

Grassland Communities - Fens, Old Field - Pioneer Brushlands and Savannahs

Community Distribution:

The Tifft Farm contains several types of grassland communities which are well distributed on the site. The "fen" along the northern edge of the preserve is a low springy grassland that has an exceptionally interesting variety of wildflowers and other ground layer species. A large area of the middle of the site is characterized as an old field - pioneer brushland, and at the extreme northwest corner of the site is an expanse of grassland with large mature trees giving the impression of a savannah. Each of these grassland communities is a somewhat different habitat type, but they are closely related and will be treated together in this discussion.

Major Natural Factor Interrelationships. Potentials, Limitations and Major Needs:

- o Land Form. The land form of the fen area is a slight topographic depression with poor drainage. The "fen" at the Tifft Farm site may not be a true fen, in the opinion of some authorities, but this area is distinct enough from other grassland communities and has many features of a true fen, containing different grasses and forbs and several species of hedge. Although part of the area has been filled (north of the new pond) and cut by roads, the surrounding higher grounds provide a drainage system similar to that of a "perched bog". The other grasslands - the old field and savannah areas - are generally on the higher areas of the site, and their plant species are more typically found on mesic to xeric soils.
- o Geomorphology. The surficial geomorphology of the fen community is normally an organic peat that is either neutral or alkaline in reaction. The more mesic grasslands at Tifft occur on a soil base of mixed fills of rubble and organic silts and mucks which initially were built up as the filled areas between the old ship canals and later extended as these canals were filled in.

Educational-Recreational Value:

As educational-recreational resources, the shrub-carr communities must be ranked low in relation to the other environmental resources at the Tifft Farm. The density of the community makes wildlife observation difficult. Any recreational value comes from the passive recreational experience of seclusion which these thickets provide.

Development Tolerance:

Shrub-carr communities are quite tolerant of human disturbance. Pathways through the thickets are readily closed when no longer used, and the communities are easily established and maintained. Their effectiveness in the control of circulation and access is quite high, and the use of this community for additional natural barrier zones should be considered in the master plan.

- o Climate. The shrub-carr communities provide natural windbreaks at the Tifft Farm. The general climate of the Buffalo region is, of course, conducive to the maintenance of required moisture levels. The windbreak effect also causes wind-driven snow to drop on the lee side of these communities, further increasing the available moisture.
- o Vegetation. Shrub-carrs are generally highly stable communities, because the density of the dominant species discourages invasion by any but the most shade tolerant species of trees. While dogwood species dominate, other species include shrub willows, alder and nanny berry. Grapes are also frequently found in the shrub-carr communities. The fruit of the dogwood is an important duck food. Pheasant will also eat the fruit and birds but it is not an important part of their diet. Rabbit (cottontail) browse on the bark in winter months of low food supply. The fruit is eaten by many songbirds, including the cardinal, evening grosbeak, robin, wood thrush and cedar waxwing. It is a favorite food of the evening grosbeak.

The density of shrub-carr vegetation makes this community an important buffer, and an excellent shelter for upland game such as pheasant and rabbit.

- o Wildlife. Species that frequent the shrub-carr community are mentioned above. The general relationship to water areas, and the high shelter and food value of the shrub-carr makes this community an excellent wildlife habitat. In turn, the establishment of this community is often due directly to the dispersion of seeds by animals.

Aesthetic Value:

Anyone visiting the Tifft Farm site in winter will be treated to a sharp contrast of red-osier dogwood against the white background of snow. The graceful texture and high color of this community is therefore an important aesthetic feature of the Tifft Farm. During the spring, the dogwood flowers also contribute to early floral beauty at the site.

Shrub-Carr Communities

Community Distribution:

The shrub-carr communities of the Tifft Farm consist of wide bands of low shrub species - predominantly red-osier dogwood - which usually form a transition zone, or ecotone, between wet lowland areas and drier upland areas. Thus, they are generally well distributed at the site because of the good dispersion of wet lowland communities. However, the high land area in the northwestern portion of the ship canal and the lake-inlet pond's northern bay contains the most extensive shrub-carr community. There are other areas of the site where more intensive development of this community would be desirable, and this establishment could be accomplished in conjunction with selected thinning of the larger community areas.

Major Natural Factor Interrelationships. Potentials, Limitations and Major Needs:

- o Land Form. As a transitional community, or ecotone, the shrub-carr generally occupies higher land along the edges of the low wetland areas. At Tifft, the shrub-carr community was probably not present on the original site as extensively as it is now. Man-made fills in the areas between the old ship canals generated the necessary land form for this community on the existing site, and the related plant species were probably established from seeds in bird droppings.
- o Geomorphology. As transitional communities the shrub-carrs prefer fairly moist soil conditions and are generally found on the higher mucks and silts associated with wet lowland plant communities. Again, at Tifft, these conditions are fairly extensive both as naturally deposited soils and as higher ground made by dredging the mucks and silts to form the ship canals that once occupied the site.
- o Hydrology. Periodic, or seasonally-flooded areas are needed for shrub-carr development. As noted previously, moist soil conditions are a requirement. The density of shrub-carr communities is also a factor in maintaining moist soil conditions. The thick growth traps precipitation and the shading of the foliage retards direct evaporation of this moisture.

Educational-Recreational Values:

This community/habitat type has extremely high educational and passive recreational value. Access to these areas is therefore very important, but should be carefully planned to avoid direct intrusion upon their sensitive ecological features. The large marsh will be particularly valuable for scientific studies of icterid populations and the muskrat.

At the western end of the play field site, the small cattail marsh should be left undisturbed - as a "mini-marsh" for the viewing enjoyment of families using the picnic areas and children using the playground area.

While a major area of the slag marsh at the eastern end of the play field site will be filled to accommodate the play field area, as much of this area should be preserved as is possible. In addition, a new marsh of this character should be developed in the low filled-in portion of the ship canal along Fuhrmann Boulevard.

Development Tolerance:

The large cattail marsh, and smaller marshes of this character are quite fragile and should not be subjected to any development activity, except for the creation of additional open water areas, control of reedgrass, and the construction of a few catwalks and observation blinds for environmental education purposes in the large marsh.

The slag marshes, while more tolerant of circulation impacts should also be restricted except for scientific studies.

The larger littoral zones of the lake-inlet pond, as well as the entire shorelines of the two smaller ponds should also be planned to discourage access. Visitors canoeing on the lake-inlet pond should be provided with a map showing littoral areas restricted to access from the water side.

The muskrat is the most important mammal of this community/habitat type. The estimated population at the Tifft Farm is about 1,000, and they have been trapped for many years - providing some of the best rat pelt found in the area. Cessation of trapping may result in overpopulation unless there is an increase of natural predators such as mink. This could cause a marsh "eat out" and should be carefully monitored. Periodic trapping might be permitted as a means of control.

The teeming insect life of these areas also favors the continuation of amphibians and reptile species.

In the construction of the new pond, consideration should be given to the development of appropriate secluded nesting habitats and potholes for waterfowl within the shallow littoral zone fringing the pond.

Aesthetic Values:

The emergent aquatic plant communities and marsh habitats at the Tifft Farm are a substantial aesthetic asset, providing the strongest sense of primitive natural area on the site. The large cattail marsh is exceptionally beautiful and the rippling sea of green cattail on windy summer days is certainly an aesthetic experience few cities in America can boast of. In contrast to this "macro-scale" aesthetic character of the large marsh, the aesthetic experience of the smaller marshes - especially the slag marshes - requires more study of details - and in many ways will produce a higher sense of discovery for the new nature lover.

The marshes have been favorite dumping grounds in the past, and the exposed eastern edge of the large cattail marsh should be protected with a fence barrier to prevent continued dumping of trash.

exposure aids in hatching and development of young birds, animals and insects. The climate conditions of this community/habitat type also produces fog and frost pockets and these have additional shelter value.

- o Vegetation. Emergent aquatic plant communities and marsh habitats are primarily populated by moisture-tolerant herbaceous species of plants and provide a rich source of plant food for many animals. At Tifft the major marsh is dominated by cattail - both the broad-leaf and the narrow-leaf species are present. There are some areas of invasion by giant reedgrass which has a high aesthetic value but which also has a low value for wildlife. The spread of this plant should be monitored and controlled by hand mowing in the late spring - early summer before the seed head matures. Cattail root stocks are a valuable wildlife food - particularly for geese and muskrats, and the stems and leaves are used for shelter and nesting cover. Arrowhead, found along the fringes of the ponds, is a high value duck food - sometimes called duck potato. Bulrushes, found primarily on the slag marshes at Tifft, are used by sora and many species of duck (seeds) and also by muskrats (stems and underground parts). North of the large cattail marsh there is a smaller marsh area fringed by a large patch of bur-reed which are also used as food by both waterfowl and muskrat.
- o Wildlife. The emergent aquatic plant communities and marsh habitats at the Tifft Farm are the most productive wildlife habitats in the entire site. The dominant bird species of the cattail marsh at Tifft is not a waterfowl, but the red-wing blackbird. This icterid species utilizes the marsh as a nesting habitat and there are great flocks present in the spring and summer. The animal food of this species is primarily insects, including weevils, beetles and caterpillars, but weed seeds make up the bulk of the diet at Tifft - with dominant foods being ragweed and bristleglass. Marsh birds such as gallinules, coots, and herons are also found in the marsh. Killdeer and sandpipers are more commonly found in the slag marshes where they nest, laying their highly camouflaged eggs in shallow depressions where they blend with the stony gravel. The diet of these birds is almost completely of small insects, worms, crustaceans and mollusks.

Other marsh areas at the Tifft Farm are found on low slag and rubble fills. They have a slightly lower moisture content than the cattail marshes, and generally contain more grass and sedge species, and dominant populations of rushes and bur-reeds.

Lens-like layers of sand may connect the main cattail marsh to the Buffalo River providing natural aquifers for the maintenance of marsh water levels.

- o Hydrology. Maintenance of appropriately high water levels is essential to sustain emergent aquatic communities and marsh habits. At Tifft, in addition to the marsh areas, emergent aquatic plant communities are found rimming the ponds, forming the littoral zone of plant growth, which may extend to three or four feet below the surface of the water - or more, depending upon water clarity. In these areas, water levels are generally quite stable. Marsh areas which are relatively even in depth and completely covered by plant growth, however, present some management problems. The annual die-back and decay of marsh vegetation will eventually raise the soil level above the water level. As this continues, the drier soil is easily invaded by less moisture-tolerant plant species. This condition exists along the southwestern edge of the cattail marsh near the aspen sprout forest which is gradually invading the main marsh. This perimeter should be dredged two to four feet below the main marsh water level to stem this encroachment.

Seasonal spring flooding helps to maintain emergent aquatic communities in the areas of low slag or rubble fill in the low wetland forest areas and slag marshes in the western and southern edges of the site.

High moisture content is essential for sustaining the high wildlife population of emergent aquatic plant communities and marsh habitats.

- o Climate. Climate plays an important role in sustaining this community/habitat type. Precipitation is, of course, the most important climate aspect. The interrelationship of climate and thick vegetative growth maintains a high humidity which is important for wildlife food and reproduction needs. The plants are more succulent species which are more digestible, and the warmth of more direct solar

Emergent Aquatic Communities and Marsh Habitats

Community Distribution:

The emergent aquatic communities and marsh habitats of the Tifft Farm site are well diversified in terms of size and species composition and have an excellent distribution on the site. The entire eastern portion of the Tifft Farm consists of this community-habitat type, but smaller marshes and wetland areas are found in the northwestern edge, south of the landfill area along the old Tifft Street right-of-way and in the area south of that line designated for the playfields. The large cattail marsh is undoubtedly the only remnant of the original ecosystem in the area.

Major Natural Factor Interrelationships. Potentials, Limitations and Major Needs:

- o Land Form. The land form structure of the emergent aquatic community and marsh habitat is a shallow depression a few feet below the surrounding ground or surface water table. Most marshes are naturally formed as the result of the aging of shallow lakes and ponds, and much of the Tifft Farm area and its environs is thought to have been a shallow bay at the western end of Lake Erie which was filled in by sands from lake storms and more organic materials deposited at the mouth of the Buffalo River. Today, however, several of the smaller marshes of the Tifft Farm are the result of man-made changes to the earth's topography. Depending upon the type of fill material, these smaller marsh areas have a marked variation of plant species - and, accordingly, contain different animal species.
- o Geomorphology. The surficial geomorphology of the Tifft Farms emergent aquatic communities and marsh habitats is of two principal forms. The cattail marshes are located in areas of natural, or man-created organic soil fills. Usually, these organic soil layers are the result of historic alluvial deposits of the Buffalo River over a base of lake deposited sands, although the natural processes of vegetation decay have added to the organic soil layers.

Development Tolerance:

In terms of development tolerance, the lake-inlet pond is undoubtedly capable of withstanding development impacts and human recreational and nature study use. The marsh pond, conversely, is the most sensitive water body and least tolerant of any developmental change. Selected dredging of bottom debris and accumulated sediments are recommended for defined areas of these ponds, but should be carefully planned and carried out lest the disturbance create even worse conditions. In terms of circulation access, the lake-inlet pond should provide many access points along the southern and western shores. Unstable bank conditions on the northern and eastern sides suggest that access points in these areas be limited to a few areas.

The pond in the northwestern quadrant that is to be created by the transfer operation earth fill borrow is expected to have an extremely high aesthetic quality due to modifications in the grading plan which will make the shoreline more irregular and which will leave a major island in the center where a major structural foundation was uncovered. The island, which will not be accessible to the public, will heighten the sense of mystery and remoteness and, if used by nesting waterfowl, will probably become a major observation focus for nature study.

The small pond in the northern end of the cattail marsh, with its background screen of willow groves and cattails and its marshy foreground - including the old ditch connection to the west and the small earthen peninsula adjacent - provides an experience similar to that of the previously mentioned pond. The shallowness of this pond, however, and resultant dense vegetation in the summer sometimes gives a feeling of stagnation - yet even this provides an aesthetic contrast which is part of the total Tiffit Farm experience. The rich variety of marsh birds and other waterfowl and amphibians and reptiles in this area provides a real nature experience. This pond usually contains several muskrat lodges as well, adding to the aesthetic experience and intensifying the feeling of curiosity.

Educational - Recreational Values:

As active recreational resources, the lake-inlet pond should be opened for canoeing and fishing from designated docks and bankside areas. Ice fishing in the winter might also be permitted on this pond.

The other two ponds, however, should not be opened for either of these uses if their high wildlife and aesthetic values are to be sustained. The pond created by the borrow operation and the marsh pond would also have high value for scientific study of submerged aquatic plant communities and aquatic animal species. The lake-inlet pond would have high scientific-educational value from the perspective of pollution abatement impacts on wildlife restoration.

more balanced food web rather than a food chain such as the bass-bluegill-minnow.

It would be advisable to add at least one additional forage species and other predator species. A member of the pike family is recommended, as is yellow perch. The perch will be intermediate in the food web, feeding upon minnows and invertebrates while in turn being forage for the larger species. The screen at the lake inlet would, of course, not prevent repopulation of carp and goldfish by larval and juvenile forms, but if water quality is improved and a desirable food web established, the aquatic community will be more stable and able to compete with the undesirable species.

It has been suggested that beaver be introduced to the site - and in recent years some have migrated into the site. Beaver would be expected to lodge along the narrow canal extending south from the lake inlet pond to the stream - where aspen and poplar growth is predominant, and the land suitable for the construction of dams. However, they may cause serious flooding of areas such as the willow grove along the old Tifft Street right-of-way, and their foraging could leave the lowland sprout forests in a rather unaesthetic condition.

Aesthetic Values:

The submerged aquatic plant communities and open water habitats at the Tifft Farm provide a variety of aesthetic attributes to the overall visual experience of the area. The lake inlet pond helps to heighten the sense of the site as a composite of distinct zones. While this pond aids in the control of site use it still affords the opportunity of visual access to more remote areas of the site from the areas programmed for more intensive use and in many ways is responsible for the feeling of a remote wild area that is achieved when one is in the north-western area. The large expanse of open water of the lake inlet pond provides a real sense of linkage with nearby Lake Erie, and because of this size factor the water presents many moods depending upon the daily and seasonal climate variations. To a canoeist, the meandering course of this old ship canal with its inlets and bays gives the same sense of intrigue and discovery that would be obtained canoeing in any natural estuarine area.

feeding this pond should be monitored and pollution sources along its course should be eliminated. Anaerobic conditions exist in the lake-inlet pond due to the nature of bottom debris as well as depth and turbidity, but disturbance of this pond by dredging may cause even more serious depletion of oxygen.

- o Climate. Climate effects on the submerged aquatic communities and habitats result primarily from seasonal temperature changes, wind-generated wave action which erodes the banks where the land form change is abrupt, and the increase of water temperature from solar exposure. As noted previously, the formation of ice and cooling of the surface water during winter months is beneficial in the maintenance of vertical water circulation. Wave erosion of the northern and eastern banks of the lake-inlet pond, however, contributes to the turbidity of the lake-inlet pond and consideration should be given to the stabilization of such banks. Increase of surface water temperature is not a major problem in the larger ponds - where it contributes to the vertical circulation of the water, but it accelerates the growth of waterweed and algae in the shallow pond in the northern end of the marsh.
- o Vegetation. The submerged aquatic plants of the Tifft Farm open water habitats are typical of those found in the area. These include both floating and rooted, but submerged, species. The pond in the northern end of the cattail marsh contains extensive growths of waterweed, which has a low rating as a duck food. The more valuable existing floating or submerged aquatic plants are wild celery, pond weed, duck weed, tape grass and filamentous algae. More detailed analysis of the submerged and aquatic plant species is needed to determine a basic program for developing a better balance of species useful for wildlife food.
- o Wildlife. Second only to the emergent aquatic plant communities and marsh habitats, the open water areas of the Tifft Farm sustain rich diversity of wildlife. Representative species of each of the major wildlife groups - fish, amphibians and reptiles, birds, and mammals - along with a variety of macroinvertebrates are found in the Tifft Farm waters as indicated in the previous section. Carp and goldfish are the least desirable species and consideration should be given to screening the lake inlet and poisoning the lake-inlet pond to remove them and restocking to gain a

Depending upon the color and turbidity of the water and the amount of suspended solids, the depth of water at which photosynthesis can occur varies, and thus determines the extent of submerged aquatic vegetation that may be rooted on the pond bottom.

At the Tifft Farm site, the shallow depth of the pond in the northern part of the large cattail marsh is a limiting factor, as is the turbidity of the murky waters of the other two ponds. Periodic dredging of the pond in the cattail marsh should be considered to remove the build-up of decayed vegetation and retard the evolution of this water body into additional marsh-like habitat. The pond in the northwestern quadrant of the site is to be enlarged during the transfer operation, in accordance with contours prepared for the Tifft Farm Nature Preserve Master Plan, which will provide a balanced basin for accommodating both submerged and emergent aquatic communities.

- o Geomorphology. The surficial geomorphology of the Tifft Farm site is an extremely important factor in the maintenance of the submerged aquatic habitat. The rate of lateral flow of ground water is determined by the porosity of the soil. At Tifft, the upper soil levels include extensive sand deposits which probably provide natural aquifers between the ponds and other wetland areas. There may also be dikes of porous slag fill and other such materials resulting from previous development of the site as a commercial port facility.

Recommended improvements to supplement water levels in the cattail marsh in essence will provide an artificial aquifer system which will help to maintain water levels in the pond in the northern end of the marsh. If water levels of the enlarged pond in the northwestern section prove unstable, this can later be corrected by the construction of a sand and gravel aquifer between this pond and the lake-inlet pond.

- o Hydrology. The physical and chemical quality of the water is probably the most significant natural factor/habitat relationship affecting the submerged aquatic communities at Tifft. While the situation, which is a major factor in the ecology of the lake-inlet pond, is probably better than in earlier years due to water pollution control improvements affecting the Lake Erie Harbor, the stream from the South Park Lake

Submerged Aquatic Communities and Open Water Habitats

Community Distribution:

The submerged aquatic communities and open water habitats of the Tifft Farm consist primarily of the three ponds identified in the first section of the report. The northern and western sections of the site contain the most open water. The southeastern portion of the site - particularly the south of the large cattail marsh - lacks an appropriate balance of this habitat type and additional open water areas should be provided as a master plan improvement.

Major Natural Factor Interrelationships, Potentials, Limitations and Major Needs:

- o Land Form. The role of land form in sustaining submerged aquatic communities is obvious. Land form depressions from the basins of ponds and lakes, and the surface hydrology watersheds that sustain a flow of water into them. The depth of water depends upon the contour of the land itself and the ground water level of the surrounding area. At the Tifft Farm, water levels are sustained primarily by direct connection with Lake Erie and by lateral flow of ground water through the earth barriers separating the ponds from the lake inlet and nearby rivers and streams. The topography of the land adjacent to the ponds is relatively flat and provides little direct runoff into the ponds.

The three principal ponds of the Tifft Farm vary significantly in depth - a direct factor of the land form. The depth of the pond basins is important in sustaining submerged aquatic communities. If a pond is too shallow, it will more rapidly evolve into an emergent aquatic community - a marsh - and ultimately become an even drier community. Minimum water depth to allow for a spring-fall turnover is approximately eight feet. This phenomenon occurs when there is sufficient imbalance between the temperature of the water at the surface and bottom layers, and results in a natural circulation in which the cooler, more oxygenated water at the surface is replaced by the warmer less oxygenated water from the bottom.

ECOLOGICAL ASSESSMENT

The existing natural ecology of the Tifft Farm site appears conducive to the support and sustenance of a variety of distinct plant and animal communities. Because the evolution of the Tifft Farm's ecosystem has been subjected to intensive development impact in the past, however, the current resource base contains a number of weaknesses which must be considered in the preparation of the master plan. Through the use of proper planning, construction and management techniques, those ecological elements or processes which are not consistent with the proposed development and use of the site can be eliminated or their influence minimized. Likewise, it is possible to identify and strengthen or accelerate those natural elements or processes which support the proposed development and use of the site.

The following discussion focuses on the interrelationships between natural factors of climate, geomorphology, hydrology, vegetation and wildlife, and the existing and potential plant communities and wildlife habitats of the site.

INTRODUCTION

The previous section of this report presented an analysis and interpretation of each of the existing individual resources of the Tifft Farm Preserve Site.

The following section considers these resources in terms of their interactions and assesses, on an integrated basis, the ecological and visual status of the site to present a composite picture of the total ecosystem and the potentials and limitations for use.

Projected site development impacts, the impacts of peripheral facilities and other external factors are then considered. These include the impact of the transfer operation and the future development and management of the site as a nature preserve.

Based on this analysis, policies are formulated to guide the development and management of the Nature Preserve. Taken together, these components of the report constitute a Basic Ecoplan which serves as the foundation for the preparation of the Tifft Farm Nature Preserve Master Plan as presented in the final section of the report.

westerly winds.

- o Vegetation. The dominant tree species of the mature wet lowland forest at Tifft are black willow and cottonwood. All grow rapidly and may attain a very great size. They generally produce stump sprouts and tend to have many-branched trunks. The loose soil structure sometimes permits the windthrow of exposed trees, and the soft wood contributes to the high wind breakage of branches. Groundlayer species are often quite showy in the spring. The sprout forest along the marsh edge is quite dense, and its wildlife value could be improved by providing some clearings in the larger section.
- o Wildlife. The forest communities of the Tifft Farm provide a series of habitat conditions for wildlife, including the canopy habitat of the treetops, an intermediate habitat and a ground habitat. In addition to the reptiles and amphibians found in and near the pools of water, the Tifft Farm wet lowland forests provide good ground habitat for mink, raccoon and beaver. Muskrats will forage in these areas as well. The small pools hidden by the dense shrub and tree growth also harbor waterfowl such as the wood duck which nests in hollows in the larger trees. The ground layer herb habitat will also provide food and shelter for the mallard, blue-winged teal and ovenbird. Many songbirds live in the intermediate shrub understory including such species as the yellow-shafted flicker, rose-breasted grosbeak, eastern pewee, black-capped chickadee and redstart. Cardinals and house wrens favor the shrub tops. In the canopy layer will be found the red-eyed vireo, great crested flycatcher and downy woodpecker.

Aesthetic and Recreational Values:

The lowland forests at the Tifft Farm contribute to the aesthetic value of the site in many ways. They provide a sense of shelter and their shade is a welcome relief on hot days. The character of the mature willow grove along the old Tifft Street right-of-way provides considerable delight with its tunnel-like character created by the tree-canopy, hanging grapevines, and glimpses of the woodland pools. At dawn and sunset, the glade is filled with the song of many bird species.

The sprout forest, because of its density and correspondingly lower use by wildlife, provides a different character, quieter, and somewhat more hostile to human presence because of the stillness and difficulty in orientation caused by the pathless, even character of the woods.

Educational - Recreational Values:

As an environmental education resource, the willow grove along the old Tifft Street right-of-way must be ranked quite high. This is due both to the size and productivity of the area as a wildlife habitat, and the excellent base conditions for providing controlled access through the area along the old roadway. The smaller willow grove at the north end of the marsh, however, lacks both size and the ability to support foot traffic due to the nearby fen and marsh areas. This area should therefore be preserved undisturbed as a sanctuary area for wildlife. In its current condition, the sprout forest along the western edge of the marsh, except where it thins to a narrow band, is not as productive of wildlife. In the larger areas, the provision of clearings, and the construction of a few trails along the perimeter close to the marsh will improve the education value of the area. As passive recreation resources, the willow grove again ranks high, good for walking and providing many interesting photography subjects. The sprout forest area, and the small mature willow grove at the north end of the marsh have low recreational values and potential.

Development Tolerance:

Normally, the wet lowland forests will not tolerate development pressures due to the wet ground conditions. At Tifft, however, previous use of the site has resulted in conditions which require improvements to be made to both the mature willow grove along the old Tifft Street path, and in the sprout forest along the marsh edge. The latter improvements include the need to bring in excavating machinery and trucks to develop additional open water in the marsh area next to the sprout forest. The disturbance caused by this construction activity will, however, be relatively quickly restored by the rapid growth of wet lowland plant species. Permanent use of these areas should, however, be restricted to trail systems.

Upland Mesic Forest Communities

Community Distribution:

Upland mesic forest communities do not presently exist at the Tifft Farm except in early pioneer stages on the higher grasslands. It would be desirable to establish such communities for variety, however. The new mounds resulting from the landfill operation will provide the major opportunity for the establishment of this community, and consideration should also be given to allowing some sections of the old field - pioneer brushland to naturally evolve into upland mesic forest stands.

Major Natural Factor Interrelationships. Potentials, Limitations and Major Needs:

- o Land Form. Land form is an important natural factor, since these communities require higher, better-drained topography. The new mounds, rising in elevation more than fifty feet above the average existing ground elevation will create the land form condition for this community.
- o Geomorphology. Mesic forests can develop on a variety of soils - the typical position is about mid-catena, with good but not excessive drainage, and with a deep layer of material fine enough to allow root penetration.
- o Hydrology. As indicated above, the availability of water is not as significant a factor in the upland mesic forest community as it is for other communities at Tifft. Because of the deeper water table, the upland mesic forest community will generally have plant species with deeper root systems and less susceptibility to windthrow and breakage. Generally, the drier the condition, the less suitable the community will be for wildlife habitat, since the plants will be species with less moisture content and insects will be fewer.
- o Climate. The upland mesic forest communities are generally winter and summer sheltered and being on warmer upland slopes will have a marked humidity differential as compared to wet lowland forests. These micro-climate features will correspondingly affect the types of vegetative and faunal species present.

- o Vegetation. Beech, yellow-birch and hardwood maples, basswood, elm, oak, ash and hickory are prevalent species of the upland mesic forest communities. The dominance of mast-producing species in turn will attract such wildlife as squirrels, chipmunks, and other animals and birds favoring nuts and hard seeds as foods. Because of the heavy tree canopy, groundlayer species of plants will tend to be restricted to the more shade-tolerant species.
- o Wildlife. The introduction or development of upland mesic forest communities at the Tifft Farm would certainly contribute to the diversity of wildlife species that could be supported by the area. In addition to squirrels and chipmunks, the vegetative species of this community/habitat type would attract such wildlife as the wood duck, gray fox, white-tailed deer, porcupine, jays, thrushes and ruffed grouse.

Aesthetic Values:

The upland mesic forest communities at Tifft would not mature for some time and thus the ultimate aesthetic contribution of these communities would not be immediately experienced at Tifft. At some point in the future, however, these communities would have a valuable aesthetic character - especially in the fall due to the attractive foliage of the species characteristic to these communities. These areas would also provide the most suitable locations for the introduction of conifer species which would add some variety and winter evergreen contrast. In later mature stands, the upland mesic forest, with its sun-flecked relatively low and open understory, would provide the inviting, aesthetic appeal of an accessible forest in contrast to the more forbidding, swampy, character of the wet lowland forests. Because of the high ground elevation, these communities can also provide attractive vistas and overlooks of the remainder of the preserve.

Educational - Recreational Values:

Development of the upland mesic forest communities would add to the educational value of the Preserve by creating additional plant communities and related wildlife species for study. They would be particularly useful for extended scientific analysis of plant successions and the introduc-

tion and management of wildlife species not currently present on the site.

As recreational resources, this potential community/habitat type would also rate high for hiking, photography, sketching and other passive recreational activities. A section of the slope of the new mounds should be made available for sledding in the winter time - and the entire trail system would provide an excellent cross-country skiing facility.

Development Tolerance:

The land form, soils, hydrology, climate and plant and animal characteristics of this community/habitat type are all quite tolerant of human use impacts, for reasons stated earlier. The upland areas at Tifft are therefore the most suitable areas for development and should provide the basic foundation for the trail system and other improvements that are envisioned for the site.

Summary

Overall, the Tifft Farm Nature Preserve site presents a unique natural resource rarely found in such an urban setting. The major visual elements of the site and the habitat/natural factor interrelationships discussed previously are summarized on the following charts.

The major strengths and potentials of the Tifft Farm are its rich diversity of plant communities and wildlife habitats, its key location on the lake shore at the center of a major metropolitan area, and its fascinating history.

The major weaknesses and limitations of the site are its exposure to urban air, water, noise and trash pollution, and its susceptibility to illegal access and uses - such as hunting.

The strengths and potentials, however, far outweigh the weakness and limitations. The most serious obstacles to human use are its history as a private shooting preserve for those who knew of its game resources, and its use as a dumping ground. Those who have habitually used the site for these purposes will not alter their habits unless firm control measures are instituted, and these actions must be taken to eliminate the serious hazards they present for general public use and enjoyment of the site.

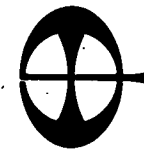
Control measures that need to be implemented and strongly enforced, especially in early stages, are signing and posting of the boundary, elimination of points of illegal access by fencing and barrier planting, and frequent patrol of the site by law enforcement agencies.

While it will be impossible to eliminate or screen out all of the urban pollutant sources, area-wide pollution abatement programs and changing land use trends are expected to improve the character of the setting of this unique resource in future years.

The following section describes in more detail the impacts of current and projected activities on and near the site.

ENV. FACTORS	HABITAT								
	OPEN WATER POND SUBMERGED AQUATIC	EMERGENT AQUATIC (CATTAIL MARSH)	SHRUB - CARR	WET LOWLAND FORESTS		OLD FIELD/ SAVANNAH	UPLAND MESIC - XERIC FOREST (SPROUT)	WEED COMMUNITIES OF RAILROAD YARDS	PROPOSED MOUNDS PROJECTED INTERRELATIONSHIP
CLIMATE/MICROCLIMATE DESCRIPTION OF CHARACTERISTICS	POTENTIAL FOG AND COLD AIR POCKET - WINTER AND SUMMER EXPOSED	POTENTIAL FOG AND COLD AIR POCKET - WINTER AND SUMMER EXPOSED	POTENTIAL FOG AND COLD AIR POCKET - WINTER AND SUMMER EXPOSED - SNOW DROP ZONE ON LEEWARD SIDE OF FOREST STANDS	- WINTER AND SUMMER SHELTERED - COOL BOTTOMLANDS SUMMER AND FALL	- WINTER AND SUMMER SHELTERED - COOL BOTTOMLANDS SUMMER AND FALL	- WINTER AND SUMMER EXPOSED - WARM UPLANDS SUMMER AND FALL	- WINTER AND SUMMER SHELTERED - WARM UPLANDS SUMMER AND FALL	- WINTER AND SUMMER EXPOSED - WARM UPLANDS SUMMER AND FALL	- WINTER AND SUMMER SHELTERED - WARM UPLANDS SUMMER AND FALL
GEOMORPHOLOGY / SOILS									
SOIL TYPE	MUCK AND SILT	2' MUCK	MUCK AND FILLS WITH SILTS	SILT AND FILLS	SILT AND FILLS	FILLS	FILLS	CINDER FILLS	SOLID WASTE FILLS
WETNESS ORDINATION	PONDED	PONDED	WET	WET TO WET MESIC	WET TO WET MESIC	MESIC TO DRY MESIC	MESIC TO DRY MESIC	DRY	MESIC TO DRY MESIC
SLOPE	0%	0%	0 - 0.5%	0 - 1%	0 - 1%	VARIES 1 - 10%	VARIES 1 - 10%	0 - 0.5%	VARIES TO 8%
LANDFORM	POND	MARSH - FLOODPLAIN	FLAT LOWLANDS	FLAT LOWLANDS	FLAT LOWLANDS	ROLLING TOPO	ROLLING TOPO	MADE LAND	MADE UPLANDS
HYDROLOGY/WATER RESOURCES									
WATER TABLE	EXPOSED	EXPOSED	LESS THAN 1' CONTINUALLY	1/2' - 1' SEASONALLY	1/2' - 1' SEASONALLY	DEEPER THAN 3'	DEEPER THAN 3'	DEEPER THAN 3'	DEEPER THAN 3'
FLOOD POTENTIAL	PERMANENTLY FLOODED	PERMANENTLY FLOODED	SUBJECT TO YEARLY FLOODING	SUBJECT TO SEASONAL FLOODING	SUBJECT TO SEASONAL FLOODING	SLOW	SLOW	MINIMAL	VERY SLIGHT
RUNOFF RATE	PONDED	PONDED	VERY SLOW TO PONDED	PONDED	PONDED	SLIGHT	SLIGHT	MINOR	RAPID
VEGETATIVE RESOURCES MAJOR DOMINANT SPECIES	HORNWORT SLENDER NAIAS WATER WEED PONDWEED SP DUCKWEED TAPEGRASS	SPIKE RUSH BULRUSH CATTAIL ARROWHEAD BUR-REED WILD RICE GIANT REEDGRASS RIKE CUTGRASS SLOUGHGRASS	NANNTY BERRY RED OSEER DOGWOOD WILLOW'S CURRANT ELDERBERRY RED RASPBERRY	POPLAR'S RED OSEER DOGWOOD	WILLOW'S POPLAR'S	OAKS HICKORY ASPEN BLACK CHERRY	SUGAR MAPLE BASSWOOD BEECH ELM HORNBEAM	RAGWEED MILKWEED SUMAC THISTLE ASTER HAWKWEED	RECOMMEND PLANTING WITH UPLAND MESIC - XERIC SPECIES
MAJOR GROUND SPECIES			VIRGIN'S POWER WILD CUCUMBER WOOD BINE BLACK BINDWEED POISON IVY	WOOD BINE POISON IVY GRAPE	WOOD BINE POISON IVY GRAPE	FLOWERING SPURGE BERGEMOT COMMON MILKWEED & OTHER GRASSES	TROUTILLIES SQUIRREL CORN SPRING BEAUTY TOOTHWORT FALSE RUE ANEMONE		
WILDLIFE AMPHIBIANS/REPTILES	NORTHERN WATER SNAKE LEOPARD FROG PAINTED TURTLE SHAGGIP TURTLE	NORTHERN WATER SNAKE LEOPARD FROG PAINTED TURTLE SHAGGIP TURTLE MUDPUDDIE	NORTHERN WATER SNAKE LEOPARD FROG PAINTED TURTLE SHAGGIP TURTLE MUDPUDDIE	LEOPARD FROG PAINTED TURTLE SHAGGIP TURTLE	AS PER LOWLAND SPROUT	GARTER SNAKE EASTERN MILK SNAKE	AMERICAN TOAD GARTER SNAKE		PROBABLE INTRUSION BY UPLAND - MESIC XERIC SPECIES
FISH	MILKNOWS (VARIOUS) SALFISH LARGEMOUTH BASS YELLOW PERCH BULLHEAD SUCKERS	MINNOWS (VARIOUS) BULLHEAD		PINK BILLED GREBE GREEN HERON BLACK CROWNED NIGHT HERON BITTERNS (VARIOUS) MALLARD BLACK DUCK BLUE WINGED TEAL VIRGINIA RAIL SODS COMMON GALLINULE COOT GULLS (VARIOUS) BLACK TEAL PALM WARBLER	AS PER LOWLAND SPROUT	NORTHERN ORIOLE VIREOS (VARIOUS) WARBLING GOLDFINCH PHILADELPHIA GOLDFINCH YELLOW WARBLER CATBIRD EASTERN KINGBIRD RING NECKED PHEASANT BLUE WINGED TEAL	SWALLOWS (VARIOUS) WARBLERS (VARIOUS) KILLDEER SPOTTED SANDPIPER SOLITARY SANDPIPER WRENS (VARIOUS)	CRON	
BIRDS	GREEN HERON BLUE WINGED TEAL MALLARD AMERICAN WIDGEON GULLS (VARIOUS) COMMON GRACKLE RED WINGED BLACKBIRD	PINK BILLED GREBE GREEN HERON MALLARD BLACK CROWNED NIGHT HERON BLACK DUCK BLUE WINGED TEAL VIRGINIA RAIL COMMON GALLINULE SODS COOT SWALLOWS (VARIOUS) RED WINGED BLACKBIRD	AS PER EMERGENT AQUATIC						
MAMMALS	MINK BEAVER	MUSKRAT RACCOON	BEAVER SHORT TAIL WEASEL	SHORT TAIL WEASEL	AS PER LOWLAND SPROUT	GRAY FOX MEADOW VOLE EASTERN COTTONTAIL WHITETAILED DEER	WHITETAILED DEER GRAY SQUIRREL CHIPMUNK RACCOON	RAT	

HABITAT / NATURAL FACTOR INTERRELATIONSHIPS



TIFFT FARM NATURE PRESERVE CONCEPT PHASE



SCALE 1" = 100'

CITY OF BUFFALO, NEW YORK
MAYOR
STANLEY M. MARKOWSKI
DEPARTMENT OF
COMMUNITY DEVELOPMENT
RICHARD L. MILLER

THE SARATOGA ASSOCIATES
ENGINEERS, ARCHITECTS, PLANNERS
AND LANDSCAPE ARCHITECTS
375 BROADWAY
NEW YORK, N.Y. 10013

ECOPLAN, INCORPORATED
THE ARCADE
SARATOGA SPRINGS
NEW YORK 12858

PERCEPTUAL SITE ANALYSIS

RAILROAD YARDS

- DOMINATE THE AREA ADJACENT TO THE SITE
- BUFFER REQUIRED

LEHIGH VALLEY RAILROAD

NIAGARA

MOHAWK

POWER

TRANSMISSION

CORRIDOR

CATTAIL MARSH

- PREDOMINANT FEATURE OF THE SITE (75+ ACRES)
- ENCROACHMENT NOTED BY UTILITY R.O.W. AND PLANT SUCCESSION

VEGETATIVE AREAS

- SEE "VEGETATIVE COMMUNITIES" PLAN FOR SPECIFIC DETAIL

UTILITY R.O.W.

- NIAGARA MOHAWK 60' CORRIDOR 34.5 KV TRAVERSES THE LENGTH OF THE SITE

OPEN WATER AREAS

- REMAIN FROM EARLIER INDUSTRIAL CANAL DEVELOPMENT
- PROVIDE RELIEF TO THE SITE IN CONTRAST TO VEGETATIVE AREAS

OPEN FIELD AREAS

- OFFER A UNIQUE CHARACTER TO THE SITE - CAN BE MAINTAINED FOR EDUCATIONAL VALUE IN VARIOUS STAGES

MOUND AREA

- DEVELOPED AS A RESULT OF THE SOLID WASTE TRANSFER OPERATION
- SCHEDULED COMPLETION IS 12/74

ROADWAY VIEW

- IS OFFERED TO BOTH THE SITE AND LAKE ERIE
- ROADWAY APPROX. 25' ABOVE SERVICE ROAD

SERVICE ROAD

- PROVIDES DIRECT ACCESS TO THE PRESERVE PORTION OF THE SITE

VIEWS

- TO INDUSTRIAL NEIGHBORS

ROADS & TRAILS

- TRAVERSING THE SITE HAVE OFFERED UNLIMITED SITE ACCESS IN THE PAST
- HEAPS OF TRASH EVIDENT THROUGHOUT NORTHERN PORTION OF THE SITE

- UNOBSTRUSIVE LOW-PROFILE STRUCTURE

OHIO STREET

TO DOWNTOWN BUFFALO
FUHRMANN BOULEVARD

LEHIGH VALLEY RAILROAD

FUHRMANN BOULEVARD

TIFFT FARM NATURE PRESERVE SITE ANALYSIS



SCALE 1" = 100'

THE SARATOGA ASSOCIATES
ECOPLANS, INCORPORATED
THE ARCADE
SARATOGA SPRINGS
NEW YORK 12856

MCARDLAND JOHNSON GIBBONS ENGINEERS, INCORPORATED
ENGINEERING CONSULTANTS
BUFFALO NEW YORK
GREVER AND WARD, INCORPORATED
LANDSCAPE ARCHITECTURAL CONSULTANTS
NEW YORK
BRISTOL LEVAYER LITVINENI BARBCK HOLLISS AND MOORE P.C.
DESIGN CONSULTANTS
SARATOGA SPRINGS NEW YORK

CITY OF BUFFALO, NEW YORK
STANLEY M. MAKOWSKI
DEPARTMENT OF COMMUNITY DEVELOPMENT
RICHARD L. MILLER
MAYOR
COMMISSIONER

DATE: 10/1/74
SHEET NO. 1
JOB NO. 74-000

DEVELOPMENT IMPACT ANALYSIS

The Transfer Operation Impacts

The potential reclamation and restoration of the Tifft Farm site as a Nature Preserve is the result of a prior environmental need in the Buffalo Urban Area -- the abatement of the water pollution of the Niagara River through the construction of the Buffalo Sewer Authority's Secondary Wastewater Treatment Facility on Squaw Island -- a former municipal refuse disposal area.

To construct this needed facility, the Buffalo Sewer Authority has moved an estimated 1.6 million cubic yards of mixed municipal refuse. This material was transferred by barge from Squaw Island to the Tifft Farm site where a landfill solid waste disposal process was used to construct a series of mounds in the southwest sector of the Tifft Farm site.

The development impact of the transfer operation resulted from several specific activities:

- the construction of facilities for the reception of the transfer materials;
- the chemical deodorizing and rodenticide agents used to minimize potential noxious odors and exterminate rodents at the Squaw Island excavation site;
- the containment and removal of liquid leachate at the Tifft Farm transfer site;
- the placement and cover of the transfer materials; and
- the excavation and haul of cover material and restoration of borrow areas.

The impacts of these activities have been temporary and/or minimal, because of the Buffalo Sewer Authority contract specifications. There may be some minor permanent changes in micro-climate features in areas of the Tifft Farm site, but these may be more beneficial than adverse. Permanent adverse impacts would only occur if the system for controlling the leachate fails to operate properly. While there are some temporary concerns related to the uncompleted connection of the leachate system to an interceptor sewer scheduled to serve the area, the

installation of monitoring wells, and the provision of a contingency system (such as tank truck removal of the accumulated leachate) could easily resolve this problem.

The determination to use barges, instead of rail, for the transfer of the materials eliminated the possibility for more extensive disturbance of sensitive areas of the Tifft Farm site, since new rail facilities would have had to be installed on the site.

The containment and removal of the leachate from the refuse placed at the Tifft Farm site was also specified in the Sewer Authority contract. Prior to the placement of any materials, a bentonite slurry wall was constructed around the landfill zone. The material was placed in a trench excavated to a depth where an impervious clay layer was encountered. The bentonite slurry hardens into an impervious wall. A sewer system has also been installed to remove the leachate, with monitor wells for the obtaining of periodic samples of leachate.

Connection of the leachate system to a municipal interceptor must await the completion of the Kelly Island treatment plant and Fuhrmann Boulevard interceptor. This line could be constructed south to the Buffalo River Improvement Corporation pumping station at the northwest corner of the Tifft Farm site within three to four years. No date has been established for connecting the leachate removal system to the interceptor, however, so there is an important question to be resolved regarding interim contingency procedures for removing the leachate.

There are no calculations known to Ecoplans which indicate the rate and volume of leachate from the refuse mounds. However, the transfer material already has a relatively high moisture content, and heavy rains could further affect the amount of leachate produced.

It is recommended that this situation be periodically monitored by the Sewer Authority and Erie County Health Department until the leachate system is connected to the new interceptor.

Cover material for the landfill is being excavated from an area surrounding the small existing pond in the northwest quadrant of the site. In the process, the pond will be enlarged as an addition to the site water

resources. Specifications in the Sewer Authority contract require the final grading of the pond to produce relatively shallow edges where emergent water vegetation will ultimately grow.

The excavated materials are being hauled via a temporary roadway between the borrow area and the mounds located between the cattail marsh and the inlet lake.

Impacts from the borrow operation resulted in temporary disturbance of existing wildlife in the borrow area and haul road area. During the course of the borrow operation, several old concrete foundations were uncovered in the area of the pond and its immediate perimeter. The Sewer Authority requested consideration of a change in the final pond grading in order to avoid the cost of removing these structures. The following suggested revision of the pond configuration was prepared by Ecoplans to assist the Sewer Authority in resolving this problem.

A temporary fence was constructed between the haul road and the cattail marsh to prevent encroachment on that area. The fence and the road area are to be removed and restored following completion of the transfer operation.

Final grading and cover and seeding of the mounds are also specified in the Sewer Authority Transfer Operation contract. At least two feet of soil material capable of growing grass and creating an impervious seal of the landfill is to be provided. Three feet of cover are required in areas of the mound which will form surface drainage ways.

Particular care should be given in the seeding and mulching of the final cover to prevent soil erosion and exposure to the landfill.

Short falls in the estimates of the amount of refuse materials to be removed from Squaw Island will apparently alter the final configuration of the mounds. To retain the objective of natural shaping of the mounds, it is recommended that the Sewer Authority calculate the amount of surplus borrow material to be excavated from the pond area and revise the mound grading plan to distribute this material in a way that will achieve the most natural configuration possible.

Even though less borrow may be required, the Sewer Authority should excavate the pond area as required.

Restoration of the site by the Buffalo Sewer Authority contractors is a critical consideration. The following recommendations are suggested.

Upon completion of the transfer operation, the contractors should be required by the Buffalo Sewer Authority to restore all disturbed areas of the Preserve including the following:

- a. Major windows along all haul roads, excavated areas and access roads (including the Lehigh Valley right-of-way, Old Tifft Street right-of-way from the stream east, and dirt access road along the western perimeter of the cattail marsh) should be leveled to surrounding ground elevations.
- b. All grubbed trees, brush, stumps, trash, rubble and debris uncovered or affected by the transfer operation borrow, haul and access activities should be buried, removed from the site or otherwise suitably disposed of. On-site burning of such materials should not be permitted.
- c. All slag materials used to stabilize haul or access roads, including slag fills placed as base fills for the temporary bridge approaches should be buried or removed from the site.
- d. Topsoil stripped from the borrow area and haul roads and stockpiled should be used to cover all excavated areas except those inundated by the waters of the expanded pond.
- e. Limbs on live trees broken during, and as a result of, the borrow, haul and regrading activities should be trimmed at the trunk and removed.
- f. The temporary culvert across the old canal-stream inlet between the landfill and borrow areas should be completely removed and the channel, shoreline and surrounding disturbed area restored to blend with surrounding elevations and original lines and depths. The culvert pipe should be buried or removed from the Preserve site.

- g. All temporary fencing and other temporary structures should be removed from the site upon completion of the transfer operation.
- h. Upon completion of the transfer operation, all areas of exposed soil should be seeded with seed types and mixtures, as specified in the contract documents at the earliest opportunity, consistent with weather conditions and recommended seasonal periods for establishing effective and viable plant growth.
- i. Upon completion of the transfer operation and restoration of the site, the Buffalo Sewer Authority, for a period of two years from release of the contractor, should periodically inspect the site and shall immediately repair and restore any eroded areas or filled areas indicating substantial settlement.

The Tifft Farm Technical Advisory Committee should not approve the location of any structures or facilities within the leachate barrier of the landfill mounds with the exception of trails, observation towers, benches and native plant materials.

The Tifft Farm Technical Advisory Committee should not cause or approve any construction activity within or adjacent to the leachate barrier, drain system or pumping station which will cause damage to or interfere with these systems.

The Tifft Farm Technical Advisory Committee should not approve any plans for construction or earth-moving within the area within fifty feet of the leachate barrier wall without prior analysis by the Buffalo Sewer Authority as to the potential impact of such activities, and certification by the Authority's engineers that the proposed activities will not adversely affect the stability and seal of the landfill.

Site Development and User Impacts

To sustain the environmental quality of the Tifft Farm site, it is essential to consider the development and human use impacts on the site. These will stem from two somewhat distinct programmed uses of the site -- conservation education and recreation:

Site Development Impacts

Site development impacts are related to the various types of facilities to be constructed on the Tifft Farm site -- including both facilities for conservation and active recreation -- and the various procedures for constructing these facilities.

The following facilities are contemplated:

- Buildings to serve both the Nature Preserve and Playfields
- Trails
- Fences
- Outdoor lecture facilities
- Playfield areas and playground facilities
- Observation towers
- Marsh catwalks and blinds
- Parking areas and service roadways
- Bridges
- Utility systems for power, water and sewage
- Lighting
- Signs and exhibits
- Wildlife habitat improvements to:
 - Water areas
 - Old field savannas
 - Sprout forests
 - Mature forests
 - Cattail marshes
 - Mounds

All of these facilities will obviously have a permanent impact on the site -- primarily changing it from an unmanaged appearance to a managed one.

The design of the facilities should be in keeping with the Nature Preserve/Playfield character of the site's two primary sectors. The Conservation Education Center could be an unobtrusive, somewhat hidden facility, blending in with the natural forms and colors of the site. On

the other hand, if the policy is to attract people into the site, the structure could be designed in such a way as to call attention to it -- and reveal its function as an educational institution -- through a dynamic, exciting mass and form. The building structure for the Playfield can also be designed to advertise its function or hide it. On the whole, the Playfield area probably should provide a conspicuous message that it is the area for active recreation as opposed to the Nature Preserve area, although the small marsh areas in the Playfield site should be retained. This may create a maintenance problem, however, and it is recommended that these marsh areas be protected by barrier zones of natural planting that will discourage "exploratory" incursions into the marshes or litter of these areas.

A unique opportunity exists for the creative design of play structures for small children in the Playfield playground. These designs should generate awareness of natural environmental resources. Timberform play structures should be used instead of the traditional pipe, concrete, and metal structures. Sandboxes, water tables, climbing trees with "crows nests", underground "burrows" and "muskrat lodges" play structures could be used to "teach" a child while he plays.

Trails, bridges, catwalks, observation towers, signs, and exhibits obviously should blend with the natural character of the site. Utility systems should be underground, parking areas should be screened with plant materials. Lighting should be restricted to the area immediately adjacent to the conservation education center and, except for night lighting of the Playfields, light standards should be of the type that hide the light source.

Wildlife habitat improvements should be as natural as possible -- simple clearings, natural nesting islands, and native plant materials that provide food and shelter for desired species.

Water areas should be cleared of underwater trash and debris, and access to the water edge restricted to areas which will not cause accidental drownings. Plant materials can be used to control and direct foot traffic.

Trail paving materials should be natural, and trails graded to prevent erosion and poor drainage.

The trails to the mound observation points should be carefully selected and properly constructed to avoid erosion.

Natural areas should be cleared of foreign debris, but natural debris left undisturbed. The cattail marshes should be protected from encroachment and foot traffic, and catwalks and blinds restricted to areas that will not disturb wildlife.

The construction of each of these facilities will necessitate some disturbances of existing environment. The impacts from construction activities will, for the most part, be temporary. In some cases, however, certain improvements will have permanent impacts. Listed below are the general construction processes which may take place on the site:

- Clearing and grubbing, including the disposal of cleared materials
- Grading and reshaping land forms
- Excavation and trenching
- Removal or replacement of excavated materials
- Dewatering of construction sites
- Filling of certain low areas
- Construction of substructures
- Construction of superstructures
- Paving
- Seeding, planting

In general, these activities can be undertaken without adverse impact on the existing site ecology if care is taken in the development of contract specifications during the detailed design. Because the construction program for the site will be phased over time, extensive disturbance of the site will be minimized.

Clearing and grubbing activity should be restricted to defined contract limit lines. These activities will be necessary to prepare locations for the various facilities on the site, and create improved wildlife habitat and a variety of environmental experiences. For the most part, to be created in the aspen woods where some cut trees and brush may be left to provide natural cover and shelter for wildlife.

Grading and reshaping of landforms should be within specified limits to prevent soil erosion. It is not intended that every landform in the site be manicured. For instance, the eroded banks of the inlet lake generally

should not be graded -- except in selected areas where it may be desirable to create shallow depths conducive to emergent plant growth.

Areas around the principal structures should be graded to provide optimum storm water drainage and a pleasing appearance.

Excavation and trenching will be necessary to install building foundations and utility runs. In addition, it appears desirable to relocate the stream entering the site from the east to form a barrier between the Nature Preserve and Playfield facilities. Side slopes of the new stream channel should be graded to a 5:1 ratio.

To create additional marsh water area, certain areas along the eastern edges of the aspen woods should be excavated. Blasting is sometimes considered to be an effective means to create such areas. The other alternative is to use a dragline shovel. While the shovel is obviously more controllable and avoids the shock impact on wildlife, bringing such equipment in requires clearing along the edge of the marsh, and necessitates haul out and disposal of spoil materials.

The disposal of spoil materials from excavations not needed for backfilling could be transferred to other low areas requiring fill, or spread evenly across nearby ground services in thin layers that will not suppress existing vegetation.

Fill material for areas such as the Playfield should be composed of inert materials and compacted to prevent slumping and graded to prevent areas of standing water.

Dewatering of foundation sites may be a necessary temporary requirement. If necessary, such water should not be discharged directly into existing water bodies but allowed to infiltrate back into the soil away from the excavation site.

Depending on the structural methods selected, construction of building substructures and superstructures will have variable temporary impacts. Following construction, debris should be collected and disposed of away from the site. Paved surfaces should not be constructed of materials which may leach toxic substances to adjacent water bodies.

Reseeding and planting of disturbed surfaces should take place as soon as possible. Grass, shrub and tree species used in the area should be native to the area and not attract undesired faunal species or interrupt normal successional patterns.

User Impacts

Subsequent to development of the Tifft Farm site, there will be a continuous sustained impact as a result of the use of the site. User impacts are a function of the type and density of the users, and their activities on the site.

Users of the Tifft Farm site can be classified into four main groups:

- Supervised groups from area associations, schools, colleges, and environmental organizations.
- Scientists engaged in environmental or ecological research.
- Casual visitors, including individuals, families, or small groups of unrelated individuals.
- Management and maintenance personnel.

The majority of the people using the site will arrive by car, bus or bicycle. Because of the inaccessibility of the site, few people are expected to walk to the area. Most use of the site will be during daylight hours, with early morning and late evening hours favored by guided groups and scientists because of greater wildlife activity during these hours. Proportionately higher densities of casual visitors can be expected during early evening hours and weekends and holidays, especially during the warmer months of the year and in periods of migratory waterfowl flights in the spring and fall.

Supervised groups, on the other hand, would be more predominant during weekday daylight hours.

Management and maintenance personnel on the site could range from permanent caretakers and seasonal guides, to periodic maintenance personnel repairing structures, cleaning litter or constructing new facilities.

Age and educational level of user groups must also be considered. Young children and elderly users of the site should be protected from dangerous situations.

This consideration should also be given to the blind and physically and mentally handicapped persons who may use the site. The educationally-deprived, at any age level, should be automatically instructed on the proper use of the site as soon after arrival as possible.

The density of use of specific areas of the site will vary in relation to the accessibility of areas to the parking facilities, user objectives and the location of trails and lecture facilities.

The control of user density is a very important consideration if the site environmental values are not to be destroyed by intensive and excessive use. Recommended densities for various sectors of the site, including the Playfields, are indicated on the attached chart.

Procedures should be established for scheduling the visits of supervised groups, parking facilities sized to accept only the optimum number of vehicles, and trails and lecture facilities designed to discourage access to areas sensitive to disturbance by human use. Management and maintenance personnel should be trained and supervised to avoid what can sometimes be the most serious impact -- incompetent maintenance.

The activities of these various user groups must also be considered in evaluating user impact. These include the typical Nature Preserve activities -- hiking, observing wildlife, research, education, and playfield active recreation activities -- ball games, free play, sledding, kite flying, cycling, running. In addition, more passive recreation activities include walking, sitting and fishing.

Impacts resulting from these activities can cause soil erosion, destruction of vegetation, injury to wildlife, pollution from litter and garbage, and possible hazards to the users themselves. Unsupervised activity can result in illegal uses -- fires, trapping and hunting of wildlife, or collection of specimen plants and animal life.

User density of the site should not exceed a maximum of 135 persons per hour. This maximum density is unlikely to occur except during peak weekends. For the most part, the Preserve can expect approximately 100,000 annual visitors -- but facilities are programmed to accommodate maximum density during peak use consisting of 75 people (five groups of fifteen people each) on

the trails and sixty people on the mounds and at the center during a single hour. Parking facilities have been sized to accommodate this load.

Overall, this would mean a gross density of approximately two people per acre.

Use of the Tifft Farm Nature Preserve at maximum density is calculated as follows:

5	Trail Groups @ 15 each	=	75 people per hour
	Environmental Education Center and Mounds	=	<u>60</u> people per hour
45	Parking Spaces/Hour @ Three Persons/Car		135 people per hour

Probable peak use should be anticipated as follows:

SUMMER PEAK USE (SATURDAY/SUNDAY)

Morning

5:30	6:30	7:30	8:30	9:30	10:30	11:30	12:30	
15	30	45	60	45	45	45	60	Trail Groups
5	10	15	20	15	15	25	30	Center/Mounds
<u>20</u>	<u>40</u>	<u>60</u>	<u>80</u>	<u>60</u>	<u>60</u>	<u>70</u>	<u>90</u>	

Afternoon

1:30	2:30	3:30	4:30	5:30	6:30	7:30	8:30	
45	30	30	30	45	60	75	45	1020 Visitors
25	15	15	15	30	60	60	30	x 52 Days
<u>70</u>	<u>45</u>	<u>45</u>	<u>45</u>	<u>75</u>	<u>120</u>	<u>135</u>	<u>75</u>	53040

WINTER PEAK USE (SATURDAY/SUNDAY)

Morning

8:30	9:30	10:30	11:30	12:30	
15	30	45	30	30	Trail Groups
5	10	15	20	25	Center/Mounds
<u>20</u>	<u>40</u>	<u>60</u>	<u>50</u>	<u>55</u>	

Afternoon

1:30	2:30	3:30	4:30	5:30	
30	30	45	30	30	470 Visitors
20	15	10	15	20	x 52 Days
<u>50</u>	<u>45</u>	<u>55</u>	<u>45</u>	<u>50</u>	24440

PERIPHERAL FACILITY IMPACTS

Highway Facility Impacts

The location of the Tifft Farm Nature Preserve in a relatively isolated industrial-port area, with no immediate residential environs implies that the majority of the users will reach the site via motor vehicle. The major highway facility providing north-south access to the Tifft Farm is Fuhrmann Boulevard -- also one of the principal east-west New York State routes (Route 5).

Several years ago Fuhrmann Boulevard was upgraded by the State Department of Transportation, and the highway is now a four-lane elevated expressway facility with parallel service roads along each side at grade. In the vicinity of the Tifft Farm, there are "slip ramps" on and off of the expressway and a modified interchange connecting the expressway to Tifft Street, the principal access route from the east.

The expressway carries a heavy volume of both truck and passenger vehicle traffic.

There are three primary adverse impacts of these highway facilities -- noise, air pollution, and salt dispersion. Secondary impacts include visual blockage from eye level to the west toward the lake, litter and dust and potential safety hazards to vehicles and people attempting to reach the site through a confusing series of U-turn movements necessitated by the highway structure.

In addition, a segment of the Tifft Farm site contains a permanent easement of the State of New York to protect against abnormal loading of the Fuhrmann Boulevard road base from the area of the inlet north to the vicinity of the Buffalo River Improvement Corporation Pumping Station. The State wishes to maintain this easement, but may permit selected uses and improvements within the easement.

Of the primary impacts, highway noise is one of the more distracting elements, and the prevailing winds carry sound well into the site. New federal noise abatement regulations directed at vehicle mufflers may reduce noise somewhat in the future, and appropriate planting schemes for acoustical functions could also help minimize the problem.

While noise is disruptive to people in nature study situations, e.g., interrupting learning various bird species from their song and calls, the noise levels within the Tifft site, seem to have little affect on the wildlife species within the site. Species less tolerant or urban noise levels would be discouraged from residence by the noise levels, however,

Emissions from motor vehicle exhaust systems also affect the Tifft Farm site due to the highway proximity and prevailing winds. Generally, however, the strong lake breezes quickly dissipate these pollutants (with evening land breezes in the summer reversing the airflow toward Lake Erie) and with new federal auto emission standards in effect, this problem could be reduced to very insignificant levels in the future.

Salt dispersion from highway de-icing in the winter is another highway impact that can seriously affect plant materials and nearby water resources. Again, careful selection of resistant plant species and grading, storm sewer service can reduce this impact.

The elevated structure of Fuhrmann Boulevard creates a visual block of the view of Lake Erie from the site. The mounds will provide new vista points, however, and the planned development of a planting program along the Fuhrmann Boulevard berms can do much to improve the visual quality of the site.

Litter from vehicles is generally more apparent in industrial areas, principally because the adjacent areas usually do not receive the same level of street cleaning maintenance. Signing along Fuhrmann Boulevard and its service roads, drawing attention to the Nature Preserve location and including anti-litter slogans could help reduce this problem at the Tifft Farm site.

From the potential Tifft Farm user's point of view, perhaps the most important highway impact to be considered is the need for directional signage locating the access routes to the Nature Preserve entrance and parking areas. These elements have been considered in the schematic plan presented later in this report.

Port Development Impacts

Fortunately, the Tifft Farm Nature Preserve is located in an area of the Buffalo Port which is little used except for public recreational purposes. The Buffalo

Municipal Small Boat Harbor is located opposite the northwestern sector of the Tifft Farm site, within the outer breakwall.

The area just south of the small boat harbor is currently used intermittently as a spoil area for harbor dredgings. The ultimate use of this area should be analyzed in cooperation with the Niagara Frontier Transportation Authority.

We recommend that the area not be used for port activities, especially bulk storage. If structures are built in this area, they should be designed so as to not obstruct the vista from the mounds. The Great Lakes Laboratory has been investigating the potential use of this area as a wildlife habitat. If these investigations substantiate that feasibility, we recommend that the area be acquired as part of the Nature Preserve.

Access to the lakefront areas would be most feasible under the Fuhrmann Boulevard viaduct approach to the Union Ship Canal Bridge at the southwest corner of the site. A pedestrian walk light should be installed to provide safe crossing of the heavily travelled section of the west service road at this location.

Rail Facility Impacts

Lands immediately north of the Tifft Farm are occupied by the Lehigh Valley Railroad Company. Adjacent to the old Tifft Street right-of-way, the Lehigh Valley Railroad also owns about 26 acres of land which separate the Tifft Farm Nature Preserve from the proposed Tifft Street Playfield Area. These lands contain a rail spur which crosses Fuhrmann Boulevard beneath the viaduct approach to the Union Ship Canal Bridge and then parallels Fuhrmann Boulevard to the west, extending north to, and currently serving the Freezer Queen plant.

The lands along the trackage to the north also contain utility power lines adjacent to the current Tifft Farm boundary, and are of secondary importance to the expansion of the Preserve for control purposes.

To ensure integrity of the Preserve (preventing illegal access and dumping), and to link the Preserve proper with the Playfields, it will be necessary to eventually acquire the Lehigh Valley lands where the spur is located.

Since the Freezer Queen plant can be serviced by truck, discontinuation of the spur is possible. Negotiations are currently underway to establish the feasibility of the acquisition of these lands from the Lehigh Valley Railroad.

The main Lehigh Valley trackage east of the Preserve serves several grain milling operations along the Buffalo River. Grain spillage from empty boxcars sometimes stored in this area attracts Norway Rats and these rodents have also invaded the Nature Preserve. They do not pose a major problem, however.

Utility Line Impacts

Properties owned by, or under easement to the Niagara Mohawk Power Corporation abut the Tifft Farm on the north and east and bisect the site in a north-south direction. The power lines on the periphery of the site are 115 kv lines. A 100' wide strip of land bordering the cattail marsh on the east is owned by the power company, and the poles carrying the lines were constructed on areas created by filling in portions of the marsh.

Negotiations are currently underway with the power company to establish policies relative to future filling of the marsh, and the erection of a fence along the eastern boundary of the marsh to prevent illegal access and dumping of trash.

Two 34.5 kv lines are located on the easement that bisects the site between the eastern and western sectors. This line serves the Portland Cement Company and cannot be relocated without considerable cost to the City. This line also bisects the Playfield areas.

Impacts on the site relate to the visual aspects of these lines and the restrictions on using the easement areas for certain purposes. These are currently under discussion with the power company, and the following policies are recommended:

The Niagara Mohawk Power Corporation should provide the City of Buffalo a permanent easement within the Corporation's 115 kv power transmission line right-of-way along the eastern edge of the cattail marsh for the construction of a barrier fence to protect

against dumping in the marsh.

The Niagara Mohawk Power Corporation should provide the City of Buffalo flowage rights over unfilled marsh lands within the 115 kv transmission line right-of-way.

The City of Buffalo should provide a designated 50 foot permanent easement to the Corporation along the route of the now undesignated 34.5 kv transmission line bisecting the site.

The City of Buffalo should consult with the Niagara Mohawk Power Corporation prior to finalizing plans for the construction of the barrier fence and should incorporate such grounding devices, gates and other criteria as are required by Niagara Mohawk.

The Niagara Mohawk Power Corporation should avoid unnecessary filling of the natural marsh areas within the 115 kv right-of-way, and in the event of an emergency requiring either removal of all or portions of the fence, or fill of any portion of natural marsh, should consult with the City of Buffalo's designated representative in the Department of Community Development prior to initiating any such action, provided that such event occurs during working hours of City employees. In any event, the Niagara Mohawk Power Corporation should notify the City of any such action within four days of occurrence.

The City of Buffalo should provide for the clearance and removal of all vegetative growth taller than four feet within the easement to be designated for the 34.5 kv line, and should establish permanent policies and criteria to maintain said easement in a condition facilitating access by the Niagara Mohawk Power Corporation.

The Niagara Mohawk Power Corporation should not utilize any chemical herbicides to prevent or retard vegetative growth on power line rights-of-way or easements within or immediately adjacent to the Tifft Farm Nature Preserve.

Except in the event of a line break or other immediate emergency operation, the Niagara Mohawk Power Corporation should not conduct routine

maintenance operations within the Tifft Farm Nature Preserve without five days prior written notice to the City of Buffalo Department of Community Development.

Miscellaneous Peripheral Facility Impacts

There are a number of miscellaneous peripheral facility impacts which need to be resolved. These include:

- Use of Lehigh Valley Railroad lands for the disposal of foundry sand.
- The visual appearance of City-owned lands inside the Tifft Street-Fuhrmann Boulevard interchange loop.
- Future use of the lands south of Tifft Street.
- Future land use of the area in general.

Currently, certain Lehigh Valley lands both within and adjacent to the site have been leased as dumping areas for used foundry sand. As an interim measure, the parties involved have agreed to restrict the dumping to railroad properties outside of the Nature Preserve area, although field inspection has indicated occasional violations of this understanding. Truck access across the site to the railroad properties east of the site was permitted, and most recent violations have occurred along this route.

The foundry sand contains a binder agent, but the material is inert. In some areas of the site (along the Lehigh Valley railroad spur) the material has been dumped along the sides of marshy areas. This material should be removed during the development of the site.

Once the transfer operation is completed, truck access across the site should be terminated. The trucks could use the roadway along the east side of the cattail marsh.

The condition of the stream connection between the South Park Lake and Tifft Farm Inlet was surveyed in connection with City Department of Public Works' suggestions that the stream be improved under the Wetlands Restoration Program. Due to higher priorities for other projects, the stream improvement project was tabled for later consideration, but this issue will require attention at some point. The stream improvement project

should include the definition of set limits to slag and sand dumping now encroaching on the adjacent small marsh areas, dredging the stream channel along the main line railroad tracks, stabilization of the banks and cleaning of the culverts passing beneath the tracks.

The South Park Lake will eventually be used as a surcharge basin for storm water run-off, and this supplemental flow would increase the periodic discharge into the Tifft Farm inlet lake. South Park Lake is suspected of being polluted by current sanitary sewage leakage. Field inspection of the stream revealed fish, water fowl and muskrats along with intermittent pollution from leachate of the slag piles and foundry sand dumps west of Hopkins Street.

The chemical and biological water quality of both the South Park Lake and the stream should be monitored to establish present quality levels as a standard for determining whether the storm drainage should be diverted directly into Lake Erie via an interceptor line to the Union Ship Canal, as an alternate system.

The City-owned land inside the Tifft Street-Fuhrmann Boulevard loop is not conducive to any human use activity, but the present unattractive appearance of this area could be upgraded by a tree and shrub planting program as recommended in a later section of this report.

The lands south of the Tifft Farm, between Tifft Street and the Union Ship Canal are zoned for industrial use, but have remained vacant for several years. Any eventual development of this area will have some impact on the site -- increased traffic, visual impact, possible noise and air pollution depending on the specific industry occupying the site.

The City Department of Community Development should establish performance standards for the use of the site to prevent the environmental degradation of the Nature Preserve.

Looking toward the long-term future, the emerging energy crisis may ultimately reverse the trend in the abandonment of the railroads, and reshape industrial location trends to place greater emphasis on the need to sustain present land use designations in the port-industrial district surrounding the Tifft Farm. Given the stress on environmental quality, however, there is

no reason why this district should not be pleasing, well-planned and compatible with the Nature Preserve.

However, there may be opportunities for housing development in the area, even if new industrial and port uses are established. The alternatives need careful examination -- an opportunity forthcoming in the Department of Community Development's community master plan program.

PLANNING, DEVELOPMENT AND MANAGEMENT POLICIES

The following planning, development and management policies are recommended to guide the formulation and implementation of the Tifft Farm Master Plan. These policies were developed by the Tifft Farm Technical Advisory Committee and reviewed by the Department of Community Development.

Preserve Name, Concepts and Purposes

The name "Tifft Farm Nature Preserve" should be adopted and used to identify all lands on the entire Tifft Farm site exclusive of the area bordering Tifft Street on the south end of the tract, such area being planned as an active recreation area. It is further recommended that this latter tract be separately identified as the "Tifft Farm Playfields".

The concepts, purposes, and policies stated below are absolutely basic if the Tifft Farm Nature Preserve is to preserve the natural resources of the area and provide the aesthetic, educational and scientific resources desired by the City.

GENERAL USE POLICY

1. The Tifft Farm Nature Preserve is a permanent natural area providing habitats for plant and animal species and communities. It is dedicated to being maintained as nearly as possible in its natural condition and to being used in a manner and under limitations consistent with its continued preservation, without impairment, disturbance, or artificial development, for the public purposes of nature study and conservation, education, aesthetic enjoyment, and scientific research on a year-around basis.
2. The Tifft Farm Nature Preserve should be considered primarily as a protected natural area aimed foremost at providing educational benefits for the general public. To accomplish a desired balance between the preservation of the site's natural resources and its use by the public, a zoning plan should be prepared to describe appropriate levels of use intensity as a guide to the provision of user facilities.

3. The Tifft Farm Nature Preserve should provide for the following uses listed in the order of their priority of desired functions:
 - o Wildlife sanctuary
 - o Conservation education
 - o Informal nature study
 - o Scientific ecological studies (by permit only)
 - o Individual and passive recreation including photography, sketching, painting, and cross-country skiing, hiking (restricted to the trail system), canoeing (restricted to the lake-inlet pond), fishing (restricted to dock facilities and selected points along the shore of the lake-inlet pond).
 - o Scenic enjoyment
 - o Open space preservation
 - o Nature festivals (in restricted locations by permit only) for occasions such as Earth Day and Arbor Day.
 - o Organized and active recreation and picnicing (restricted to the playfield area and mound sledding area)

Planning and Construction Policy

1. The Master Plan for the Tifft Farm Nature Preserve should be formulated to achieve the above general use policy objectives, with particular emphasis on providing "built-in" control of site use to minimize later management tasks.
2. The Master Plan should set forth a realistic program for the development of the site over the next three to five years.
3. The Master Plan should reflect the basic ecologic objective of providing a variety of distinct plant and animal communities which would be present in the potential natural evolution of the Tifft Farm site. Exotic plant and animal species should not be intro-

duced to the site.

4. To the extent feasible, the Master Plan should sustain the historic ecology of the area by preserving those remnants of the original site as they existed prior to human influence and by emphasizing both the natural and man-managed restoration of disturbed portions of the site.
5. The Master Plan should provide for special needs of the physically handicapped. This should include the equipment of a section of the trail system with an asphalt surface to accommodate wheel chairs and the provision of a self-guidance system for the blind, with easily activated audio and/or braille devices explaining nearby ecological systems, plants and animal species. This section should also emphasize natural exhibits that could be recognized by touch, odor or sound. Entrances, restrooms and other aspects of the environmental education center should be designed to accommodate wheel chairs.
6. The Master Plan should be considered as a flexible document setting forth general long-range objectives and illustrative design details that will permit modification if subsequent studies and analyses indicate desirable changes. The Master Plan should accommodate such changes without violation of the goals for overall organization and use of site.
7. The development phasing of the Master Plan should allow for the early use of the site as a Nature Preserve by providing basic use facilities (parking, trails and outdoor lecture centers) in areas which have not been disturbed by the transfer operation. The latter areas should not be programmed for development or use until the flora have had an opportunity to become established, thus being able to resist better the degradative effect of human traffic.
8. Construction activities should be planned with the biosystem in mind and restricted at certain times, such as during the nesting seasons. The annual construction schedule should be reviewed and agreed upon by the Advisory Committee and other advisors as appropriate.
9. Initial construction efforts should be directed, at least in part, to providing perimeter control and screening of the site, particularly through the use of native plant materials.

Management Policies

1. The City of Buffalo should retain title to the Tifft Farm and provide for the physical development of the site as defined in the Master Plan. However, county, state and federal funding sources for both development and management should be fully explored and secured wherever possible. A program should be organized to stimulate the participation and contribution of private enterprise, conservation-oriented groups, and concerned individuals to the development of the Nature Preserve.
2. The Nature Preserve should be managed and operated by a private, non-profit agency on a contractual basis with the City. Such an agency should be responsible for the management of the facility and for establishing policy guidelines within the broad policy directives established by the City Administration and its advisory committees.
3. A management committee should be established as a subcommittee of the Tifft Farm Technical Advisory Committee to formulate management policies and programs until a permanent management contract is secured.
4. Management personnel should be hired as soon as possible to help provide the continuity required to effectively implement the Master Plan. Temporary personnel should be assigned to the project by the Department of Community Development until a permanent staff is hired by the management contract agency. The management contract agency should hire personnel on the basis of education, training and experience qualifications.
5. General public use of the site should be continually monitored so that the natural carrying capacity of the Nature Preserve is not exceeded. Use of the site by area school environmental education classes should be formally solicited and programmed and conducted by trained personnel.
6. User fees should not be charged, as a rule, but policy should be reviewed as a means of controlling overuse of the site in future years.
7. A scientific program of wildlife marking and monitoring should be established. Specific scientific study areas should be marked out and staked to provide con-

stant locations for the acquisition of base-line data on wildlife species and habits. Botanical study programs should also be organized to both monitor vegetative succession in specific areas, and evaluate various management techniques for maintaining, accelerating or retarding natural successional trends.

8. Exotic plant and animal species should not be introduced to the site, but desirable species native to the area, but not presently found on the site should be introduced to provide variety.
9. The Preserve should be operated on a year-around basis to provide for maximum utilization and allow the study and analysis of seasonal variations of natural factors on a continual program.

LAND USE ANALYSIS

BUFFALO RIVER

LEHIGH VALLEY RAILROAD

SANCTUARY ZONE

HIGH INTENSITY USE

MODERATE INTENSITY USE

POND

LOW INTENSITY USE

HIGH INTENSITY USE

BUFFER ZONES

OHIO STREET

BUFFER ZONE

LEHIGH VALLEY RAILROAD

FUHRMANN BOULEVARD

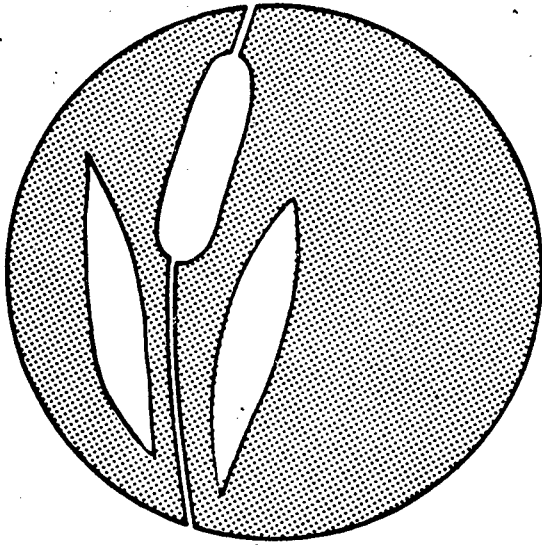
TIFFT FARM NATURE PRESERVE CONCEPT PHASE



THE BARTOGA ASSOCIATES ECOPLANS, INCORPORATED THE ARCADE BARTOGA SPRINGS NEW YORK 12866	McJANING, JOHNSON, GIBSON, ENGINEERS INCORPORATED ENGINEERING CONSULTANTS CRANE AND SMOKE INCORPORATED GRADICAR, INCORPORATED SANDERSON, LONSLA, TAYNE DESIGN CONSULTANTS SUNSHINE, NEW YORK	EAST ALBANY NEW YORK	STANLEY M. MARKOWSKI DEPARTMENT OF COMMUNITY DEVELOPMENT RICHARD L. MILLER COMMISSIONER	CITY OF BUFFALO, NEW YORK	MAYOR DEVELOPMENT COMMISSIONER



SCALE 1" = 100'



TIFFT FARM NATURE PRESERVE

PHASE III

- **SITE DEVELOPMENT PLAN**
- **MANAGEMENT PROGRAM**

ECOPLANS, INC.



INTRODUCTION

The Basic Ecoplan and recommended policies, goals and objectives presented in the previous section are the foundation for the Tifft Farm Nature Preserve Master Plan.

In this section of the report, the proposed master plan is presented in four components. These are:

- o The Site Development Plan and Program which will serve as a guide for the physical development of the Nature Preserve.
- o The Habitat Improvement Plan and Program which will be used to guide activities directed at the strengthening of the plant communities and other actions necessary to make the site a more attractive habitat for wildlife.
- o The Environmental Education Plan and Program designed to set basic guidelines for the use of the Preserve as an environmental education resource.
- o The Management Plan and Program for the maintenance and operation of the Nature Preserve.

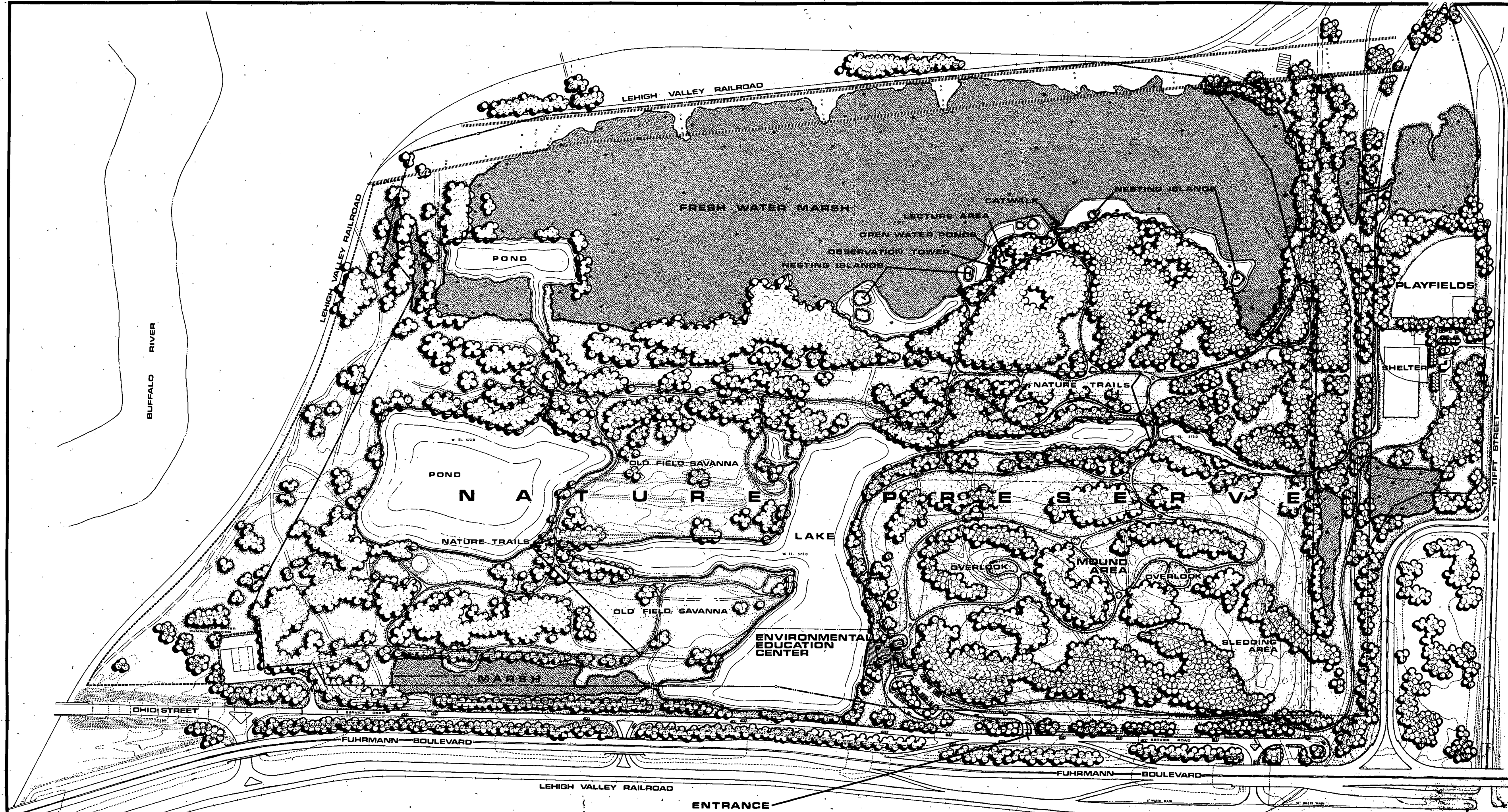
SITE DEVELOPMENT PLAN AND PROGRAM

The Site Development Plan and Program is meant to serve as a general guide for the more detailed project planning that will take place as part of the implementation of the master plan. Thus, the site development plan should not be considered as a final, ultimate plan, and such details as the configuration of buildings, trail locations, etc., can be expected to change as more refined project planning begins.

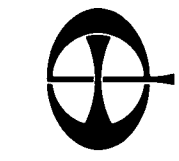
The major elements of the site development plan have been investigated in some detail on an individual basis and are illustrated here in order to highlight their function and importance. These include:

- o Land Use and Structural Facilities Plan
- o Circulation Plan
- o Utilities Plan
- o Graphics Plan
- o General Grading Plan
- o Site Development Phasing and Schedule

The overall site development plan on the following page indicates how each of these components are integrated, and what physical facilities the site will contain when fully developed. Certain modifications of this plan have already been made in response to changes in the grading of the mounds and the more detailed project planning which has occurred on the playfield site.



TIFFT FARM NATURE PRESERVE MASTER PLAN



THE SARATOGA ASSOCIATES ECOPLANS, INCORPORATED THE ARCADE SARATOGA SPRINGS	SARATOGA ASSOCIATES ENGINEERS ARCHITECTS LANDSCAPE ARCHITECTURAL CONSULTANTS 376 BROADWAY NEW YORK 12866	CITY OF BUFFALO, NEW YORK STANLEY W. MAKOWSKI DEPARTMENT OF COMMUNITY DEVELOPMENT RICHARD L. MILLER MAYOR COMMISSIONER	DATE: _____ REVISION: _____ SHEET NO. 1 OF 1

Land Use and Structural Facilities Plan

The basic land use plan for the Tifft Farm is based on the sensitivity of site values. Those assets easily upset by man's intrusion are sheltered or protected. Other areas, less sensitive, are utilized to their maximum potentials to absorb the pressures of human use while still satisfying visitor curiosity. To achieve this objective, the site is organized according to the following use density zones:

1. High Intensity Use Zone - This area is designed to absorb sustained and intense use. Views or vistas into the site should be provided along with educational displays aimed at interesting the "average" visitor. This concept will allow one to "visit" the preserve and satisfy his or her curiosity, while protecting the more sensitive areas of the site from overuse.

The mounds and western edge of the large pond are best suited for this task. Visitors may enter the site from Fuhrmann Boulevard and immediately park their vehicles, arrive at a visitor's center, and "spread out" into the mounds area. This intense use is then contained to one area, an area designed with facilities (such as paved walks, etc.) to absorb this use.

2. Moderate Intensity Use Zone - This area is designed to accommodate those desiring a more involved site experience while providing a "second stage" defense for protecting the more sensitive assets.

Lands between the high use area and cattail marsh are recommended for this use. This area possesses numerous habitat types, including limited marsh areas. The trail system takes advantage of this variety of assets to allow full appreciation and satisfaction of one's visit to the Preserve.

3. Low Intensity Use Zone - This area is intended to provide a more isolated area which can still be used for environmental education purposes. It is intended that this area would provide land and water areas where wildlife would only occasionally be disturbed by human activity.

The northwestern quadrant of the site is set aside for this purpose since it is relatively remote from the primary access point to the Preserve, and the area contains an excellent mix of habitat types.

4. Sanctuary Zone - This area is intended to protect that part of the site which is least tolerant of human use. No human traffic will be permitted in the sanctuary zone.

The eastern area of the site -- the large cattail marsh including the pond and willow grove at the northern end -- is set aside for this purpose.

5. Buffer Zone - Generally, the perimeter of the site should be set aside as a buffer area to protect the site from unauthorized access and screen out adjacent unsightly uses. The buffer zone will also exclude human traffic, and thus serves as part of the sanctuary zone as well.
6. Organized Play Zone - This area is intended as a place where people coming to the Preserve can engage in more organized recreational activity and have picnic lunches.

The area south of the Lehigh Valley railroad spur entering the site from the east is set aside for this purpose.

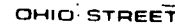
The attached Land Use and Structural Facilities Plan describes the various functional relationships between the site and the facilities contemplated for development. Land Use Areas include:

- o Nature Preserve Area
 - o High Intensity Use Zone
 - o Moderate Intensity Use Zone
 - o Low Intensity Use Zone
 - o Sanctuary Zone
 - o Buffer Zone
- o Playfield Area
 - o Organized Play Zones
 - o Free Play Zones
 - o Buffer Zones

Facility relationships to these zones are as follows:

- o Nature Preserve Area
 - o High Intensity Use Zone - Environmental Education Center, Mound Observation Areas, Mound Sledding Areas, Lake Inlet Fishing Docks.
 - o Moderate Intensity Use Zone - Trail System, Lecture Centers, Marsh Catwalk and Observation Tower.
 - o Low Intensity Use Zone - Trail System, Lecture Centers.
 - o Sanctuary Zone - No structures.
 - o Buffer Zone - Fencing.
- o Playfield Area
 - o Organized Play Zone - Ballfields.
 - o Free Play Zone - Playground Facilities, Shelter, Picnic Areas.
 - o Buffer Zone - Small marshes at east and west ends of playfield, relocated creek and area along Tifft Street.

BUFFALO RIVER.



→ BUFFER ZONE

LEHIGH VALLEY RAILROAD

ENTRANCE

FUHRMANN — BOULEVARD



TIFFT FARM NATURE PRESERVE MASTER PLAN



100

**THE EASTERN ASSURANCE
COOPLAND, INCORPORATED**

THE ARCADE 378 SUNDAY

DEWLAND · JOHNSON · GIBSON
ENGINEERS · INCORPORATED
SUFFOLK, NEW YORK

GREYER AND WARD, INCORPORATED
LANDSCAPE ARCHITECTURAL CONSULTANTS

CITY OF BUFFALO, NEW YORK

STANLEY M. MARKOWSKI	PRAYER
THE DEPARTMENT OF COMMUNITY DEVELOPMENT	

Circulation Plan

As indicated on the attached plan, vehicular traffic is restricted to the perimeter of the site, where penetration is made for service to the two major facilities on the site.

A strong relationship is developed with the site and the lake in particular through its orientation, elevation and development of site elements such as decks, terraces and observation areas.

The entrance road provides service to a drop-off area at the Center. Parking for approximately fifty cars and five buses is provided along the access road in close proximity to the facility.

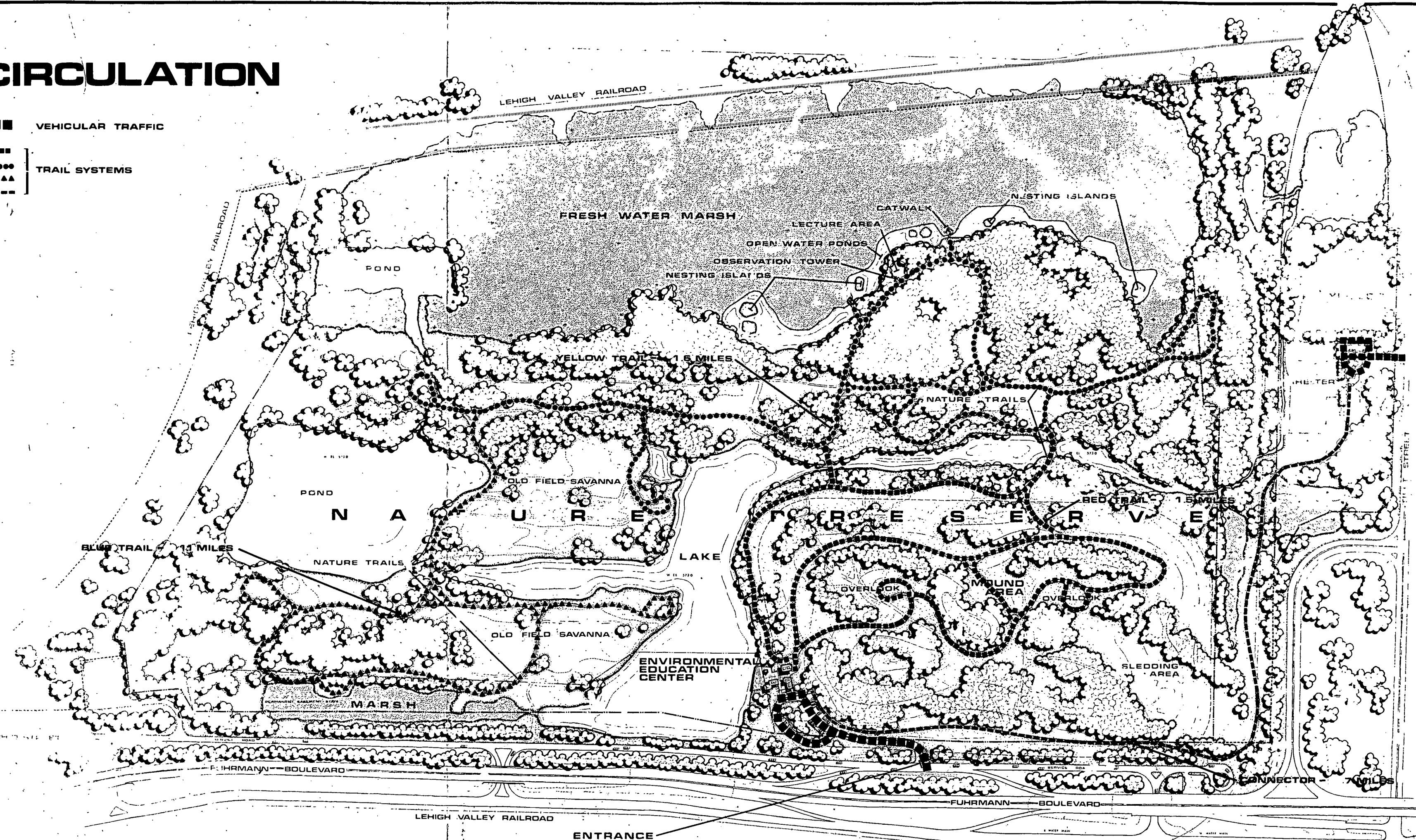
Three trail systems have been included in the site plan. The red trail, 1.5 miles in length, serves the mound area of the site and is expected to accommodate the greatest number of people. The yellow trail, 1.6 miles in length, provides access to the eastern portion of the site and portions of the marsh. The blue trail, 1.1 miles in length, serves the most remote areas of the site and is expected to be oriented toward study purposes.

A connector trail of .7 miles provides a pedestrian connection from the Environmental Education Center to the Playfield Shelter. The shelter is the second most prominent facility on the site and serves as the focal point of this area. The shelter is planned as an open-sided facility with some capability for storage and future restroom facilities. An entrance road serves the vehicular need and culminates in a drop-off area and parking facility.

The design vocabulary discussion deals with the details of road and trail surfaces, treatment and alignments, as well as massing material and color selection of the structures.

VEHICULAR TRAFFIC

TRAIL SYSTEMS



TIFFT FARM NATURE PRESERVE

MASTER PLAN



SCALE. 1" = 100'

**THE ARCADE
SARATOGA SPRINGS**

IMPORTED
378 BROADWAY
NEW YORK 10066

McFARLAND • JOHNSON • GIBBONS
ENGINEERING CONSULTANTS
BUFFALO, NEW YORK

GREVER AND WARD, INCORPORATED
LANDSCAPE ARCHITECTURAL CONSULTANTS
EAST AURORA
NEW YORK

BRISTOL LEAVER LITVINSKI, TARBOK HOLLISTER AND MOORE P.C.
DESIGN CONSULTANTS
SARATOGA SPRINGS, NEW YORK

CITY OF BUFFALO, NEW YORK

STANLEY M. MAKOWSKI	MAYOR
DEPARTMENT OF	DEVELOPMENT
RICHARD L. MILLER	COMMISSIONER

[illegible]

Utilities, Lighting and Graphics

The plan entitled "Utilities and Lighting" illustrates the type and extent of utility services existing in the vicinity of the site and those proposed for servicing of the site.

Lighting within the site will be limited to the road and parking areas and those areas directly related to the buildings. Since the areas will generally operate during daylight hours, further lighting is not required except in the playfield for evening recreation.

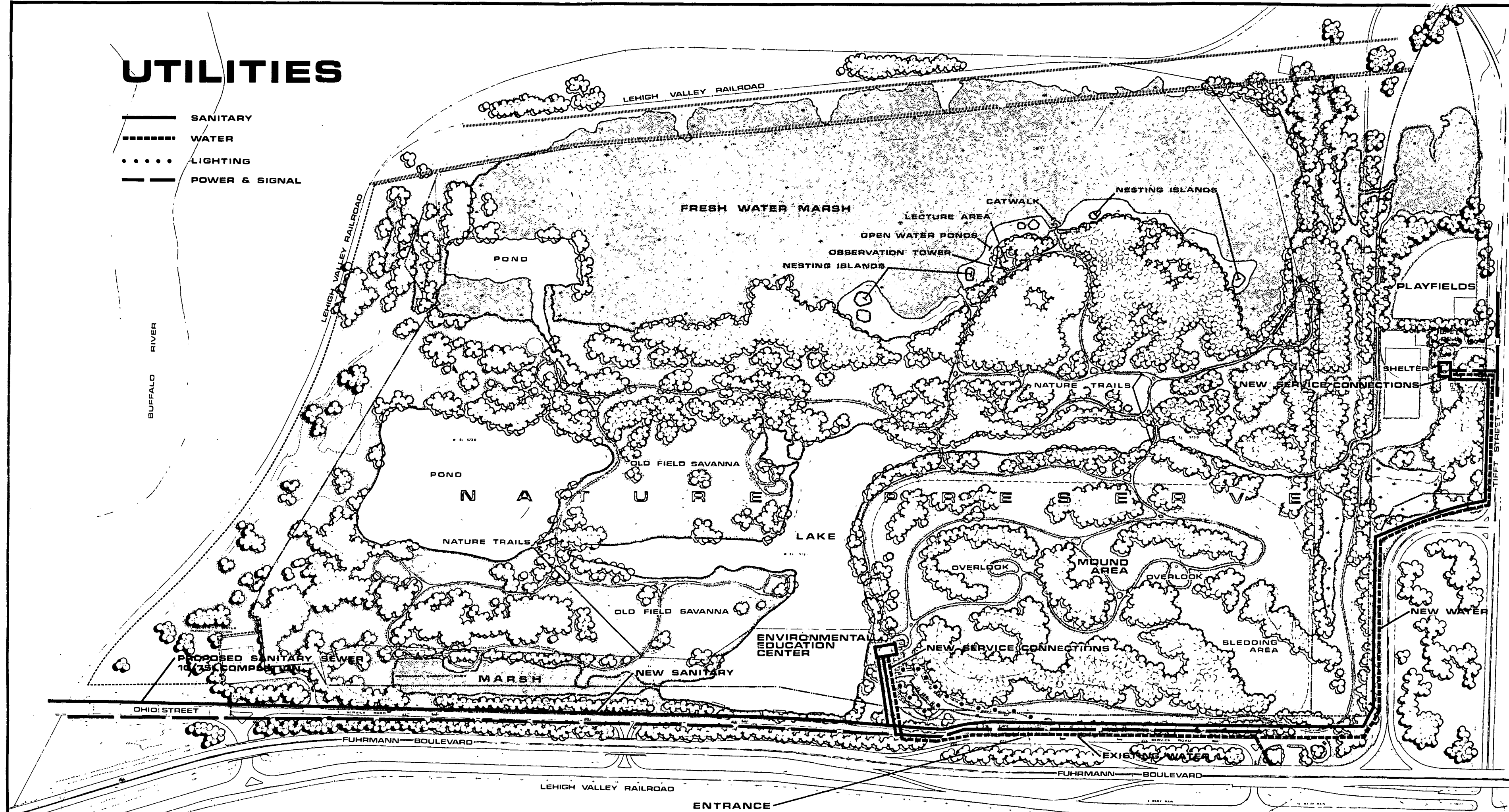
Power and signal sources exist along the Fuhrmann Boulevard Service Road and Tifft Street, in addition to a 16" water line which also exists along the north side of the Service Road.

Sanitary service will ultimately be provided only as far as the Water Pumping Station. A schedule has not been developed; however, it is estimated that this will not be available until the fall of 1975, at the earliest. A sewer connection from the Environmental Education Center to the proposed sewer will necessarily be a forced main due to the grade differential.

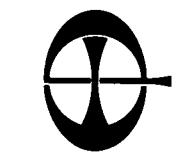
A graphics program is delineated in the plan entitled "Graphics". It indicates the general location and requirements envisioned include: identification, directional, informational and orientation devices. The design vocabulary section discusses the graphic format recommended for the family of signs to be utilized at Tifft Farm.

UTILITIES

- SANITARY
- WATER
- LIGHTING
- POWER & SIGNAL



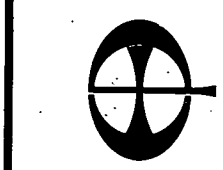
TIFFT FARM NATURE PRESERVE MASTER PLAN



SCALE 1" = 100'

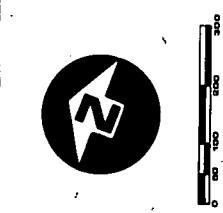
 	THE SARATOGA ASSOCIATES ECOPLANS, INCORPORATED THE ARCADE SARATOGA SPRINGS NEW YORK 12886		376 BROADWAY NEW YORK 12886		McFARLAND, JOHNSON, GIBSONS ENGINEERS INCORPORATED ENGINEERING CONSULTANTS GREYER AND WARD, INCORPORATED LANDSCAPE ARCHITECTURAL CONSULTANTS BRISTOL-LEAVELLY WYNSKI TARBOK HOLLISTER AND MOORE P C DESIGN CONSULTANTS		CITY OF BUFFALO, NEW YORK STANLEY M MAKOWSKI DEPARTMENT OF COMMUNITY DEVELOPMENT RICHARD L MILLER MAYOR COMMISSIONER		DATE	INVOICE NO.	SHEET NO.	JOB NO. 72200

■	IDENTIFICATION
▲	DIRECTION
●	INFORMATION
⬢	ORIENTATION



TIFFT FARM NATURE PRESERVE

MASTER PLAN



THE SARATOGA ASSOCIATES
ECOPLANS, INCORPORATED
THE ARCADE
SARATOGA SPRINGS
378 BROADWAY
NEW YORK 10008

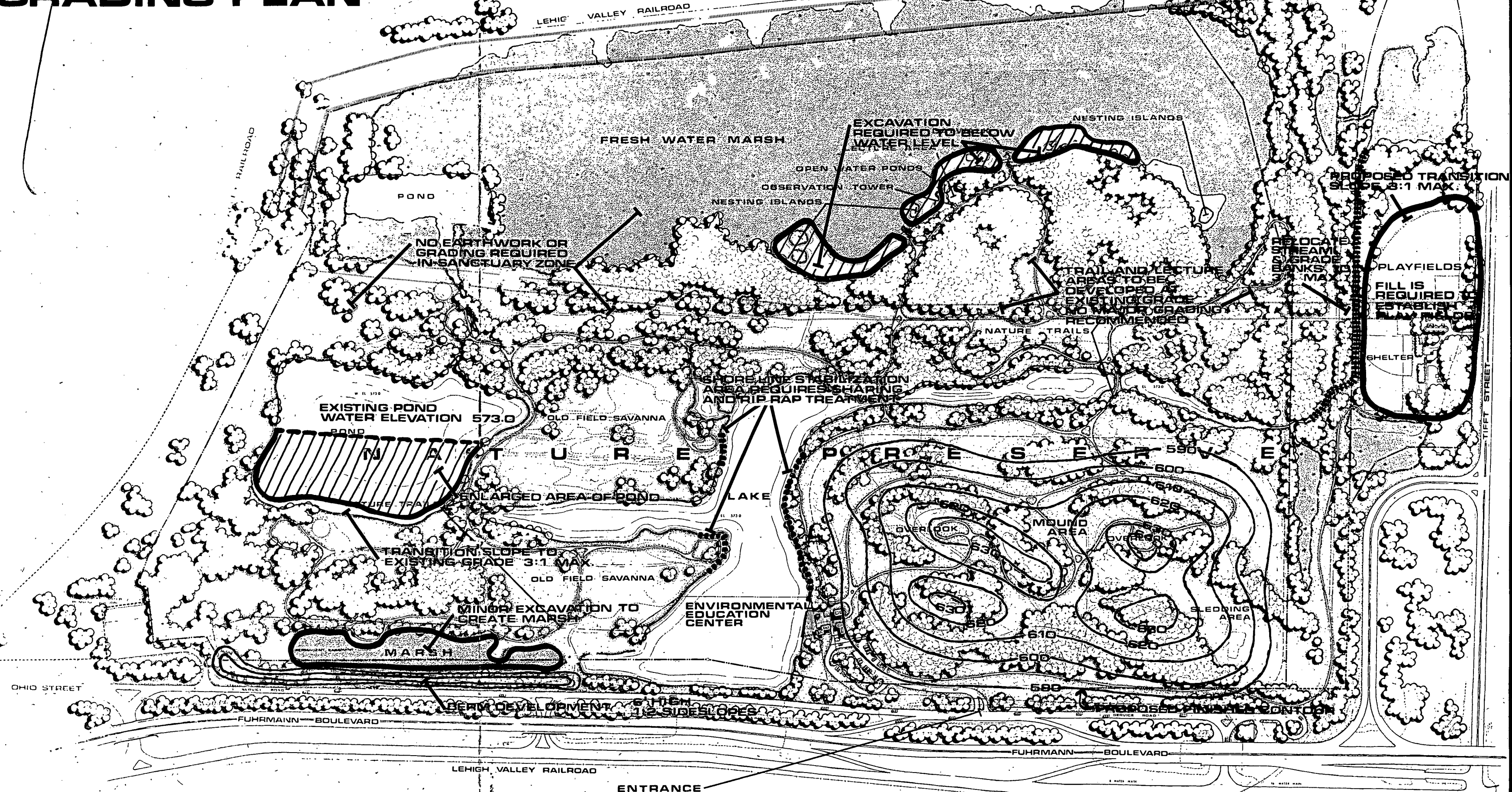
CITY OF BUFFALO, NEW YORK

STANLEY M. MAKOWSKI	MAYOR
DEPARTMENT OF	DEVELOPMENT
RICHARD L. MILLER	COMMISSIONER

General Grading Plan

Most of the site is maintained in its present character in terms of earthwork. Grading is limited to the western portion of the site where an existing pond will be expanded to provide earth fill for the solid waste mound in the southwest corner of the site. With the exception of some shoreline stabilization along the lake shore, no further earthwork is planned.

GRADING PLAN



TIFFT FARM NATURE PRESERVE MASTER PLAN



SCALE 1" = 100'

THE SARATOGA ASSOCIATES ECOPLANS, INCORPORATED THE ARCADE SARATOGA SPRINGS NEW YORK 12086	MC FARLAND, JOHNSON, GIBBONS ENGINEERS, INCORPORATED ENGINEERING CONSULTANTS GREYER AND WARD, INCORPORATED LANDSCAPE ARCHITECTURAL CONSULTANTS BRISTOL LITVINSKY TARBOK HOLLISTER AND MOORE, L.L.C. DESIGN CONSULTANTS SARATOGA SPRINGS, NEW YORK	CITY OF BUFFALO, NEW YORK STANLEY W. MAKOWSKI DEPARTMENT OF COMMUNITY DEVELOPMENT RICHARD L. MILLER MAYOR OFFICE OF COMMUNITY DEVELOPMENT COMMISSIONER	SHEET NO. DATE REVISIONS JOB NO. 12500
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Facility Design Vocabulary

This section is intended to summarize the character and quality desired in the physical elements to be introduced within the Tifft Farm environment.

Two distinct areas should be developed within the site which will require compatible yet varying treatments. The nature preserve proper should essentially remain in its natural state with management techniques used to "improve" the area; while the visitor center and playground portions should be substantially developed to perform their intended functions. Man-introduced elements should be limited in the former area while these elements should be obvious in the latter. Indigenous plant materials should be utilized throughout the preserve with exotics and other specialized plantings limited to the entrance areas or perimeter of the site. Colors should be subdued, organic tones within the preserve proper while the palette may be somewhat broader in the other areas of the site. Materials throughout the site should be limited in an effort to blend with the environment. Most structural elements including the buildings at the visitors center and playground are envisioned as wood framed and clad.

The active areas of the site should be reinforced as distinct from the more passive preserve areas through the use of a variety of techniques. In combination or separately they would include: barrier planting (dogwoods, hawthorns, roses), fencing, grading of mounds and maintenance of water courses.

The discussion which follows describes each of the primary site elements to be utilized, their suggested scale, materials, detail and general treatment.

Roads

The site is served by Fuhrmann Boulevard to the west and Tifft Street along the south. From these two roads, vehicular penetration on the site should be minimal; with traffic limited to the Visitors Center and Playground area. The entrance roads should be 18' wide with an asphaltic concrete surface.

Parking

Provision should be made for parking 50 cars and 5 buses both at the Visitor Center and the Playground area. This area should also be surfaced with asphaltic concrete and curbed to control drainage and direct traffic.

Walks & Trails

The area near the active centers should be served by asphaltic concrete walks from 4' to 8' wide depending on their location and function. The remainder of the trails on the site should be composed of a wood chip surface, 4' in width. The slope should vary with the natural contour which should be generally level throughout most of the site. However, in the mound area, slopes should not exceed 8%. As illustrated in the sketches, plant materials can be utilized to advantage in trail development as means to: attract, repel, define, direct and buffer.

Bridges

Bridges will occasionally be required to cross streams and afford access to certain portions of the site. Appropriately located bridges can provide a great deal of control to the circulation system; providing access to some areas while limiting access to others. They should be constructed of timber and wood frame treated for protection and allowed to weather to a natural gray color. Bridge design and size should consider the crossing requirements of service and emergency vehicles.

Catwalks

As a further extension of the trail system, catwalks should allow penetration of the wetland areas for study and observation purposes. Catwalks should be of simple wood frame construction, treated with preservative and allowed to weather in the same fashion as the bridges. Blinds should be provided in association with the catwalks and for other observation areas on the site.

Observation Towers

In areas where it would not be appropriate to develop trails or catwalks, but study or observation is desired, a simple observation tower may be developed. This would permit visual penetration without physically disturbing the area of interest. Depending on the specific location, a tower of 25 to 35 feet in height would be ample to provide a filtered view to the surrounding area. This structure should be wood framed, provided with a railing and roof and simply executed. Natural weathering should be allowed once the wood is treated with preservative.

Site Furniture

Benches will be required throughout the site along the trail system. As detailed in sketch form, backless benches can be provided in areas where people are not expected to linger or where it may not be desirable for people to stay from a management point of view. Benches with a back are envisioned for use primarily at the developed "centers". Waste receptacles should be conveniently located throughout the site. They should be made of heavy duty woven wire and painted matte black.

Lighting

Lighting should be limited to the entrances and active centers of the site and be unobtrusive in character. A "Cut-off" fixture is recommended which controls light in a positive and desirable fashion and eliminates the "spill" of light. This fixture type can be established for both vehicular and pedestrian uses with appropriately sized and spaced standards.

Graphics

It is important to establish a graphic program early in the development of the preserve to aid visitors in the appropriate and fullest use of the site. The graphics are used to identify, direct and inform and can be accomplished within a consistent format. A logo has been chosen (as illustrated in sketch form) which should be

used throughout the signage system. Once established, the logo will be the familiar identification of the Preserve. The message "Tifft Farm Nature Preserve" need only appear on the highway trailblazers and entrance sign. The directional signs will direct people to specific areas, trails, etc. while the informational signs will impart data including uses of the site. Educational information regarding flora of the site and faunal habitats can also be imparted in the format of the informational signs described.

The type face, "Optima", has been chosen for its appropriateness in combination with the logo. The sign material should be metal with the capability of applying strip-on messages. This would allow flexibility in developing messages appropriate to the specific needs of the site.

Peripheral Treatment

The road frontage portion of the site should be buffered from the road through the use of planted mounds where possible. The planting chosen should be salt tolerant species which can withstand the winter road salt condition which currently exists. It is felt that a well planted mound will provide a sufficient feeling of exclusion to the general public; will prevent vehicles from entering the site and can be used as a directional device to the proper entrance. The planting will also in time, provide a sufficient screen and promote a feeling of remoteness on the site.

The peripheral area along the cattail marsh is currently being violated by the dumping of refuse. A more positive exclusion device must be developed in this area. It is recommended that a 6' high chain link fence be developed along this edge for the most positive control. The fencing could be installed in combination with berming and planting.

Active Centers

The Visitors Center and Playground Area are the two points of entry to the site. It is envisioned that the Playground Area will be developed as a distinct entity from the preserve and that no connection between the two areas will

be developed. Both areas should provide for vehicular parking and should be developed in a manner which will support numbers of people.

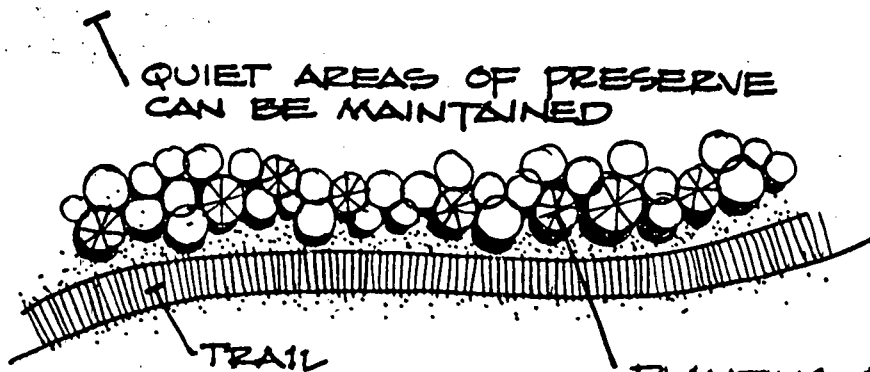
The shelters or structures envisioned for each site should be wood framed and wood clad in keeping with the character of the site. The structure at the preserve will become the "gateway" to that area and could house informational displays, seminar areas and administrative functions. Its location near the central lake suggests that decks and overlooks could be developed in concert with the structure and the site. The playground structure can be a simple expression of shelter which should in addition, house play equipment and maintenance items.

These areas should be expressed as the most highly developed areas at the Tifft Farm site.



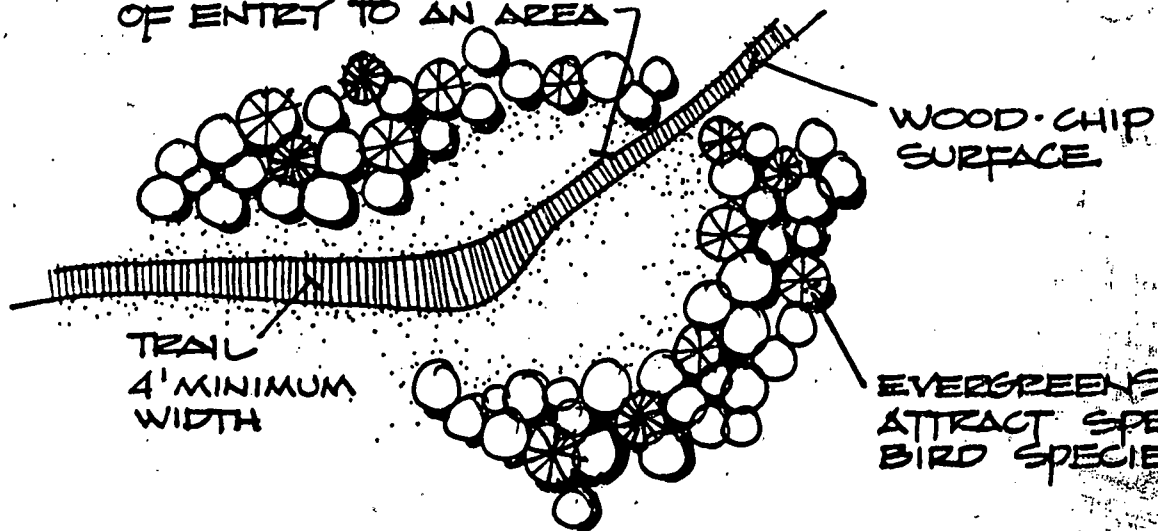
PLANTING AIDS
IN DEFINITION OF
VIEWS, SUGGESTS
DIRECTION & SCREENS
POOR VIEWS.

TRAILS

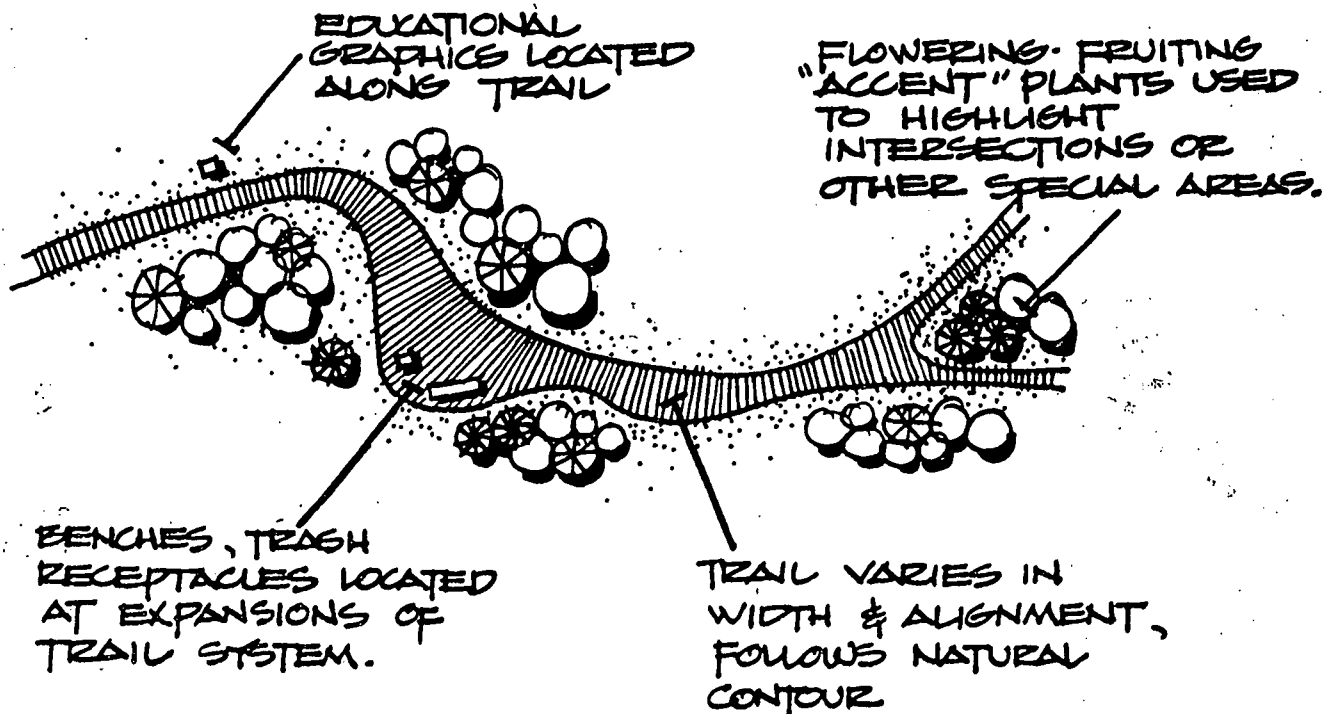


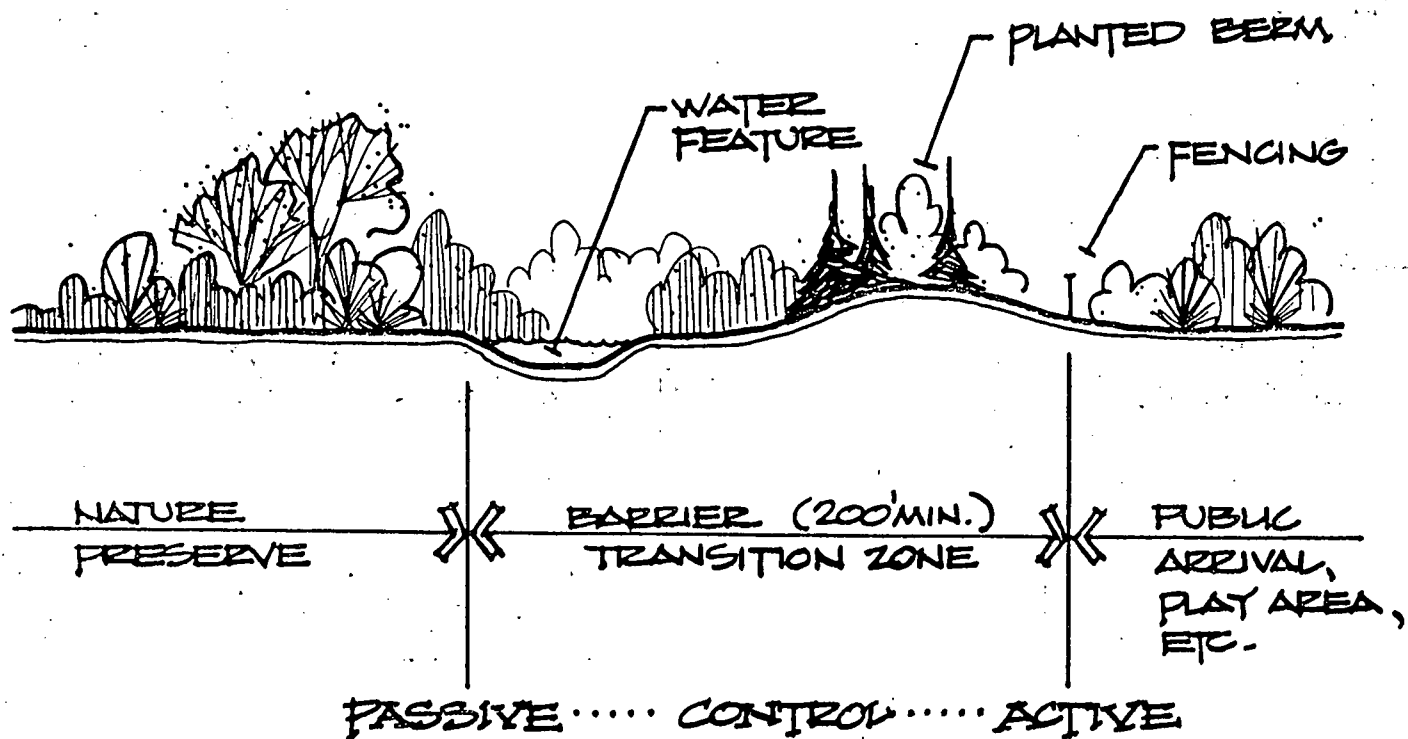
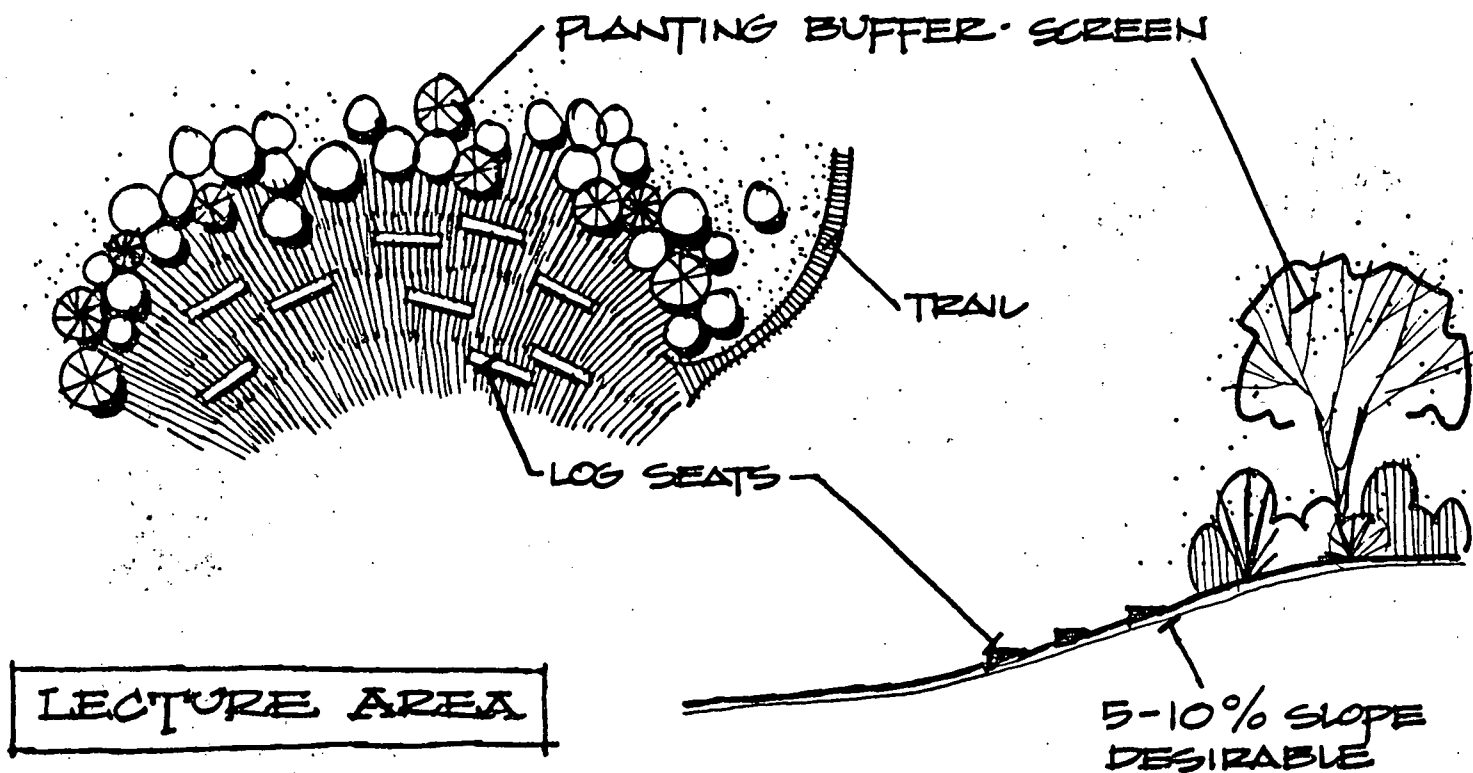
PLANTING FORM SUGGESTS
NO ENTRY - CONCEPT CAN BE
REINFORCED THROUGH THE
USE OF DENSE SPECIES
(DOGWOOD, HAWTHORN)

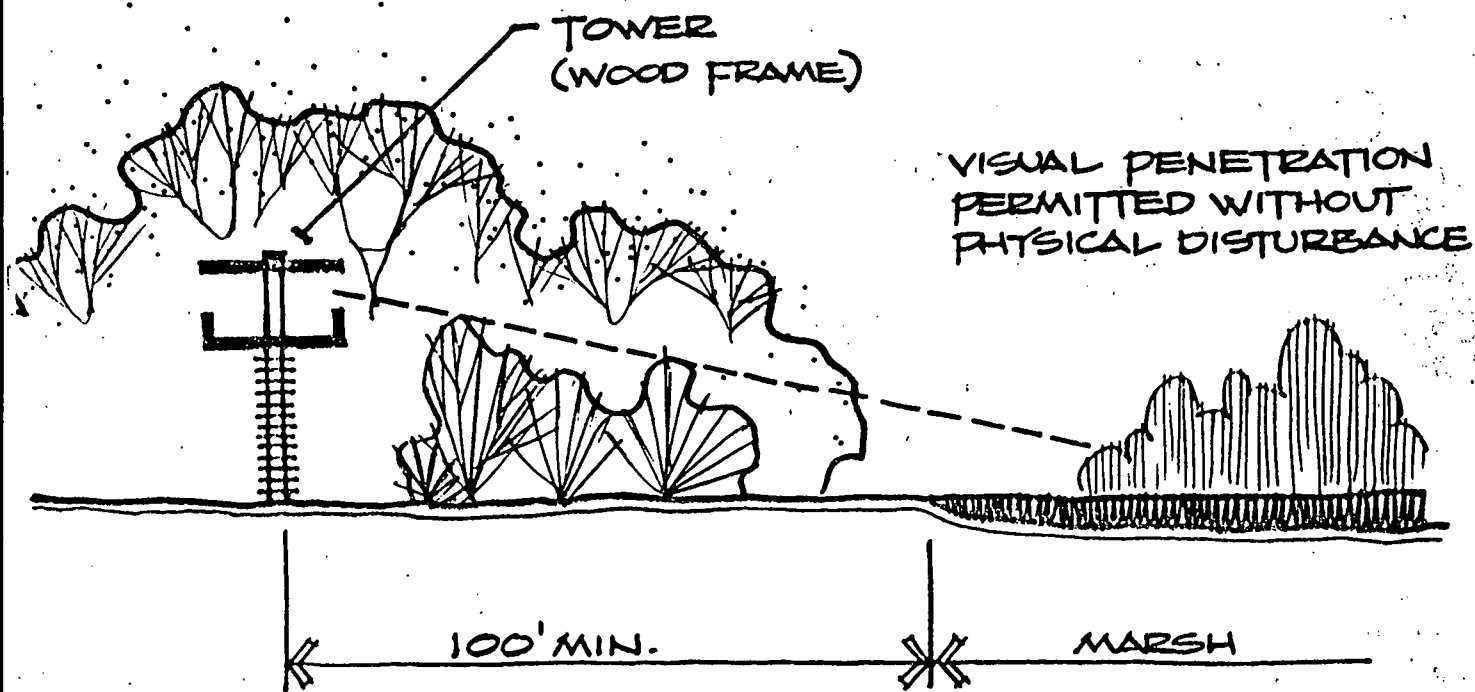
PLANTING FORM
ESTABLISHES SENSE
OF ENTRY TO AN AREA



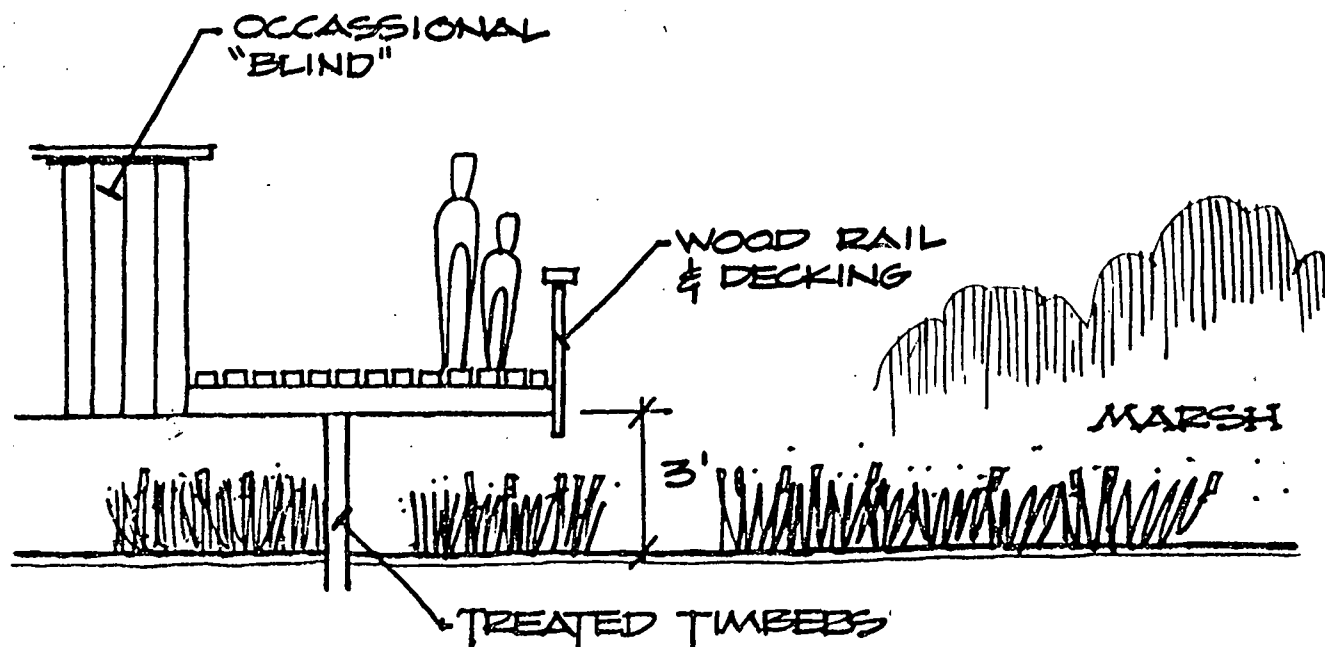
TRAILS







OBSERVATION TOWER



CATWALK

NO TRAIL DEVELOPMENT
ALONG UNSTABLE SHORE

UNDERCUT
BANKS

STONE RIP-RAP
(1:3 SLOPE) USED
WHERE TRAIL
APPROACHES SHORE
& STABILIZATION
REQUIRED

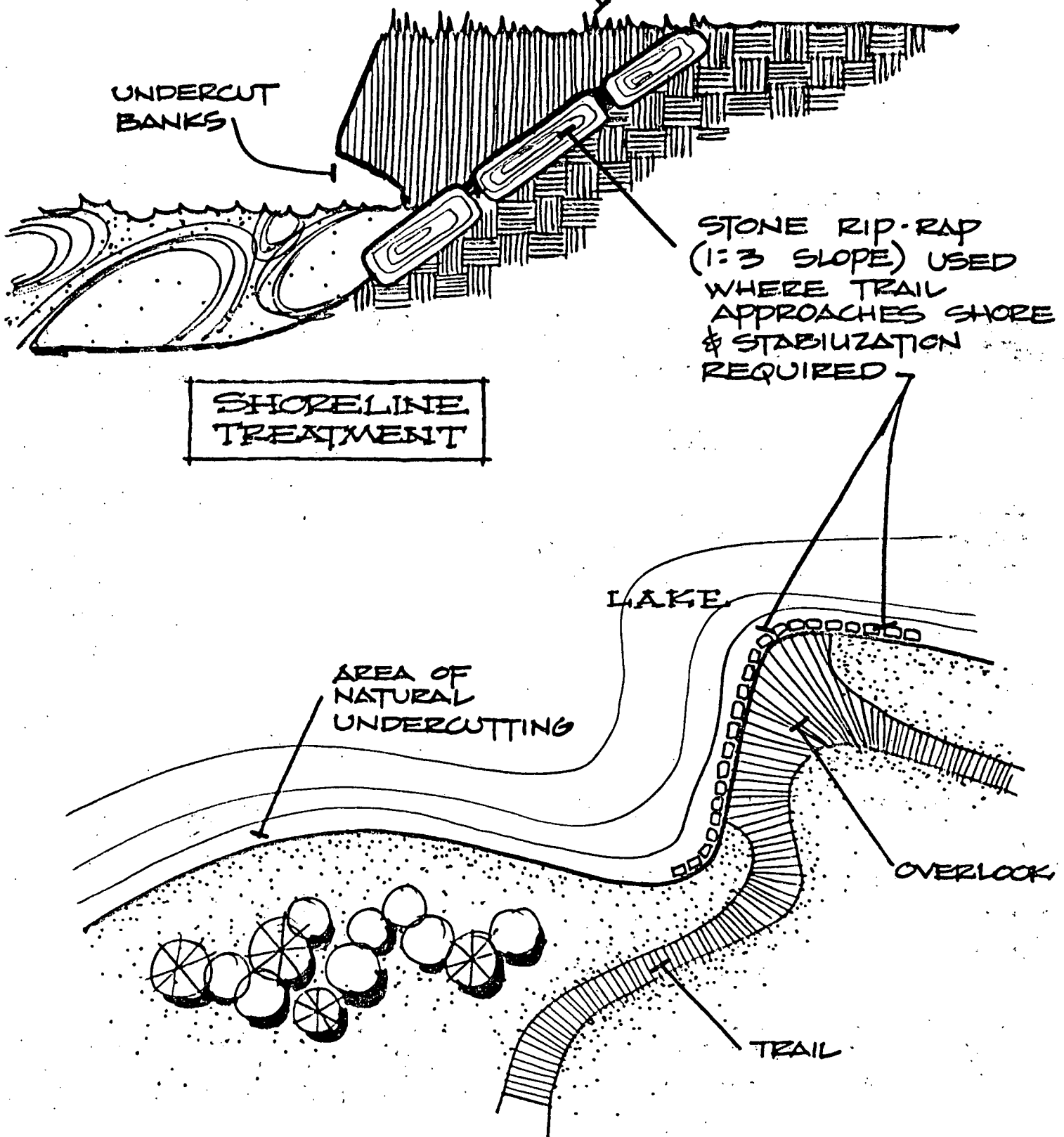
SHORELINE
TREATMENT

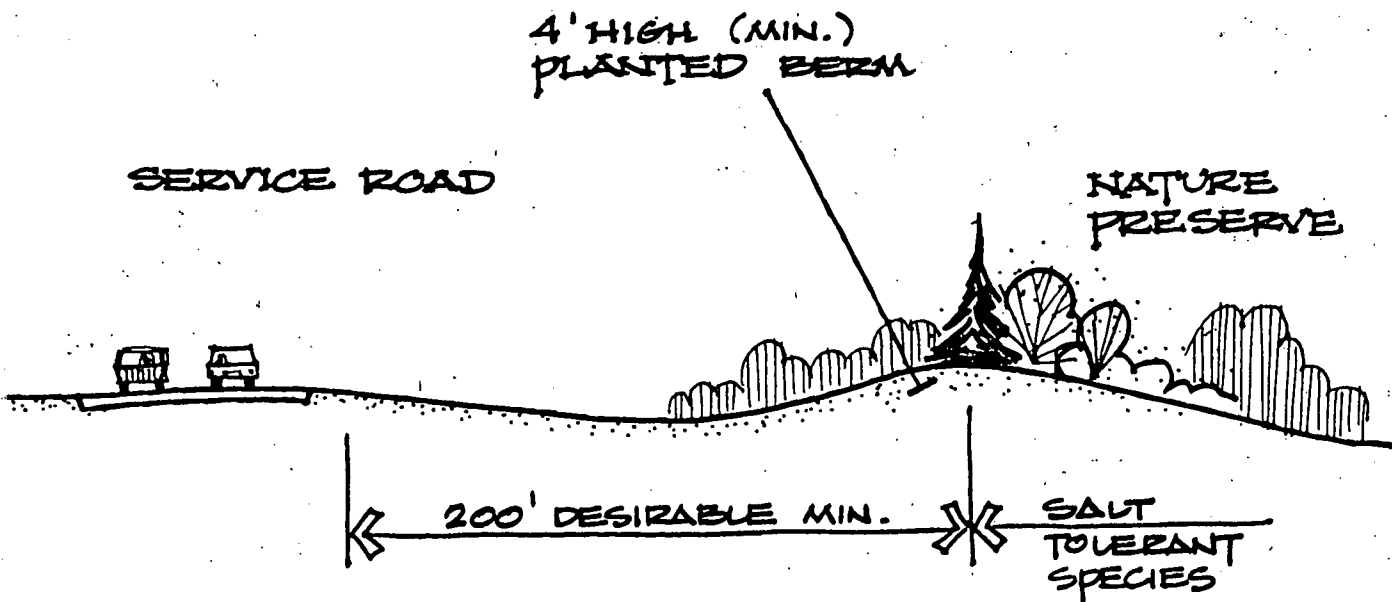
LAKE

AREA OF
NATURAL
UNDERCUTTING

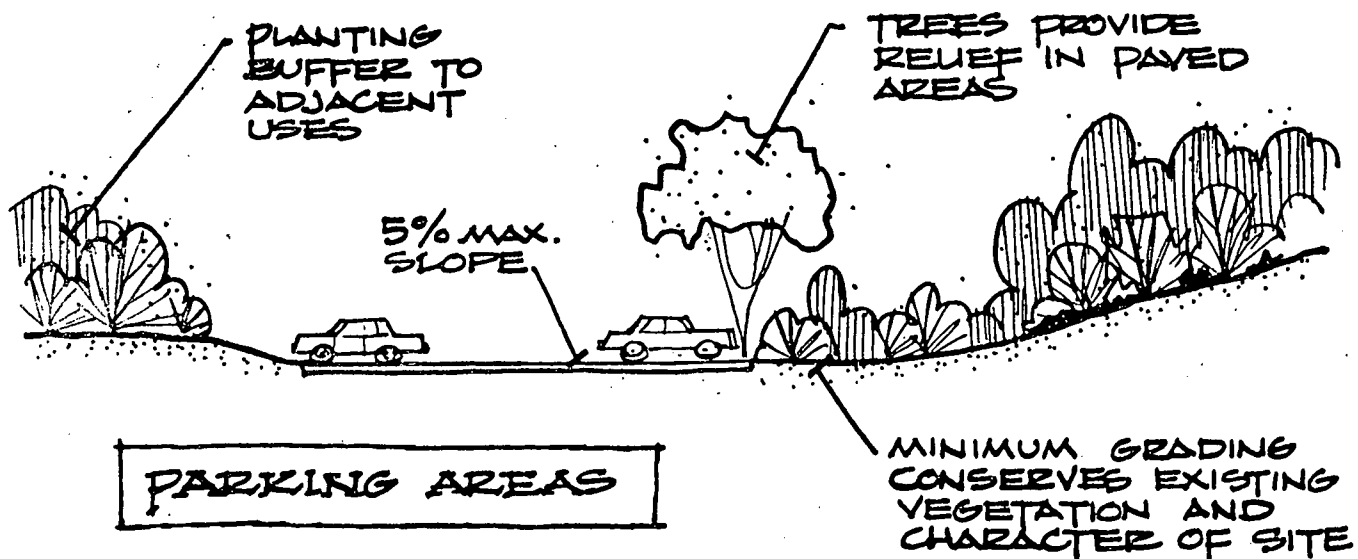
OVERLOOK

TRAIL

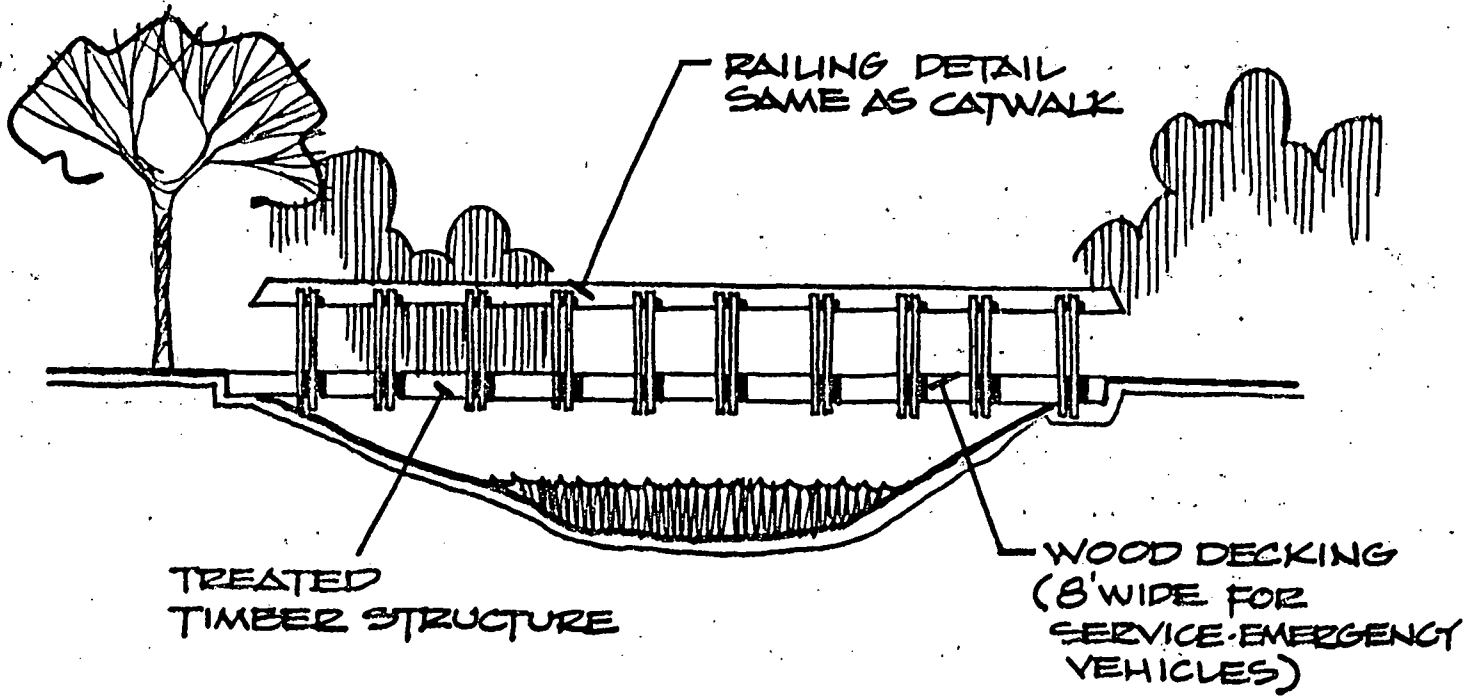


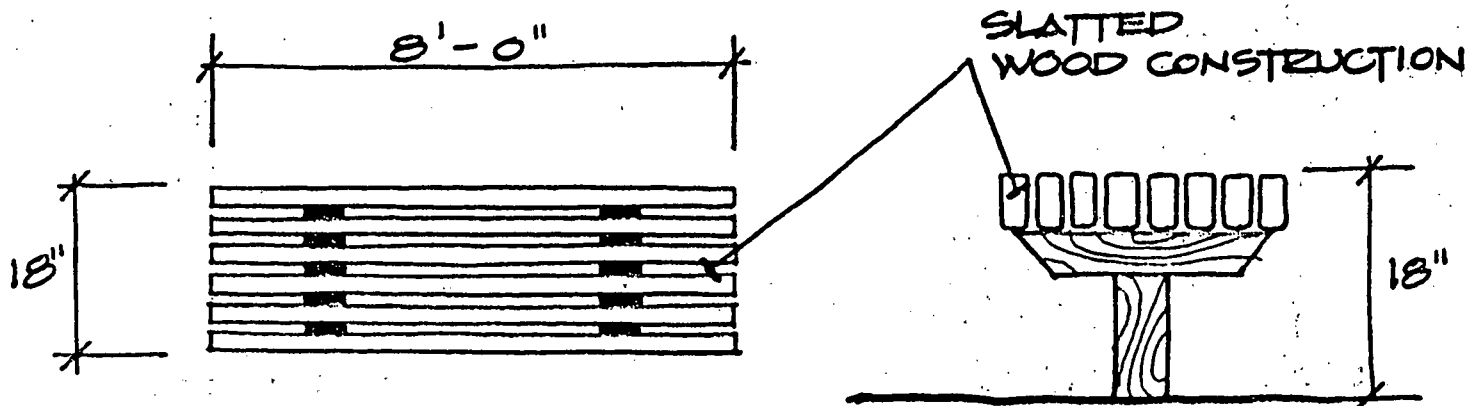


VEHICULAR CIRCULATION



BRIDGE

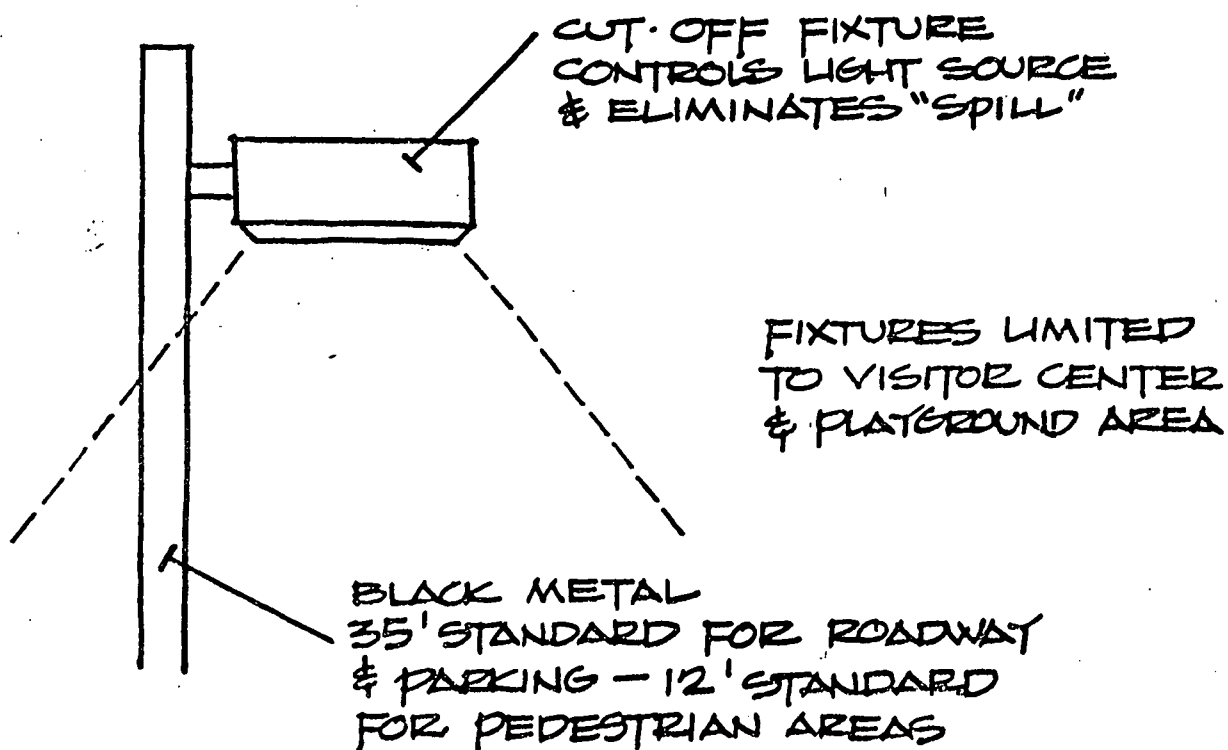


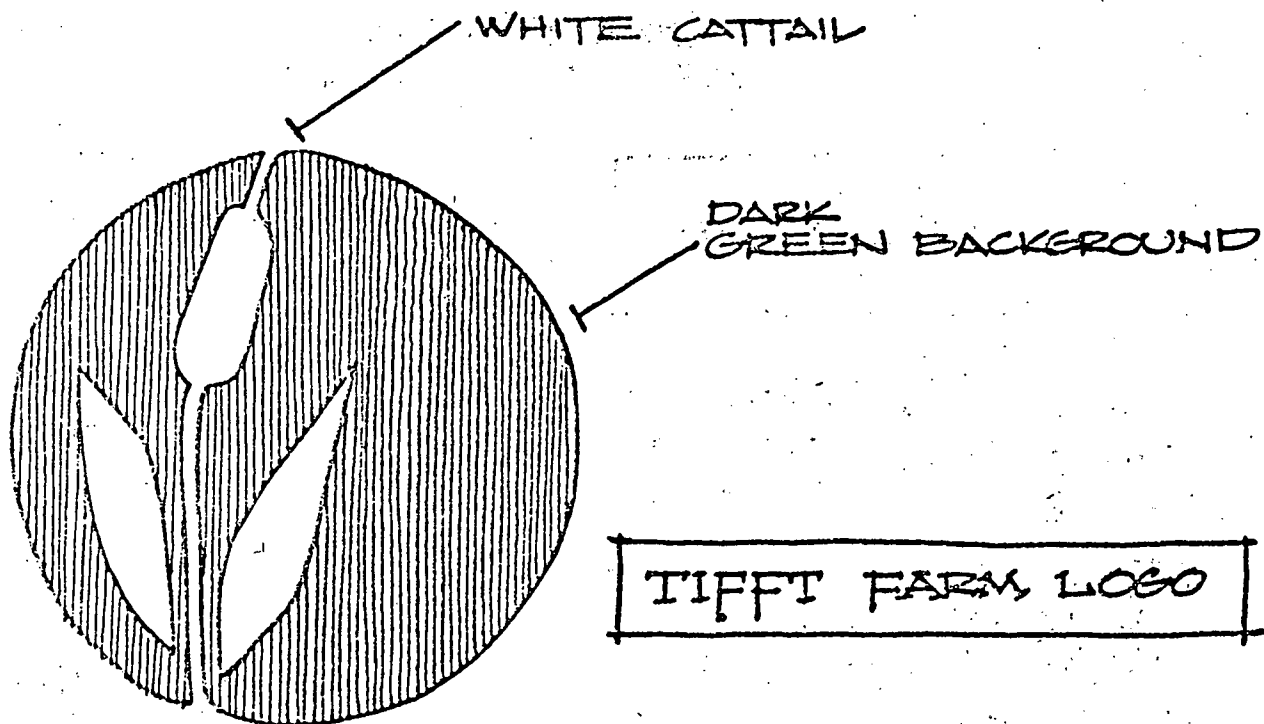


- BACKLESS IN "TRANSIENT" AREAS
- WITH BACK IN "LOUNGING" AREAS
- 1 BENCH/2000 LIN. FT. OF TRAIL

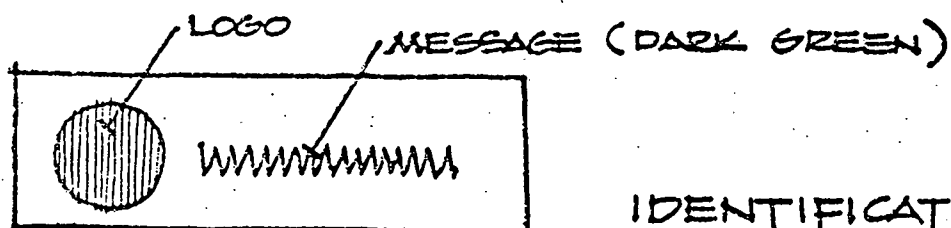
BENCH

LIGHTING

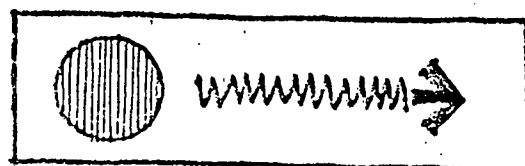




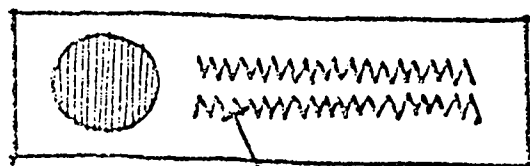
GRAPHICS



IDENTIFICATION
(TIFFT FARM NATURE PRESERVE)



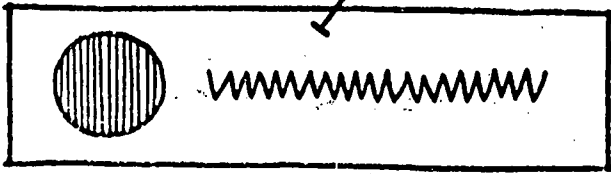
DIRECTIONAL
(VISITOR PARKING)



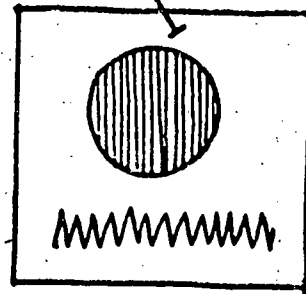
INFORMATIONAL
(HOURS OF OPERATION, USES...)

TYPE FACE FOR
ALL MESSAGES
TO BE "OPTIMA".

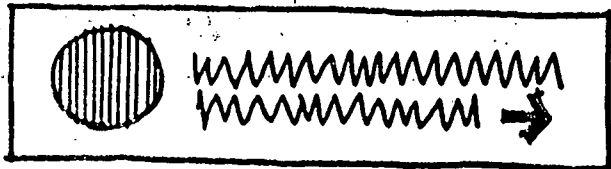
METAL PANELS
STRIP-ON MESSAGES



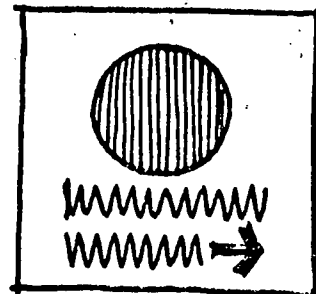
OR



TRAIL MARKERS
(DIRECTION & INFORMATION)



OR



HIGHWAY TRAILBLAZERS



Site Development Schedule and Costs

The following strategy proposes that a logical and orderly development of the Tifft Farm site over a four-year period be accomplished. The costs are based upon 1974 dollars and delays within a phase would require a verification or adjustment in the scope of work proposed.

Phase 1 (1973-74)	o Wetlands Restoration	\$144,000
	o Planning-Playfield Area	45,000
		<u>\$189,000</u>
Phase 2 (1974-75)	o Playfield Construction	\$350,000
	o Nature Preserve-Part 1	225,000
	o Land Acquisition	125,000
		<u>\$700,000</u>
Phase 3 (1975-76)	o Playfield Shelter	\$ 75,000
	o Nature Preserve-Part 2	700,000
		<u>\$775,000</u>
Phase 4 (1976-77)	o Land Acquisition	\$175,000
	o Nature Preserve-Part 3	125,000
		<u>\$300,000</u>

TIFFT FARM IMPLEMENTATION SCHEDULE

PHASE	1973	1974	1975	1976	1977	1978
MASTER PLANNING	■■■■■■■■■■					
LAND FILL OPERATION	■■■■■	■■■■■■■■■■	■■■■■■■■■■			
1 PLAYFIELD		■■■				
WETLANDS RESTORATION		■■■■■■■■■■	■■■■■■■■■■			
2 PLAYFIELD SITEWORK			■■■■■■■■■■			
NATURE PRESERVE - PART 1 & LAND ACQUISITION			■■■■■■■■■■	■■■■■■■■■■		
3 NATURE PRESERVE - PART 2 & PLAYFIELD STRUCTURE				■■■■■■■■■■	■■■■■■■■■■	
4 LAND ACQUISITION				■■■■■		
NATURE PRESERVE - PART 3					■■■■■	■■■■■■■■■■

Phase 1 (1973-74)

Wetlands Restoration

- o Marsh Development
- o Water
- o Clearing Aspen Woods
- o Culvert Control
- o Fencing Barrier

Phase 2 (1974-75)

Playfield Construction

- o Roads and Parking
- o Softball Diamond
- o Football and Playfields
- o Planting
- o Playground Equipment
- o Utilities and Site Lighting
- o Site Furniture
- o Graphics

Nature Preserve - Part 1

- o Roads and Parking
- o Mound Area Planting
- o Yellow and Red Trails
- o Pedestrian Bridge
- o Lecture Centers
- o Site Furniture
- o Site Lighting
- o Graphics

Land Acquisition

- o Lehigh Valley Spur Portion

Phase 3 (1975-76)

Playfield Shelter

Nature Preserve - Part 2

- o Environmental Education Center
- o Walks, Terraces
- o Decking, Dock Areas
- o Planting, Reforestation
- o Utilities
- o Site Lighting
- o Site Furniture
- o Graphics
- o Catwalks

- o Observation Tower
- o Shoreline Stabilization
- o Additional Water - Marsh Area
- o Blue Trail
- o Connector Trail

Phase 4 (1976-77)

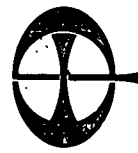
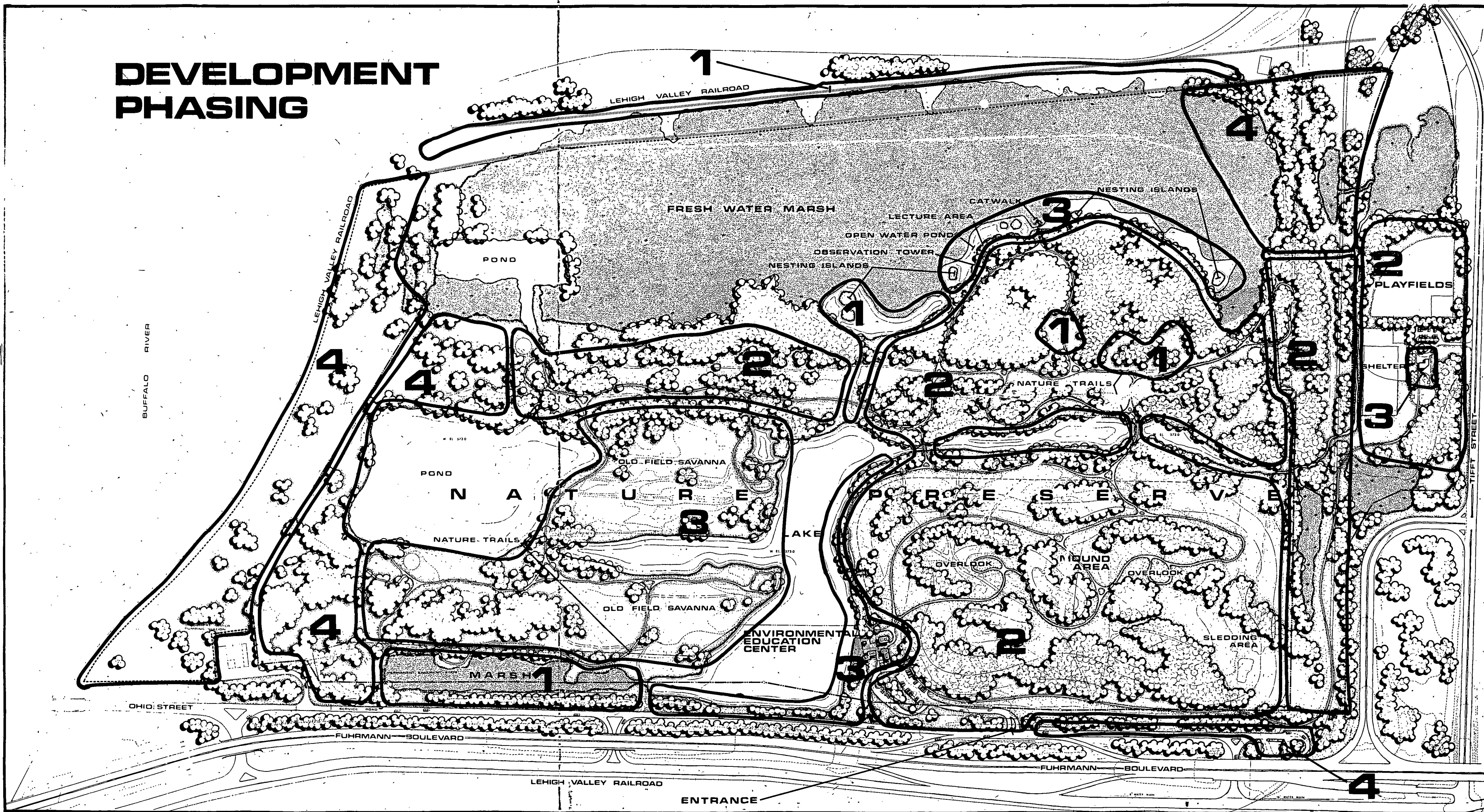
Land Acquisition

- o Lehigh Valley Spur - S.E. Section
- o Lands - North Portion of Site

Nature Preserve - Part 3

- o Parking - Pull-offs
- o Planting
- o Habitat Improvements

DEVELOPMENT PHASING



TIFFT FARM NATURE PRESERVE MASTER PLAN

THE SARATOGA ASSOCIATES
ECONOMICS, INC.
 THE ARCADE
 SARATOGA SPRINGS

THE SARATOGA ASSOCIATES
ECONOMICS, INCORPORATED
378 BROADWAY
NEW YORK 10008

McFARLAND, JOHNSON, GIBBONS ENGINEERS, INCORPORATED
ENGINEERING CONSULTANTS BUFFALO, NEW YORK

GREYER AND WARD, INCORPORATED
LANDSCAPE ARCHITECTURAL CONSULTANTS EAST ALBANY, NEW YORK

BRISTOL LEAVELLYNYSKI, TARBOX HOLLISTER AND MOORE, P.C.
DESIGN CONSULTANTS SARATOGA SPRINGS, NEW YORK

CITY OF BUFFALO, NEW YORK

STANLEY M. MAKOWSKI	DEPARTMENT OF	COMMUNITY	DEVELOPMENT	MANAGER
RICHARD L. MILLER				COMMUNITY ENGINEER



HABITAT IMPROVEMENTS PLAN AND PROGRAM

The improvement of habitat conditions at the Tifft Farm Nature Preserve follows from the Basic Ecoplan identification of the various ecological units within the Tifft Farm and the existing constraints and potentials of each unit. The criteria for effective habitat improvement are:

- o Management of existing site resources to sustain a diversity of habitat environment.
- o Management of existing site resources to produce a higher quality of habitat environment.
- o Introduction of certain native plant and animal species to increase the diversity and quality of the Tifft Farm ecosystem.
- o Control (including removal) of certain plant and animal species which might tend to reduce the diversity and quality of the Tifft Farm ecosystem.

The following habitat improvement program recommendations are based on the various ecological units and the above criteria.

Submerged Aquatic Habitats

Upon completion of the Nature Preserve Development, the ratio of open water area to upland and wetland areas will approximate the current conditions, but the plan recommends improvements in the distribution and quality of open water areas. These improvements are as follows:

1. Reduction of the water area occupied by the old canal-inlet pond in the central, eastern portion of the site and improvements in the volume and circulation of water in this pond. This can be achieved by a number of steps. A portion of the pond adjacent to the northern boundary of the landfill area should be filled in to create a site for the Environmental Education Center. This action will also reduce the development of wave action during high winds -- a phenomena which is responsible for the extensive soil erosion on the western and northern shorelines which has contributed considerable silt to the pond. Areas of bank erosion due to wave action generally should be graded back. The stream from the South Park Lake to the inlet pond and several culverts along its route should be cleared and graded to improve the volume and rate of water entering this pond, and major debris on the pond bottom should be removed to improve circulation. Artificial structure could be added at a future date to improve fish habitat. Since this pond is open to pollution influences from both the stream and harbor areas outside the boundary of the Nature Preserve, the water quality of the pond will always be related to influences on the stream and harbor. Particular steps should be taken by the City to supervise dumping along the stream west of Hopkins Street.
2. Enlargement of the pond in the northwestern sector of the site. This work will be done in connection with the Buffalo Sewer Authority's transfer operation borrow pit excavation. When completed, this enlarged pond should provide the best fresh water quality available at the site. The lake will be

approximately 11.7 acres in size, and have a maximum depth of approximately 10 feet, sufficient for a natural fall-spring water overturn to maintain good dissolved oxygen distribution yet shallow enough to prevent formation of a permanent thermocline. The shoreline will be graded to a maximum slope of 3 on 1 and a substantial emergent aquatic zone will be created by grading the northern and southeastern bottom to a maximum depth of 2 feet for a distance of approximately 40 feet from the shore. Massive concrete foundations uncovered in the borrow operation should be covered with earth or reduced to elevations below the water level by blasting. The latter may be preferable as it could provide "structure" for fish habitats. Prior to the growth of natural vegetation in this marshy edge, we recommend the construction of several potholes to provide better duck nesting habitat.

3. Rehabilitation of the marsh pond. The pond at the northern end of the cattail marsh is quite shallow and contains extensive waterweed and algae bloom in late summer months. This pond should be dredged periodically to remove decayed vegetation and other detritus on the bottom which will otherwise accumulate, reducing the oxygen content of the water until the pond becomes similar to the remainder of the marsh.
4. Creation of additional open water area in the main cattail marsh. This improvement is recommended as part of the Phase I improvements to be financed from the Municipal Wetlands Restoration grant from the State of New York. This open water area will be created by dredging areas along the southwest perimeter of the marsh. Water levels should be maintained primarily by natural conditions, but this new pond facility will also be connected to the marsh hydrological control culvert and pump station which will provide a controlled connection between the marsh and the lake inlet.

Emergent Aquatic Habitats

Emergent aquatic habitats are the most dominant and important features of the Tiffit Farm wetlands. These include the cattail marshes, edges of ponds and ponded water areas within the low wetland forest communities. They are very productive wildlife areas since much of the groundlayer and understory plants provide food for a variety of animal species. The master plan recommends the establishment of additional emergent aquatic habitat -- primarily cattail marsh and the maintenance and quality improvement of other forms of emergent aquatic habitat as well. This includes:

1. Creation of a new cattail barrier marsh habitat in the northwestern quadrant of the site along Fuhrmann Boulevard. Excavation for this marsh area would require the removal of approximately 2.5 feet of slag and other waste fill. In the process of the excavation, occasional deeper potholes should be left to allow for open water waterfowl.
2. Control of giant reedgrass invasions in the major marsh areas. Giant reedgrass is a visually attractive plant. However, it has no value as wildlife food, and can invade marsh areas reducing the more valuable cattail. Hand mowing in late spring or early summer before the plant flowers is probably the most effective means of control.
3. Maintenance of marsh water levels. Occasional periods of drought can seriously affect the ecology of the cattail marsh. In order to prevent this occurrence, it is recommended that the City install a pump and conduit connecting the marsh with the lake inlet to maintain appropriate water levels in the marsh.
4. Maintenance of marsh vegetation density. Generally, the major cattail marsh will respond to water level control as a principal maintenance mechanism. However, the elimination of muskrat trapping in the marsh could, on occasion, lead to a phenomenon called "eat out" in which uncontrolled population generates excessive consumption of the cattail

stands. Conversely, too low a muskrat population can lead to the development of a dense mat of dead cattail. In the latter case, control is sometimes achieved by burning-off the marsh in late fall.

5. Provision of additional vegetative species. Introductions for native plant species not commonly found in the Tifft Farm marshes should be considered. The most valuable additions would include rice cut-grass, wildrice, wildcelerly, widgeongrass and arrowheads. Each of these provides food for a variety of waterfowl.

Shrub-Carr Habitats

The shrub-carr is an ecotone habitat or transition zone between the submerged or emergent aquatic habitats and the upland habitats. On the Tifft Farm, these units are well-established and consist primarily of Red-osier Dogwood. They are particularly prevalent in the northern half of the site bordering the bays of the lake inlet pond and the cattail marsh. To improve this habitat type, the following management actions are recommended:

1. Thinning of the shrub-carr in the peninsula area north of the lake inlet pond. The shrub-carr in this area is quite extensive and the interior edges could easily be moved back closer to the water edge. This would provide additional grassland in this area and provide stock for replanting in other areas.
2. Diversification of shrub-carr species. The variety of the shrub-carr stands could be increased by planting willow and alder shrubs in thickets. Shrub-carrs should be maintained along the edges of the ponds and the cattail marsh.

Grassland Habitats

The existing grassland habitats at the Tifft Farm are relatively indistinct. Generally, grassland habitats rapidly advance to later successional stages if not managed to maintain the existing sere or stage of development. The following habitat improvements are recommended:

1. Establishment of a fen -- a grassland on a wet and springy site -- along the northern edge of the preserve. The low elevation in this area receives seepage from surrounding higher areas including the northern end of the cattail marsh and the pond in the northwestern quadrant. Much of the area lies along the Niagara-Mohawk utility easement and the easement for the Buffalo River Improvement Corporation's transmission main from the pumping station to the elevated storage tank east of the site. This improvement should include some minor grading to eliminate access roads now crossing the area and fill which has been placed just to the north of the pond in the northwest quadrant.

Fens tend to develop into shrub-carrs if protected from external disturbance due to increases in the size of their component dogwood and willow shrubs and by the invasion of other woody plants. In natural states, this invasion is usually controlled primarily by the size of local rabbit populations, but at Tiffitt, it is recommended that the area be periodically mowed.

2. Establishment of old field-savanna habitats in the low density use area. Much of the northwestern quadrant of the site should be managed as old field-savanna habitat. Removal of excess shrub-carr in the peninsula to the northwest of the lake inlet pond will convert the interior to grassland which should be maintained as an old field pioneer brushland. Immediately north of this peninsula, across the existing access road from the Fuhrmann Boulevard service road and adjacent to the pumping station is an open grassland with several large cottonwood trees which approaches a mature savanna condition. This area should be left intact. The area immediately east and south of the new pond, and the area east and adjacent to the old canal east of the mounds, should also be maintained as a mixture of old field pioneer brushland and lowland wet forest.

Lowland Wet Forest Habitat

The primary lowland wet forest habitats at the Tiffitt Farm are the poplar sprout forest at the southwest edge of the cattail marsh and the more mature willow

forest along the old Tifft Street right-of-way at the south end of the marsh. Improvements to these habitats are recommended as follows:

1. Control of the sprout forest invasion of the cattail marsh. The eastern edge of the sprout forest is slowly encroaching upon the cattail marsh. Maintenance of this edge will be secured by the provision of additional open water areas in the marsh adjacent to this forest community.
2. Provision of wildlife clearings in the lowland sprout forest habitat. The density of the sprout forest has decreased its capacity to serve as a wildlife habitat. It is recommended that several small clearings (about 1 acre each in size) be provided as shown on the plan. Brush should be left on the ground to provide additional cover.
3. Removal of trash and other litter in the pools in the mature willow forest. Considerable trash and litter is strewn about the willow glade south of the old Tifft Street right-of-way. While not directly decreasing the habitat value of this area, the litter is unsightly and the area should be given a major clean-up to remove the larger debris. Piles of rubble of old building materials can be left as these provide dens for fox and mink in the area.

Upland Mesic Forest Habitat

The mounds resulting from the transfer operation will provide the opportunity to establish an upland mesic forest habitat on the site. Both tree and ground-layer species (see typical species list in Section I of the report) should be planted. The mounds will also provide the opportunity to introduce conifer species which would add to the variety of the species found at the site. Because of the high rabbit population, it may be necessary to protect young saplings from browsing rabbits by encircling the trunks with wire-mesh screen.

Buffer Zones

Generally, the perimeter of the Nature Preserve should be strengthened by planting shrub-carr species and multiflora rose shrub barriers. Along Fuhrmann Boulevard on the northwestern edge of the site, an earthen berm should be planted with shrub and tree species that will be resistant to auto exhaust pollution and salt spray from winter ice control.

are some primary equipment items recommended. These include a pick-up truck with four wheel drive, a small tractor with a power drive and attachments for snow plow, gang mowers and a disc harrow; two canoes and an outboard motor boat and motor. Additional "above normal" equipment includes biological laboratory facilities, veterinary medicine equipment, automatic weather monitoring equipment, automated analytical instruments for physical and chemical water quality analysis, audio-visual units and emergency wireless telephone communication units to link the center with each of the Preserve's lecture areas.

Annual Budget

The annual operating budget for the Tifft Farm Nature Preserve, when fully operational, should amount to approximately \$270,000, based on current dollars. This does not include debt service payments or capital construction outlays, or any reserve or sinking fund for the replacement of facilities or equipment over time. Initial costs for major equipment and vehicles would be approximately \$35,000 to \$40,000.

The following proposed budget indicates a program of gradual staff development. Salaries indicated can be considered conservative, and do not include salary increases. Phase I staffing is considered a minimum requirement.

A considerable portion of this annual operating budget expense could be recaptured by the following.

1. User Fees

There is a strong possibility that the Preserve would attract close to 100,000 visitors annually if aggressively promoted and creatively programmed. Revenues from such use, based on the same fee structure applied at the Buffalo Zoo, would yield approximately \$55,000.

2. Contribution and Subscriptions

A variety of environmentally-oriented groups and individuals reside in the Niagara Frontier and the feasibility of establishing a Tifft Farm Nature Preserve Association should be explored as a means of acquiring revenues from subscriptions and contributions. It is difficult to estimate the revenues

ANNUAL OPERATING PROGRAM BUDGET
TIFFT FARM NATURE PRESERVE

	Phase I	Phase II	Phase III
<u>Salaries</u>			
Exec. Director	15,000	15,000	15,000
Adm. Asst.	-	-	9,000
Exec. Secretary	7,500	7,500	7,500
Director of Maint.	8,000	8,000	8,000
Director of			
Env. Education	-	13,500	13,500
Chief of Maint.	-	-	10,000
Chief of Hab. Imp.	-	-	10,000
Chief R&D	-	-	11,500
Chief Env. Ed.	12,000	12,000	12,000
Laborer	-	-	7,500
Laborer	-	7,500	7,500
Botanist	-	-	8,500
Zoologist	-	8,500	8,500
Res. Asst.	8,000	8,000	8,000
Devel. Asst.	-	-	8,000
Supv. of Exhibits	-	-	9,000
Tour Supv.	10,000	10,000	10,000
Secretary	-	-	6,000
Secretary	-	-	6,000
Total Perm. Sal.	60,500	90,000	175,500
Fringes (x .12)	7,260	10,800	21,060
Part-Time Tour Guides	8,400	16,800	33,600
	(5 @ 3/hr x 560hr)	(5 @ 3/hr x 11200hr)	(10 @ 3/hr x 11200hr)
Utilities	1,500	1,500	1,500
Supp. Equip. Ins.	5,000	10,000	20,000
Travel	400	800	2,300
Contract Serv.	3,000	7,500	15,000
Veh. Maint.	500	1,000	1,000
TOTAL BUDGET	86,560	138,400	269,960

from such a source in as much as subscribers or members are often provided with free admission to the facility and some form of newsletter and special program events are generally needed to maintain interest. A reasonable estimate might suggest a net additional revenue of \$20,000 to \$50,000 could be acquired by this method.

3. Intergovernmental Transfers

Appropriations in the form of non-categorical program grants or grants for specific programs from the federal, state and county governments also should not be overlooked. The indeterminacy of these programs is a major factor for consideration however, and these should not be relied upon for steady support, but as supplemental funds. If the Preserve is a success as a unique urban resource and research situation, an average of \$10,000 to \$20,000 per year might be a reasonable guess of this "outside" support.

Further reduction of direct costs to the City can be achieved by considering the following:

1. If the City contracts with an existing organization for management and operation of the Preserve, certain administrative costs (accounting, bookkeeping and fringe benefits) might be absorbed by utilizing the existing administrative services of such an agency.
2. The City could make available vehicle repair and maintenance services, and loan equipment to the Preserve on occasion.
3. City, county, or state personnel could also be loaned on occasion, and summer employees under federal and state work programs could be used by the Preserve.
4. Voluntary services could be provided or donated by interested conservation organizations and neighborhood groups.

VEGETATIVE IMPROVEMENTS

VEGETATIVE IMPROVEMENTS

MANAGEMENT GOALS AND ZONES:

- MAINTAIN AS MATURE WETLAND FOREST
- MAINTAIN AS EMERGENT AQUATIC
- PROVIDE NEW SUBMERGED AQUATIC NESTING ISLANDS
- FRESH WATER MARSH
- LECTURE AREA
- OPEN WATER PONDS
- OBSERVATION TOWER
- MAINTAIN AS LOW WETLAND SPROUT FOREST WITH CLEARINGS & SHRUB-CARR EDGE
- MAINTAIN AS MATURE WETLAND FOREST
- MAINTAIN AS EMERGENT AQUATIC
- MAINTAIN AS LOW WETLAND SPROUT FOREST
- PROVIDE NEW SUBMERGED AQUATIC WITH EMERGENT EDGE
- OLD FIELD SAVANNA MANAGE AS OLD FIELD SAVANNA
- LAKE
- MAINTAIN AS SHRUB-CARR EDGE
- OLD FIELD SAVANNA MANAGE AS OLD FIELD SAVANNA
- ENVIRONMENTAL EDUCATION CENTER
- ESTABLISH NEW UPLAND MESIC FOREST STAND WITH CLEARINGS IN OVERLAP PATTERN INDICATED
- OVERLOOK
- SLEDDING AREA
- PROVIDE ROADSIDE PLANTING OF SALT RESISTANT SPECIES
- PROVIDE NEW EMERGENT AQUATIC
- PROVIDE PLANTING ALONG FUHRMANN BOULEVARD
- LIMIT EXOTIC TO AREA OF ENV. ED. CENTER AND ROADSIDE PARKING
- OHIO STREET
- FUHRMANN BOULEVARD
- PLANT BERM WITH NATIVE SALT RESISTANT SPECIES
- ALLOW SUCCESSION TO UPLAND MESIC FOREST WITH CLEARINGS & SHRUB-CARR EDGE
- PLANT SPECIES INDIGENOUS TO SHRUB-CARR FOR DENSE BARRIER
- CLEAR UTILITY EASEMENT AND ALLOW SHRUB-CARR SUCCESSION



TIFFT FARM NATURE PRESERVE

MASTER PLAN



SCALE 1" = 100'

THE SARATOGA ASSOCIATES
ECONOPLANS, INCORPORATED

McFARLAND JOHNSON GIBBONS ENGINEERS, INCORPORATED
ENGINEERING CONSULTANTS BUFFALO, NEW YORK

GREVER AND WARD, INCORPORATED
LANDSCAPE ARCHITECTURAL CONSULTANTS EAST AURORA
NEW YORK

BRISTOL LEAVER LITYNSKI TARGOX HOLLISTER AND MOORE P C
DESIGN CONSULTANTS SARATOGA SPRINGS NEW YORK

CITY OF BUFFALO, NEW YORK

STANLEY M. MAKOWSKI	MAYOR
DEPARTMENT OF	DEVELOPMENT
RICHARD L. MILLER	COMMISSIONER

FAUNAL HABITAT IMPROVEMENTS

- MAINTAIN & SUPPLEMENT SHRUB-CARR - PROVIDES TRAVEL LANE/FOOD/SHELTER & BUFFER FOR WILDLIFE

- MAINTAIN OLD FIELD/SAVANNA CONDITION BY BURNING/SELECTIVE CLEARING/MOWING TO ALLOW MAXIMUM HABITAT DIVERSITY

- ENLARGEMENT OF EXISTING POND PROVIDES IMPROVED AQUATIC HABITATS.
- ELIMINATE UNDESIREABLE FISH SPECIES & RESTOCK WITH BASS/PANFISH FOOD CHAIN.

OHIO STREET

FUHRMANN BOULEVARD

- "SCREEN" DEVELOPMENT ALLOWS INTERIOR WILDLIFE TO BE PROTECTED

LEHIGH VALLEY RAILROAD

ENTRANCE

LEHIGH VALLEY RAILROAD

- PLANT PONDWEED SMARTWEED WILD CELERY ETC TO ATTRACT WATERFOWL
- PROVIDE HYDROLOGY CONTROL
- CONSIDER SELECTIVE TRAPPING OF MUSKRATS TO MAINTAIN HABITAT BALANCE

- DEVELOPMENT OF OPEN WATER AREAS ENCOURAGES WATERFOWL USE

FRESH WATER MARSH

- DUCK NESTING BOXES TO BE PROVIDED ALONG OPEN POOLS IN THE MARSH

LECTURE AREA

OPEN WATER PONDS

OBSERVATION TOWER

NESTING ISLANDS

- CULVERT WITH CONTROLS INSTALLED

- CONSTRUCT NESTING PLATFORMS FOR RAPTORS (OWL, MARSH HAWK, REDTAIL HAWK, ETC.)

NATURE TRAILS

- CLEARINGS PROVIDE INCREASED EDGE CONDITIONS FOR WILDLIFE

PLAYFIELDS

- MAINTAIN WILLOWS. INSECTS ARE ATTRACTED TO THESE SPECIES WHICH IS DESIRABLE FOR BIRD LIFE

POND

NATURE TRAILS

NATURE TRAILS

OLD FIELD SAVANNA

- MARSH DEVELOPMENT INCREASES EMERGENT AQUATIC SPECIES ENVIRONMENT

ENVIRONMENTAL EDUCATION CENTER

POND

OVERLOOK

MOUND AREA

OVERLOOK

SLEDDING AREA

- PLANTING OF INDIGENOUS MATERIALS IN MOUND AREA

TIFFT FARM NATURE PRESERVE MASTER PLAN



SCALE 1" = 100'

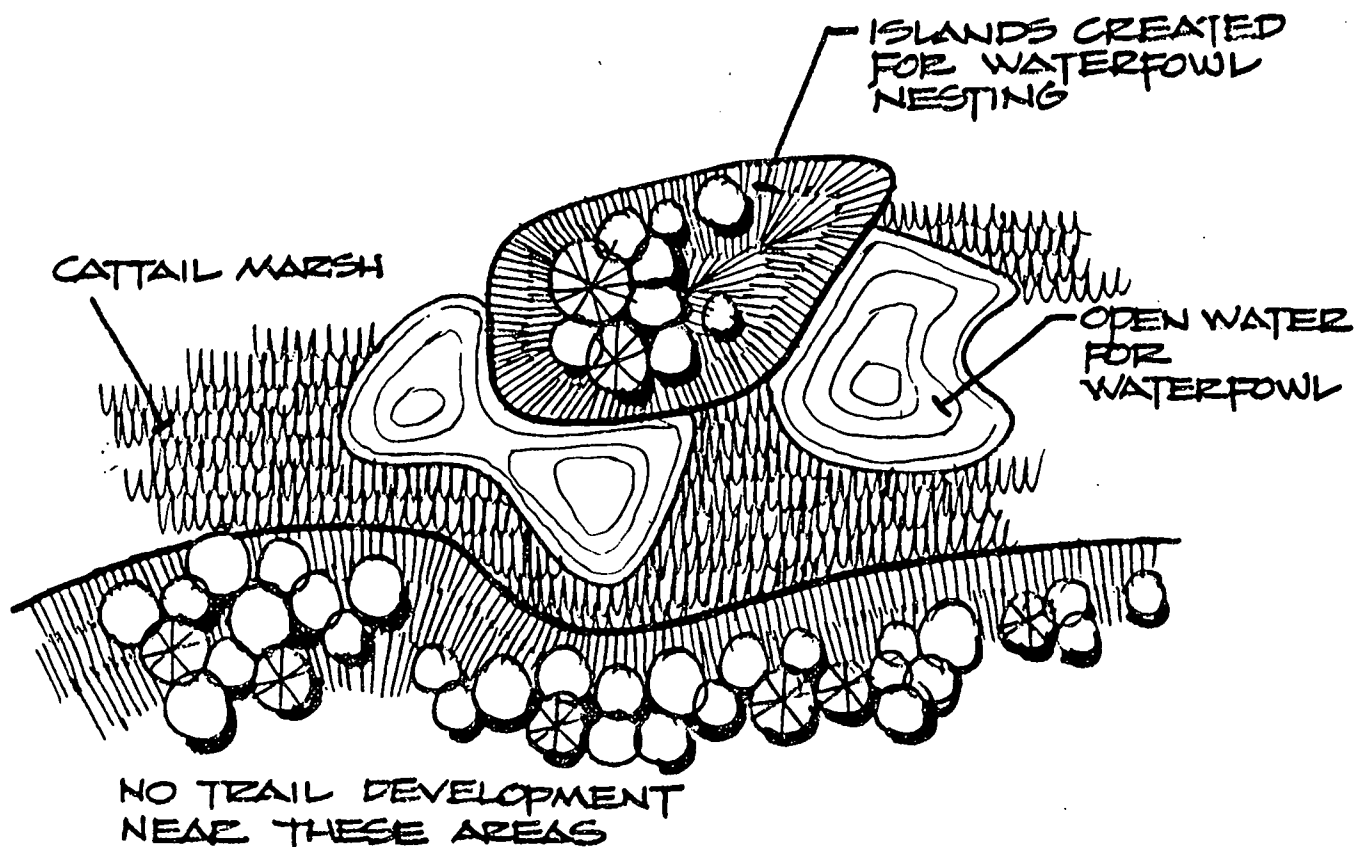
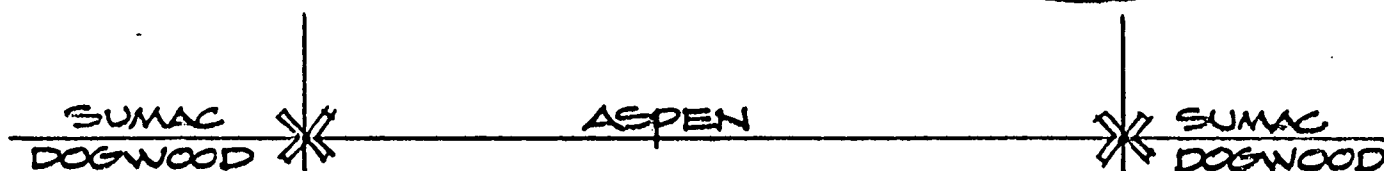
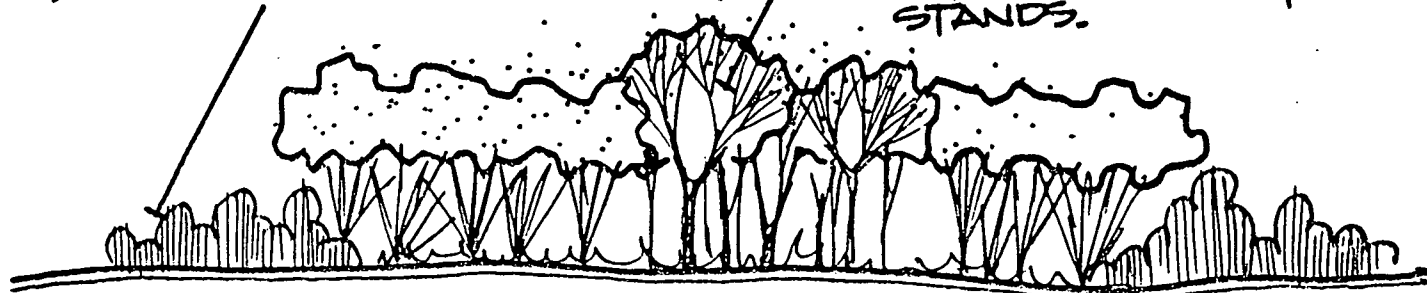
CITY OF BUFFALO, NEW YORK
MAYOR
DEPARTMENT OF COMMUNITY DEVELOPMENT
STANLEY M. MAKOWSKI
RICHARD L. MILLER

McFARLAND JOHNSON GIBSON ENGINEERS, INCORPORATED
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DESIGN CONSULTANTS SARATOGA SPRINGS, NEW YORK

THE SARATOGA ASSOCIATES
ECOPLANS, INCORPORATED
THE ARCADE
SARATOGA SPRINGS
376 BROADWAY
NEW YORK, 10018

DOGWOOD SPECIES FORM
EFFECTIVE FAUNAL TRAVEL
LANES, SHELTERS &
FOOD SUPPLY.

"SPOT" PLANTING OF
VARIED HARDWOODS
CREATES DIVERSITY
WITHIN LARGE ASPEN
STANDS.



ENVIRONMENTAL EDUCATION PROGRAM

Locational Concepts and Environmental Education Resources

The Tifft Farm Nature Preserve, as an urban facility, has an inherent mission to improve the character of urban man -- and the primary contribution the Tifft Farm can offer is an educational experience. The underlying purpose of the "preserve" is not the mere protection of wildlife, but the protection of wildlife so that man can learn the intricate processes that nature has developed to sustain life -- including human life -- on the planet.

The Tifft Farm transmits a powerful message to urban man, an optimistic message which speaks of the capacity for survival and recovery in the face of intensely degrading influences. If nature, largely unaided, can restore viable purpose and function to such an abused and abandoned area, then perhaps the rest of the deteriorated urban fabric can be restored.

The environmental education program for the Tifft Farm therefore should emphasize the meaning of natural ecology as it affects the life of the urban man. This does not mean that the program should not include aspects of non-urban ecology, or that fundamental ecological principles always must be presented in a way that relates them to human involvement.

More detailed consideration of the locational aspects of the Tifft Farm site also suggest program orientations. These aspects include the site's proximity and connection to Lake Erie, its proximity to major highway and rail facilities, its proximity to heavy industrial centers, and its proximity to the less affluent residential areas of the inner city. In terms of the program, these locational aspects suggest programs dealing with the formation of the Great Lakes and the aquatic ecology of Lake Erie, the relationship of plants to highway noise and dust abatement, the plant ecology of railroad yards, the impact of industrial air and water pollution on natural areas, the ecology of the Norway Rat, the environmental education of central city residents and the human social values of urban open space.

Within the Tifft Farm site proper, there are a number of major and minor ecological units that will provide the basic setting for the environmental education program. These are:

- Submerged Aquatic Environments
- Emergent Aquatic Environments
- Shrub-carrs
- Grasslands, including Fens and Old Field Savannahs
- Wet Lowland Sprout Forests
- Wet Lowland Mature Forests
- Upland Mesic Forests
- Weed Communities on Old Railroad Cinder Beds

These units cannot be defined by rigid lines but are separated by transition zones or "ecotones" which, in many cases, provide the most interesting areas for environmental study. A variety of programs and facilities will be necessary to provide for the diversity indicated above.

Client Groups

In terms of the "users" of the environmental education program, there are three basic factors to be considered -- the client objective in using the site, the age and general educational level, and the physical-mental condition.

Generally, there will be three types of users of the program:

- o Organized, supervised environmental education classes or groups from public, private and parochial schools and colleges and conservation-oriented associations.
- o General public, casual visitors to the site who may be attracted to the program, and other associations interested in, but not directly related to conservation activities.
- o Individuals or groups engaged in environmental education and/or scientific research who wish to utilize the site resources for short or long-term projects.

Within the first group, "user" objectives are generally focused on the extension of environmental education levels and the use of the site for field demonstration and/or observation of previous knowledge gained from books or classrooms. Usually, such a group is accompanied by a teacher or competent director who has either advanced knowledge of the site itself, or is familiar with the general experiences the site will offer.

Depending on the age of the group, educational levels will vary -- and the supervisors accompanying such groups will usually be better equipped to organize and direct the groups' activities after a general orientation session. Nature Preserve personnel may be needed for this general orientation, and later as "guides" or for occasional advice, but in these situations, they play a secondary, support role. This assumes, of course, that the visit to the Tiffit Farm site is actually part of a larger curriculum of study or involvement in conservation-oriented group activities.

In as much as this general group of users are young people or others used to considerable outdoor activity, physical-mental condition is not a major area of concern.

The objectives of the second group are generally to gain an understanding of the rudimentary principles of ecology and environmental phenomena. There may be a considerable variation in the age and background knowledge of such groups and a major problem is determining an appropriate level of detailed, scientific information which can be easily transmitted to, and assimilated by, this group.

Generally, this group of users would tend to have the greatest range of physical and mental health characteristics. Thus, the environmental education program should be flexible enough to meet the needs of the elderly, physically-handicapped, blind, and mentally-retarded, as well as the needs of families with children of all age levels.

The Nature Preserve Environmental Education Center should be adequately staffed and equipped to provide this group with definitive orientation sessions and guided tours related to their general physical and mental levels of ability.

Since these groups would tend to use the Preserve more during the late spring, summer and early fall months, and more generally on the weekends and during evening hours, the staffing requirements could generally be provided by part-time personnel.

The objectives of the third major group of client-users are similar to the first, but are generally more detailed and more narrowly focused on the advancement of environmental knowledge and ecological study of specific phenomena. These would include college graduate students or advanced high school students working on specific, programmed research projects, or teams from environmentally-oriented organizations developing and maintaining detailed studies and records of the Nature Preserve's environmental resources.

Generally, this group of client-users would tend to be mature adults or young adults with a sophisticated understanding of ecology. As a whole, this group would not present any serious physical or mental health conditions, and would not require supervision, except for checking in and notifying the Nature Preserve staff of their activities.

Environmental Education Program Policies and Objectives

To meet the environmental education objectives of the groups identified previously, we recommend the following program policies and objectives:

- o A Tifft Farm Nature Preserve Environmental Education Committee should be established to administer, monitor and control the use of the site for environmental education purposes.
- o The Master Plan for the Tifft Farm Nature Preserve should include an Environmental Education Center operated as a year-round facility.
- o The Master Plan for the Tifft Farm Nature Preserve should include a system of trail facilities, observation points and lecture areas designed to provide controlled access to each of the major ecological units found within the preserve.
- o The Management Program for the Tifft Farm Nature Preserve should include permanent trained personnel for environmental education orientation and instruction. This core staff should be supplemented by part-time personnel for weekend and seasonal peak use periods. Part-time personnel should be drawn from local colleges and universities, or area conservation organizations.

- o Priority use of the Preserve for environmental education should be given to organized and supervised environmental education classes from the Buffalo Public School System. These groups should be scheduled in advance.
- o In-service training and orientation seminars should be held twice a year in order to equip elementary, secondary and higher education teachers for the supervision and guidance of environmental education classes.
- o The Nature Preserve should be open to the general public only during early morning and late evening hours and week-ends, except during the periods when schools are not in session.
- o Individual or group research activities, especially those requiring long-term use of the site, should be permitted only on an application basis which would require the applicant to prepare a research prospectus for prior review and approval of the environmental education committee.
- o The Master Plan for the Tiffit Farm Nature Preserve should be designed to accommodate the environmental education needs of all age groups and educational levels.
- o Facilities should be provided for the environmental education of special groups, such as the physically and mentally handicapped and senior citizens. Self-guidance systems for the blind, including Braille descriptions of the site, history, environmental exhibits and wildlife habitats should also be provided. The needs of non-ambulatory visitors should be considered in trail design. Wide-track wheel-chairs should be provided.
- o Special efforts should be made to provide environmental education programs for exceptional children, such as the hyper-kinetic, emotionally and educationally deprived, and mentally retarded. Such children often respond strongly to natural environmental experiences and such programs could have a powerful therapeutic as well as educational impact.

- o Overall user density of the site should be controlled to avoid adverse impacts. This should be achieved by limiting the availability of parking facilities and by the provision of proper supervision and site use schedules. The size of single groups should be limited to approximately 10 people.
- o Environmental education facilities, outside of the center itself, should be unobtrusive and blend with the natural features of the site. Trails, observation points and lecture facilities should be located away from areas of particularly sensitive ecology.
- o The core Environmental Education Program should consist of the following:

I. Orientation

Objective: To provide the visitors with an overall historic and current perspective of the Tifft Farm Nature Preserve, prepare them to recognize and understand their field observation experiences and acquaint them with the basic rules and procedures for utilizing the preserve.

Content: The History of Tifft Farm

- o Original natural state as a river delta marsh.
- o Geomorphology of the parent soils and subsequent vegetation and wildlife structure.
- o Early settlement of the area.
- o Buffalo River Improvements and drainage of the delta marshes.
- o Channelization and industrial development.
- o Impact of harbor breakwalls.
- o Port and industrial abandonment.
- o Industrial and municipal land fills.
- o Inactive stage and natural regeneration.
- o Transfer operation.
- o Master Plan development and implementation.
- o Current management and cooperating agencies.

Composite Ecology of the Tifft Farm

- o Climate
- o Hydrology
- o Land Form and Soils
- o Vegetation
- o Fauna
- o Inter-relationships of the above

Urban Influences

- o Urban impacts from air, noise, solid waste, visual and water pollution.
- o Potential vegetation and wildlife.

Use of the Preserve

- o Facilities available.
- o First aid, emergency procedures.
- o Rules and regulations.

Location:

- o Environmental Education Center, Auditorium and Display Areas.

Media:

- o Audio-visual film strips, slides, dioramas, maps, guide booklets, narrative by personnel.

II. Field Observation

Objective: To provide users of the site with direct environmental education experiences, and develop a more specific understanding of individual environmental resources and phenomena.

Content: The Ecology of Disturbed Areas

- o The Mounds - Technique of development, materials used, restoration of a natural system, importance of soil cover, grasses, control of soil erosion and leachate, selection of native upland mesic shrub and tree species, the mounds as existing and potential wildlife habitat. Overview of the entire preserve (note the transitional role of the mounds from indoor to outdoor orientation).
- o Other disturbed areas - Highway embankments, railyard cinder and weed communities, harbor dredging spoil areas. Impacts of trash on pollution and salt dispersion. Norway rat ecology related to illegal trash and grain spillage from railcars. Highway affinity of crow, kestrel. Use of plant materials for noise control, dust control and improvement of visual quality.

The Ecology of Fresh Water Lakes, Streams and Ponds

- o The Lake Inlet - Ecology of the Great Lakes and Lake Erie in particular, industrial pollution problems, original commercial fishing value, species, invasion of the lamprey and subsequent control efforts, chemical and biological water quality testing procedures, trends in inlet water quality.
- o The New Pond - How it was developed, grading to create and sustain aquatic biologic communities, stocking, amphibians and reptiles, aquatic insects, migratory waterfowl.
- o The Stream - Original and current drainage basin, connection with South Park Lake, beaver, mink habitats, minnow species, amphibians and reptiles. Impact of adjacent land fill and slag dumping.

The Ecology of the Cattail Marsh

- o The marsh as a remnant of the original dominant ecological unit. Hydrology of the marsh, soils, emergent aquatic plant communities, muskrat ecology, marsh birds, waterfowl, amphibians.

The Ecology of the Shrub Carr

- o The shrub carr as a transitional zone from emergent aquatic to wet lowland forests. Dominant shrub species, related wildlife -- cottontail rabbit, ruffed grouse, fox, spotted skunk.

The Ecology of the Sprout Forest

- o Upland and lowland varieties and related wildlife, historic development of the aspen grove (lowland) on land fill area and upland sprout forest on former cinder communities on old wharf and dock sites.

The Ecology of the Grasslands

- o Dominant grasses and trees and related wildlife, voles, pheasant, raccoon, sparrows, finches, grass snake.

The Ecology of the Wet Lowland Forest

- o Willow forest and related wildlife species, impact of moisture gradient of soils in controlling plant species.

Location:

- o Trails, observation points, outdoor lecture areas related to the above.

Media:

- o Guided tours, guide books, outdoor exhibits, concealed observation blinds, outdoor lectures.

Facilities and Personnel

The Tiffit Farm Nature Preserve contains a variety of ecological units as described in the Phase II Report. Each of these distinct ecological units should be served by a trail system with outdoor lecture facilities located at key points. The Cattail Marsh, because of its sensitive ecology, should be left undisturbed for the most part except for a limited section of trail catwalk on the north side of the aspen grove where a concealed blind and observation tower could be constructed. Submerged aquatic environments (the pond, inlet lake and stream) could also be served by small piers. The tops of the mounds should be developed as overall observation points, possibly equipped with coin operated view binoculars. Each of the high observation facilities (mounds and towers) should also have weatherproof panoramic display panels to orient the view and identify important features.

The trail system should be organized to avoid overuse of the site, yet provide a variety of routes. It should also control access and egress to the site from the environmental education center. At key points along each of the trails, outdoor exhibits could be constructed in vandal-proof display cases. Lecture areas might also include small outdoor shelters which could also serve as picnic locations and outdoor classrooms. Each lecture area should be equipped with a small storage shed for maintenance equipment.

The Environmental Education Center should include spaces for entry, information, orientation area, display/exhibit area, library and projection equipment room, classroom and laboratory, administrative spaces, toilet facilities, maintenance equipment and vehicle storage, and caretakers residence.

In terms of personnel, the Environmental Education Center should have a full-time staff Director and secretarial assistant. For peak use periods, about five part-time personnel will be required.

MANAGEMENT PLAN AND PROGRAM

The Tifft Farm Nature Preserve Master Plan sets forth a plan of action designed to establish the Preserve as a proper setting for the protection of unique wildlife resources and the environmental education of the public. In addition to providing the capital resources for the achievement of these primary goals, the City must also consider the annual management and operational requirements of the Preserve.

The Master Plan is based upon earlier considerations of alternative goals and objectives for the use and maintenance of the Preserve, ranging from a "no use" policy under which the Preserve would have been left as an undisturbed area to evolve as nature dictated, to a broad "multiple-use" policy under which the Preserve would undergo considerable development intervention to create a new park facility including a variety of recreational facilities and services.

The basic policy goal adopted by the Tifft Farm Advisory Committee falls between these two extreme policies. Under the adopted policy, the Preserve's natural ecosystems will be sustained, but managed. In some instances, the natural evolution of parts of the site will be accelerated. In other cases, interventions will retard natural trends. In terms of user orientation, the adopted policy emphasizes the use of the site for environmental education and passive recreational activity but limits the extent of this use in terms of access to various parts of the site and the overall density of users permitted on the site.

Management Program Policies and Objectives

The objectives of this management program are derived from and supportive of the above policy. They are:

1. The Tifft Farm Nature Preserve Management Program should be conducted on a full year basis, both to insure against the misuse of this highly visible and accessible facility and provide a complete program of environmental education and ecological research during all seasons of the year.

2. The Tifft Farm Nature Preserve Management Program should include the physical facilities and equipment required to conduct on-going monitoring of the status of the Preserve's environmental condition in order to guide the maintenance of the Preserve and improve the educational value of the Preserve.
3. The Tifft Farm Nature Preserve Management Program should include the physical facilities and equipment required to conduct an environmental education program with a variety of levels of sophistication ranging from scientific field studies to self-guided nature tours.
4. The Tifft Farm Nature Preserve Management Program should be administered by a competent professional staff including persons with administrative management, wildlife management and education program management backgrounds and abilities. The staff should be responsible to a Board of Directors composed of public officials and interested private individuals.
5. The Tifft Farm Nature Preserve Management Program should include an integrated annual capital improvement programming budget development process.
6. The Tifft Farm Nature Preserve Management Program should be financed from user charges to institutions, subscriptions and donations, federal and state grant funds, county appropriations and city appropriations.

Program Activities

The Program Activities to be conducted or provided at the Tifft Farm Nature Preserve provide the basis for the definition of management requirements in terms of organizational structure, personnel, facilities and equipment, and financial requirements. These program activities are recommended as follows:

1. Overall Policy Development and Evaluation

Overall policy development and evaluation is a key program activity. This function is recommended as a responsibility of a Board of Directors of the Nature Preserve, as specified in the following sections on organizational structure and personnel. The Board should meet on a bi-monthly basis at the minimum to provide for the continuing development of management policy for the Preserve, and evaluate the progress of the staff in implementing policies adopted by the Board.

2. Preserve Administration

Preserve administration is the program activity involving the basic scheduling and implementation of management policies adopted by the Board of Directors. This includes:

- o Recruitment, training and supervision of personnel.
- o Preparation on an annual basis of a six year capital improvements program.
- o Preparation and administration of the annual operating budget.
- o Purchase of supplies and equipment.
- o Provision of secretarial services.
- o Liaison and coordination with city, county, state and federal officials.
- o Promotion of the Preserve.
- o Provision of first aid services.

3. Maintenance of Facilities and Equipment

Annual maintenance of facilities and equipment in the Preserve includes the following specific tasks:

- o Repair and upkeep of buildings, trails, lecture centers.
- o Repair and upkeep of vehicles.
- o Construction, installation and maintenance of exhibits.
- o Control of supply storage areas.
- o Prevention of illegal access and use of the Preserve.
- o Control of traffic during peak use periods.
- o Maintenance of formal grounds areas and trash removal.
- o Fire control.

4. Improvement and Maintenance of Preserve Environmental Resources

This program activity is directed at the monitoring, development and improvement of the vegetative and faunal resources of the Preserve. It includes:

- o Preparation and conduct of an ongoing overall program of ecological quality maintenance.
- o Installation and operation of environmental monitoring devices.
- o Control of undesirable vegetative and faunal species.
- o Planning and construction of habitat improvements.
- o Provision of immediate veterinary services and emergency wildlife food supplies.
- o Identification of field observation opportunities.
- o Stocking of wildlife resources.
- o Preparation and supervision of planting programs.

5. Environmental Education Program Development

This program activity provides the most important area of preserve staff interaction with the general public. It includes:

- o Preparation and conduct of an ongoing overall program of environmental education.
- o Design and supervision of construction of exhibits.
- o Organization, scheduling and control of environmental group visits.
- o Provision of guided tours.
- o Preparation of lectures and course materials.
- o Recruitment, training and supervision of part-time environmental education staff.

6. Research and Development

Continuing improvement of the Nature Preserve requires a continuing assessment and evaluation of the Preserve's ecological quality and the development of scientific information as a basis for updating and formulation of management policy. This program activity includes the following:

- o Analysis and evaluation of data from monitoring devices and programs.
- o Development of specific ecological research project priorities.

- o Coordination and liaison with public and private environmental agencies, high schools, colleges and universities wishing to use the site for ecological research.
- o Development of federal and state grant applications for ecological research and development.
- o Provision of advice and assistance to other program personnel.
- o Supervision of field research by others.

Organization and Personnel

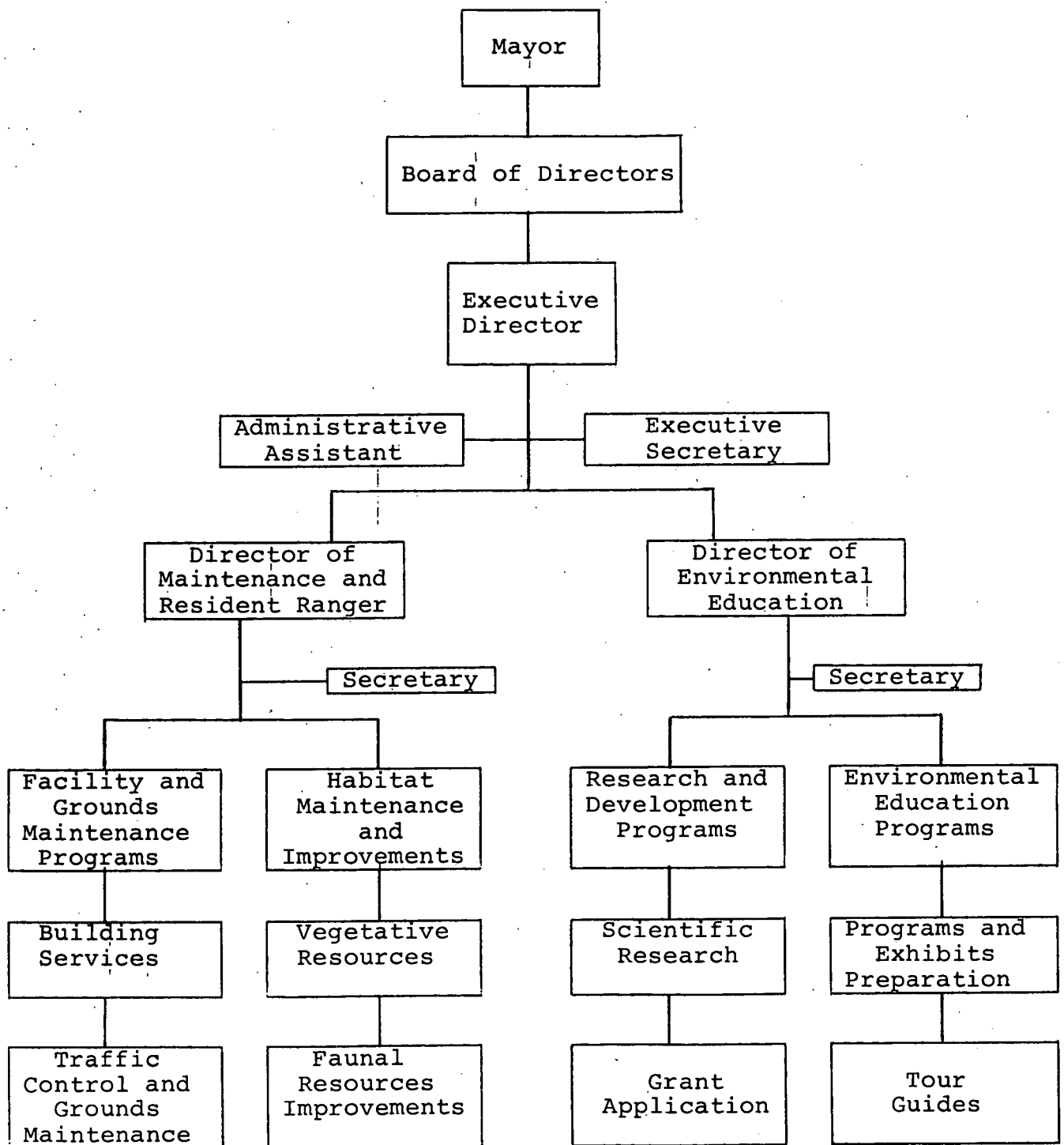
To provide for the creative and efficient implementation of the previously described program activities, the Tifft Farm Nature Preserve will need a skilled professional staff and organization. The Tifft Farm Nature Preserve will be owned by the City of Buffalo. Current city policy with respect to such unique facilities (such as the Buffalo Zoo) is that the City will construct and maintain the actual physical facilities, but management and operation is commonly contracted for with an outside agency or institution that has the specialized skills required for management and operation.

Utilizing such a policy for the Tifft Farm Nature Preserve would require action by the Mayor and Common Council to formulate and execute a management contract. The City's Division of Management Services should be involved in the detailed preparation of such a contract. It is recommended that the management staff for the Preserve be non-civil service employees in order to meet the requirements for special skills and background orientation of Preserve employees. This policy is especially important in the early years, since flexibility in the management plan is desirable until the exact nature of the utilization of the Preserve can be determined.

The chart on the following page indicates a recommended organizational structure and required personnel for the conduct of the Tifft Farm Nature Preserve Management Program. Additional personnel considerations are as follows:

1. Board of Directors

The Tifft Farm Nature Preserve Board of Directors should consist of between 6 to 10 individuals selected from various public and private agencies with environmental interests similar to those who are currently serving on the Tifft Farm Technical Advisory



TIFFT FARM NATURE PRESERVE
MANAGEMENT ORGANIZATION

Committee. The members should be appointed to staggered four-year terms by the Mayor of the City of Buffalo. In the event that the Erie County government participates in the funding of the Preserve's annual budget, or an institution such as the Buffalo Museum of Science becomes the agency responsible for the maintenance and operation of the Preserve on a contractual basis, these agencies should have ex-officio representation on the Board. Residents of the surrounding communities should also be appointed. The Executive Director of the Tiffit Farm Nature Preserve should also be an ex-officio member of the Board. The Board should have the authority to select its own chairman and would have the responsibilities previously described under Program Activities. The Board should also be responsible for the selection of the Executive Director.

2. Executive Director

The Executive Director of the Preserve should be a person of proven administrative ability in the field of nature preserve management. The Executive Director should be a graduate of a college or university and have a degree in environmental sciences or biology and a minor in business or public administration or vice-versa. Teaching experience would also be a desirable, but not mandated, criteria. The Executive Director would be responsible for the program activities specified in the previous section under Preserve Administration. The Executive Director eventually should have sufficient support staff in terms of secretarial and accounting personnel.

3. Director of Maintenance and Resident Ranger

The Director of Maintenance and Resident Ranger would be the chief caretaker of the Preserve. This person would be responsible for the conduct of all maintenance and habitat improvement program activities as specified in the previous section. Graduation from a recognized college or university with a degree in forestry, botany or wildlife management or landscape architecture, is a desired criteria along with several years of managerial experience in nature preserve maintenance. The Director of Maintenance and Resident Ranger would be required to reside at the site and the conduct of his responsibilities would require staff support as indicated below.

4. Chief of Buildings and Grounds Maintenance

The Chief of Buildings and Grounds Maintenance would be one of two key persons reporting to the Director of Maintenance and Resident Ranger. This position would require the capacity to identify maintenance requirements, program repairs and upkeep, and to program the actual work conducted by contractors or city force account labor or staff personnel. The position would require high school graduation or an Associate Degree in Construction Technology and Building Maintenance and experience in building and grounds maintenance.

5. Chief of Habitat Improvement Programs

The Chief of Habitat Improvement Programs would also report to the Director of Maintenance and Resident Ranger. This position would include the responsibility for the identification of needed improvements in vegetative conditions and wildlife habitats, programming and specifying the work required to complete these activities and supervising the actual improvements. This position would require expertise in wildlife management but not necessarily require a college degree in as much as the Preserve staff would provide considerable assistance in developing habitat improvement programs.

6. Director of Environmental Education Programs

The Director of Environmental Education Programs would be the second key staff assistant of the Preserve's Executive Director. This position would require considerable environmental and educational experience and training as well as a personality with the ability to promote the Preserve's use and gain public understanding and acceptance. The Director of Environmental Education Programs would be responsible for definitive scientific research and development programs as well as general environmental education activities.

7. Chief of Research and Development

The Chief of Research and Development would report to the Director of Environmental Education Programs although the activities of this program have an obvious application to all other program areas. The position would require a person with at least a master's degree in the environmental sciences as

well as several years of experience in environmental research management. Many ongoing programs in this general area are funded by the federal and state governments, so the Chief of Research and Development would require a staff assistant (or personally conduct the work) to achieve the necessary liaisons in Albany and Washington to acquire such funds.

8. Chief of Environmental Education Programs

The Chief of Environmental Education Programs would also report to the Director of Environmental Education Programs. This person would also need to have expertise and talent in public presentations, as well as the ability to supervise a large part-time staff of tour guides during the peak periods of use. The position requires a college or university degree in education with an emphasis on the natural sciences. Artistic abilities would also be needed to guide the preparation of exhibits and displays. A close working relationship with public school officials would also be desirable.

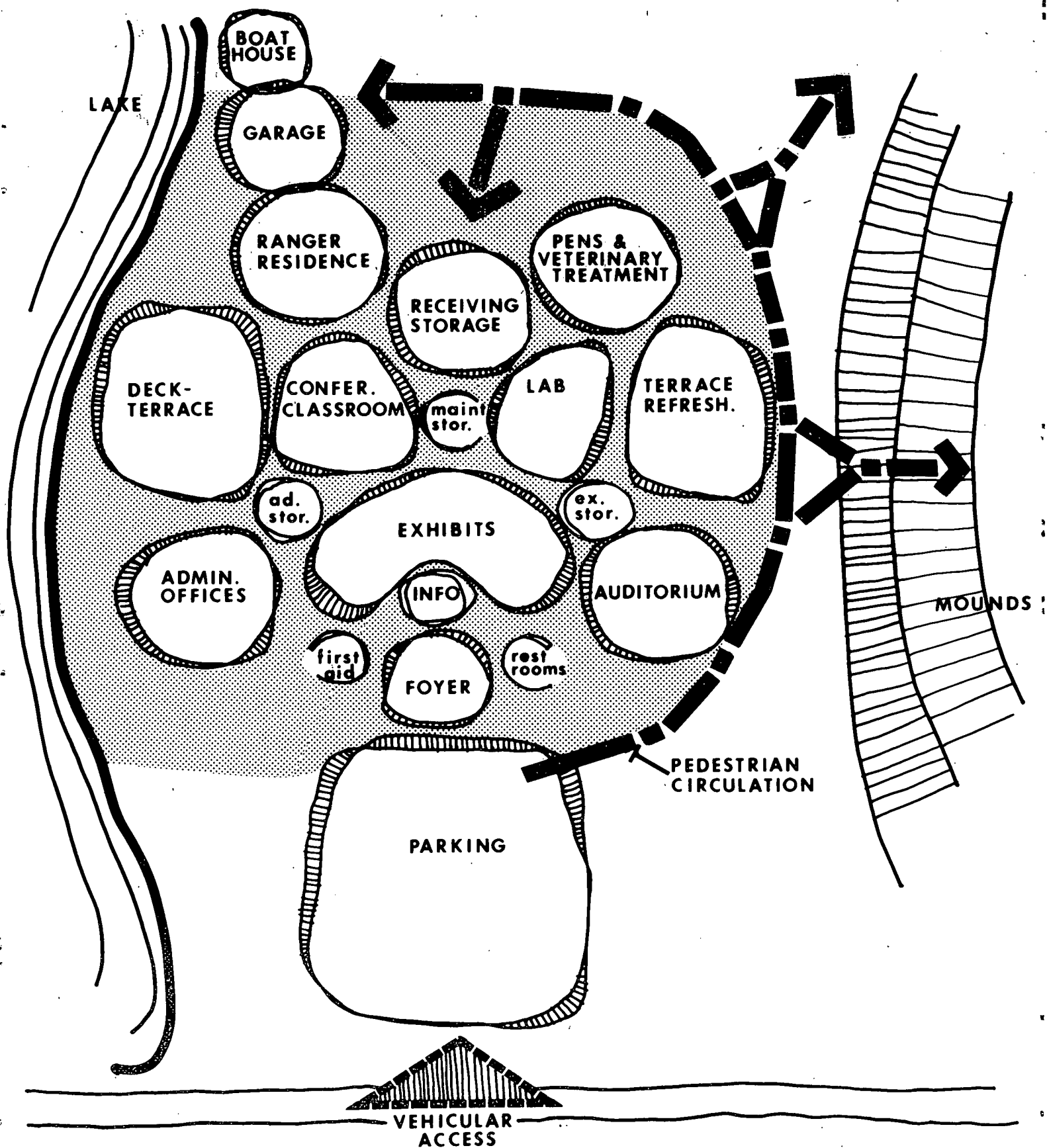
9. Part-Time Staff

During summer periods of peak use of the Preserve, user demand is very likely to extend over a 16-hour period from early morning to late evening. The permanent staff of the Preserve will need to be expanded by part-time staff -- college students majoring in environmental or natural sciences would be good candidates. With a maximum of five tour groups on the trails within any given hour, as many as 10 part-time assistants might be required.

Facilities and Equipment

The provision of the previously described program activities and personnel obviously generate a need for basic facilities, equipment and supplies. The trail system and lecture center/observation tower programs defined in the master plan anticipate the provision of an orderly user structure. These will be detailed further in later phases of the work.

The principle facility -- the Environmental Education Center -- is indicated as a schematic program on the following page. In addition to this facility, the Ranger's residence, the trails, lecture centers and observation towers, there



SCHEMATIC FACILITY PROGRAM TIFFT FARM ENVIRONMENTAL EDUCATION CENTER