plays, recreation, good playground; footpath from Pine
     frequently traversed by students provides pleasant
     walking experience through heavy vegetative cover
     blocking views of nearby homes
16.) Amphitheater - historically and culturally significant;
     focal point for 4th of July, graduation, Hiroshima Day,
     concerts, etc.
17.) Post Office - important socially as meeting place for

residents, all mail is received through post office boxes
18.) Triangle - important intersection between several
     significant view corridors

Eastern Section (4 residents)

19.) Borough Hall - meeting place that could use some
improvement   in appearance
20.) North Rochdale Avenue - traffic is light to moderate;
     sidewalks are not preferred
21.) Homestead Lane - homes are well kept, most are in the
     Bauhaus style with minor modifications; the streetscape
     has varying house setbacks and empty wooded lots which
     provide visual interest; the thicket along the road and
     the presence of street trees on only one side of the road
     detracts from the overall image
22.) Cherry Tree Triangle - pleasant appearance, is well liked
23.) Eleanor Drive - turkey vultures on the water tower is a
     well known and appreciated natural resource; the dirt
     road and presence of thicket is appropriate for this
     remote setting with three acre lots; rustic amenities
     such as street lamp posts and gravel drives are highly
     preferred; geodesic domes are liked, while bold colors
     and dominating homes that do not blend with the wooded
     setting are considered distasteful
24.) Cemetery - place for contemplation and solitude, receives
     frequents visits; homes in close proximity are not
     preferred unless they are well screened
25.) Notterman Tract - very highly regarded field with
     wonderful vista toward North Valley Drive; deer
     frequently seen
26.) Solar Village - satisfied with the architecture, seems to
     fit well with community
27.) Farm Lane - some modified original Bauhaus; many newer
     homes, some Bauhaus style, some split levels; patchy
     asphalt road lined with uniformly spaced street trees;
     sewer lines were replaced

Southern Section (4 residents):

28.) Horse Ranch - aesthetically pleasing, residents like the
     openness and take walks to visit the horses; one negative
     aspect is that the ranch uses a lot of water but pays the
     same water bill as the individual homeowner
29.) Swim Club - participants of the walk knew little about
     this site and expressed no opinions about it
30.) "The Estates" - uniform setbacks seem rigid; geodesic
     domes and their surrounding landscape are well liked,
     although Bauhaus architecture is preferred; the connector

path between them are used by many residents who do not
want to see it connected to main road

31.) Trails - enjoyable passage through pleasant Assunpink
resource; however trails harbor ticks, are expensive   to
maintain and are potential liability risks if Roosevelt
maintains them

APPENDIX C

RESIDENT EMPLOYED PHOTOGRAPHY

RESIDENT EMPLOYED PHOTOGRAPHY

Resident Employed Photography is a technique that will help us analyze the visual resources of your community. Your participation will assist us in determining a consensus on desirable and undesirable landscape components. Landscape components are the basic physical elements that make up the landscape and everything else around you. They include landform, vegetation, water, and man made structures in any degree or combination of scenery at various scales. We give you absolute discretion to photograph anything you please.

Instructions:
Each participant will be given a 12 exposure disposable Kodak camera. We would like you to photograph:

- 4 scenes which you perceive to being visually desirable, attractive, or simply special.
- 4 scenes which are visually undesirable, unattractive, or appear to be a problem/issue.
- 4 scenes of either of the above

Please include in the space below a short description of the location of your photograph along with a brief explanation for taking that picture. It could be as personal as the tree where you first kissed or an ideal view or scenic corridor.

Have fun!

Camera #___

photo #13

photo #14

photo #15

photo #16

photo #17

photo #18

photo #19

photo #20

photo #21

photo #22

photo #23

photo #24

Thank you for your participation

The entry to Roosevelt was important to almost all respondents. They said this field and tree let them know they were home.

Natural and agricultural features received numerous positive responses. The only negative comments associated with natural features dealt with dumping of yard and household waste in the greenbelt or with the need for vegetation management along some roadsides.
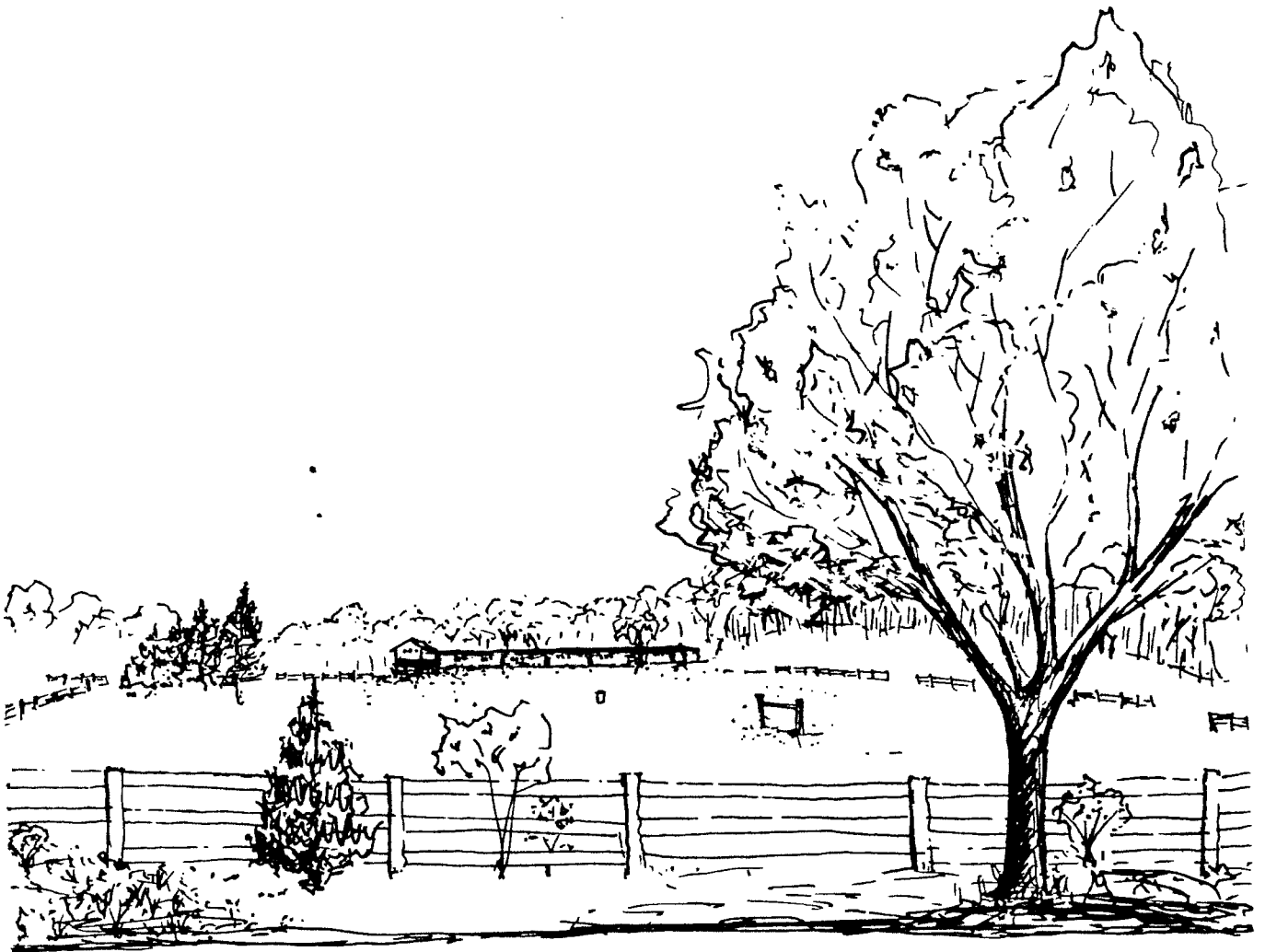
The school and surrounding area were
frequently selected as important features.
The school yard and Roosevelt monument
were listed as "desirable" and "significant".
Some respondents also noted that there
were problems in litter accumulation and
upkeep, especially with regards to the
monument.

Many people commented on architecture. In general, positive comments were directed at the original house designs and renovations that were in keeping with the original designs. Newer homes received either negative or positive comments, again reflecting whether they were "in character".
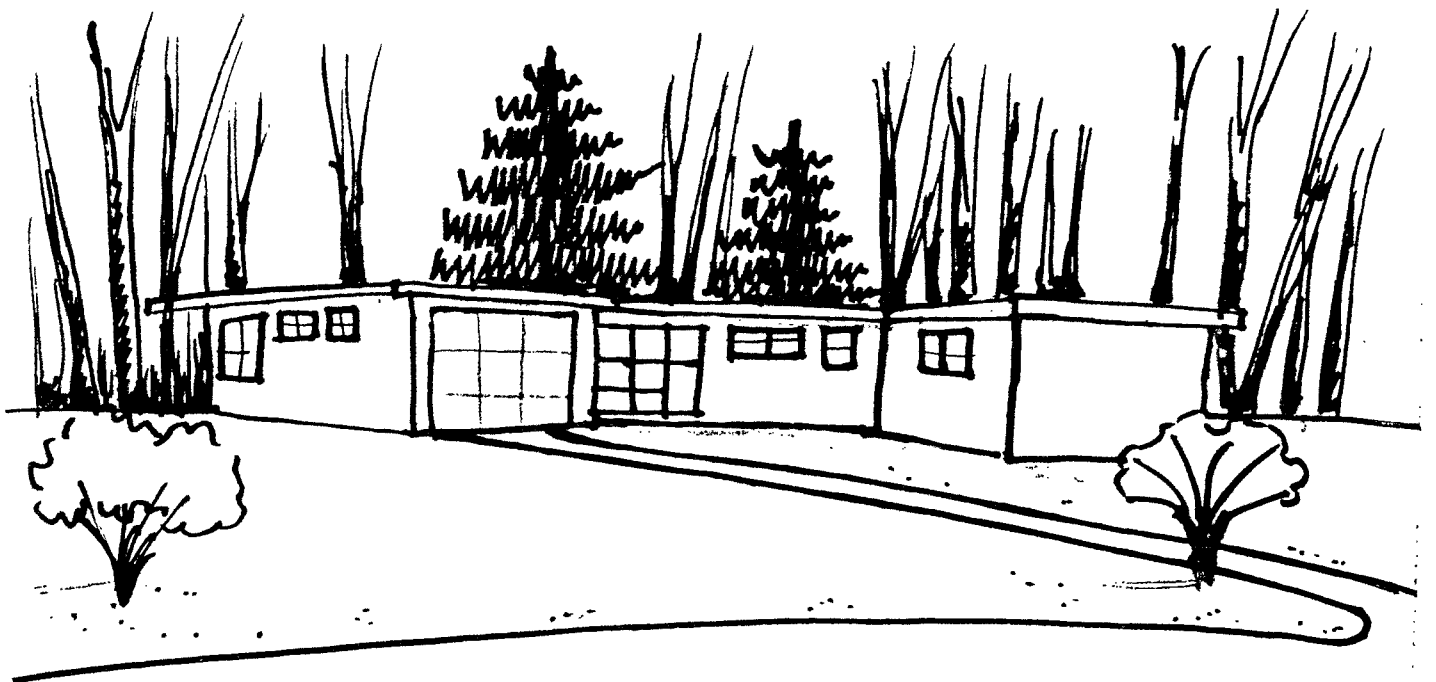
Several respondents commented on the streets of the borough. In general, the lack of curbs and sidewalks received positive comments because of the way this fits the small town image. Streets with curbs and sidewalks received positive comments because of safety issues. Parking along the streets creates muddy patches and prevents lawn growth; this was listed as a negative characteristic.

APPENDIX D

WRITTEN SURVEY

NATURAL RESOURCES SURVEY FOR THE BOROUGH OF ROOSEVELT

1. How would you rate the overall quality of life in Roosevelt? (Check one)
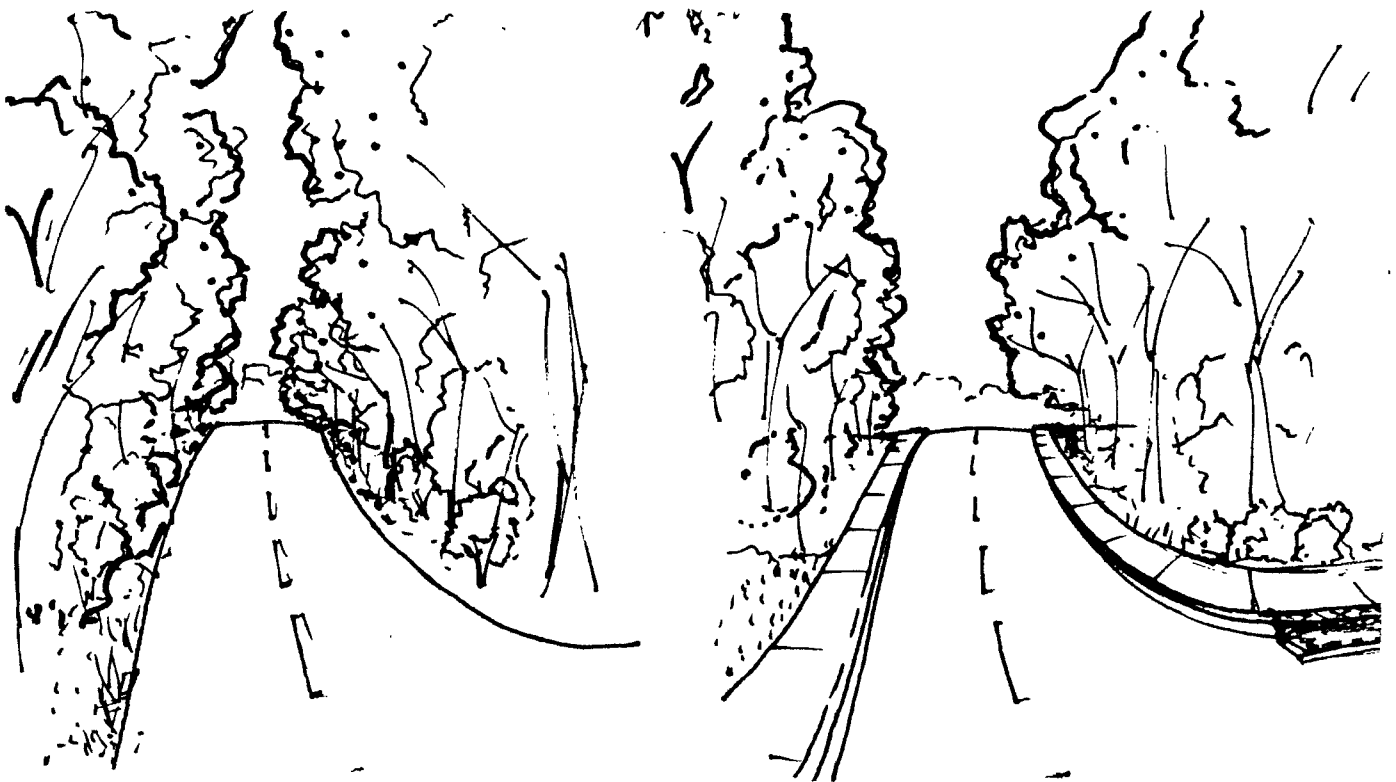
___outstanding ___excellent ___good ___fair ___poor

2. How would you rate the following in terms of their importance to Roosevelt? (Circle one for each item)

	Most important				Least important
Village character of Roosevelt's planned community	1	2	3	4	5
Historical importance of the founding community	1	2	3	4	5
Historical importance of the original architecture	1	2	3	4	5
Sense of community within the borough	1	2	3	4	5
Agricultural landscape	1	2	3	4	5
Other - please specify_____	1	2	3	4	5

3. How would you rate the importance of the following natural features in the borough? (Circle one for each item)

	Most important				Least important
Farmland	1	2	3	4	5
Woodland	1	2	3	4	5
Meadows	1	2	3	4	5
Roosevelt's Greenbelt	1	2	3	4	5
Streams	1	2	3	4	5
Other - please specify_____	1	2	3	4	5

4. Name one natural feature and one man made structure in Roosevelt which have special historical or cultural significance.

_____   _____

5. Name one natural feature and one man-made structure that you consider a landmark of Roosevelt:

_____   _____

6. How do you feel about the following characteristics of Roosevelt? (Circle one for each item)

	Strongly dislike		Neutral		Strongly like
Natural environment and open space	1	2	3	4	5
Small town / rural character	1	2	3	4	5
Historical / cultural character	1	2	3	4	5
Sense of community	1	2	3	4	5
Appearance	1	2	3	4	5
School system	1	2	3	4	5
Location (e.g. proximity to work or other facilities)	1	2	3	4	5
Safety	1	2	3	4	5
Traffic	1	2	3	4	5
Water and sewage bills	1	2	3	4	5
Level of services	1	2	3	4	5
Taxes	1	2	3	4	5
Shopping	1	2	3	4	5
Isolated location	1	2	3	4	5
Structural improvements to home	1	2	3	4	5
Parking	1	2	3	4	5
Street layout	1	2	3	4	5
Bauhaus architecture	1	2	3	4	5
Other - please specify_____	1	2	3	4	5

7. What types of activities do you regularly participate in that involve the natural environment? (Check all that apply.)

	Within the borough	Outside the borough
Walks in the woods/ open areas	—	—
Watching wildlife from your home	—	—
Bird watching	—	—
Bicycling	—	—
Hunting	—	—
Fishing	—	—
Gardening	—	—
Photography	—	—
Other - please specify_____	—	—

8. Do you like living in Roosevelt more or less than when you arrived?   ___ more   ___less

9. Has anything changed? ____ yes ____ no

   If yes, what _____

   _____

10. How long do you plan to stay in Roosevelt? (Check one)

    ___leave soon   ___stay for awhile but eventually leave   ___stay through retirement

11. Do you think the borough of Roosevelt is growing......? (Check one)

    ___too fast   ___about right   ___too slow   ___don't know

12. Do you think the traffic on Rochdale Road is......? (Check one)

    ___too much   ___just right   ___not enough   ___don't know

13. Do you think the traffic on your road is......? (Check one)

    ___too much   ___just right   ___not enough   ___don't know

    Please give name of road_____

14. How acceptable or desirable would you find the following types of housing development in Roosevelt? (Circle one for each item)

	Absolutely acceptable	Acceptable	Strongly desirable
Single family houses	1	2	3
Multi-family houses	1	2	3
Townhouses / condominiums similar to Solar Village	1	2	3
Housing development similar to Ridings	1	2	3
Single family houses on more than 2.0 acre lots (e.g. the houses on Eleanor Ln./Cemetery Rd.)	1	2	3
Single family houses on 0.5 acre lots (e.g. the original homesteads on Farm Lane)	1	2	3
Bauhaus architecture	1	2	3
Varied architecture	1	2	3

15. Which conversions of land use would you find acceptable and/or desirable? (Circle one for each item.)

	Absolutely unacceptable	Acceptable	Strongly desirable
Forest to farmland/ pasture	1	2	3
Forest to housing	1	2	3
Forest to park or municipally owned land	1	2	3
Farmland to meadows/ woodlands	1	2	3
Farmland to housing	1	2	3

16. Please identify places, structures or features of Roosevelt that you value and would like to see stay the same.

17. Please identify places, structures or features of Roosevelt that you dislike and would like to see change.

18. What do you feel best contributes to Roosevelt's unique character?

19. What do you think Roosevelt needs most?

20. How would you rate Roosevelt in comparison to the surrounding areas for the following attributes? (Circle one for each item.)

	Much worse than most		About the same		Much better than most
Natural resources (e.g. woodlands, open space, etc.)	1	2	3	4	5
Sense of community	1	2	3	4	5
Overall quality of life	1	2	3	4	5
Street layout	1	2	3	4	5
Traffic	1	2	3	4	5
Taxes	1	2	3	4	5
Municipal services (e.g. water, sewage, etc.)	1	2	3	4	5
School	1	2	3	4	5
Safety/crime	1	2	3	4	5

21. In what other town / village located in New Jersey would you like to live?

BACKGROUND INFORMATION

This information will give us a profile of those who answer the survey. We appreciate your cooperation.

1. How long have you lived in Roosevelt?

2. Have you moved away from this area and returned?   ___yes ___no

3. Who lives in your household?

    # of adults _____ ages_____

    # of children ____ ages_____

5. Please check your gender.   ___female   ___male

6. What was your household's approximate annual gross income from all sources in 1992? (Check one)

    ___ less than $25,000   ___$75,000 - $100,000
    ___ $25,000 - $50,000   ___over $100,000
    ___ $50,000 - $75,000

7. In what type of house do you currently live? (Check one)

    ___Pre-1930's farmhouse
    ___Original unaltered Bauhaus style house
    ___Altered (i.e. new roof line, additions,etc) Bauhaus style house
    ___Solar village house
    ___Geodesic dome
    ___Newer house (built after 1950) on 0.5 acre lot
    ___Newer house (built after 1980) on 2.0 acre or larger lot
    ___Other - please specify: _____

8. Do you work in Roosevelt or commute? (Check one) ___work in Roosevelt   ___commute

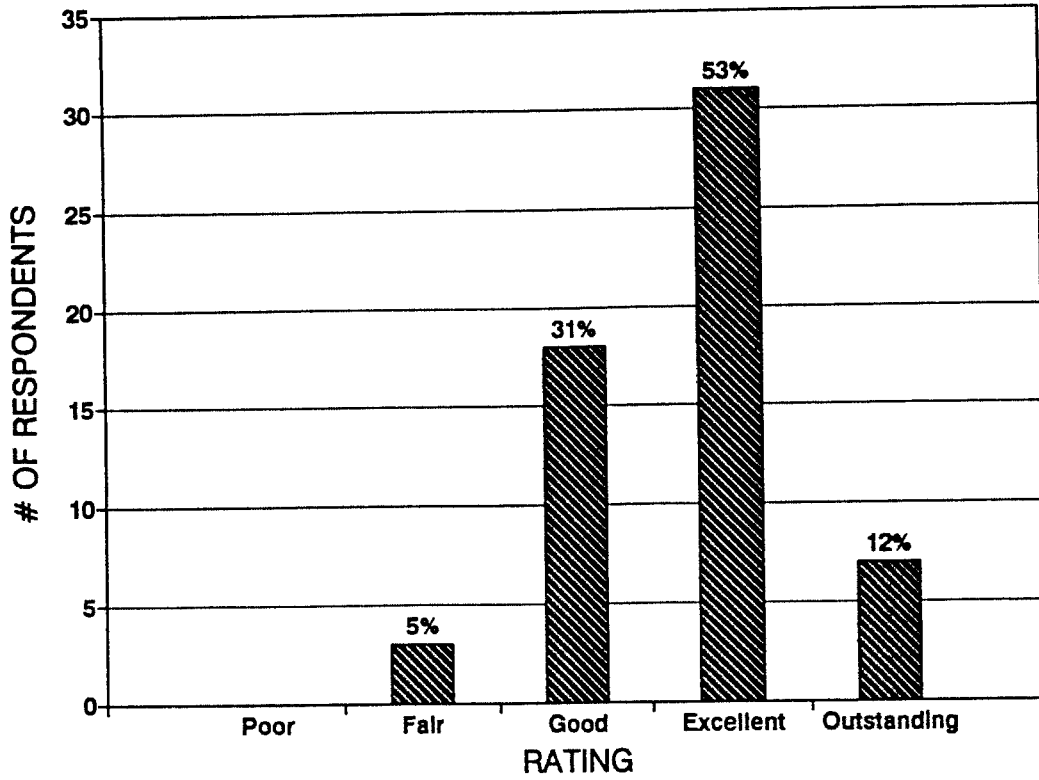9. If you work outside of Roosevelt where do you commute to?

10. What community or volunteer organizations do you participate in? (Please list all that apply.)
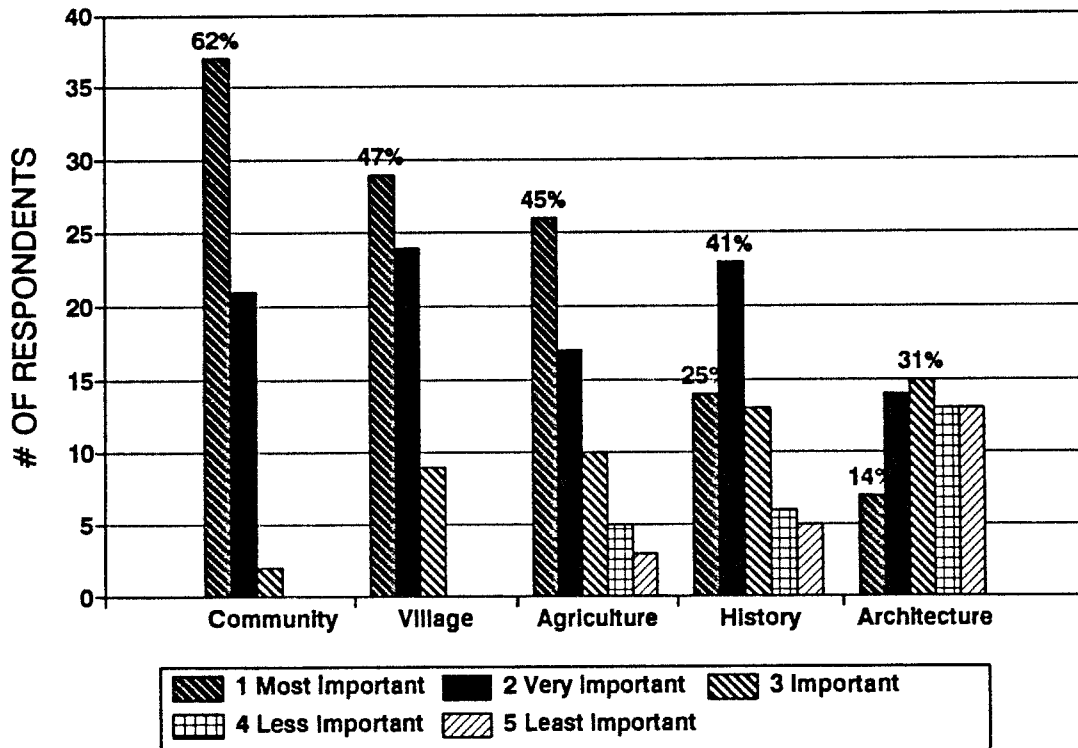
11. Additional comments:

PROFILE OF SURVEY RESPONDENTS
COMPARED TO CENSUS DATA

	SURVEY	CENSUS
RESIDENCY		
0 to 5 years	21%	44%
5 to 20 years	50%	36%
More than 20 years	29%	20%
HOUSEHOLDS WITH CHILDREN	57%	40%
INCOME LEVEL		
Less than $25,000	13%	20%
$25,000 to $50,000	18%	27%
$50,000 to $75,000	30%	29%
$75,000 to $100,000	25%	13%
More than $100,000	15%	10%
COMMUTING		
Commuters	76%	91%
Work in Roosevelt	24%	9%

Q1. Quality of Life in Roosevelt

Chart showing "# OF RESPONDENTS" (y-axis, 0 to 35) vs "RATING" (x-axis):
- Poor: 0
- Fair: 5%
- Good: 31%
- Excellent: 53%
- Outstanding: 12%

Q2. Importance of Various Elements of Roosevelt

Chart showing "# OF RESPONDENTS" (y-axis, 0 to 40):
- Community: 62%
- Village: 47%
- Agriculture: 45%
- History: 25%, 41%
- Architecture: 14%, 31%

Legend:
- 1 Most Important
- 2 Very Important
- 3 Important
- 4 Less Important
- 5 Least Important

Q3. Importance of Natural Features
Within Roosevelt

OF RESPONDENTS

Greenbelt 98%
Woodland 92%
Streams 87%
Meadows 75%
Farmland 67%

1 Most important
2 Important
3 Least important
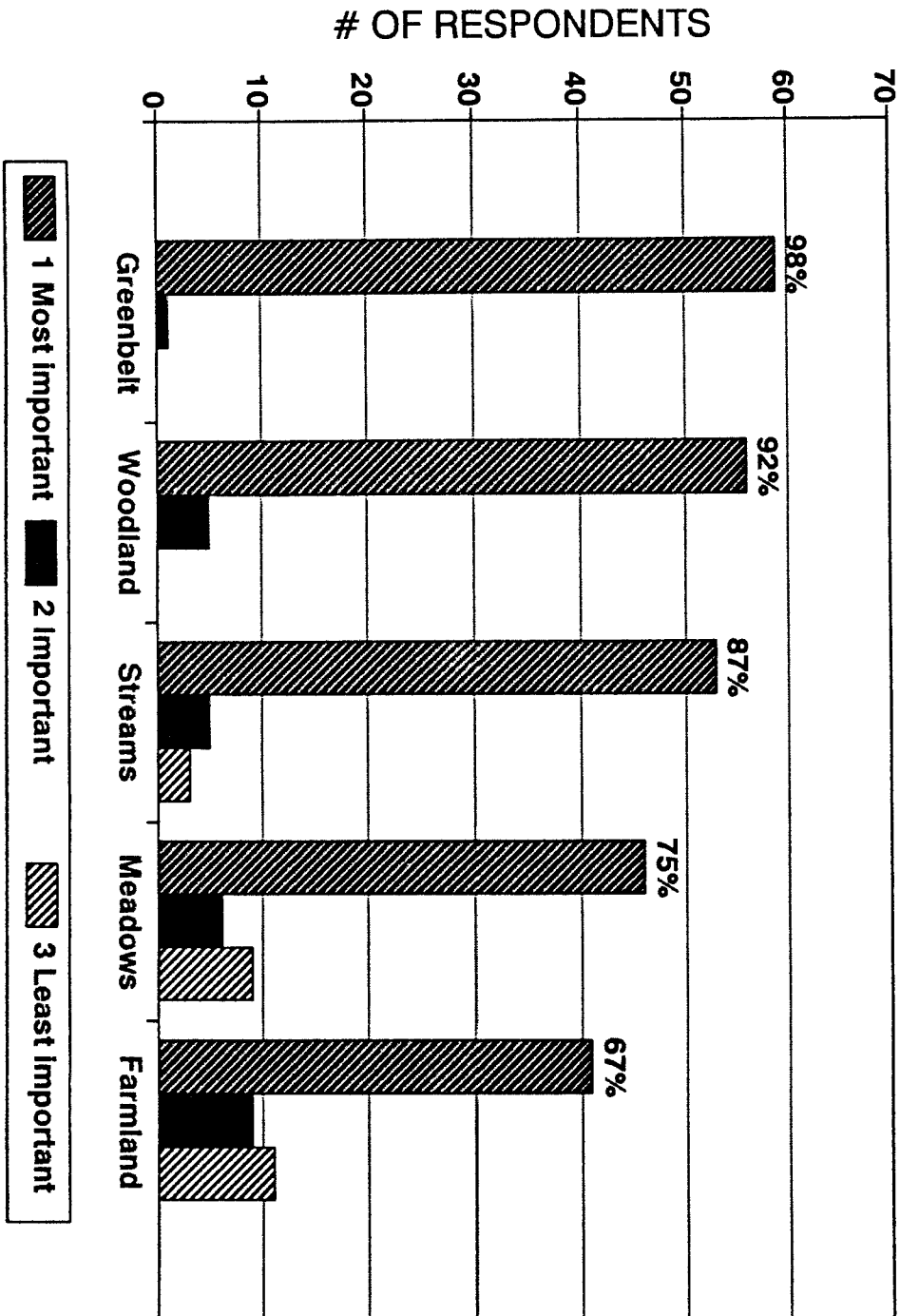
Q4a. Natural Features of Roosevelt with Historical and/or Cultural Significance

Category	Value
Memorial	4%
Assunpink	4%
Wildlife	7%
Other	7%
Woods	15%
Streams	15%
Greenbelts	49%

OF RESPONSES
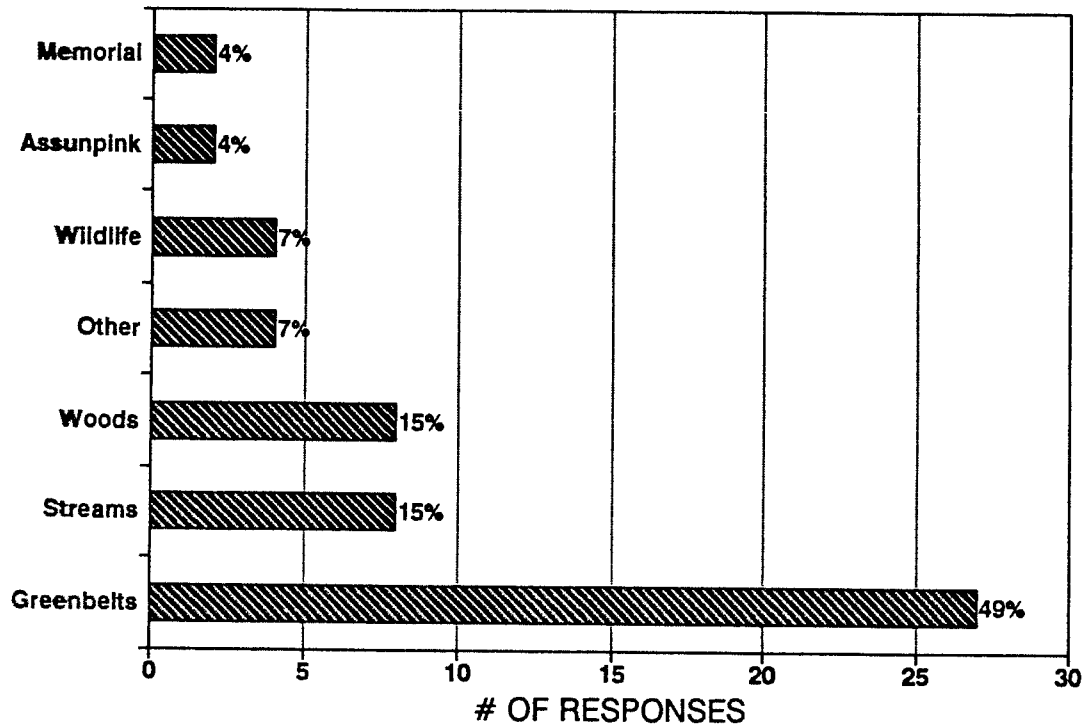
Q4b. Man-Made Structures with Historical and/or Cultural Significance

Category	Value
Amphitheater	6%
Cemetary	9%
Other	11%
School	14%
Roosevelt bust	20%
Mural	39%

OF RESPONSES
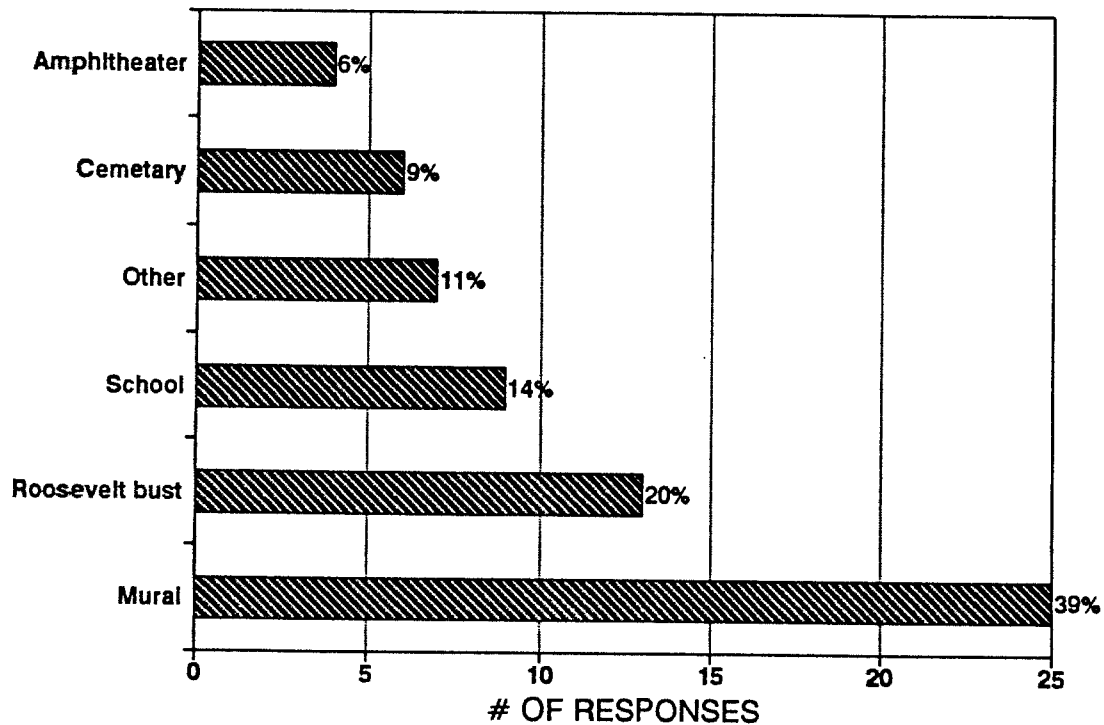
Q5a. Natural Features Considered
Landmarks of Roosevelt

Category	Value
Hills	8%
Empty Box brook	10%
Vultures	10%
Other	12%
Nurko tree	14%
Woods	14%
Greenbelts	33%

OF RESPONSES
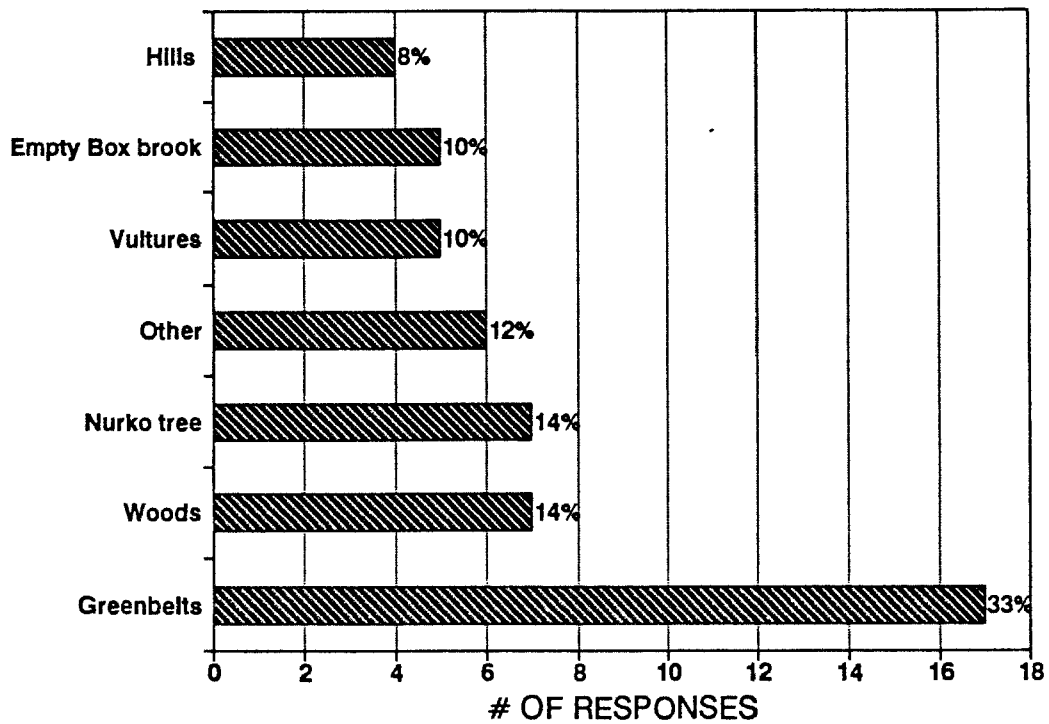
Q5b. Man-Made Structures Considered
Landmarks of Roosevelt

Category	Value
House	3%
Memorial	5%
Other	5%
Bauhaus architecture	5%
Post office	6%
Cemetary	6%
School	10%
Water tower	13%
Mural	14%
Amphitheater	33%

OF RESPONSES
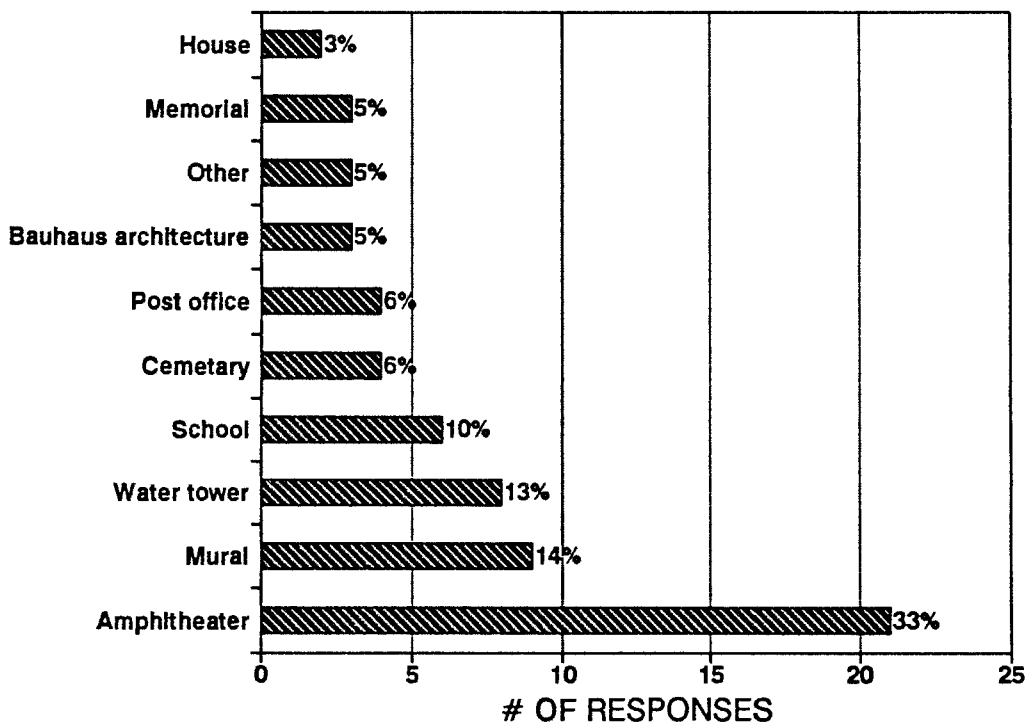
Q6. Resident's Opinion Concerning Characteristics of Roosevelt

Legend: Dislike, Neutral, Like

Y-axis: # OF RESPONDENTS (0–70)

Categories: Natural Resources, Small town, Community, Service, Taxes, H2O Bills

Values shown: 100%, 95%, 85%, 39%, 37%, 48%, 40%, 87%
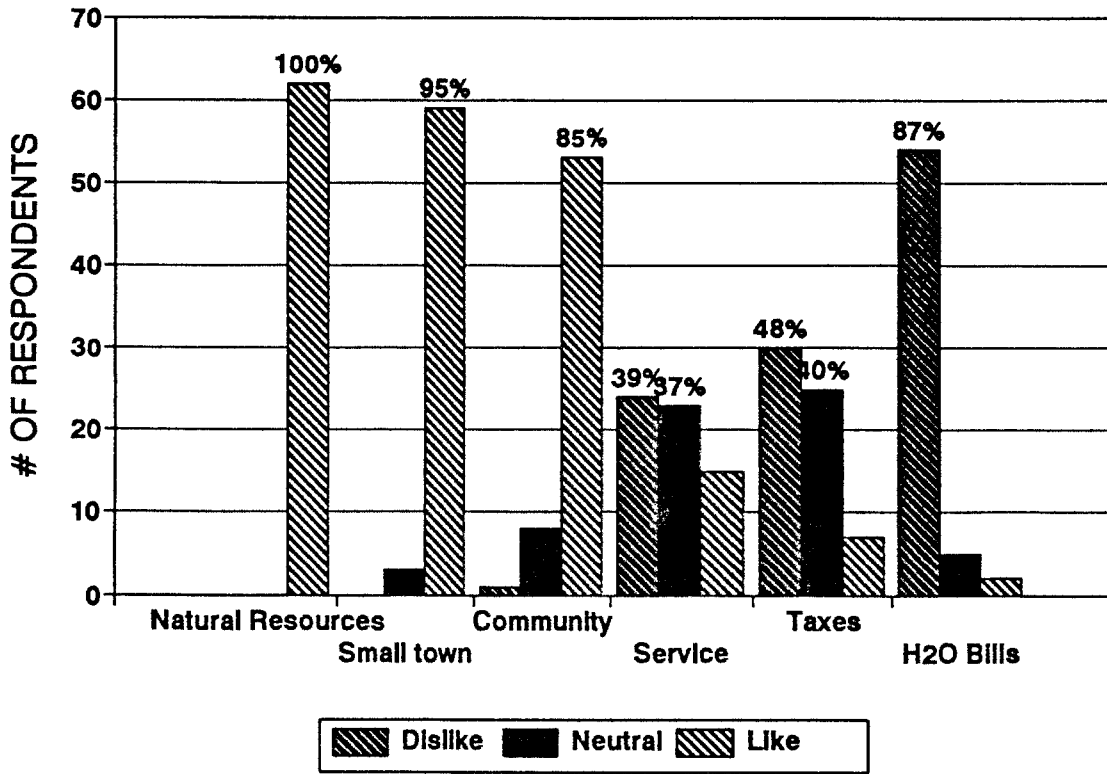
Q7. Resident's Activities in the Natural Environment

Legend: Within the borough, Outside the borough

Y-axis: # OF RESPONDENTS (0–90)

Categories: Watch wildlife, Walks, Garden, Bird watch, Bicycle, Photography, Fish, Hunt

Values shown: 11%, 92%, 54%, 87%, 3%, 76%, 17%, 73%, 27%, 56%, 33%, 43%, 29%, 11%, 3%, 2%
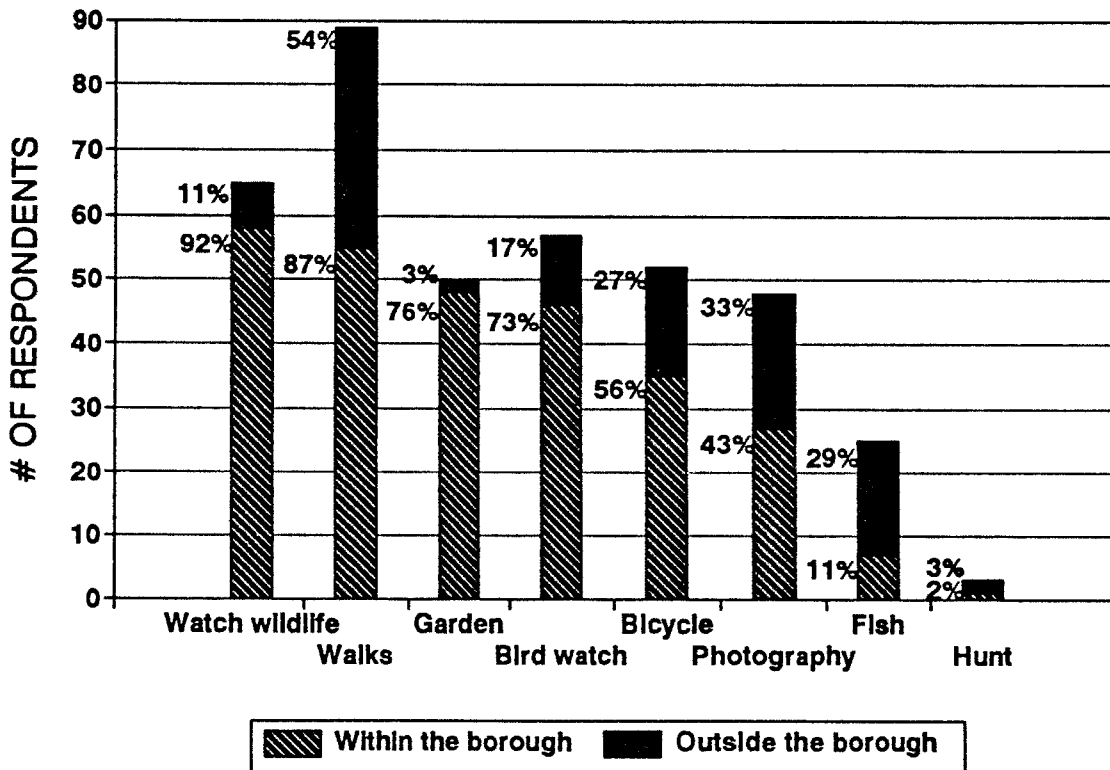
Q8. Do Residents Like Roosevelt More or Less Than on Arrival?

Same (1.6%)

Less (16.1%)

No response (11.3%)

More (71.0%)
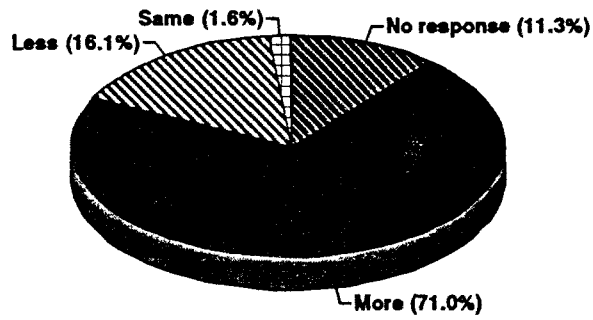
Q9. Resident Opinion: Has Anything Changed?

No (17.7%)

No response (6.5%)

Yes (75.8%)
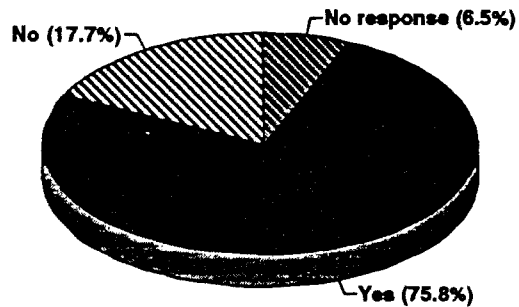
Q10. How Long do Residents Plan to Stay in Roosevelt?

No response (1.6%)⌐   ⌐Leave soon (4.9%)

⌐Stay awhile but eventually leave (23.0%)

Stay through retirement (70.5%)⌐
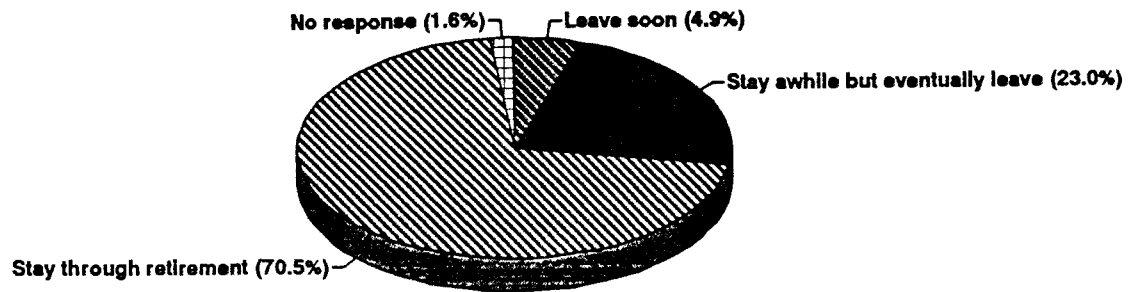
Q11. How Do Residents Think the Borough is Growing.....?

Too slow (13.0%)⌐   ⌐Too fast (16.7%)

About right (70.4%)⌐
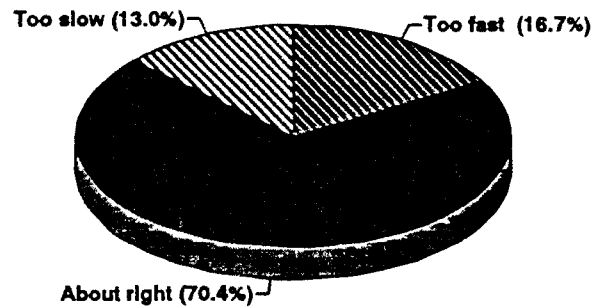
Q12 & 13. Traffic in Roosevelt
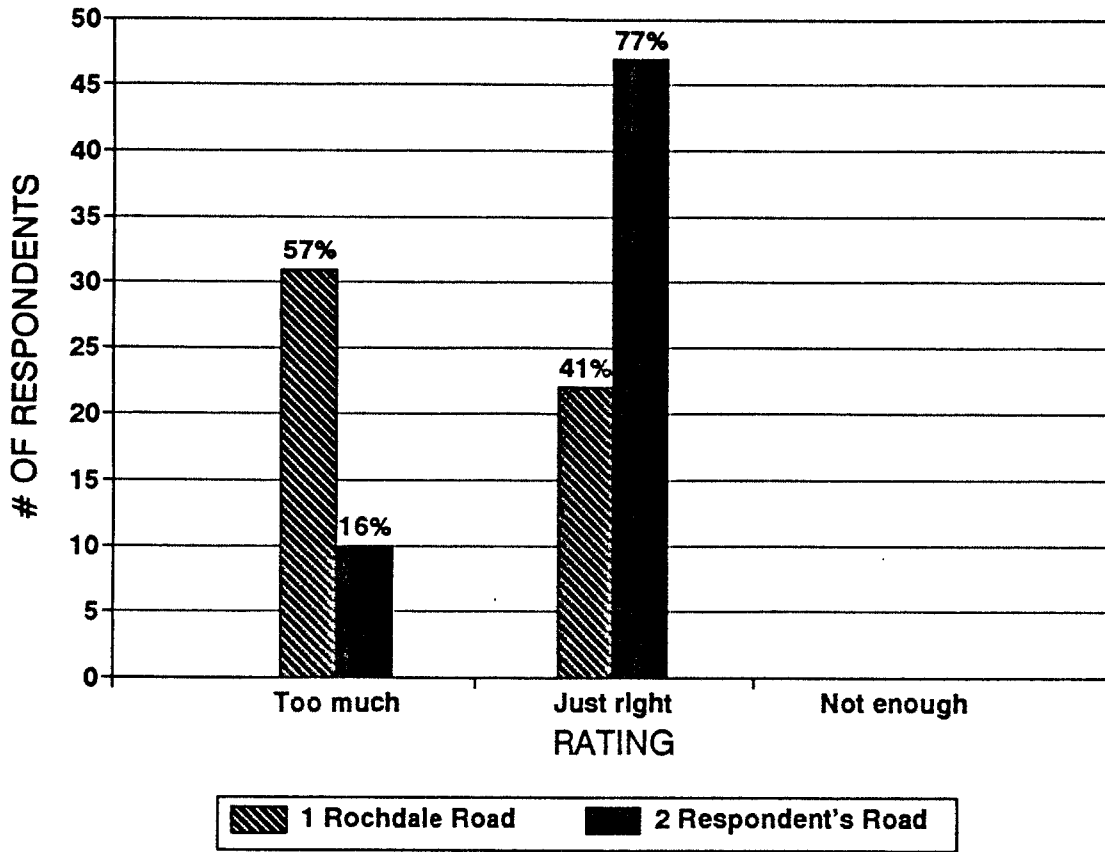
Q15. Conversion of Land Use
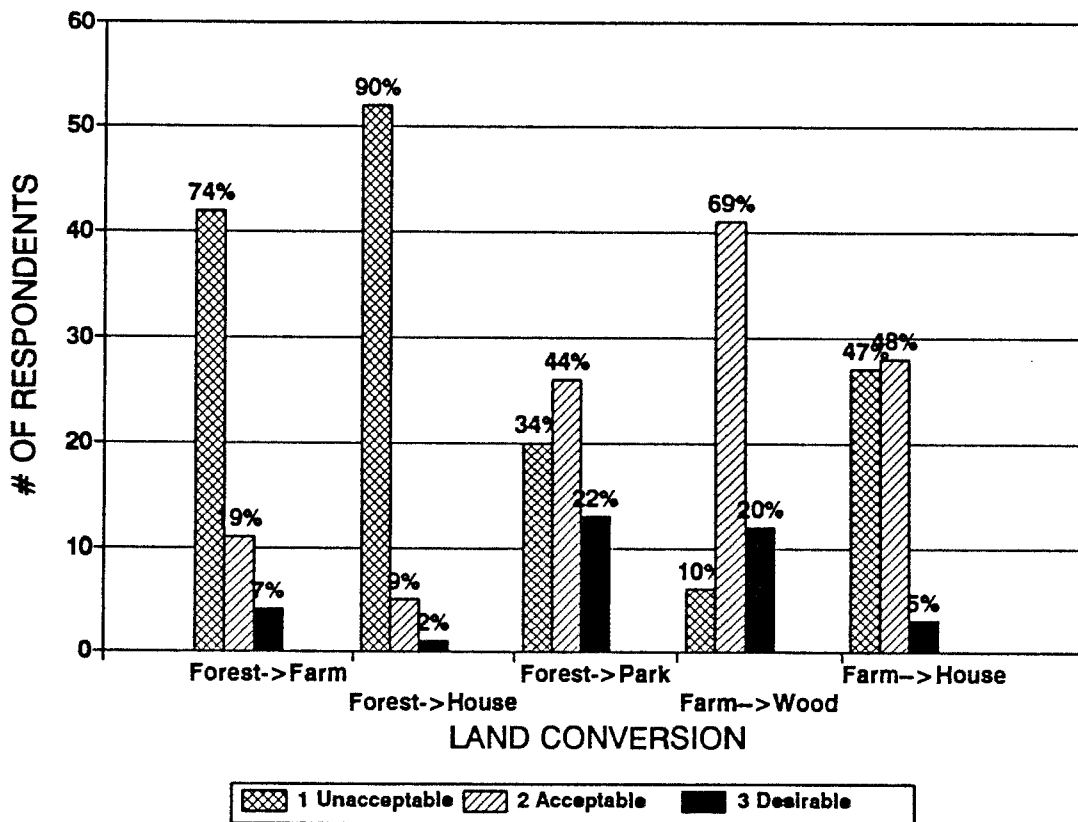
Q16. Elements That Should
Remain Unchanged

Open space

Community Involvment

Park

Farmland

Cemetery road

Factory

Trees

Rural character

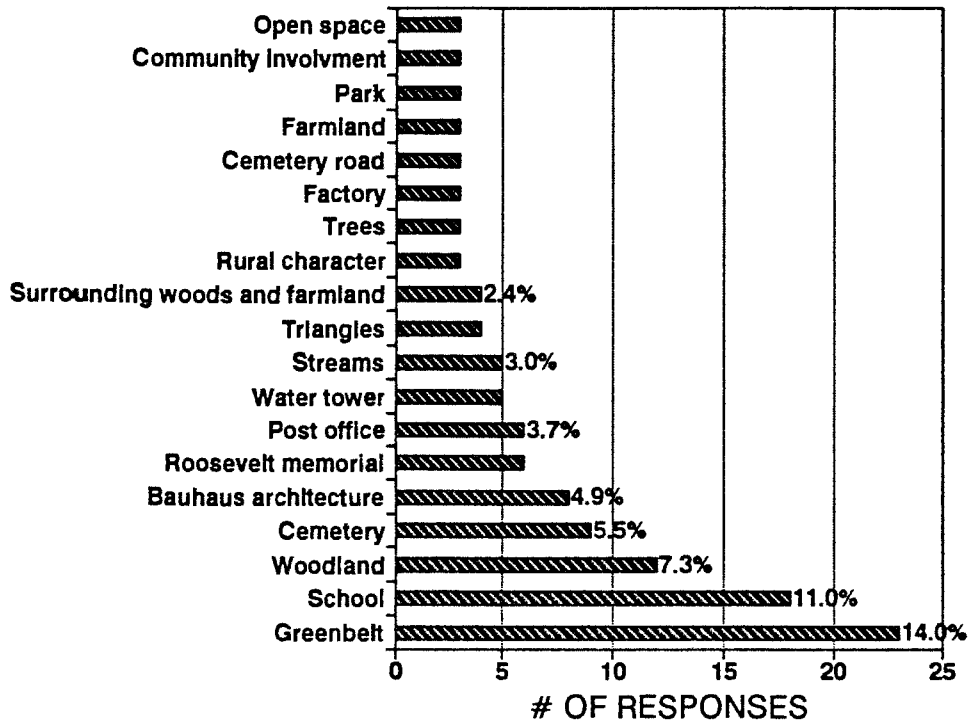Surrounding woods and farmland 2.4%

Triangles

Streams 3.0%

Water tower

Post office 3.7%

Roosevelt memorial

Bauhaus architecture 4.9%

Cemetery 5.5%

Woodland 7.3%

School 11.0%

Greenbelt 14.0%

OF RESPONSES

Q18. Elements That Contribute to
Roosevelt's Unique Character

Remoteness 2%

Community Involvement 4%

Design 7%

Architecture 7%

Ruralness 7%

Art/culture 8%

History 10%

Small community 11%

Greenbelt 12%

Other 14%

People 18%

OF RESPONSES
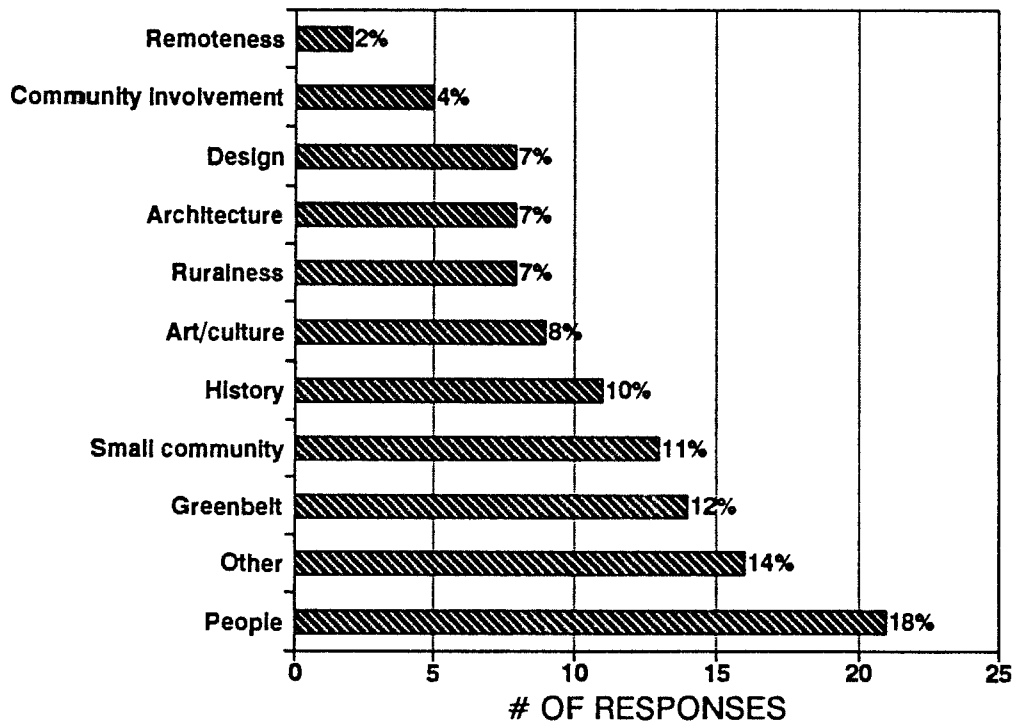
Q20. Roosevelt's Characteristics vs. Surrounding Areas

Legend:
- 1 Much worse
- 2 Somewhat worse
- 3 About the same
- 4 Better
- 5 Much better

Categories: Natural Res., Community, Safety, Quality of Life, Layout, Traffic, School, Taxes, Service

Y-axis: # OF RESPONDENTS
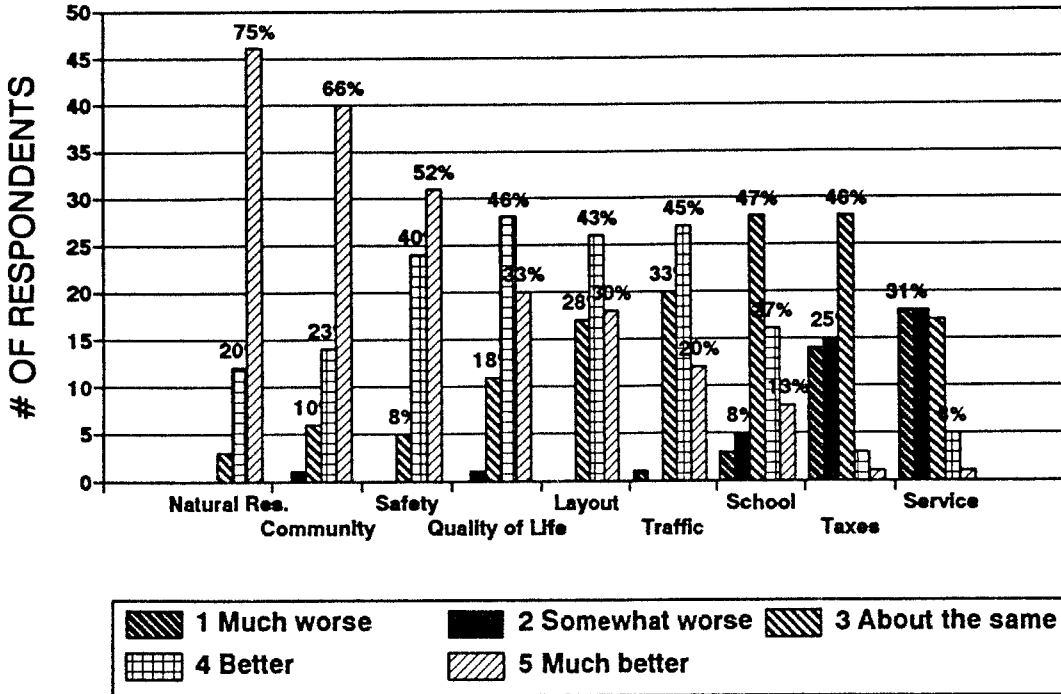
Q21. Other Places Roosevelt Residents Would Like To Live

- Allentown: 3%
- Hunterdon: 3%
- Millstone: 5%
- Cranbury: 7%
- Princeton: 8%
- Other: 36%
- None: 37%

X-axis: # OF RESPONSES
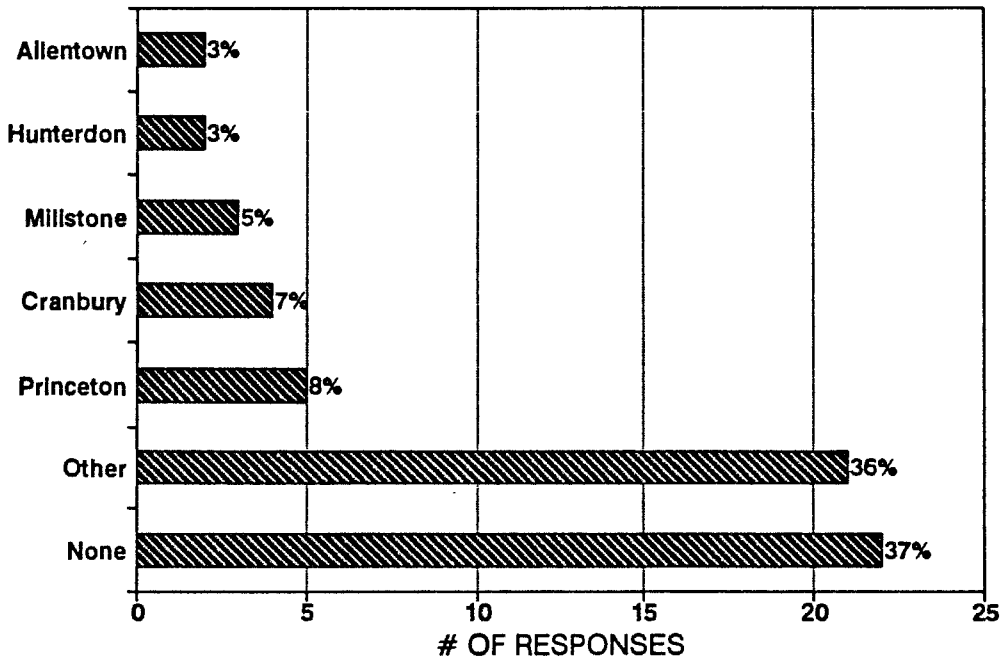
APPENDIX E

PHONE SURVEY

FORMAT FOR ROOSEVELT INTERVIEWS

I. INTRODUCTION

Hello, is this_____?

My name is _____ from Rutgers University. My classmates
and I are working for the Roosevelt Environmental Commission   on the Natural
Resource Inventory. We're very interested in   understanding the needs and
resources of your community and to accomplish this we sent out a survey
towards the end of February.

In addition to the survey we are conducting phone interviews to increase our
understanding of the important cultural elements in Roosevelt and their
significance to you and your neighbors.

The interview should take about 15 to 20 minutes.

Would you like to be interviewed?

Is now a good time? (If not schedule a time to call back.)

Your identity will remain confidential and responses to our questions will be
written up and included in the Natural Resource Inventory. The report will be
on file in the Borough Hall.

II. QUESTIONS

1. How long have you lived in Roosevelt?

2. What is your current involvement within the community?

3. Did you receive the survey that was sent out in Feburary?

4. Have you had a chance to send in your response?

5. The initial results of the survey indicate the following items have
historical or cultural significance in Roosevelt. I'm going to read through
the list and I'd like you to respond to each item with "agree" or "disagree".

	Agree	Disagree		Agree	Disagree
Greenbelts	____	____	Cemetary	____	____
School mural	____	____	School	____	____
Roosevelt bust	____	____	Amphitheater	____	____
Park memorial	____	____	Borough Hall	____	____
Community	____	____	Turkey buzzards	____	____
Streams	____	____	Woodturtles	____	____
Woodlands	____	____	Publicly owned space	____	____
Deer	____	____	Assunpink	____	____

1

6. Can you think of anything else in Roosevelt having historical or cultural significance?

7. The following is a list of items from the survey that are considered to be landmarks in Roosevelt. I'm going to read through the list and I'd like you to respond with "agree" or "disagree".

	Agree	Disagree		Agree	Disagree
Empty Box Brook	___	___	Nurko tree	___	___
Turkey vultures	___	___	Publicly owned land	___	___
Greenbelt	___	___	Woods	___	___
Surrounding farmland	___	___	Openspace entering town	___	___
Paradise hill	___	___	Park memorial	___	___
Lawns	___	___	Assunpink	___	___
Lake	___	___	Water tower	___	___
School building	___	___	School mural	___	___
Amphithearter	___	___	Roosevelt bust	___	___
Community	___	___	Shahn house	___	___
Cemetary	___	___	Post Office	___	___

8. Can you think of any other items considered to be landmarks in Roosevelt?

9. The following is a list of items from the survey considered to contribute to the unique character of Roosevelt. I'm going to read through the list and I'd like you to respond "agree" or "disagree".

	Agree	Disagree		Agree	Disagree
Community involvement	___	___	Youth of most newcomers	___	___
Potential for community	___	___	History	___	___
The people	___	___	Trees	___	___
Sense of small community	___	___	Arts and culture	___	___
Remoteness	___	___	Mix of population	___	___
Town layout/ unique design	___	___	Greenbelt	___	___

Country village/
rural feeling   ____ ____   Architecture   ____ ____

Location   ____ ____   Tolerant attitude   ____ ____

School mural   ____ ____   Roosevelt bust   ____ ____

School building   ____ ____

10. Can you think of any other items considered to be especially important to the character of Roosevelt?

11. Do you feel there is a strong sense of community in Roosevelt?

(If **NO** proceed to question 16.)

12. What places or events help to create a strong sense of community for you?

13. Why?

14. Based on conversations with your friends and neighbors, what do you think they feel contributes to the strong sense of community?

15. Why?

16. We are interested in knowing what places or events in Roosevelt have special meaning to you. These could be places that you visit frequently as part of your routine, or infrequently. These could be events that occur frequently to infrequently.
What places or events in Roosevelt have special meaning to you?

(If they need **more** prompting or don't understand the question use the Post office and driving past the farmland as an example of place. Use meetings or the town clean up as an example of event.)

17. Why?

18. Based on conversations with your friends and neighbors, what places or events in Roosevelt do you think they feel have special meaning to the community?

19. Why?

20. What do like best about Roosevelt?

21. What do you like least about Roosevelt?

22. Would you like to make any comments?

.

23. Do you have any questions?

III. CONCLUSION

This concludes our interview. I'd like to thank-you for taking the time to answer our questions.   I would also like to remind you that your participation will be kept confidential. If you are interested in the results of this interview they will be included in the final report of the Natural Resource Inventory which will be on file in the Borough Hall.