

development study

Fort Whyte Nature Centre

DEVELOPMENT STUDY FORT WHYTE NATURE CENTRE

BY

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A practicum submitted to the Faculty of Graduate Studies of the University of Manitoba in partial fulfillment of the requirements of the degree of

MASTER OF LANDSCAPE ARCHITECTURE

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The University of Manitoba

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Winnipeg, Manitoba

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Winnipeg, Manitoba

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ABSTRACT

The Fort Whyte Nature Centre offers potential to the entire urban population of Winnipeg and people living throughout the region to view, interpret and become involved with part of Manitoba's wildlife heritage. The uniqueness of this site at present stems from its relationship to industry, namely Canada Cement (Lafarge) Limited who have supported and encouraged the interpretive facilities on their property. Through the management of the Wildlife Foundation of Manitoba, the site has been developed to its present state where visitors can experience expansive water features, flora, fauna and captive waterfowl. This study will provide a framework for a further stage of development focusing on specific site plans and supported by recommendations for the integration of the centre into regional interpretive and recreational systems.

Throughout the study two basic objectives have been considered:

- (1) provision of a facility which offers the visitor excitement through diverse recreational and interpretive opportunities, and
- (2) encouragement to study major aspects of the natural wildlife of Manitoba.

With these in mind and a basic program provided by the Wildlife Foundation of Manitoba, the site has been studied and analyzed, and recommendations have been made to develop a successful environmental education facility. It is felt that the proposed Fort Whyte Nature Centre will make a significant contribution to wildlife interpretation not only in Winnipeg, but also in the prairie region and lead the way for private development of interpretive facilities.

ACKNOWLEDGEMENTS

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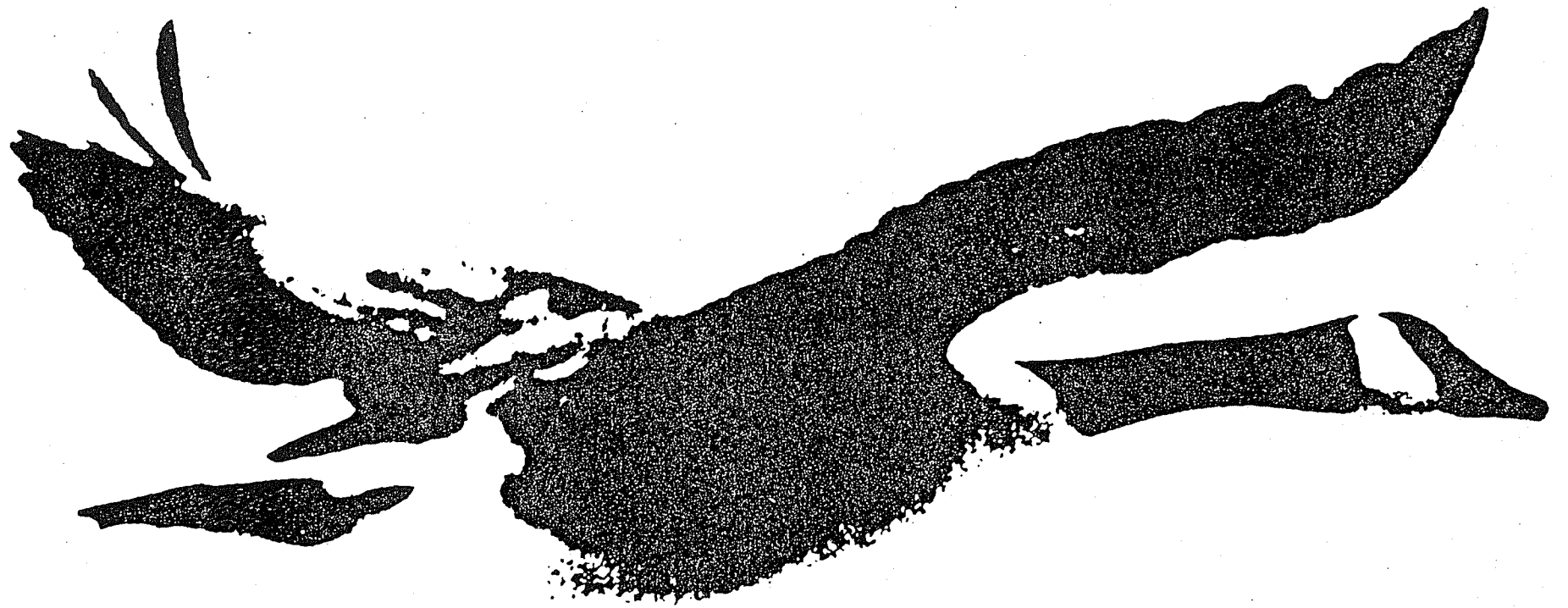
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introduction

Critical to the well-being of mankind is a stable and healthy environment. In recent years we have been faced with a continual misuse of natural resources evident by such environmental problems as the energy crisis, air and water pollution, environmental degradation, increased wildlife extinction, etc. Attention is now being paid to the reversal of these trends, by many agencies public and private, in an attempt to restore the environment to a healthy condition. This battle has been fought primarily by a minority of the population including biologists, ecologists and other resource people who are environmentally trained. This is not sufficient. A primary goal to strengthen forces would be to develop an environmental consciousness in the general public.

The urban lifestyle of the majority of the population in North America allows very limited contact with the natural environment. Without such contact very few can appreciate nature, its beauty and importance, and develop responsible attitudes towards the environment. A form of environmental education is the basis to encourage these responsible values at all levels. This is the purpose of the Fort Whyte Nature Centre, managed by the Wildlife Foundation of Manitoba.

The Fort Whyte Nature Centre has been in operation in its present form since 1975. Featuring nature trails, a reception building, a waterfowl demonstration building, large ponds and vegetation plus an astonishing variety of wildlife (including a herd of deer), the centre has been a success, with the number of visitors increasing annually. Inherent to the success of the centre has been its proximity to a large urban population. Fort Whyte is located seven miles south-west of the centre of Winnipeg, within a short distance of the many schools of the city and for the general public (Figure 1). This provides

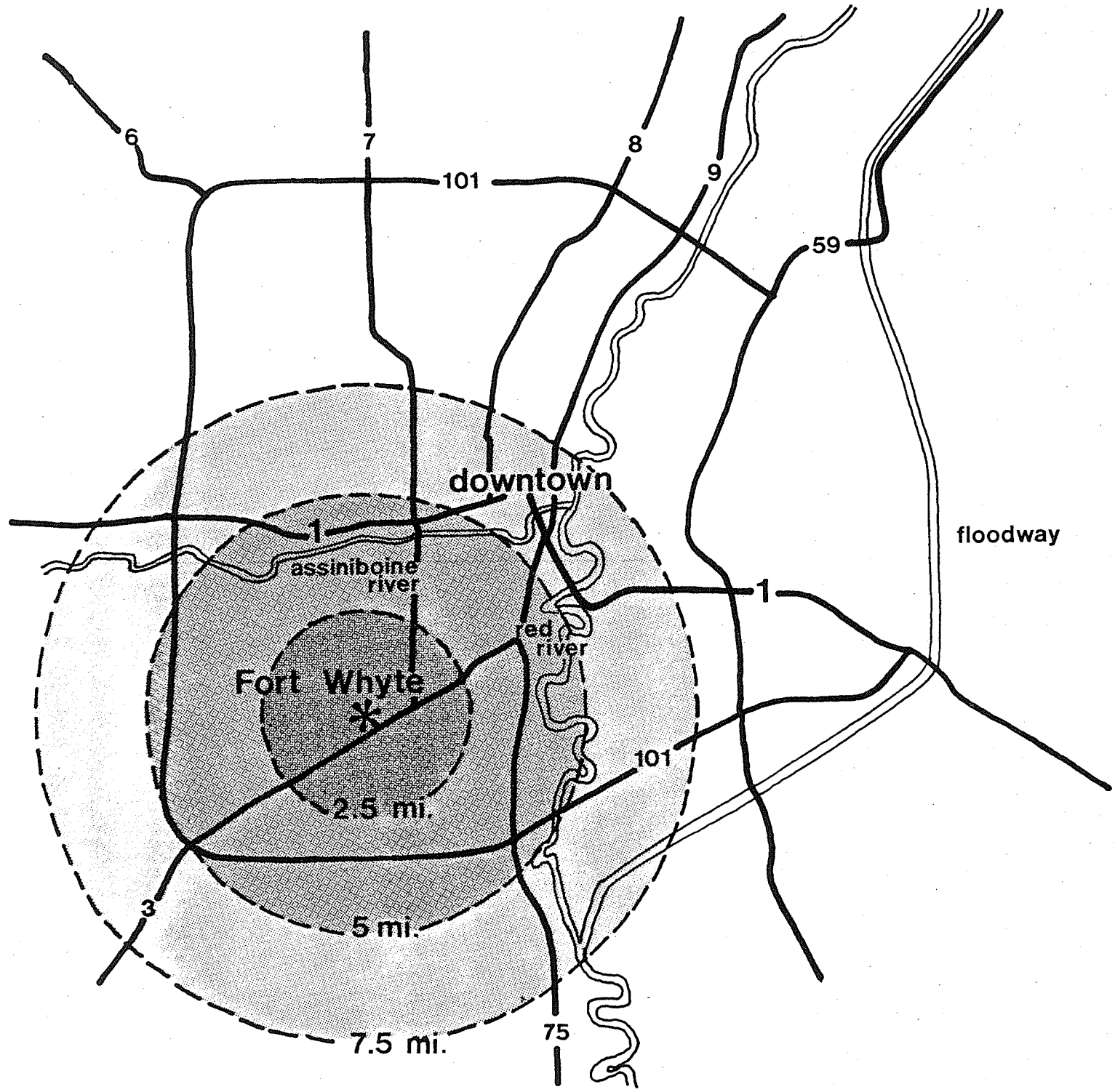


FIGURE 1

a tremendous opportunity to generate new environmental attitudes in a large population base. The growing success of the present centre indicates both a need and a desire for these services in Winnipeg's population. After reviewing its successes and shortcomings, the Wildlife Foundation of Manitoba has proposed an expansion of the facilities to increase its educational impact. Central to the development will continue to be education, research, conservation and recreational activities on a site displaying the physical beauty and wonder of nature.

The Fort Whyte Nature Centre is located on a 400-acre site owned by Canada Cement (Lafarge) Limited. Environmental activities on the site began in 1957 when the employees of Canada Cement (Lafarge) Limited used the ponds, created by the excavation pits, as a place to keep Canada Geese. In 1973, an agreement between Canada Cement (Lafarge) Limited and the Wildlife Foundation of Manitoba granted the latter the opportunity to lease a large area of the former's property for the purposes of environmental education and wildlife management. From there, the site has progressed to its present state attracting school groups, naturalists' clubs, camera clubs, church groups, scouts, guides and the general public. Research also plays an important role at the site with participation by departments from the University of Manitoba and the University of Winnipeg. These activities are to be maintained and encouraged in future development.

The intent of this study of the Fort Whyte Nature Centre is to investigate potentials and make recommendations for development to increase the effectiveness of the facility as a major environmental education centre for Winnipeg.



context

The Fort Whyte Nature Centre lies in the Tuxedo-Charleswood area of Winnipeg. Here, much of our natural heritage can be viewed in undeveloped woodlots and protected forests. Planned in advance of predictable developmental pressure, the preserved forests will provide a unique opportunity for the present and future generations of the citizens of Winnipeg. The Wildlife Foundation of Manitoba should encourage the preservation of tracts of land required to maintain the area as a stable system for wildlife, Man and Nature.

Included in this ecological system should be white-tailed deer and waterfowl whose importance in this area dates back to the early settlers. The waterfowl, significant for their migration routes, will be the focus of the Fort Whyte Development Plan, while the white-tailed deer are a key element in the development of the region.

The intent of regional development for the area is to identify a corridor for integration of wildlife and Man and to propose guidelines to develop, manage and protect this system.

LAND USE

The area of regional significance for wildlife planning at present supports a large herd of white-tailed deer. Included in the present open-space system and identified in Figure 2 are major facilities such as the Fort Whyte Nature Centre, the Assiniboine Park Zoo and Forest, the Tuxedo Golf Course and the Assiniboine River. The area also offers numerous neighbourhood parks, undeveloped private land holdings, residential areas and industrial sites.

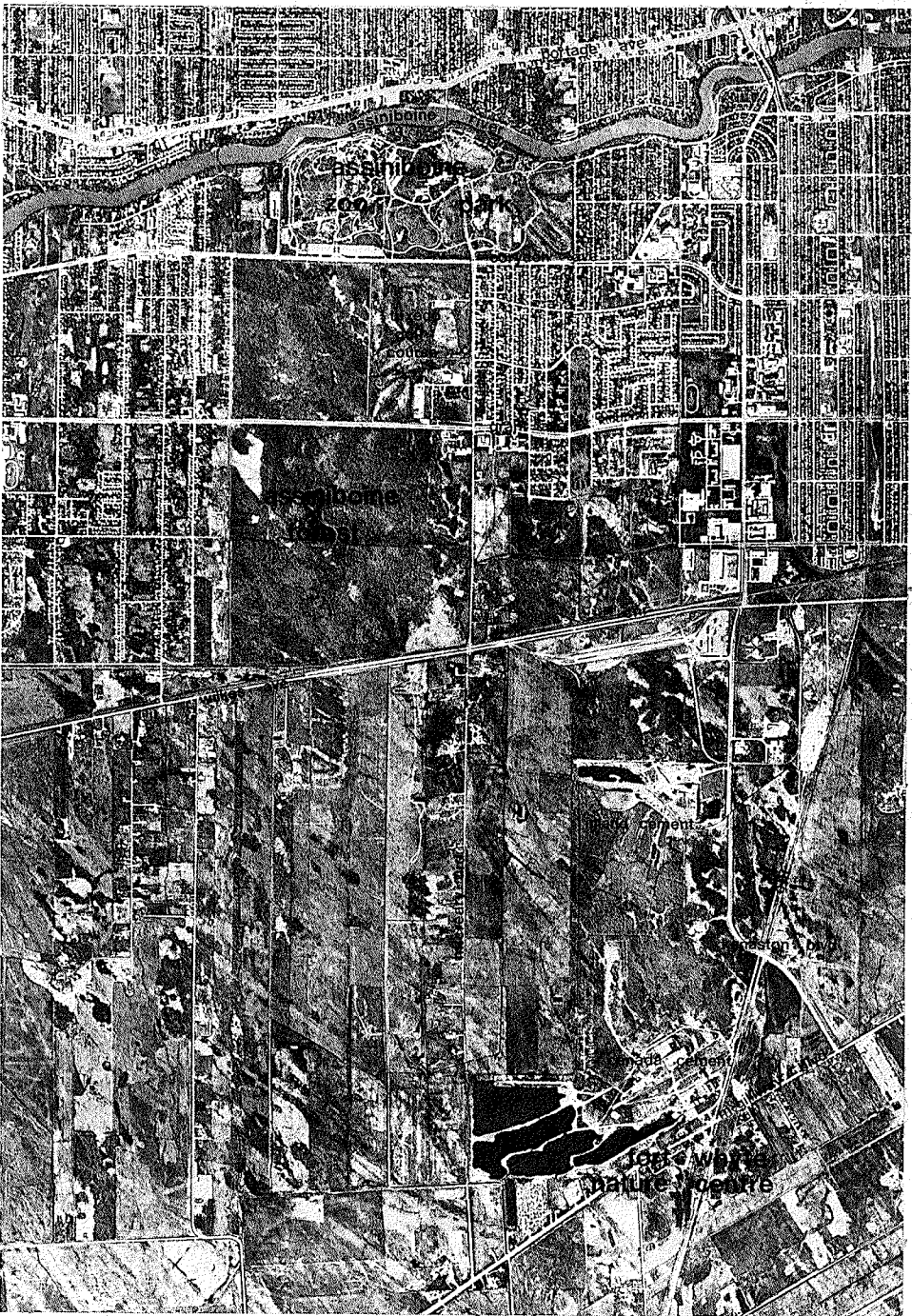


FIGURE 2
Regional Context

The southern fields can anticipate developmental pressure in the near future as the area grows. This, in combination with a road network which discourages open-space linkages, indicates a need for planning a corridor in advance of further development.

FLORA

The vegetation of the area is broadly classified as Hardwood Aspen/Oak Forest characteristic of the Aspen Parkland Region of south-central Manitoba.¹ Numerous plant communities have been identified which range from the very moist wet meadows to areas of the dominant species of trees to, finally, the dry prairie. The present condition in the Assiniboine Forest indicates the community is moving towards a Mixed Hardwood Forest, with oak, ash and Manitoba maple invading while aspen and balsam poplar die out during a time span of 40 to 70 years. Studies have shown a great richness of existing vegetation with three species of trees, 16 of shrubs, nine of grasses and 70 of herbaceous plants in the forest alone (Appendix 1).

FAUNA

Wildlife of the region reflect the diversity of vegetation with estimates of 200 species of birds, 31 of mammals and a life strata of amphibians and reptiles (Appendix 2). Of these, the most notable

¹The Establishment of Assiniboine Forest as an Urban Wilderness Park: Feasibility Study.
Winnipeg: City of Winnipeg, Parks and Protection Division, 1974.

are the white-tailed deer which range throughout the Tuxedo-Charleswood area. With a herd including as many as 200, the white-tailed deer are a major consideration in the development of plans for wildlife management in this area (Appendix 5).

CORRIDOR DEVELOPMENT

Although the region abounds in natural qualities of vegetation and wildlife, the land has undergone tremendous pressures for development (Appendix 5). This direct conflict should be addressed while planning the Fort Whyte Nature Centre to open potential links for recreational and interpretive links into the region. A corridor for both wildlife movement and recreational enjoyment has been proposed to reduce the impact of past and future development on the natural elements. This corridor would begin in Assiniboine Park and follow open lands to the south down to, and past, the Fort Whyte Nature Centre (Appendix 5). Zoning and management recommendations should be developed (Appendix 5) to ensure long range stability for the corridor. The Fort Whyte Nature Centre should be seen as a major node along this corridor, a focus for recreation and interpretation. People will consider it either a destination or a departure point. With this system in mind, the development of the Centre must consider not just a program within its boundaries but interpretive co-ordination with other centres and recreational systems for bicycling and hiking access to and from the site.



background

PRESENT STATUS

The Fort Whyte Nature Centre is located on a 400-acre site owned by Canada Cement (Lafarge) Limited (Photo 1). Used for excavating material, the site is in neither a natural nor a developed state. The four lakes created by excavation cover the major portion of the area to be utilized by the nature centre and its facilities. The balance is characterized by grassland or scrub brush with some mature trees. A diversity of both flora and fauna can be observed within the relatively small site. Since the opening of the Nature Centre in 1975 there has been little change in the available facilities. Major structures include the reception building and the waterfowl demonstration building. Provided are outdoor pens for waterfowl which offer good predator protection on the ground. A nature trail through the bush on the north side of the lake has been used for interpretation.

A gravelled area near the reception building provides parking space for visitors and is connected by an access road to McGillivray Boulevard. A new sign has been constructed and this will be placed at the entrance from McGillivray Boulevard.

The cement plant only 1,500 feet from the reception building is a dominant feature in the landscape and its presence can be felt throughout the site. The plant does not eliminate development but reminds one of the site's history and the context for the nature centre.

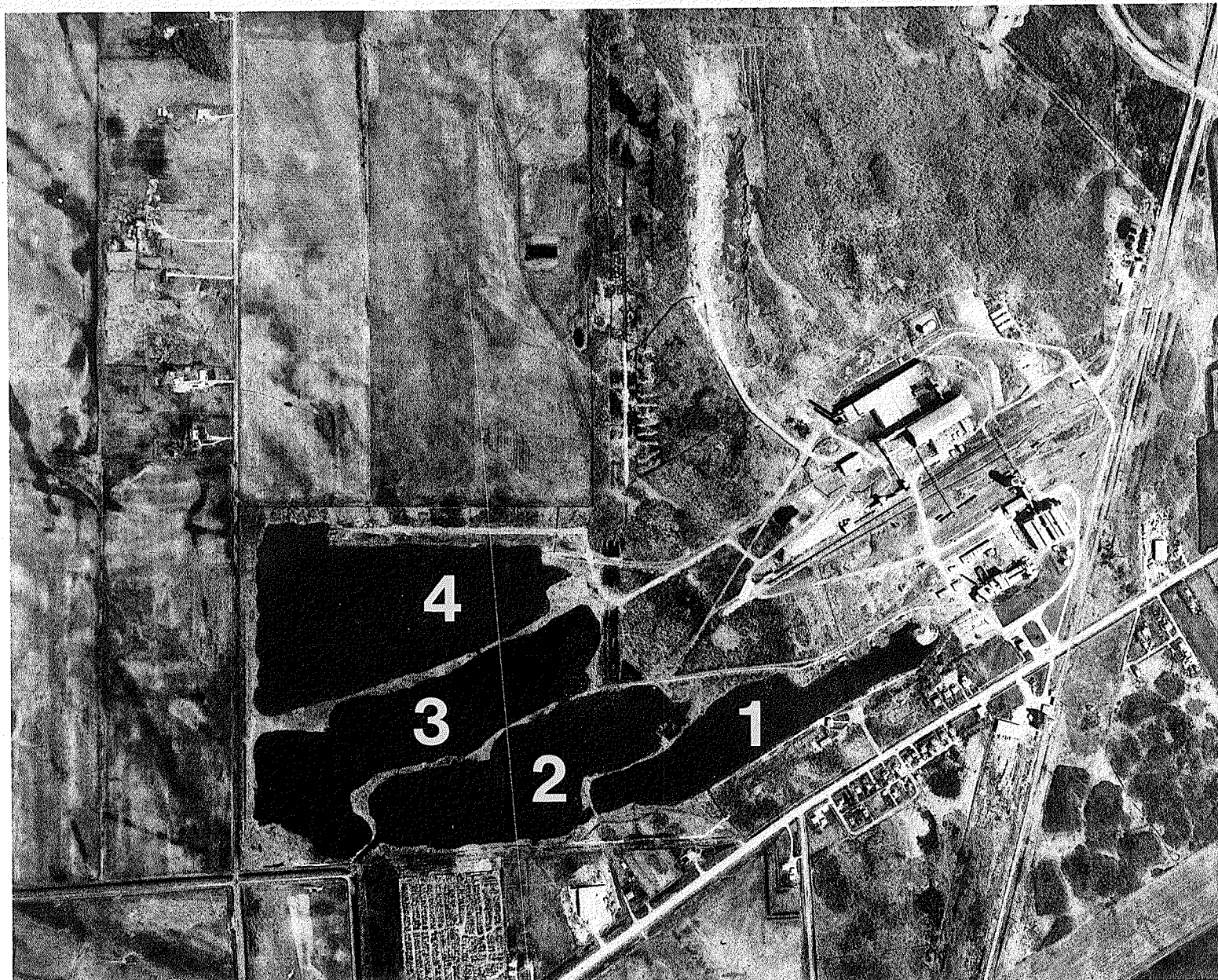


PHOTO 1

Air photo of Canada Cement (Lafarge) Plant. Note lakes are numbered to correspond with text.

WILDLIFE FOUNDATION OF MANITOBA

The Wildlife Foundation of Manitoba, manager of the nature centre, is a non-profit organization offering services in the conservation of wildlife and its habitats. Its primary services include the provision of facilities and the funding for education in wildlife conservation. Chartered by law in 1966, the Foundation accepts land donations and endowments to develop permanent wildlife areas. In these ways the Foundation aids in the preservation of the natural heritage of Manitoba and encourages the education of the public. Through these services their goal of increasing the public's appreciation of our wildlife heritage will be reached.

HISTORY OF THE FORT WHYTE NATURE CENTRE

One of the Foundation's chief interests is the Fort Whyte Nature Centre. An on-site environmental history, dating back to 1957, begins with the employees of Canada Cement (Lafarge) Limited using the ponds created by clay extraction to keep Canada Geese. In 1973, an agreement between Canada Cement (Lafarge) Limited and the Wildlife Foundation granted the latter the opportunity to lease a large area of the former's property for environmental education and wildlife management. The centre has now been in operation since 1975. Featuring nature trails, a reception building, a waterfowl demonstration building, large ponds, diverse vegetation, plus an astonishing variety of wildlife (including a herd of deer), the centre has been a success, with annual increases in visitor use. Attracting school groups, naturalists' and photographers' clubs, church groups, scouts, guides and the general public, it is now proposed to begin a further stage of development

of the centre. An expansion of facilities is proposed to increase its educational impact with enhancement of the educational opportunities and conservation activities presently accommodated at the site. The Wildlife Foundation of Manitoba wishes to maintain the original focus of the nature centre—native waterfowl—throughout the development.

PROPOSED DEVELOPMENT OBJECTIVES

Central to this development study of the Fort Whyte Nature Centre will be the following objectives which have been derived through meetings with members of the Wildlife Foundation.

1. The Centre will provide facilities for the interpretation of waterfowl and its habitat in a form unique to the Winnipeg region. It will

- provide for a diversity of user groups;
- provide both supervised and unsupervised interpretive facilities;
- provide first-hand access to waterfowl and its habitat;
- maintain a captive collection of waterfowl for education and breeding;
- provide facilities for the identification and display of native Manitoban waterfowl.

2. The Centre will be supportive of the interpretive and recreational systems of Winnipeg, and will

- provide recreational activities compatible with the interpretive goals;
- integrate facilities into the recreational systems of the City of Winnipeg;
- provide information on other environmental groups;
- co-ordinate programming with the interpretive program of the City of Winnipeg.

3. The Centre will be a self-sufficient resource, and will obtain funds through admissions, memberships, and donations to support the Centre; provide continuing opportunities without dependence on other facilities.
4. The Centre will acknowledge the ability of industry to play a positive role in the preservation of the environment, through history and the current participation of Canada Cement (Lafarge) Limited in the nature centre.

PROGRAM

The program for the Fort Whyte Nature Centre was developed from two sources; through meetings with the Wildlife Foundation and through the author's site investigations into potentials, constraints and character of the area.

The Foundation considers the major components of the proposed development to be an extension of the existing facilities at the site. Modification of these existing elements to provide a site plan similar in concept to Slimbridge in England, managed by the Wildfowl Trust, was desired. The program for Fort Whyte was then developed.

A major nature centre building would function as the reception area and hub of the development. This, along with other existing buildings, would remain at their present location and would be modified and upgraded as required.

A series of waterfowl display ponds and interpretive areas were to be developed so that waterfowl could be studied at close proximity. Contact between the visitor and the waterfowl was a key

element of the design. Nature trails were to provide additional interpretive value to the previous features. Site access was to be upgraded and parking areas enlarged to suitable capacities. Screening of incompatible views of adjacent land uses, in particular an automobile wrecking yard to the south of the second lake, was desired. A final consideration was to develop the site in conjunction with the future industrial needs of Canada Cement (Lafarge) Limited. The site was then analyzed to determine where conflicts occurred in programming. Site conditions led to the structuring of these components and identified potential for further interpretation of white-tailed deer and for recreational pursuits such as hiking and bicycling for regional ties.

VISITOR USE

The estimation of anticipated visitors to the Fort Whyte Nature Centre is a difficult task complicated by many variables. These variables include:

1. development of public transportation systems in the area;
2. future growth of the Charleswood area;
3. increased access by the proposed Southern Freeway;
4. development of an open-space link with Assiniboine Forest and Zoo;
5. growth in recreational potential for the City of Winnipeg.

There is no single facility available to the City of Winnipeg comparable to the proposed Fort Whyte Nature Centre. It combines both the intensive appreciation of wildlife characteristics of the Assiniboine Zoo and the extensive interpretive values of the Living Prairie Museum or the Assiniboine Forest Program. Intensive interpretive development has proven to be highly sought after in many

other major cities. Slimbridge in Britain, for example, has very high visitor use and is very successful. The increased use of interpretive trails through natural areas of our National and Provincial Parks leaves little question as to the importance of this element to the recreationist. The combination of the two in one site in the heart of a city such as Winnipeg indicates a great potential for high usage.

As indicated by other interpretive facilities, the site will attract visitors with wide backgrounds and diverse interests. Many visitors will come in organized groups with specific areas of interest. Such groups include school classes, photography clubs, naturalist groups, senior citizens and church groups. These can be planned for through advance reservations and also through self-organization of programs. Visitors from the general public will be even more varied with families, tourists, duck hunters, bird watchers, the handicapped; all with individual objectives, interests and requirements. A program to accommodate this diversity must be very adaptable. The adaptability must also encourage repeated visits through availability of knowledge at a variety of levels. The popularity of this type of facility is increasing, and its potential has yet to be fully realized in Winnipeg.

ACCESS

Fronting on McGillivray Boulevard, a major city and regional route, just 10 miles from the heart of the City of Winnipeg, the Fort Whyte Nature Centre has a prime location. It is only a short drive away for the 600,000 people of Winnipeg. Although access is direct, since there is no

public transportation to the area, private vehicles are required. It can be anticipated that a bus route will be extended along McGillivray Boulevard from Waverley Street to service new development in the Charleswood area. The upgrading of roads due to this development and the construction of the proposed Southern Freeway will provide even greater access to the site.

Movement should be encouraged between both the Assiniboine Park and the Forest with direct, well-defined routes for hikers, cyclists and vehicles. A separate corridor should be provided to encourage pedestrians and cyclists. This corridor could link Fort Whyte with regional systems currently under study such as bicycle routes along the Assiniboine River.

Signage and road graphics are very important to the first-time visitors. These should be clear and precise giving proper information as to location, orientation and schedules. The other major function of signage is to attract transient visitor use.

The stacks of the Canada Cement (Lafarge) Limited plant would act as a major landmark for orientation from miles around.

SITE INVENTORY

Vegetation Communities

The vegetation communities of the Fort Whyte site vary greatly, from wetland marshes to aspen-oak forest. Formed mostly by disturbance at various times in the past, the vegetation is in different stages of succession. The key aspects of the disturbance have been the changing of groundwater levels and the clearing of the land which have resulted in the wide range of vegetation capable of supporting a diversity of wildlife.

Forest

Dominated by trembling aspen, the aspen-oak community is located in the drier areas of the site. Bur oak are scattered throughout the forest with a major understory of hazel, saskatoon and wild rose plus a herbaceous layer. In a few areas the forest is approaching a mature state. Many of the trees are still 20-30 feet high with a very high density. Saplings and suckers are very characteristic of much of the area.

A small cottonwood community can also be identified along with sporadic growth of species such as green ash, Manitoba maple, Russian olive and white spruce, some of which have been introduced by Man. These vegetative units provide variety to the otherwise flat and uniform site.

Shrub

A dominant willow-shrub community can be found north of the pond closest to the existing nature centre. In this area the groundwater level has been raised through the construction of roads that block drainage. A few peach-leaved willows tower above the dominant willow shrub characterized by sand-bar willows and pussy willows. Also evident by the dead stumps in this area is the previous aspen community which died due to the higher water-table. Many other areas in early stages of succession show the characteristics of a shrub community. These are dominated by aspen seedlings, herbaceous plants and grasses.

Wetland

These communities can be divided into wetland meadow and emergent vegetation. The wetland meadow is a community of sedges and grasses, preferring areas which are continually moist with a very high water-table. In these areas very little succession will occur unless the water-table falls since most other communities will be drowned out.

The emergent vegetation can be seen only in a few areas around the lakes or in the marsh by the second and third lakes. The major species include cattail, bullrushes and some Phragmites. They require water covering a portion of the plan at least in the early growing stage. Here there is insufficient water for submergents and too much for the sedges. This community provides good habitat for a diversity of wildlife.

Submergent

Although portions of the lakes are as old as 50 years, this vegetation is just begining to be established. Nutrient run-off from the neighbouring fields has aided in its establishment. The clarity of the standing water allows light penetration which is needed by the plants. The vegetation is more successful in the first pond in the shallow end because of its relatively stable water-level and the water depth. The vegetation is sufficient at present to maintain various species of fish.

In general, the upland vegetation is of low quality and areas could be sacrificed for development due to its relatively young successional stage. It should be acknowledged that there are few woodlots

in the region and a preservation of larger, healthier stands would benefit the visual quality of the landscape. None of the existing floral communities should be removed completely from the site as this would result in loss of habitat for specific wildlife.

Wildlife

The diversity of vegetation on the site provides habitat (food, water, cover) for a wide variety of wildlife species. The interface of two different floral communities is the location for increased activity of wildlife. Here the vegetative diversity is further increased guaranteeing a higher degree of suitability for more animals. This is very common at the Fort Whyte site with the resident fauna. The site is a major stopover for migrating wildfowl. The regional movement of such mammals as the white-tailed deer occurs through the site. The lakes provide habitat for a wide range of aquatic animals.

Birds

The nature centre is the home of a number of both pinioned and free-flying waterfowl. Attracted by the pinioned birds, migrants find food and cover within the site and its immediate surroundings. The location of this site on three of four North American flyways ensures an abundance of waterfowl during migratory seasons.

Many other birds are attracted to the areas of water, marshes, trees and shrubs for food and cover. Common birds include grebes, hawks, sandpipers, terns, marsh wrens, owls, swallows, warblers, and sparrows.

Mammals

The major mammal of the area is the white-tailed deer. Often sighted in the forest to the north, the herd of up to 200 animals roams throughout the region. Smaller mammals which make their homes in the forest and shrub areas include red foxes, raccoons, muskrats, rabbits, squirrels, weasels and voles. Attracted to the vegetative diversity, these animals can usually satisfy their needs in a relatively small area.

Aquatic Animals

The lakes and marshes provide the habitat for a number of amphibians and fish. Frogs, turtles and snakes can be found in the area. The fish are relative newcomers. Stocked with speckled trout at one time, these ponds now contain numerous other fish which have been introduced naturally. The dominant species is yellow perch, but also found in the lakes are carp, pike, catfish, minnows, large-mouth bass, walleye and rainbow trout. The submergent vegetation and water depth provide the necessities of these species.

Food, cover and water are the key elements of habitat for wildlife. These factors vary between species but must be protected if the species are to remain. The critical time for minimal human interference is in the late winter and during breeding periods.

Topography

The topography of the site is basically flat with the only major deviations a result of excavation. The important aspect of the landform is the drainage system which replenishes the lakes during spring run-off. The major drainage ditch collects water from the surrounding area, then enters the second pond from the south. A change in drainage patterns on the site would alter the nutrient run-off from the agricultural fields. Studies by graduate students of the University of Manitoba on nutrient content are in progress and would indicate the problems which might be caused. There is much flooding during the spring run-off which has affected neighbouring properties in the past. A dike, still only partially complete, is being constructed to deal with this problem.

Soil

The Fort Whyte Nature Centre sits on predominantly clay soils mostly of the Fort Garry association. There are pockets of the highly unstable Osborne clay also present. The clay layer is more than 40 feet thick in most areas with the best excavation material in the lower layers. These clays have been developed in the shallower areas of glacial Lake Agassiz. The basic limitation for development lies in those areas where Osborne clay is present. Its poor drainage, high moisture content and high shrink-swell characteristics make it very unsuitable for most structural development. It is, however, still suitable for water retention in the form of dugouts, lagoons and ponds.

Lakes

The lakes cover an area of about 70 acres with depths ranging to 36 feet or more. Their major function for the cement plant is cooling. The first lake is self-contained and is maintained by pumping water from the other lakes. This provides a constant supply of water to the pumphouse at the east end of the first lake. This lake was first excavated with horse scrapers about 50 years ago and reworked with a dragline recently. In some areas, as with the second lake, there are depths of only ten feet or less where it was not reworked. The edges are steep in all recently excavated areas but through erosion and slumping form an underwater terrace. The south wind causes wave action which results in this slumping. The narrow spits, once much wider, reduce the size of these waves.

The water itself is gradually increasing in nutrient level as a result of agricultural run-off. It now supports a variety of life forms, both floral and faunal. The clarity of the water is not a problem with visibility well into their depths being possible. In general, the lakes are highly susceptible to pollution as they are not flowing and have no constant water source.

Structures

Presently on the site are two major structures, the reception building and the waterfowl demonstration building. The latter is basically a wintering facility for ducks and geese. There are facilities within it for incubation which were used in the past. A work space is also available for use.

The reception building, constructed in 1974, is the heart of the site. Elevated on piers, the structure overlooks the first pond and the land adjacent. Its primary view is to the west. Inside there are a large open display space, washrooms and an office area. Fully insulated and heated, the building is available for use the year round. Its capacity for meetings or presentations is approximately 50 people.

Cement Plant

The cement plant occupies an area of about 80 acres for buildings, parking, roads and railways. The future production period will be about 40 to 50 years with a constant trend toward efficiency. The plant combines the clay excavated on site plus other materials transported to the site to produce portland cement. It is a major element in the landscape seen from afar.

Climate

The general climate of the site is the same as that for Winnipeg. Of major concern are the months of proposed use: May through October. During these months average temperatures range from 12°C to 26°C with July and August having the highest temperatures. No major fluctuations in rainfall are common, and daily sunshine hours are usually high. The wind averages about 11.5 miles per hour with the dominant prevailing direction being south.

The microclimate for the Fort Whyte Nature Centre varies according to the influence of major physical units: lakes, meadows, wooded areas and marshes. The resulting impacts of these on the

general climate are minor and are not design issues. The major issue of climate deals with the wind. The wind does not normally carry waste from the cement plant over the site but it does pose a problem with the water on the lakes. The openness of the land in the region allows a sweep of wind capable of extensive wave action. It is for this reason that the spits of land between the lakes are important. They prevent the buildup of large waves with increased erosive power. They must be maintained and protected in any development plan.

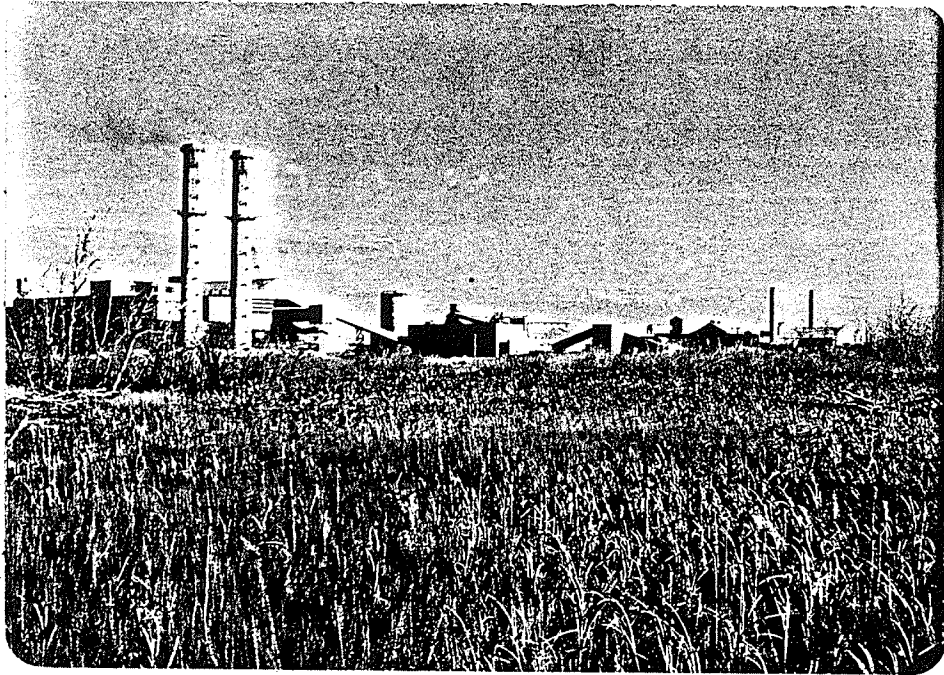


PHOTO 2

Skyline view from interior of site.

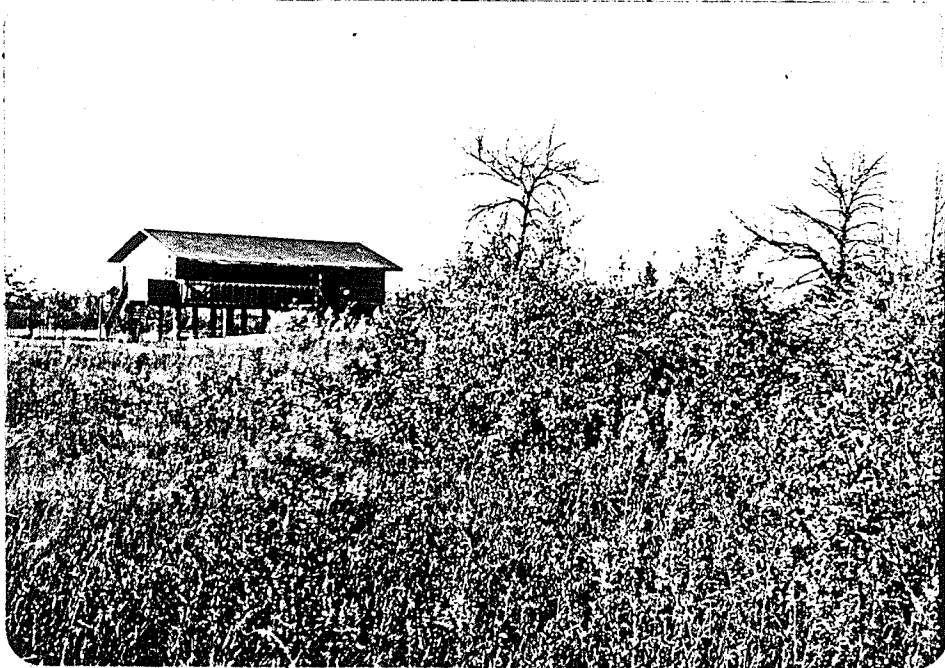


PHOTO 3

Reception Building
Viewed from near McGillivray
Boulevard.

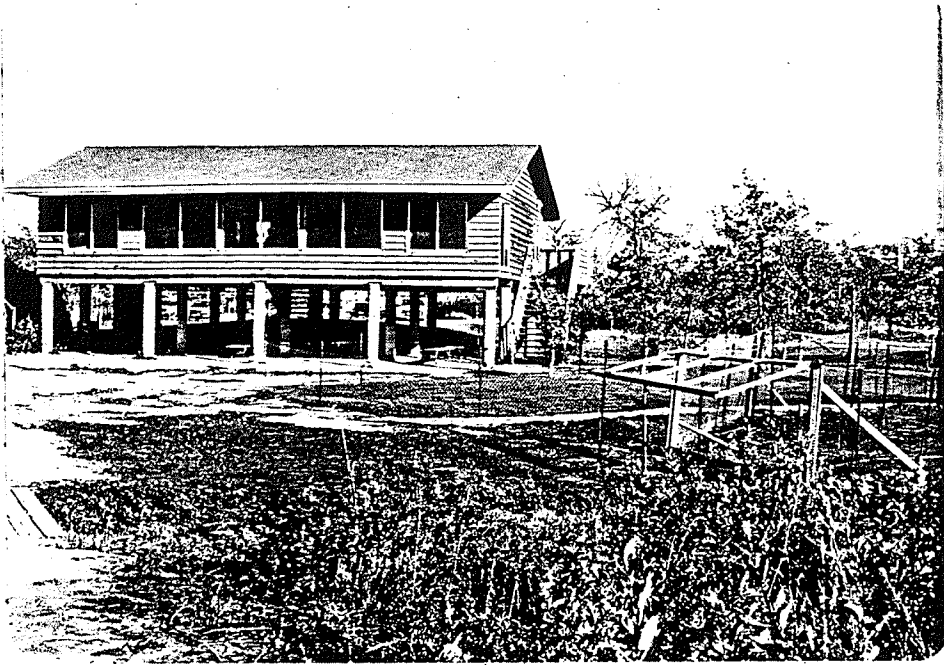


PHOTO 4

Reception Building
Viewed from the lakeshore.



PHOTO 5

Existing display ponds for
ducks and geese.

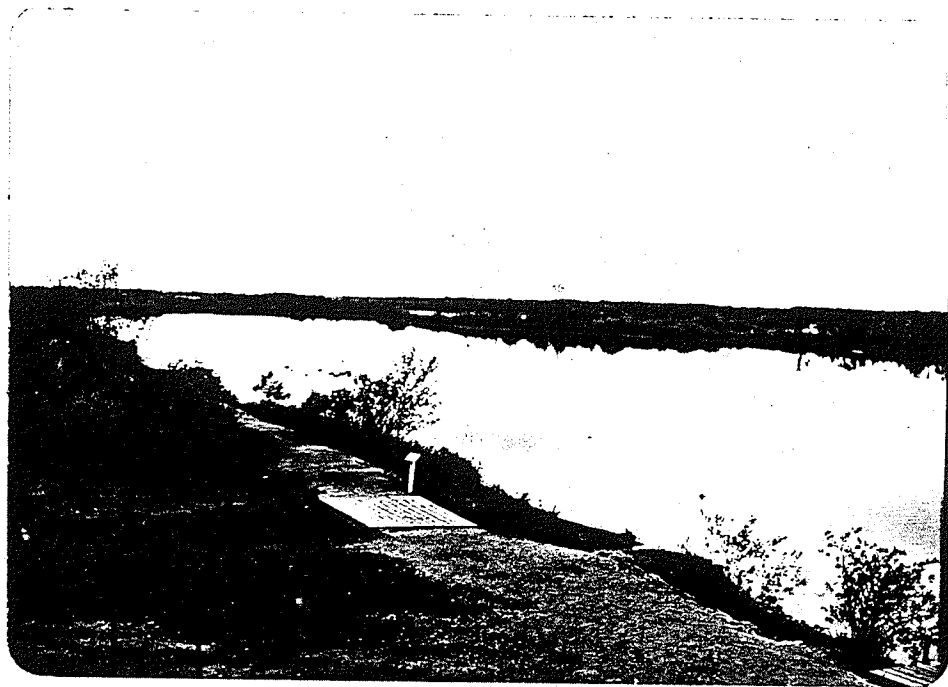


PHOTO 6

Lake #1.
West view from Reception
Building. Note flock of
Canada Geese and solitary
Mallard.

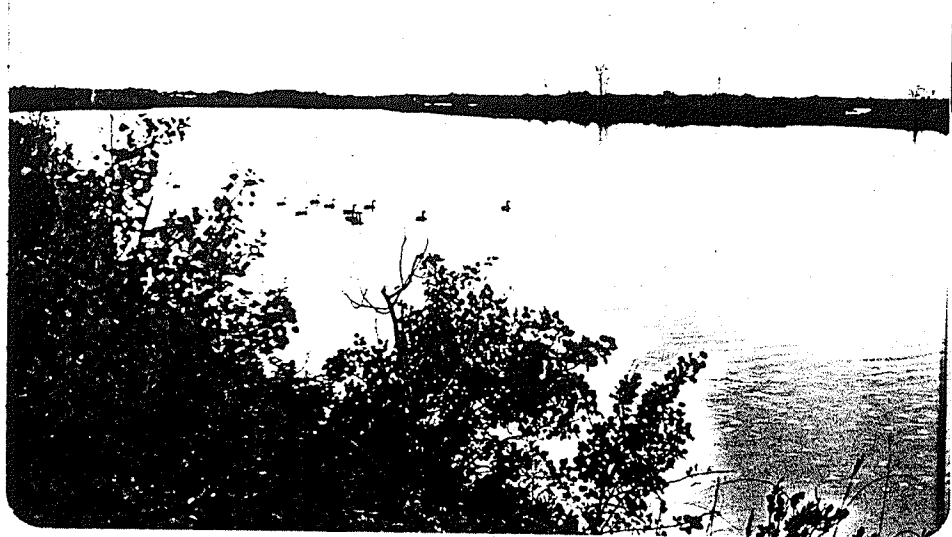


PHOTO 7

Lake #1.
Note shoreline character and
flock of Canada Geese.

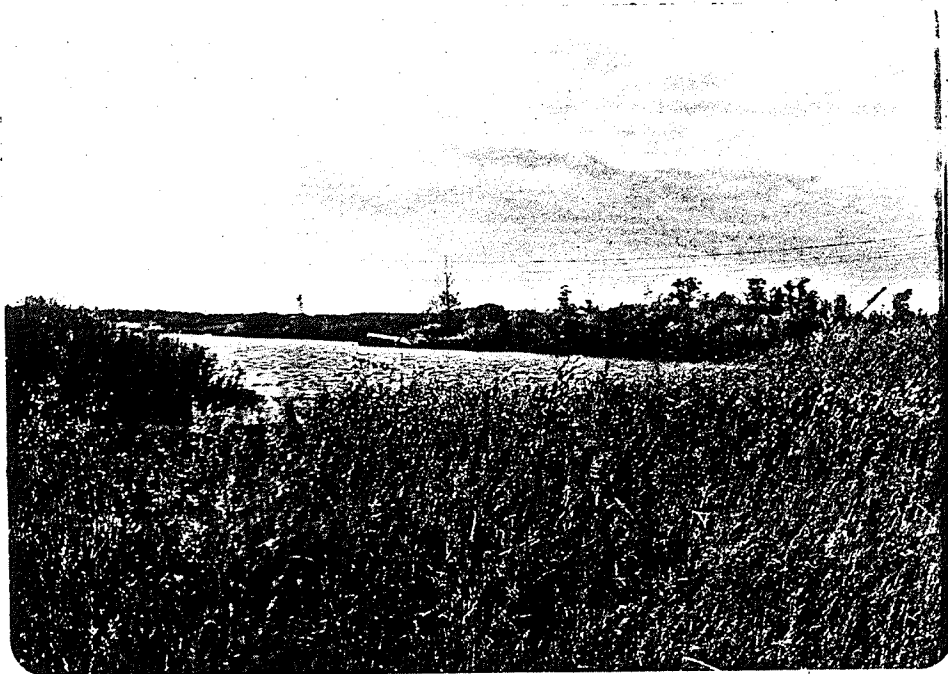


PHOTO 8

Lake #2.
View of shallow east bay.



PHOTO 9

Scrapper Marsh.
Note Mallard taking off.



PHOTO 10

Existing internal access road
north of Lake #1.



PHOTO 11

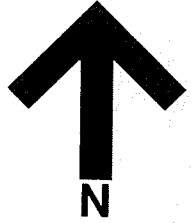
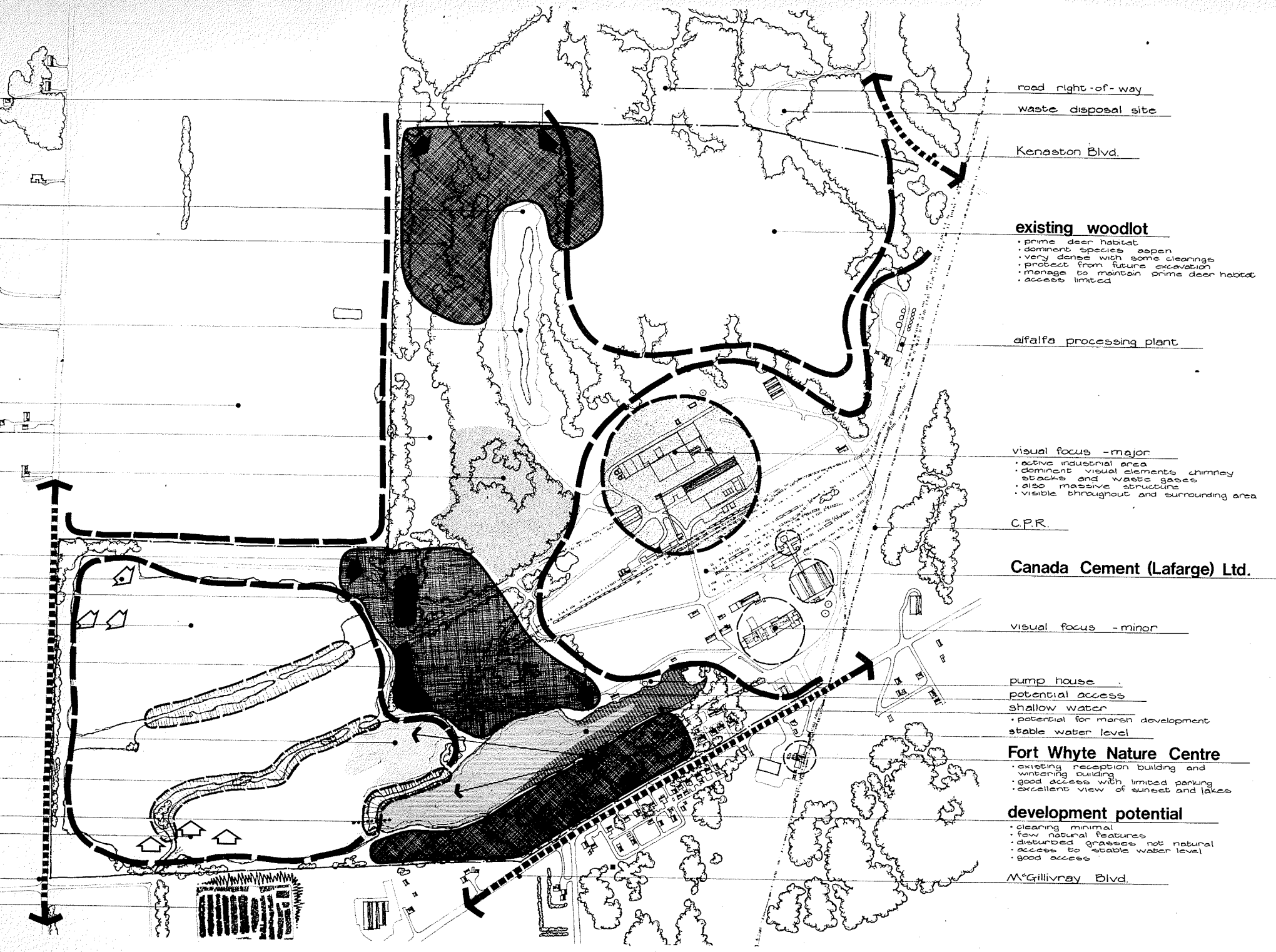
Present excavation pit located
north of site with forest in
background. Note slumping and
gullying in soil.

SITE EVALUATION

Upon investigation of the natural elements explained in this Chapter and the development of the basic program, the site was studied for developmental potential (Figure 3). The nature centre was the first element examined for the most suitable location, although the program had assumed it to be stable. Two new alternative sites to the existing location were found and studied. These sites are respectively in the north and central areas of the property, each with enough land to build on and to develop the supportive requirements of the nature centre. An assessment of these alternative sites follows.

North Site

The north site was seen as an ideal area to incorporate the nature centre into a regional corridor. The area has suffered from major disturbance, with the removal of much of the forest in preparation for excavation. This would not have adverse effects on development as major open spaces would be required for parking, access, the nature centre and other facilities. A planting program could be started to revegetate the remaining areas. Access would be provided from either Kenaston Boulevard along an existing right-of-way or from McCreary Road. Preference would be given to the west route from McCreary Road to protect the woodlot in the east, and forego obstructions for movement of deer. This woodlot would play a major part in the site development. Zoning of the area would provide access only by interpretive trails. Restrictions of use would be required, since this is a major deer habitat. Through proper management, the numerous sightings of deer would be a major asset to the nature centre.



fort whyte nature centre
SITE FEATURES

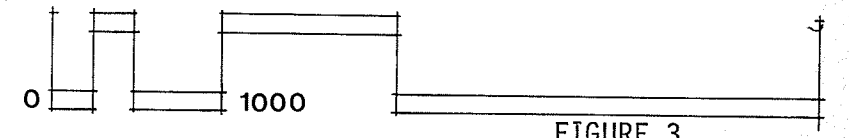


FIGURE 3

access
 • through right of way from Kenaston Blvd.
 • from McCreary along property boundary
 of access fields

present excavation area

development potential
 • good proximity to prime land for interpretation
 • poor access to major water feature
 • access from regional trail system
 • previously disturbed area

future lake
 • incomplete excavation pit
 • potential planned lake
 • slumping banks

agriculture
 • fields in productivity
 • owned by M.H.R.C.
 cleared for future excavation

marshy area
 • moist to wet soils
 • many dead or unhealthy trees
 • large areas of cat tails

access
 • along property line from McCreary Rd.
 north-west winds

marsh
 • areas in late marsh succession
 • management required to maintain condition

reservoir lakes
 • depths to 35 ft.

development potential
 • central area to most features
 • very diverse vegetative units
 • dissected by industrial roads
 • access potential from McGillivray Blvd.
 • some areas susceptible to impacts

shallow water
 • potential for island or marsh development

fragile spits
 • eroding from wave action
 • susceptible to slumping

water level control pump

south winds
 • major summer winds causing wave
 erosion

McCreary Road

auto wreckers
 • buffering from view required

road right-of-way
 waste disposal site

Kenaston Blvd.

existing woodlot
 • prime deer habitat
 • dominant species aspen
 • very dense with some clearings
 • protect from future excavation
 • manage to maintain prime deer habitat
 • access limited

alfalfa processing plant

visual focus - major
 • active industrial area
 • dominant visual elements chimney
 stacks and waste gases
 • also massive structure
 • visible throughout and surrounding area

C.P.R.

Canada Cement (Lafarge) Ltd.

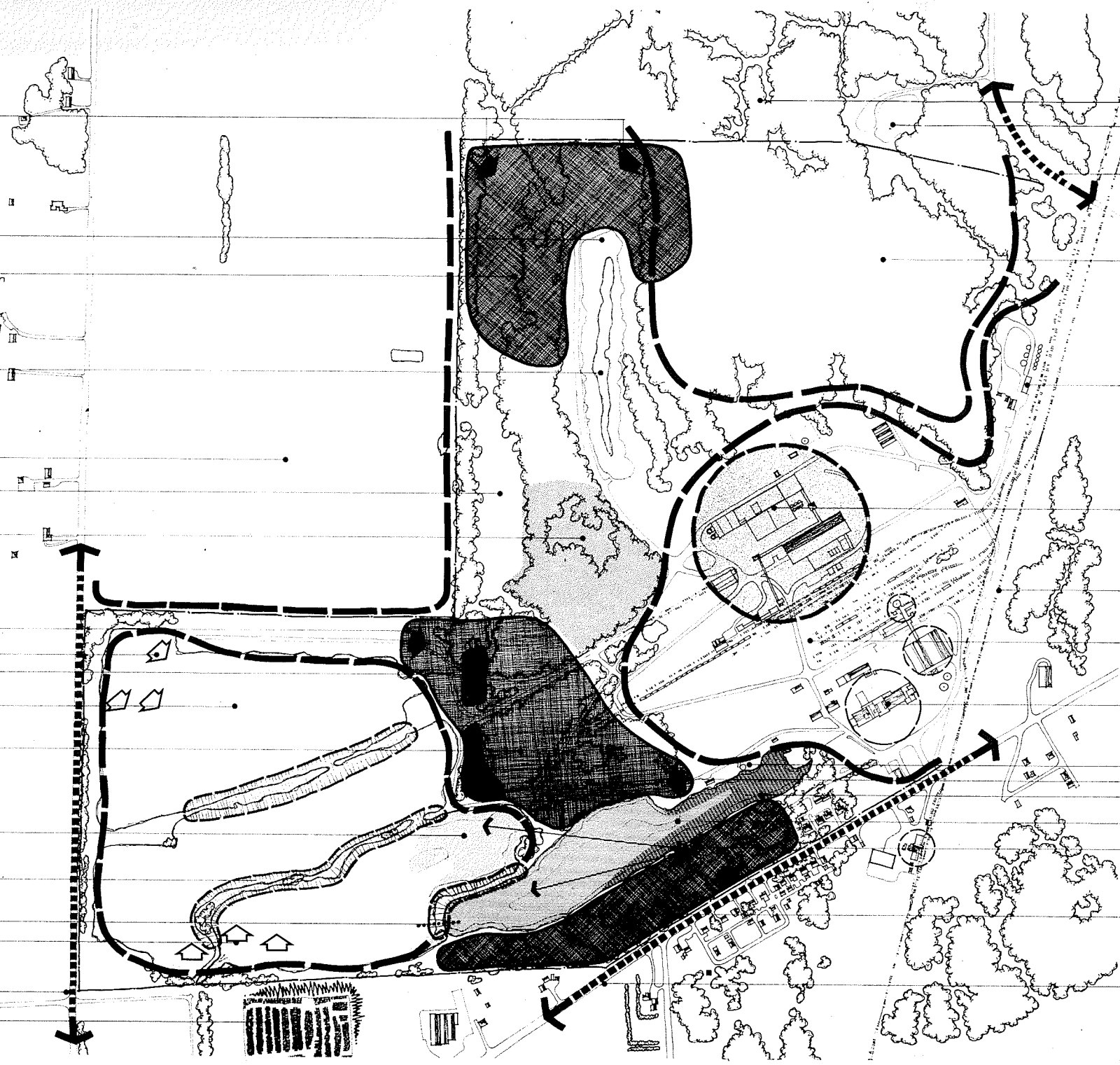
visual focus - minor

pump house
 potential access
 shallow water
 • potential for marsh development
 stable water level

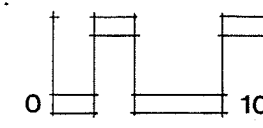
Fort Whyte Nature Centre
 • existing reception building and
 wintering building
 • good access with limited parking
 • excellent view of sunset and lakes

development potential
 • clearing minimal
 • few natural features
 • disturbed grasses not natural
 • access to stable water level
 • good access

McGillivray Blvd.



for
SITE



A corridor running north to the Assiniboine Forest would be easily developed from this site. At this location there would be little conflict with the cement plant in future development. There are, however, limitations for the nature centre at this location.

The first and very obvious conflict with the program is that the development is very land-oriented. One of the key features of the property as a whole is the excavation ponds. Direct use and appreciation of this water feature for city dwellers is important and would not be accommodated by locating the centre at the north site. A more suitable interpretive theme would be the urban deer herd and its habitat. This theme would duplicate interpretive programming in the Assiniboine Forest and not contribute to regional development. For these basic reasons this area was rejected as being less suitable than the existing location.

Central Site

The central area would eliminate many of the problems associated with the northern site. It is close to the water feature and would be very compatible with the designated program. Much of this area is suitable for building but the occasional low marshy spot is susceptible to impact. There is potential access either along lake four from McCreary Road or from McGillivray Boulevard along lake one. Both these routes would provide a long scenic entrance road along the lakeshore. The site itself has a very diverse vegetative structure and is capable of good buffering. There are two areas of marsh to be managed on the site, and development of waterfowl display ponds could be associated with these areas. The water conditions are good in this area with the shallow water of lake two suitable

for island development. The expansive view of water would be unique for the site but developing the linear banks for added interest would be very costly.

A hiking trail around the lakes is a potential feature of the site. The orientation towards the lake itself would provide a psychological buffer to the cement plant. Access to the regional corridor would be direct and present no problems. A further development of nature trails could be directed to the north through the marshy area, and eventually to deer viewing areas in the existing woodlot.

There are also numerous restrictions on this site for nature centre development. The first would be the elimination of a major feature, the diverse vegetation, in favour of parking areas and the nature centre. Although access routes could follow much of the existing road network, there would still be much vegetation removal. This vegetation could be better used for interpretive and recreational uses. The lakes themselves also create a problem. Major water-level fluctuations in the lakes not regulated can be witnessed in dry years. In these dry years the pits could become an eyesore to the visitor rather than a benefit. Directly across lake two is the automobile wrecker's yard. This, although screened, would remain unsightly for many years. Screening would also be required along either access road since the chimneys of the cement plant would be visible from along the entire entrance route. Although this area is suited to the program, its problems outweigh the benefits when compared to the existing site.

Numerous other sites have been looked at but the lack of major developable area has ruled them out.

Existing Site

The existing site has been the area chosen for development. It is well-suited to the program and can combine with other areas to make an exciting development. There would be no loss of good vegetation. Access is simple and straightforward. The aesthetics and views are pleasing. It also makes direct use of the existing building. A problem with the site, however, is noise. Sound buffering from McGillivray Boulevard will be required.

Lakes

The lakes were studied for existing vegetation and potential for expanding vegetation. There are no prime areas of marsh, emergent vegetation or submergent vegetation associated directly with the lakes which provide background for the program. For limited funds, however, there are two areas, the east ends of lakes one and two, which have potential. If water levels could be maintained in lake two as in one then the shallow area could accommodate aquatic vegetation. Measures must be taken in lake one to ensure free water movement in and around the pumphouse of the cement plant's cooling system. A change in water-regulation practice must also respect problems with the spits which serve to first divide the lakes and, second, to reduce problems of wave action.

Woodlots

The existing woodlot, located on the north end away from the nature centre, is a unit of major importance as it is prime deer habitat in winter. Characterized by clearings, dense brush and aspen,

this must be protected and managed for wildlife if any regional wildlife movement is to occur. Access should be limited, especially in winter and spring months when the deer are weakest. Its potential for excavation has been realized as indicated by the north lake. Implications of further industrial use should be brought forth when future excavation is planned in the zone.

Industrial Area

The industrial area should not be considered detrimental but an asset to the nature centre. A reminder of its proximity to the cement plant would demonstrate how industry can participate in a healthy environment. At present, however, the cement plant dominates the landscape and should be reduced in visual impact. Screening and buffering is required in many areas to accomplish this. The major chimneys of the plant would still provide an orientation feature on the site and for miles around. This would continue the idea of the industry/nature centre existence in a lower key.



interpretive plan

INTERPRETIVE PLAN

Interpretation:

"An educational activity which aims to reveal meaning and relationships through the use of original objects by firsthand experience and by illustrative media, rather than simply to communicate factual information."

- Freeman Tilden¹.

INTERPRETIVE SIGNIFICANCE

The Fort Whyte Nature Centre is unique in Winnipeg's interpretive system. The basic developmental framework, a series of waterfowl display ponds, nature trails and reception centre and waterfowl building have been provided by the Wildlife Foundation of Manitoba. Historically, this responds directly to the site, with waterfowl breeding first attempted in 1959. The plan will build on this aspect and encourage a wide range of interpretive experiences to develop a knowledge and understanding of waterfowl and its habitat.

In the past, indication of this knowledge and understanding has been lacking not only in Manitoba but throughout the central prairie region where 75% of waterfowl breeding takes place. Large scale drainage and reclamation of marshes for agricultural purposes have resulted in a loss of many prime waterfowl production areas. Not only are waterfowl affected by this practice but also numerous other problems have developed. These areas provide habitat for many other forms of wildlife and

¹F. Tilden, Interpreting Our Heritage, (Chapel Hill, North Carolina: University of North Carolina Press, 1967).

and have vegetative zones not found elsewhere in the environment. The manipulation of a water system will naturally have an effect on water conservation and flood control through its changes of run-off retention and groundwater capacities. The loss of wetland areas can result in increased surface run-off, thus an increased potential for flooding. It could also reduce groundwater levels, the source of well-water and drinking supplies. Another form of wetland destruction in this century has been increased siltation and other forms of pollution. Aesthetically, wetlands will always hold a special quality for many people, from the child for whom they are a constant source of excitement to those appreciating their beauty and the diversity of the landscape. Similarly, waterfowl add relaxation, recreation and joy to the lives of many. The past few years have shown an increase in concern for these issues on an individual basis with increased pond construction and protection. Through wider understanding, restoration of wetlands, increasing breeding populations and management, the benefits of waterfowl can once again become a reality. The central issues of waterfowl and their habitat are what the Fort Whyte Nature Centre will be addressing in its interpretive program.

RESOURCE BASE

Although the program seems well suited to the site, the site is not characteristic of an area to develop for waterfowl interpretation. Common areas for such a development, for example, Hecla marsh, began with an existing marsh environment. On the Fort Whyte site the resources must be manipulated with both marsh and display ponds being constructed. This, however, does allow for stage

setting and a stronger control over program development. The site does offer a traditional stop-over for many birds during spring and fall migration.

The key elements of the site are the lakes, the north shore for trails and the south shore adjacent to the reception buildings for intensive development. These areas, when developed, will provide the physical requirements for the interpretive program. Existing at present are two buildings, the Kiwanis reception building and a waterfowl building. These have been incorporated into the plan with all other supportive buildings. Their function will be to house permanent displays, library, naturalist's office, reception area and further operational areas. A final aspect of the resources of the site is the northern woodlot. This area is the winter home for the largest population of Winnipeg's deer. This key interpretive feature is also supported by over 150 species of songbirds, a wide variety of southern Manitoban animals and vegetation typical to the aspen parkland areas of the prairies.

RECEIVER GROUPS

The visitor group dealt with previously suggests a very diverse background for potential users. The development of the interpretive program must deal with this diversity by providing for a range of educational levels. The Living Prairie Museum has provided clues to the real potential visitors to the site. During 90% of operating time in the months of May, June, September and October, the museum was booked by school groups. This would seem comparable to the projected use at Fort Whyte. This period, however, could be extended to include April and March for viewing of the spring migration at

Fort Whyte. During the summer, the largest visitor group at the museum were tourists, making up 75% of all visitors. This could also be seen as a major group at the nature centre, if a similar promotional program was established.

The museum has found its proximity to the local people has inhibited rather than attracted them to it, with the major reason for local attendance being to show the area to a visiting friend or relative. Regional visitors were less in number. Usually, these people had a purpose in mind for visiting. Major visitors were a wide range of interested groups of both adults and children who can be expected at Fort Whyte. The museum also indicates a large vicarious user-group which requests information and resource materials but cannot visit the site.

The users indicated by the museum provide a basis for interpretive program development. To increase user-appeal a wider range of interests should be provided for. This, combined with integration of other existing programs, should be beneficial not only for increasing use but also for repeat visits.

PURPOSE

The theme and development of the Fort Whyte Nature Centre is not meant to satisfy all aspects of interest in waterfowl. The purpose of the nature centre is to provide information and build interest in waterfowl and the environment. The centre should be viewed not as an end in the learning experience, but as an integrated component in a system of environmental education. It will have a general relationship to the programs of other Winnipeg facilities but have direct interpretive links to programs at such



natural areas as Oak Hammock Wildlife Management Area, Delta Marsh, Hecla Marsh and the Alfred Hole Goose Sanctuary. These areas will provide a further step in understanding waterfowl and their habitat within the natural environment of their sites.

THEMES

The major interpretive theme for the nature centre is waterfowl and their habitat. Focal topics which include waterfowl identification, characteristics, behaviour and life cycles, habitat characteristics, marsh formation, marsh management and conservation messages, all deal with this theme. A secondary theme of general ecology has also been incorporated in the plan.

The objective of the themes is to build proper environmental attitudes and an ecological philosophy. A series of seven steps common to many nature centres¹ has been incorporated into the program to build this philosophy:

1. Knowledge: presentation of factual information.
2. Interest: opportunity to investigate for oneself.
3. Understanding: synthesis of information to demonstrate relationships.
4. Appreciation: awareness of the values important to the environment.
5. Respect: understanding of how the resource should be used or protected.

¹B.L. Ashbaugh, Planning a Nature Centre, (New York: National Audubon Society, 1963).

6. Responsibility: realization of how oneself can become involved.

7. Action: involvement in environmental problems.

These steps will be reflected on the site by the various areas devoted to focal topics.

INTERPRETIVE CONCEPT

The site has been developed in two basic interpretive zones for intensive and extensive use. The objective of the intensive-use zone will be to provide information on the focal topics to establish a basis for understanding the issues. Key features of the program here are interest-generation and individuality.

Direct contact with the waterfowl through feeding and viewing at arm's length is the major concept for generating and maintaining interest. The individuality is developed through a diversity of options. The self-guiding layout of the waterfowl ponds, display areas and nature trails allows the individual to absorb information at his own speed and according to personal preferences. Reinforcement of issues and information will be encouraged throughout, with summary displays and pamphlets available at key points along the trails.

The function of the extensive-use zone will be to synthesize the individual concepts and information presented earlier to understand the inter-relationships as part of a system and to present the problems encountered within this system. This concept can be further explained by Figure 4, illustrating the seven steps to building proper ecological attitudes as they apply to the developmental aspects of the Fort Whyte Nature Centre. It should be noted that many of the features of the site incorporate more than a single step thus strengthening the program.

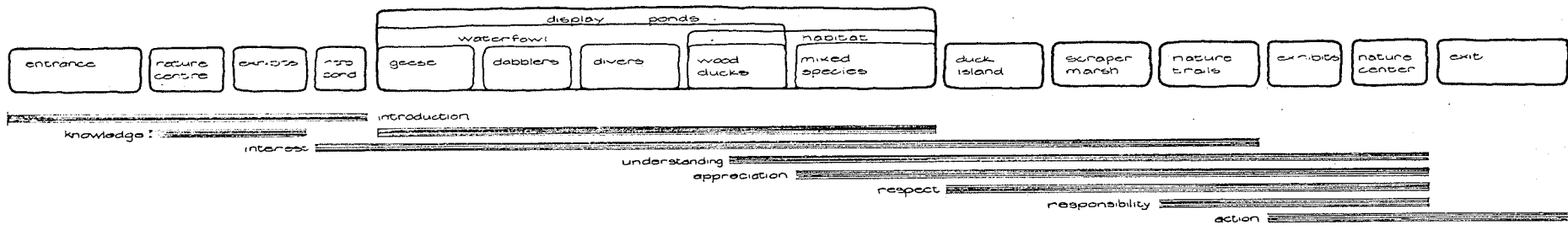


FIGURE 4

The Seven Steps of Environmental Education at Fort Whyte



development proposals

CONCEPT

Based primarily on the interpretive concept with intensive and extensive-use zones the development plan will assume a general form as illustrated in Figure 5. The extensive-use zones are further developed with a recreational or interpretive focus and are directly linked to a circulation corridor, part of the regional system. Buffers are provided to separate these areas from adjacent land-uses such as industry, excavation, the forest preserve and intensive-use zones. The heart of the site is maintained as the intensive-use zone associated with the reception and access areas. From this area the extensive-use zones can be easily monitored. The display of waterfowl, in a series of Man-made ponds, is central to the development of the Fort Whyte Nature Centre. The centre will establish

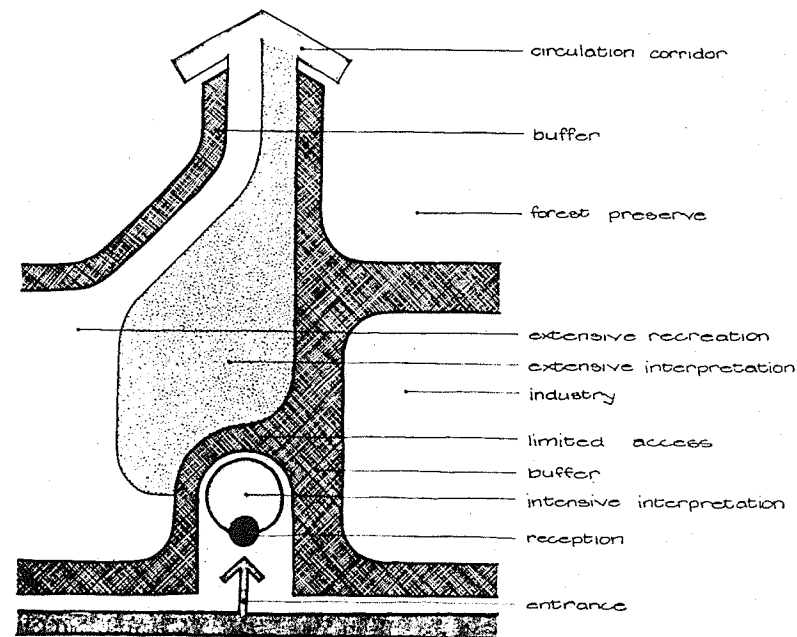


FIGURE 5
Interpretive Concept

four areas on waterfowl and its habitat to reinforce and advance the educational potential of the display area. Through the development of these units, defined by their resource potential, the public will be introduced to and informed on various levels of the natural heritage of Manitoba. This will provide visitors with the information necessary to develop their understanding of waterfowl and the environment.

The site theme will revolve around two levels of participation incorporating a broad range of activities. The first level will contribute the major facts and information for the enjoyment of the other areas. This intensive-use zone will include the nature centre, display ponds and demonstration building. The activities of the site will be focused in the outdoor environment with the centre providing the introduction to the site. It is the intention to have the centre complement these activities, allow an overall appreciation of the site potentials and features, and provide a base from which most activities will originate.

The visitor's experience will be enhanced in the reception centre through the provision of informative displays and program organization as a preview to the visit. The previous siting of the centre takes advantage of overall views of much of the site and of spectacular sunsets. Through incorporation with the centre, the waterfowl demonstration building can be utilized for exploration of management techniques. The land adjacent to these buildings will incorporate an outdoor display area with a varying program. Provision will be made for a concession and an entrance for the handicapped. The final portion of the intensive-use zone will be display ponds to aid the visitor to identify

species and requirements of the native Manitoban waterfowl. At this point, a reinforcing of the concepts dealt with in the nature centre should also be incorporated. Two separate areas of ponds will be built. Firstly, to introduce the individual species of birds and habitats and, secondly, to display the species in a more integrated situation in preparation for the remainder of the site.

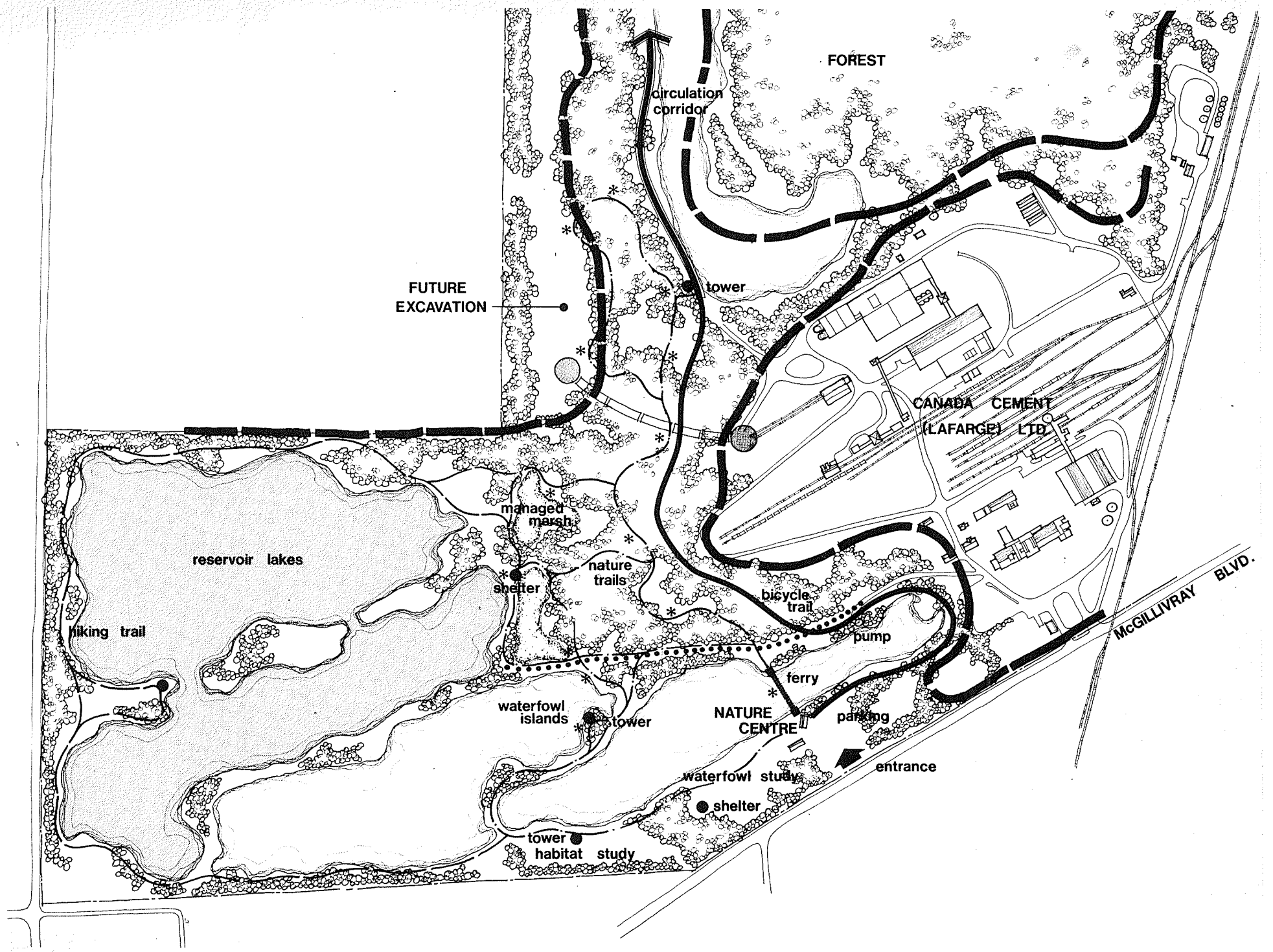
The extensive-use portions of the site will allow a much less structured program of events. In these areas the person or groups will be left in closer association with nature, able to participate in a variety of activities. The birds will not be captive birds and will be free to fly at their desire. A series of developed islands in the second lake will provide excellent nesting and loafing habitat for a variety of species. Here the birds will be within close range of the viewer while also being protected from both viewer and predator. A hiking trail will be provided around the reservoir lakes to allow for further observation of the species and the habitat. Along the mainland, self-guiding interpretive trails will be developed for the use of both groups and individuals. The purposes of these will be to expand upon and provide firsthand contact with concepts introduced in the resource centre. The dividing of ecological systems into their components will allow the visitor to further understand their inter-relationship and importance. The result will be a heightened enjoyment of the waterfowl, their behaviour, habitat and role in an ecological system. The final aspect of the concept involves the identification of environmental agencies and problems which one could become involved with, or other sites to visit to further one's appreciation of Manitoba's natural heritage. The concept of the site is not to be self-centred but to be a catalyst and to

encourage a unity between environmental groups which have the same basic interests. The concept, however, is to be both self-contained and self-reliant not depending on other areas for its survival.

DEVELOPMENT PLAN

The Development Plan (Figure 6) locates the major features of the concept on the site. The nature centre is noted as it exists with parking adjacent and access from McGillivray Boulevard. The extensive-use area is buffered from the intensive activities by the first lake. The entire south shore of lake one, west of the nature centre, is devoted to intensive interpretation. An existing woodlot divides this area into two themes of interpretation dealing with waterfowl. The first section adjacent to the nature centre is for the study of waterfowl. Species and characteristics of Manitoba's waterfowl will be the main focal topics in this area. A shelter will be provided with washroom facilities, displays and seating in the woodlot. The second section of the area will be based on habitat interpretation where characteristics of vegetation, water and waterfowl requirements would be studied. A feature incorporated in this area will be an observation tower for viewing the ponds and for orientation both back to the nature centre and to the remainder of the site. Details regarding this intensive interpretive area will be discussed in a subsequent section.

A defined circulation route has been established to provide direct access to the extensive use portion of the site. This route includes two options, the first along a trail past or through the intensive-use area, and the second a direct route across the lake via ferry. The small ferry was developed for both interpretive value and aesthetics. In this way the lake would not require a structure



FUTURE EXCAVATION

FOREST

circulation corridor

tower

CANADA CEMENT (LAFARGE) LTD.

reservoir lakes

hiking trail

managed marsh

nature trails

bicycle trail

pump

waterfowl islands

shelter

NATURE CENTRE

parking

ferry

entrance

waterfowl study

shelter

tower habitat study

McGILLIVRAY BLVD.

dividing it into two sections. The ferry allows easy, quick access to the trails for those visitors with little time or physical disabilities.

Features of the extensive-use area include nature trails, a managed marsh, viewing towers, a shelter, a hiking trail and managed waterfowl islands. The nature trails are the central feature for the area. They serve to tie the remaining elements together and provide the interpretive basis. A variety of themes can be followed on the estimated 3.2 kilometres of self-guided trail-loops. The trails reinforce the waterfowl theme of the nature centre by providing access to and information on the waterfowl islands and the managed marsh area.

The waterfowl islands are developed in the shallow waters of lake two. The purpose of the islands is to provide food and cover for waterfowl without a need for fencing. A separation of 100 feet from shore has been utilized for predator control. A feeding program would be required to maintain a resident flock of birds. It is anticipated that with a core of pinioned birds, a flying flock can be established here with large population increases during migration periods. One requirement for the success of these islands would be water-level control to maintain proper vegetation for cover. For this reason the water connection between lakes two and three has been eliminated.

An observation tower with telescope would be provided to study the waterfowl and their habits without human interference. This tower would be partially buffered from the major view of the nature centre by vegetation but would still provide orientation to the site.

The managed marsh, to be referred to as Scrapper Marsh, is developed on the existing marshy site.

This site was originally developed by the horse-drawn scrapers used during the early excavation of the lakes one and two. Presently overgrown in many areas, the marsh still provides temporary cover for waterfowl throughout the year. The marsh would provide a further development in natural character for the habitat interpretation theme begun in the intensive-use area. Expansion of the present marsh and the use of a pumping facility would be required. The nature trails would converge at a shelter to be built overlooking both the marsh and lake three. This shelter would provide washroom, display, and sitting facilities in an optimal setting.

A service road would be required for maintenance of the shelter, marsh, trails and pumphouse. This road would extend along the existing road to lake two. It would be used as part of the nature trail system for a short distance and should be maintained as such. The remainder of the existing road network should be encouraged, through planting and road base removal, to revert back to the adjacent forest community.

The nature trails provide access to many other areas and features as well. General diversity of vegetation and sightings of wildlife are always of interest and can easily be incorporated into the trail. As the trail moves further to the north it approaches the lower portions of the forest preserve. A viewing tower has been proposed for this area. Sightings of deer should be common from this point with increased attractive features along the forest's edge. The water, possible salt licks and increased cover should attract deer to this area. As a contrast to the development of a healthier environment, the trails would provide circulation to areas where the forest has died due to changing

water levels and to where it has been cleared for future excavation. A final interpretive area would be an actual excavation site to show the process which the lakes have undergone.

A hiking trail is designated to follow the lakeshore around the outer edge of the site. This one and one-half mile trail has been incorporated to satisfy those people who wish to explore, relax and walk on their own. There is one major station on the trail located on a peninsula bordered by lakes three and four. Near the half-way mark of the trail is an ideal area for a rest spot. The lakeshore has undergone some variations and so provides more interest for both the viewer and the hiker.

Central to the lake renovation has been the completion of the shoreline of lake two to make it self-contained. This will result in lakes three and four having a greater fluctuation. These two lakes have had water circulation increased by opening a second channel to form an island. The island has increased aesthetic appeal and reduces the perception of separate lakes. In general, the spits have been widened and would require reinforcing once erosional patterns are established. Circulation has remained restricted to the existing spit along lake one. Tree planting is proposed in areas on the spits to create increased viewing interest. It is not the intent to line the spits with trees but to create pockets of vegetation to frame or restrict views. These pockets also add to the stability of the spits.

Extensive planting is required along the edge of the property to create better hiking conditions and to buffer the site from future adjacent land-uses. With the exception of the

automobile wreckers' operation to the south which presently requires buffering, the type and quality of future development cannot be predicted. So few developments, with the exception of some forms of recreation, have compatible visual characteristics with the nature centre. Buffering would obstruct the main views to the west and maintain the site's character. Planting programs would be established on three edges: north, south and west.

The bicycle trail from the nature centre will become part of a proposed regional trails network. It will serve as a major recreational aspect of the circulation corridor to the Assiniboine Forest. Fencing would be required to separate the bicycle route from the nature trails and provide continuous circulation from the nature centre to the major corridor. A variable experience would be provided by following lakeshores and travelling through forest conditions. Buffering is required near lake one to screen the cement plant from the full view of the bicyclists. Rest areas would be developed at the nature centre and near the northern observation tower. It should be stressed that a regional network will play an important part in the expansion of the extensive interpretative and recreational uses of the nature centre and, therefore, should be encouraged.

The northern woodlot has been designated as a restricted access area. A management plan to maintain the forest as prime deer and wildlife habitat with increased viewing potential are the only proposed improvements to the area. This would ensure that sufficient cover, food and water are available for the wildlife. The management of the vegetation would include creating areas in rotation at various stages of succession by developing clearings to increase cover to satisfy the needs of

wildlife. The woodlot should have a direct connection to the regional wildlife corridor to promote free movement between the rural fields and the Assiniboine Forest and River to the north. The buffer between the woodlot and the remainder of the site utilizes the lake and planting along the cement plant. The lake is further increased in size by a planned excavation which facilitates industrial use of this area. This would increase visual interest and be more effective as a buffer for the preserve. It would also provide for increased wildlife observation from the tower and circulation corridor for recreational and interpretive value.

The major industrial area of the site, including the cement plant, has been dealt with through its affects on other uses. Basically, the plant has been screened except for the orientation value of the chimneys. The industrial activities on the site will be maintained along the west border north of lake four. This location creates a conflict for the bicycle route and hiking trails since industrial transportation is required to and from the area. The proposed solution is a vertical separation of the systems. The trails have been centralized at this point to reduce bridging costs. The industrial activities will have no adverse interpretive effects since the trails are focusing on the excavation process in this area.

INTENSIVE-USE AREA

The intensive interpretive-use area will be the single most important aspect of the program of the Fort Whyte Nature Centre. This area, located at the entrance to the site, will create the important first impressions and provide the basis for further enjoyment of the site. Access to the

nature centre and the parking space has been provided by a short entrance road from McGillivray Boulevard. Parking space for 80 cars and three buses have been provided, with an overflow capacity of 100 cars. From there the intensive interpretation zone begins. The conceptual diagram (Figure 7) designates the four major units within this zone: the introductory area, waterfowl interpretation, habitat interpretation and operations.

The introductory area includes an entrance feature, the existing reception building, outdoor panel displays, an orientation display and an amphitheatre. The central purpose of this area is to provide background for detailed interpretive aspects in the other zones. The circulation system will lead a visitor from this area through to the waterfowl and habitat ponds. The option exists to go directly from here to the extensive-use portion of the site either by ferry or along the trails.

The waterfowl interpretive unit will deal with a series of interconnected ponds which provide a basis for viewing individual species of waterfowl ranging from geese to wood ducks. The end of this section is marked by a shelter or pavilion which displays the summarized information of the area and an introduction to interpretation of the next habitat.

The habitat interpretive unit will combine a number of waterfowl species on the same pond. The focus of the unit is to understand the needs of waterfowl including cover, food and water. An observation tower increases viewability and aids in orientation to other parts of the site. From this unit a trail connects to the extensive-use area for further information.

The final unit, operations, is located adjacent to the nature centre and for the majority of the

season supports the other units. Along with satisfying maintenance requirements, this area houses wintering facilities and breeding pens. In this zone, resident birds are wintered and the young raised for display in the ponds.

The site plan of the entire intensive interpretation area plus the access features (Figure 8) best illustrates how all the units work together. In the plan, water has been used as a design element to strengthen ties between areas. The general character of the entire area illustrated in the sketch of the nature centre (Figure 9) is very naturalistic with diverse vegetation, a flowing path system and seemingly uncontrolled shorelines. Vegetation and earth manipulation have been used

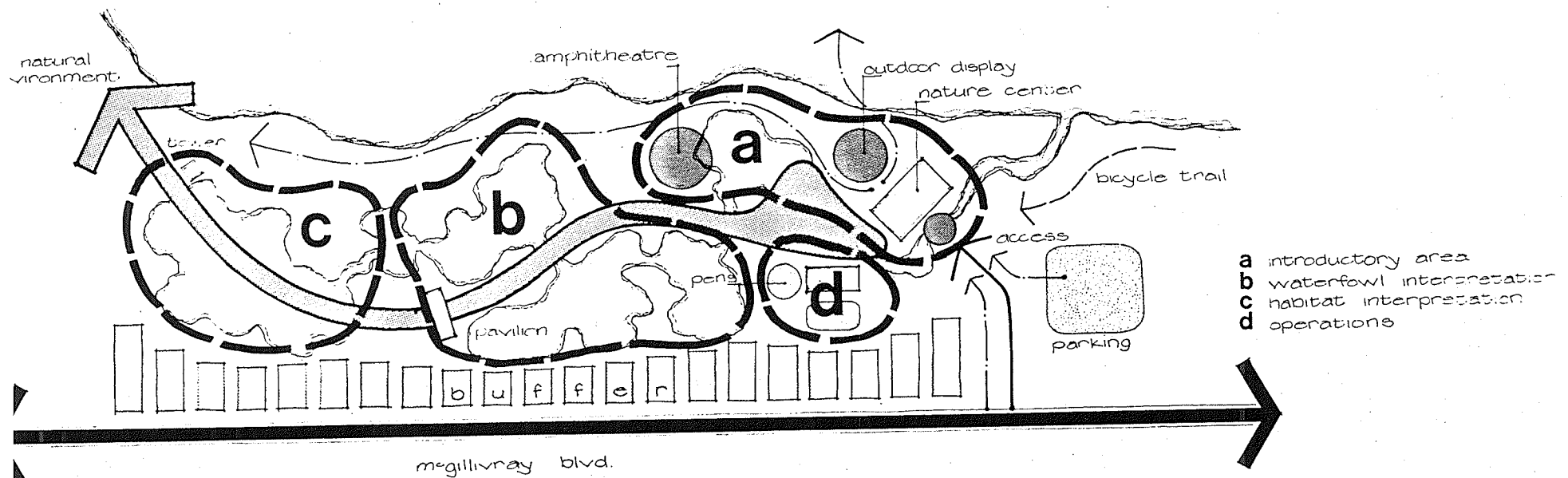
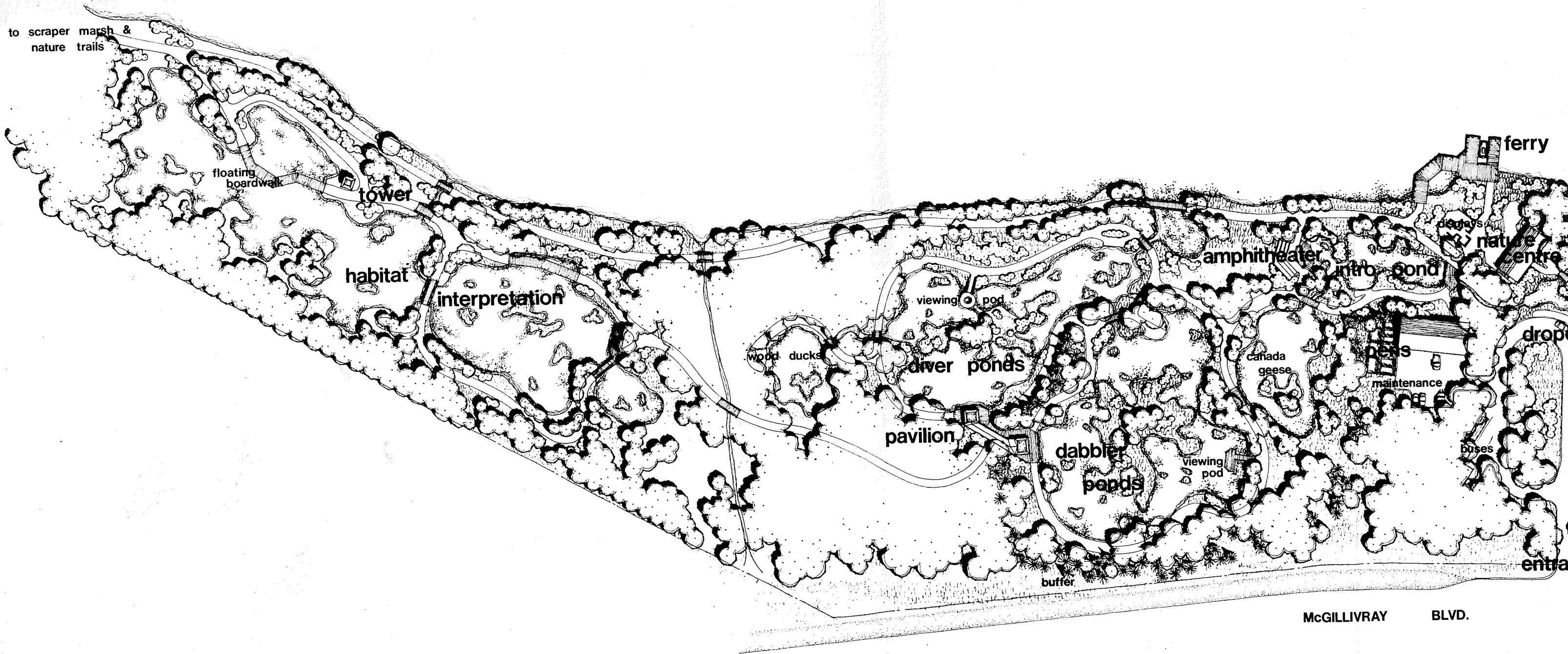
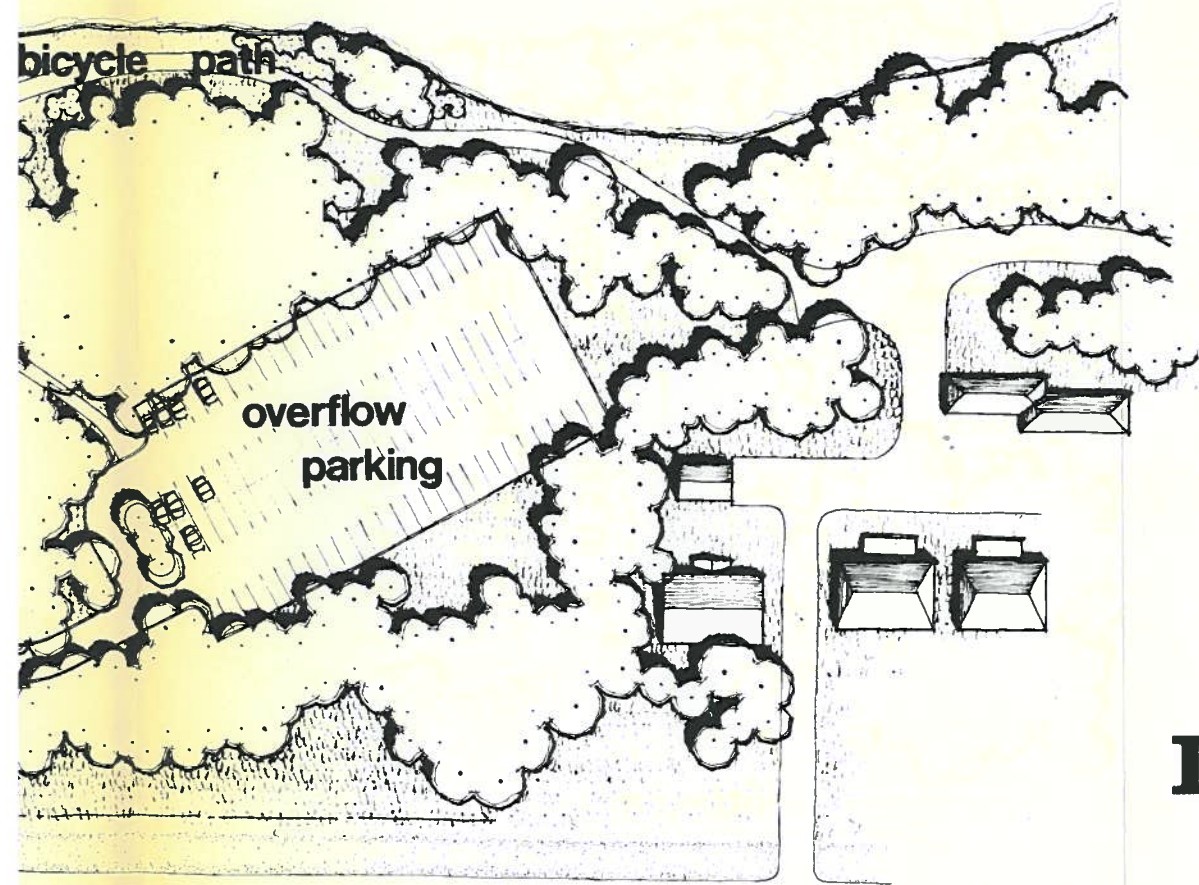


FIGURE 7

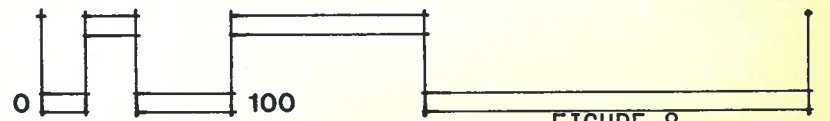
Concept of Intensive-use Area Development



McGILLIVRAY BLVD.



fort whyte nature centre
**INTENSIVE AREA
SITE PLAN**



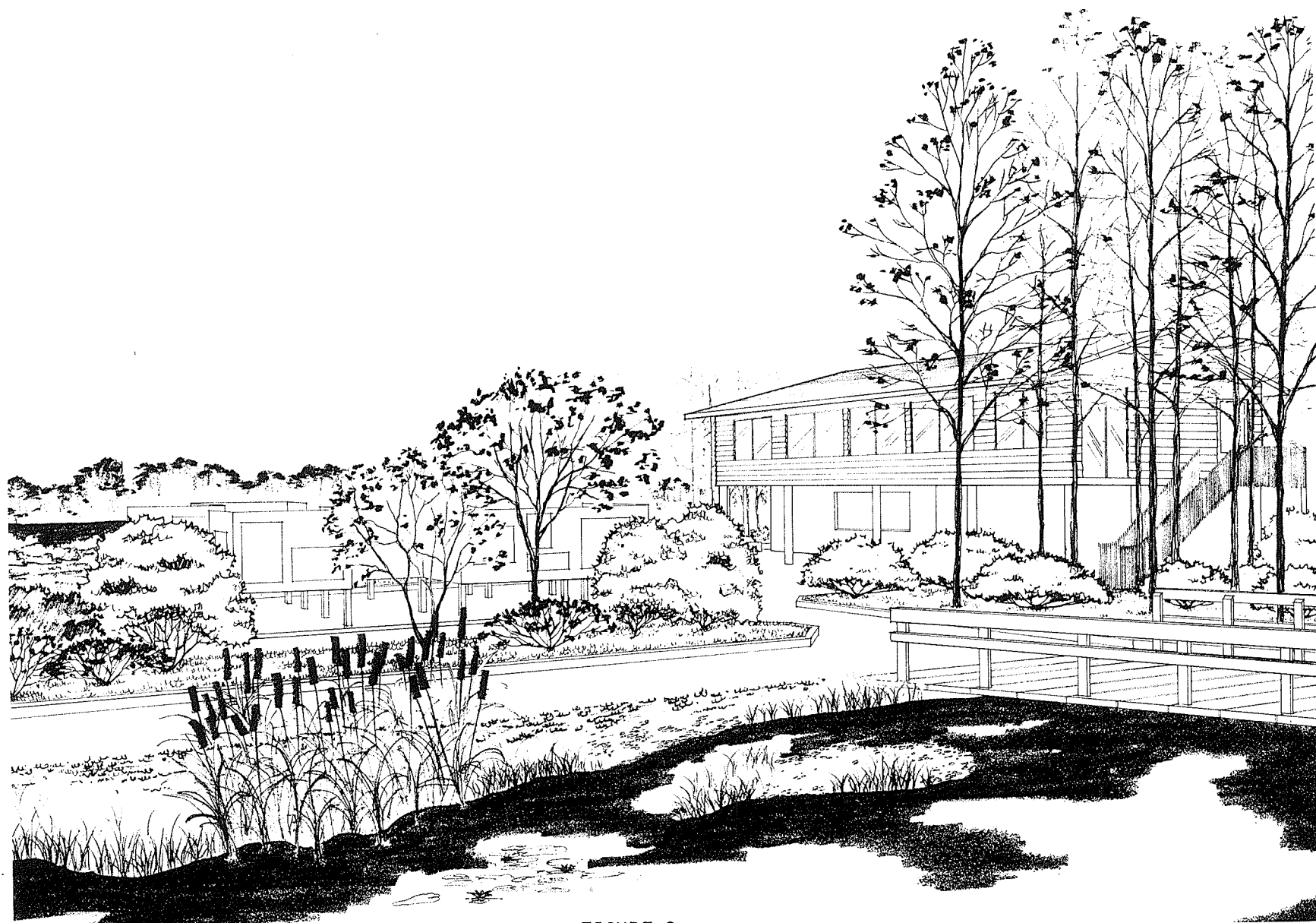
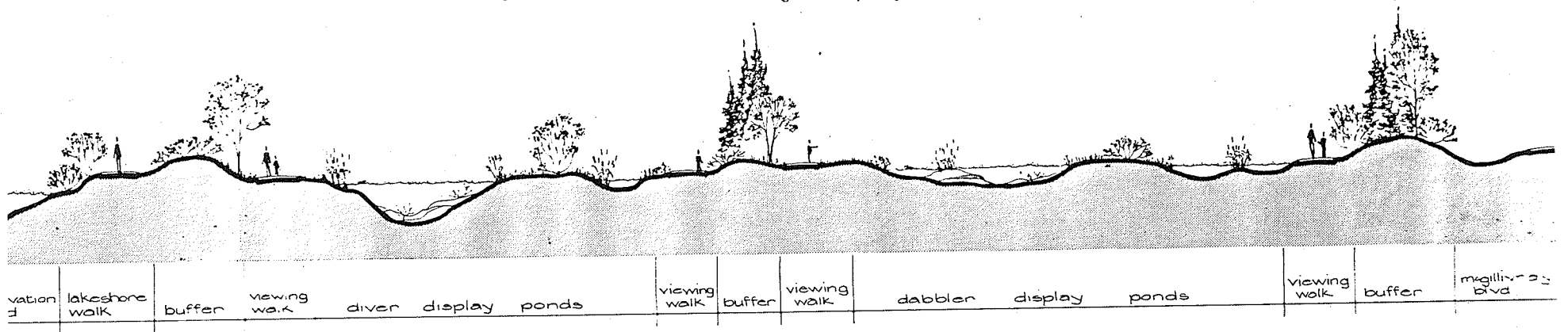


FIGURE 9

View of Nature Centre from Introductory Pond

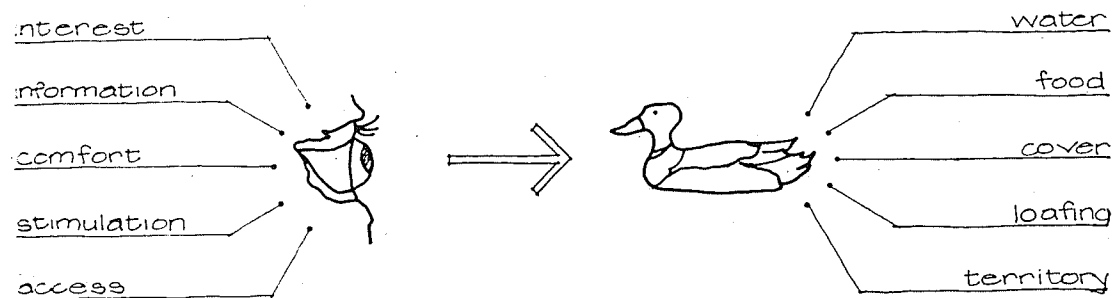
extensively (Figure 10) to focus attention on the immediate area and to reduce a feeling of crowding often associated with areas similar to the display ponds. Options have been left open throughout the design to return to the nature centre once each section has been viewed.

FIGURE 10. Section through Display Ponds



The detailed development of the entire area has been based on an understanding of the needs of both the waterfowl and the visitor (Figure 11). A basic concept, with direct access and contact by the visitor to the waterfowl, will benefit the entire interpretive program on the site.

FIGURE 11. Needs of Waterfowl and Visitors



Introductory Area

The first of the four units to be studied in greater detail is the introductory area (Figure 12).

The entire pedestrian approach to the reception building has been redesigned to establish character for the centre. Views of the reception building have been maintained from all areas of the entry zone, street, entrance road, drop-off area and parking lot. Views past the centre have been blocked for greater impact after entry. Focus upon entry is thus put on the entrance pond which provides the first contact with the site environment. An area has been provided to sit, wait and observe the pond and waterfowl, if present, before crossing a bridge to enter the reception building.

The reception building allows the first view of the site through a wall of windows on the upper floor. An area for relaxing and appreciating this view should be combined with orienting information, permanent displays, reference information and the services of a receptionist. From this area, orientation to the display ponds, habitat-pond tower and the distant waterfowl island's tower is established. The lower or ground floor of the building has been developed for needed indoor space. An area for display-panel storage and a concession has been provided. The concession will offer a nutritional mix of waterfowl food to discourage unhealthy feeding habits and increase visitor enjoyment. An optional entrance suitable for the handicapped and for concession service joins the central circulation system in this area.

The outdoor displays are the first major form of information outside the building. These are accessible to everyone leaving the plaza area on any route. The layout of the panels is informal to

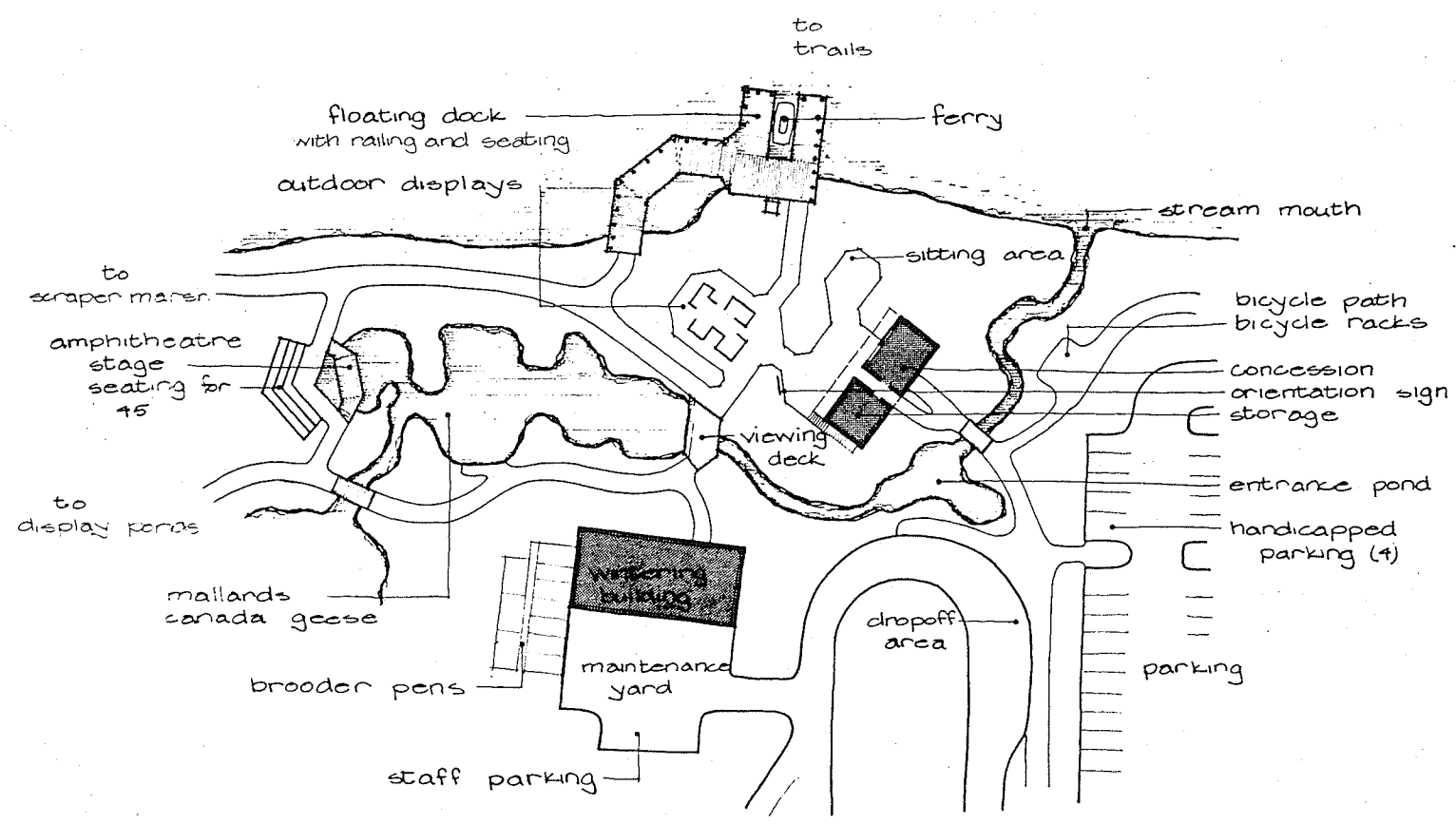


FIGURE 12
Conceptual Plan of Introductory Zone

promote study at an individual rate. The panels should be weather-proofed and interchangeable. They will primarily provide general information on waterfowl and its habitat. The display panels will in no place rise above seven feet in height or interfere with viewing from the reception building.

At this point, an option exists to proceed to the display ponds or to go directly to the nature trails area either by ferry or lakeshore walk. The first display pond is the introductory pond, a home for mallards and Canada geese. The purpose of this pond is solely to create interest through contact. The mallards and geese were chosen since they are familiar to many and the most adaptable to crowds. A large viewing deck has been provided but feeding and viewing are possible around much of the pond edge. Numerous areas for loafing, preening and sleeping are available for the waterfowl and to allow the visitors to view them many ways. The pond is quite shallow, up to three feet deep, and suitable for tipping.

The final aspect of this area is an amphitheatre and stage with a capacity of about 45 people. This capacity was established to allow a program to be relocated inside, not cancelled, if poor weather conditions existed. The stage was designed to have water flowing around it to allow waterfowl to paddle therein during a program.

The operations area is also shown on Figure 12 to locate the brooder pens, wintering building, maintenance yard and staff parking.

Display Ponds

With interest heightened and the proper educational base established, a visitor may now proceed to the waterfowl display ponds (Figure 13). The function of these ponds is to identify and explain the basic waterfowl species of Manitoba. There have been four ponds established on the area to present these various waterfowl types. The display groupings include Canada geese, dabbling or surface-feeding ducks, diving ducks and wood ducks. The ponds are subdivided where necessary into smaller areas to control the individual species. Although each species differs greatly in characteristics and specific requirements, the basics of food, water and cover are all required to satisfy the waterfowl. For the visitor, observation and comfort are of utmost importance. These considerations, combined, developed the concept (Figure 14) for pond and trail relationships. A central island is used as a retreat, for the waterfowl, from the constant human pressure. With no trails penetrating this area, security for the waterfowl is assured. The trails, circling the pond offer numerous views of the island and areas to make contact and feed the waterfowl, with each sub-pond offering one major viewing and interpretive node plus various other rest/viewing spots. The pavilion located between the dabbler pond and diver pond functions as the major focus and orientating feature of the area. Located in the structure are washrooms, tables and benches, displays, viewing deck, drinking fountain and duck-food vendor.

The first pond encountered is home for three species of Canada geese native to Manitoba. A common site during spring and fall migration periods, the honkers will be represented by species

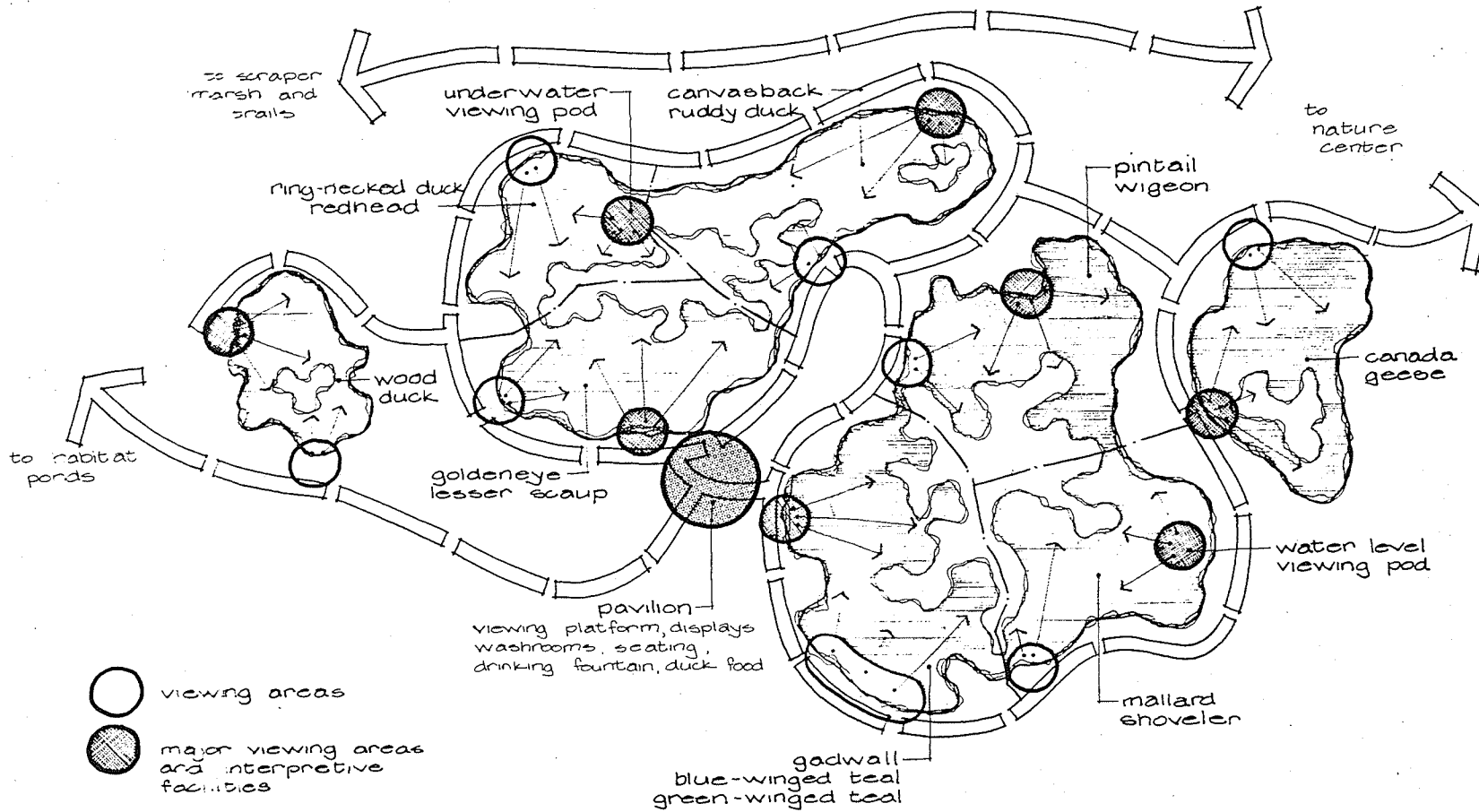


FIGURE 13

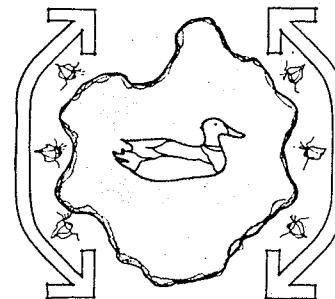
Conceptual Plan of Waterfowl Display Ponds

which will vary greatly in size since colour patterns are very similar. The feature and most outstanding species will be the Giant Canadas which weigh up to 18 lbs. The smaller Lesser Canada and Richardsons' geese usually weigh from 3 to 5 lbs. The major viewing node is located overlooking an island which would be used extensively for loafing by the geese.

From this point on, the buffer between the path and dabbler ponds, developed to focus attention on the geese, has been eliminated. A sub-pond with two species of dabblers is now the feature. Resident in this area is the very common mallard and the distinctive shoveler. This combination allows easy identification for the visitors' first contact with different species. The water level viewing pod has been designed to promote an understanding of feeding habits of dabblers and to encourage a greater sense of identification with the waterfowl.

FIGURE 14

Pond and Trail Relationships



viewing from path system
around the pond for
maximum visibility
waterfowl cover on island
for retreat and maximum
protection

The remaining two dabbling sub-ponds display gadwalls, blue-winged teals and green-winged teals in one and pintails and widgeons in the other. These utilize the same concept with a major viewing and interpretive area plus a minor area along the path. A vegetative buffer was proposed to define the pond area and separate it from the diver ponds.

Based on the same principles of waterfowl needs, the diver pond layout resembles that of the dabbling pond. In both ponds the central island used is divided by a low fence to enclose the pinioned birds. The fence should be located in the midst of taller vegetation, grasses, shrubs, etc. to be hidden from view. It connects through to the mainland in areas of dense emergents. The fence has the sole purpose of holding the waterfowl in, not keeping predators out. The predator control would come from taller electrified fencing, six feet in height, surrounding the entire group of ponds.

The divers are separated into three ponds with groupings of canvasback and ruddy duck, golden-eye and lesser scaup, and redhead and ring-necked duck. The major feature for the diver ponds is the underwater viewing pod from which one can view the waterfowl diving for food in depths of five to eight feet. The depth is one characteristic which differentiates the dabbling and diver ponds. The maximum depth for the dabblers would be about three feet with five to eight foot depths common for the divers.

The shoreline of each pond is very similar, characterized by emergents, sedges, willows and other wetland vegetation. Each waterfowl species should have important or typical vegetation in

their pond (Appendix 8). The shoreline is not uniform. It has many small bays to allow the waterfowl more seclusion and an area in which to establish their territory. The key elements to establish a territory is sight restriction and a defensible area which is provided by the bay concept. In this way, a greater number of birds can live in the small ponds with fewer conflicts.

The final pond is designated to wood ducks. The unique habitat of the wood duck separates it from the other waterfowl. Although it is a dabbler, it prefers a pond in a wooded area and has been located in the buffer zone. It has a viewing area from both path systems, one of which focuses on the species and the other on the habitat.

For all the ponds, feeding stations would be provided to encourage birds to specific areas. The station itself should not be visually dominant but easily accessible for the maintenance crew. Trampling would soon eliminate much of the grasses in close proximity, hence the station should be seen as a gravel bar. Areas of lesser traffic might still have problems with grazing, therefore special grasses should be used. Two recommended species of natural grasses around the ponds would be Russian wild rye and crested wheat which are naturally low-growing. These should keep the pens green throughout the year and maintain aesthetic appeal.

Sanitation of the ponds is not expected to be a major problem. With a continual turnover of water, odours and diseases will be kept down and water quality kept high. The best water for the birds is the natural rain and run-off water pumped from the reservoir lakes. Aeration of the water must be provided but should be undertaken when the centre is closed. A final consideration for sanitation is

total cleaning of the ponds. This is required on a three or four year basis. The ponds must be totally drained for this purpose and the clay lining washed out. This would be a major maintenance task thus scheduling should be carefully considered.

Habitat Pond

The last section of the intensive use area, illustrated in Figure 15, utilizes many of the same principles found in the display ponds. The characteristics of the pond now become the important feature for interpretation. The pond is seen through a variety of conditions with two special viewing facilities, the sunken boardwalk and the floating boardwalk. An observation tower and other viewing areas provide added situations from which to study the environment.

The pond will have varying depths to accommodate both divers and dabblers. To correspond with the depths, the shoreline will reflect areas more adaptable to particular waterfowl groups as they could be seen in natural marshes. A high density of loafing and nesting islands will encourage good viewability and emphasize the importance of such islands to waterfowl.

Buffering, in this final zone, is of major importance. As in the case of the display ponds, McGillivray Boulevard must be screened to reduce noise and visual disturbances. A buffer of mixed vegetation is best but will not eliminate all sound problems. The opposite side of the pond also requires a screen to reduce distractions caused by users of the lakeshore walk. A series of berms should be developed to contribute to the screening effect.

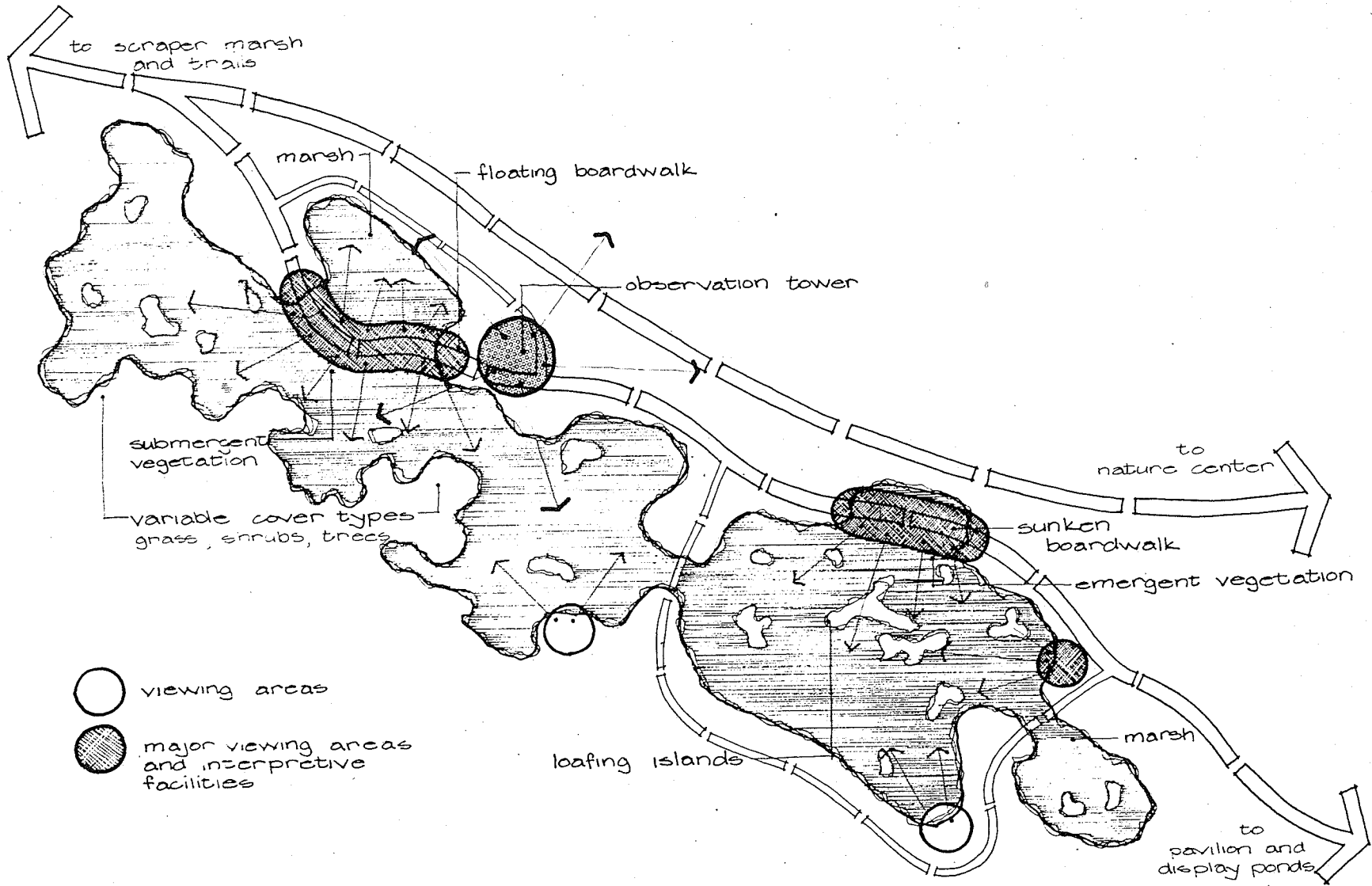


FIGURE 15
Conceptual Plan of Habitat Display Pond

From the habitat pond, the visitor has the choice to continue onto the islands, scraper marsh and the nature hiking trails or return to the nature centre along the lakeshore for a review of information before departing.

INTERPRETIVE DETAILS

The following details should be related to the site plan (Figure 8) for a full understanding of their location and purpose in relation to the other features.

Entrance Area

Upon arrival at the site, the first interpretive feature is the entrance pond (Figure 16). Located adjacent to the drop-off area and pedestrian entrance paths, this pond serves to generate

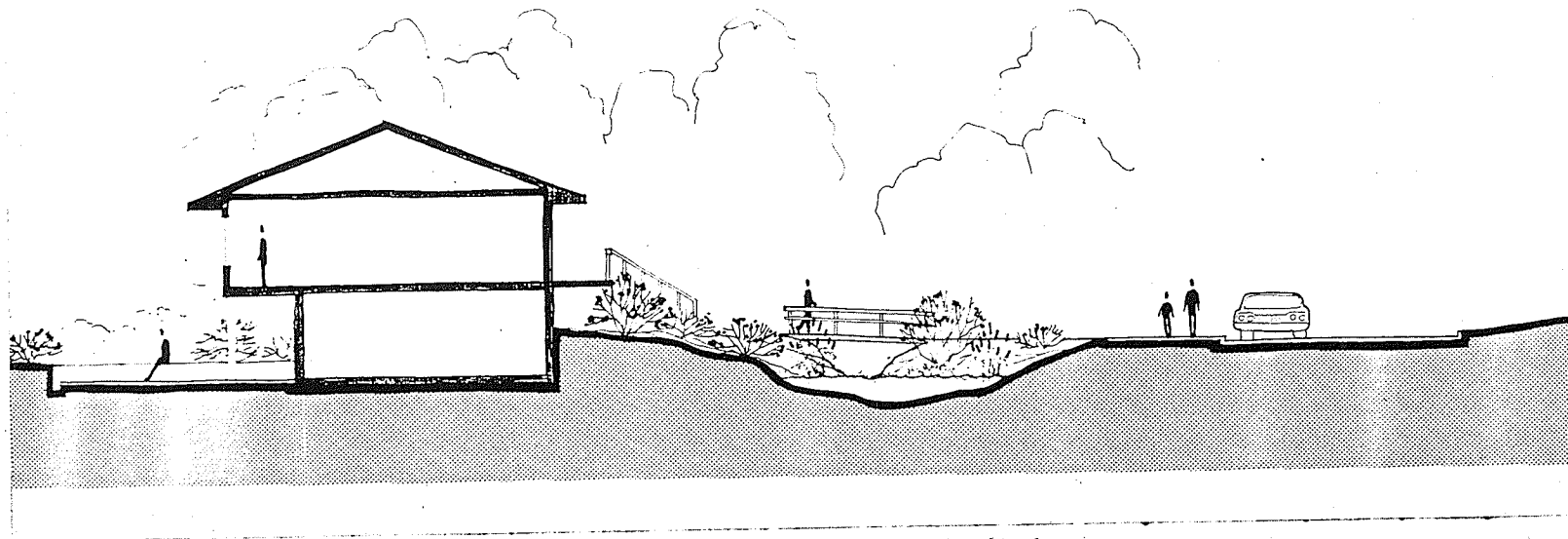


FIGURE 16. Section through Entrance Pond

interest and provide a transition to the nature centre. The pond will be surrounded with vegetation including cattails, sedges, willows and dogwoods to provide a natural character. There will be no waterfowl held in the pond. However, a feeding station could attract flying birds. Benches will be provided for waiting at the drop-off area. The bridge over the stream leaving the pond will provide a viewing area and support an introductory plaque.

Nature Centre

The Kiwanis Reception Centre will undergo a few changes. Additions will be developed on the lower level to provide support functions such as storage and a concession. The upper floor will remain for viewing and interpretive functions. The office of the naturalist and the library, located on this level will be a major resource base for the nature centre along with the numerous displays, programs, washrooms and sitting area located here. Upon entry, the building will provide a panoramic view of the site through the ten windows on the west for both aesthetics and orientation. To provide further orientation a series of models explaining the site and its history should be available. An area for an automatic slide show should be provided which can also double as an interpretive program if outdoor conditions are unsuitable. Displays along the walls should include photographic studies of specific topics such as waterfowl, marsh management, environmental problems, other interpretive centres, etc. Finally, a general area to sit and rest in or to discuss ideas should be designated along a portion of the windows. Pamphlets and publications by the Wildlife Foundation, Ducks Unlimited and Manitoba Department of Natural Resources should be made accessible to all visitors.

Outdoor Displays

The purpose of the outdoor exhibit area will be to give general background information on waterfowl and habitat. The area, as shown in Figure 9, will be developed around a modular display system. Removable posts will be anchored in the exhibit area with interchangeable panels mounted on them. The display panel module would be four feet wide to allow freedom of layout and accommodate visitor circulation. An informal arrangement with small spaces will provide the greatest freedom for the individual reading the panels. Samples of information to be provided on these panels would be on migration, flyways, waterfowl of Manitoba, feeding, behaviour, marshes, etc. A feature panel could include further information on the species of the week or a particular behaviour trait, territoriality, for example, or seasonal cycles like mating, brooding, etc. These features could be changed weekly or seasonally to focus on various important aspects. The exhibit area is located in this area to provide maximum contact with visitors.

Introductory Pond

The first contact with the waterfowl is based on familiarity. Mallards and geese have been given a home in the introductory pond because they are familiar and adapt to human noise and presence well, thus offering maximum contact. No information is stressed in this pond with its sole purpose to increase the interest level. This pond, like the rest, offers a natural character suitable to both the waterfowl for their needs and the visitor for pleasurable viewing. Several viewing areas were developed with a major deck/bridge at one end. There is also a high density of loafing sites in the pond to increase viewing potential.

Amphitheatre

The amphitheatre (Figure 17) has been developed for presentations to groups no larger than 45 people. The size has been restricted to accommodate the group in the nature centre if the weather is poor. The intent was not to provide a slide or film theatre but to allow an area for the naturalist to deal directly with an audience. Presentations of real objects and exhibits is the key attraction. Topics could range from a species of waterfowl, to hunting, to major environmental problems. A water area has been included both to tie the amphitheatre to other features and to intensify the setting. It is buffered from other areas with vegetation to reduce noise and visual distractions. A slide-show aspect of the program would require a major structure, and since the period of operation at the nature centre is restricted to daylight hours this was not proposed. The small automatic show in the reception centre was developed to satisfy this need.

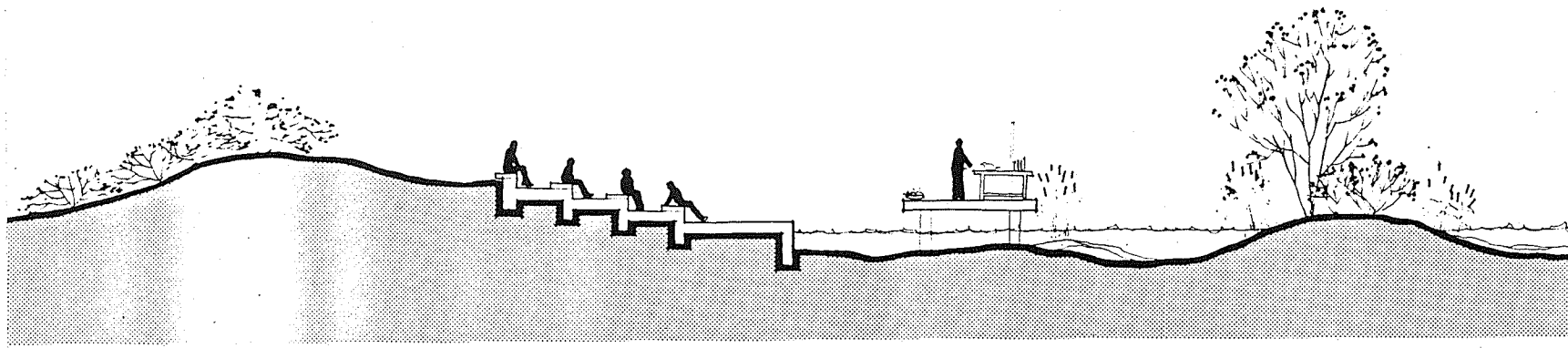


FIGURE 17. Section through Amphitheatre

Waterfowl Display Ponds

The display ponds are the area of the site where most detailed information is presented. The major function of the ponds is for identification and familiarization with waterfowl and their habits. The waterfowl have been separated into four basic groups: Canada geese, wood ducks, dabblers and divers. The last two were further divided into small sub-ponds of two or three species each. In this way, the common species of Manitoba's waterfowl are displayed clearly. Each species will have information regarding behavioural traits, life cycles, identification features and unique characteristics explained through display panels located at their respective major viewing areas in each sub-pond. Viewing is increased by many small loafing islands and exposed feeding sites. There is opportunity for the birds to escape to cover, often required early in the year.

The Canada geese pond is the first pond to be viewed. Here, three species of Canada geese are displayed. Care should be taken to see that the size variation is distinctive when choosing potential birds. The three species include giant, Richardson's and lesser Canada geese. Major behavioural differences between geese and ducks should be stressed in the displays.

The dabbler pond is for ducks which are surface feeders. Basically, their feeding zone extends to a depth they can reach by tipping up. There are three sub-ponds with seven species represented. The species are grouped according to natural compatibilities plus ease of distinction. The first pond deals with the familiar mallard and the unique shoveler. These two are very easy to identify and therefore have been included in the first sub-pond. The major feature of the entire dabbler ponds is also

located in the area. The water-level viewing pod (Figure 18) has been developed to encourage further understanding of the ducks and their feeding habits. Through the use of an underwater/above-water viewing window, a visitor can appreciate the behaviour of the dabblers. Feeding, with the proper food obtainable at the concession, would encourage the ducks, especially the mallards, to come close enough to view. Viewing through clumps of bullrushes and cattails is an added benefit for the interpretive pod.

The remaining two sub-ponds do not have any major viewing features other than level variations. In the next pond, the major viewing of gadwall, blue-winged and green-winged teals is from a slightly raised deck connected to the pavilion. In the final sub-pond, pintail and widgeon can be seen from an island. Each will offer information on plaques as was explained earlier.

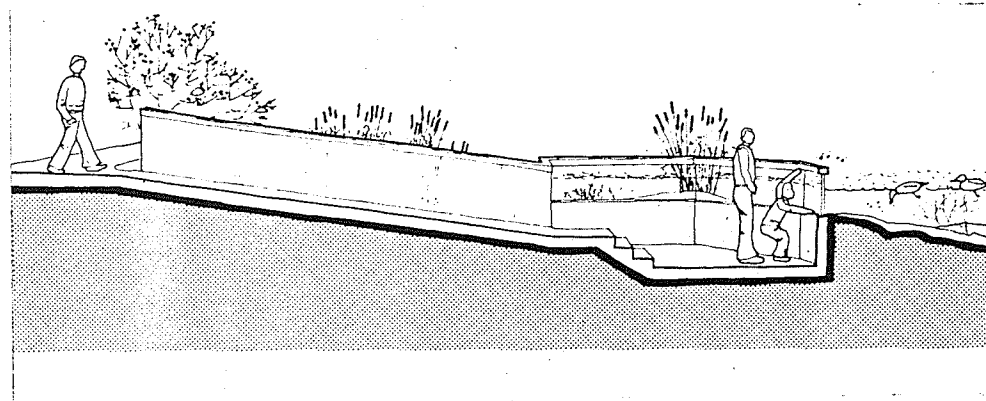


FIGURE 18

Water Level Viewing Pod

The diver pond has been based on similar considerations to that for the dabblers. Characteristics of birds in this pond are diving for their food plus minor similarities. This pond is also divided into three smaller areas accommodating six ducks, two in each sub-pond. One of the similarities in the sub-groups has been diving depths which vary from species to species. Once again, viewing is from varying levels with the underwater viewing pod (Figure 19) the major attraction. From this pod a wide variety of vegetation can be seen together with four species of ducks, the redhead with the canvasback on one side and the ruddy duck and ring-necked duck on the other. A feeding station would be required in this area to attract the waterfowl to dive. This would be a unique experience and, as with the dabbler pond, would help the visitor identify with the waterfowl. Fish should also be included in the pond for additional interest. Viewing in the remaining pond would include the combination of lesser scaup and goldeneye. The goldeneye pond is located closest to the forest area for a more natural situation.

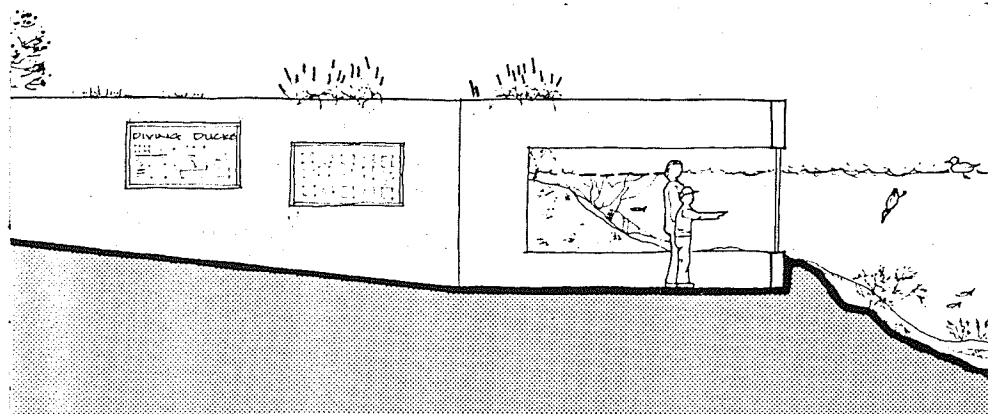


FIGURE 19

Underwater Viewing Pod

The final pond is solely for wood ducks. Although these are dabblers, the habitat for these waterfowl is the key element. For this reason they have been located in the forest area and can be viewed from both the display pond walk and the path to the habitat pond. Also included here will be a display of nesting boxes suitable for wood ducks.

At the end of display ponds is a pavilion which has both interpretive and functional purposes. The pavilion and associated deck connects both dabbler and diver ponds and acts as an entrance to the habitat pond area. Functionally, the structure provides washrooms, a rest/shelter stop and acts as an orientation feature. Its interpretive aspect is to house displays and exhibits which summarize the waterfowl display ponds. If a short visit to the ponds was the intent of the visitors, it would provide a good stopping point and serve to remind them where to return on their next visit. The pavilion has a simple organization with two rest/viewing areas at either end, displays in the centre and the washrooms adjacent to the exit area.

Habitat Pond

Interpretation in the habitat pond area will be based upon viewing the home of waterfowl from a variety of conditions. The pond is populated by a number of different species of waterfowl to encourage the visitor to recall information from the previous section. The display plaques will not deal with the previous information but encourage an understanding of what makes a waterfowl pond unique. As in the previous ponds, the need for cover and an escape area for waterfowl has been respected. The path has therefore been eliminated from one side of the pond. The path system follows

the shore for much of its length while extending into, and crossing over, the water in some areas.

A total of four major viewing areas have been established with a number of minor spots along the way. The first major area is located where the path from the display pond emerges from the woodlot. Here an overall perspective is obtained with a view along the length of the pond. Developed as a simple raised deck, here, the introduction to the general characteristics of the wetland would be presented. From here the major route is to a unique boardwalk (Figure 20) built through the marsh below the water level. The intent of this feature is to put the visitor in close contact with the environment of the waterfowl. Numerous forms of vegetation such as cattails, bull-rushes, water lilies, various aquatic plants, etc., are seen from the duck's-eye level, views rarely seen by people. Views of the major pond and the waterfowl are framed by the emergent vegetation. In this area, the vegetation's character would be the interpretive focus. A similar concept is developed at another feature, the floating boardwalk (Figure 21). Providing access to the central area of the pond, this boardwalk offers a different outlook. Along with the general views around the pond

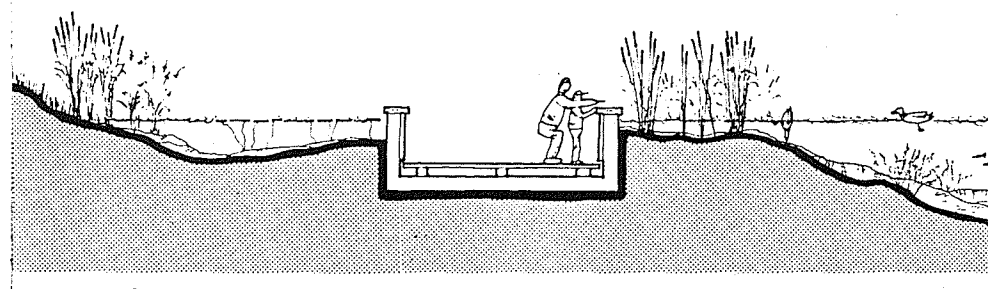


FIGURE 20
Boardwalk Below Water Level

a detailed look into the deep water at aquatic plants and animals of the system is possible. Throughout the walk, feeding and contact with the waterfowl will still captivate many of the visitors.

The final feature of the habitat pond is the observation tower which serves a double function, orientation and interpretation. The tower offers an overview of the character of the pond through the displays and gives an insight into the problems and benefits of management. The aspects of orientation deal with viewing in two directions back to the nature centre and on to the tower overlooking the waterfowl islands.

A review area should be provided as the path leaves this section for the more "natural areas". Views back over the pond would help to refresh one's memory while displays would summarize key habitat features and relate them to the behaviour of the waterfowl.

EXTENSIVE-USE AREA

In terms of waterfowl interpretation, the two following areas, the waterfowl islands and scraper marsh, both serve to strengthen concepts developed in the intensive-use area. These areas

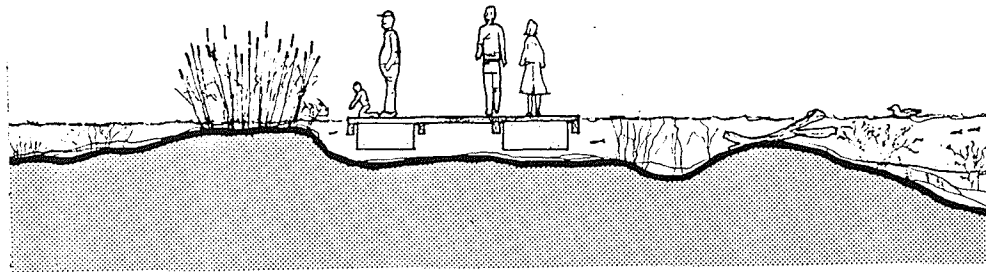


FIGURE 21. Floating Boardwalk

are characterized by a natural effect with restricted human penetration. Both have major interpretive features.

Waterfowl Islands

The waterfowl islands are overlooked by an observation tower (Figure 22) with viewing telescope. The islands do not have fences and are located one hundred feet from shore to control predators. A core of pinioned birds should be provided to attract a flying flock of waterfowl. Observing flying, landing and taking-off, and viewing such behaviour as breeding, nest building, preening, loafing, brood rearing, etc. would be beneficial. Feeding should be provided when required to attract and maintain the flock.

Scraper Marsh

Scraper marsh has the same concept of increased naturalization. The marsh presently exists in part and would require management to maintain its character. A viewing shelter provides the centre for

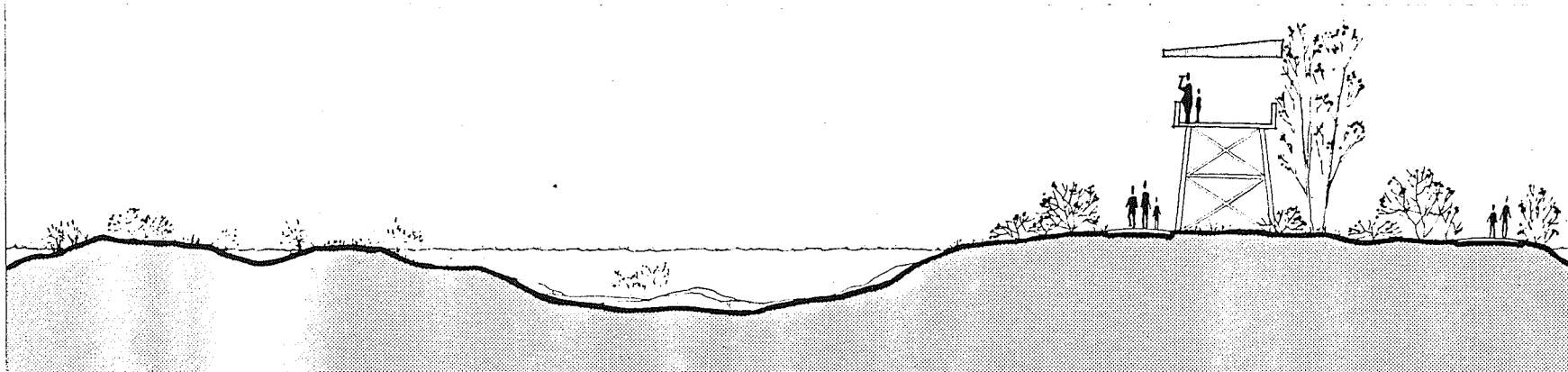


FIGURE 22. Observation Tower

the displays in this area which focus on the wetland and its diversity. It also provides a review of information presented, a key to further information and lists of other areas to visit, all of which can be discussed back at the nature centre.

Nature Trails

The remainder of the interpretive program is devoted to the theme of general ecology. A self-guiding nature trail is the method of interpretation. A trail with several loops has been chosen to allow various lengths of walks. Access to these trails is provided by two routes. The first follows the lake around past the display ponds to the natural areas. The second is a ferry (Figure 23), an interpretive feature in itself. The glass-bottomed boat would permit observation of the bottom of the lake and become a special attraction for general interpretation. There are five major interest-sections where unique sightings are possible and information is offered. Generally, the sections on vegetation, songbirds and small mammals overlap while the last two, based on excavation and the deer herd, respectively, have defined areas. The herd of deer is expected

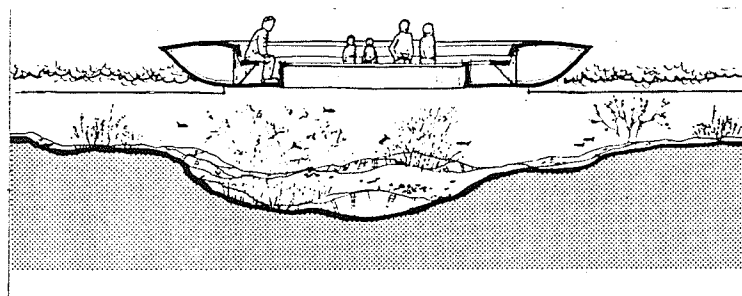


FIGURE 23. Ferry Crossing

to be the climax of the walking experience with an observation tower and viewing telescope provided in the northern area. Sightings of deer would be increased with a managed woodlot-fringe providing such attractions as salt licks, water, food and cover, all located in close proximity. The featured excavation will offer insight into the operations of the cement plant and how the site has been formed. This is seen as a changing program as work progresses. Finally, access should be provided to the regional corridor to further the interpretive opportunity for the visitor.



administration

OPERATING PERIODS

The program, as discussed, should be considered on a seven-month basis with an additional one-to-two-month partial program. During winter, the interpretive program is expected to be greatly decreased with the nature trails open for groups and limited public use to maintain ongoing interest with the centre. If demand warranted it during this period, occasional presentations at the centre on issues relating to the program should be considered. The staff naturalist's position should be considered to be full-time with the winter period a time for planning and preparation of the program for the next season.

STAFFING

Staffing is often an area overlooked when considering further development of a facility. In the case of Fort Whyte definite commitments should be made to a core of permanent staff before the nature centre is expanded. Figure 24 indicates a suitable staff complement.

The core of four permanent staff would be responsible for the various duties involved in the operation of the nature centre. Included at the top of the chart is the Director of the nature centre who would oversee promotional and administrative functions. Reporting to the Director would be the Naturalist and Maintenance Foreman who control interpretive and maintenance aspects respectively, of the nature centre. The final full-time position is that of the receptionist/secretary for a full range of support staff duties. One of the prime reasons for the four-person core is to ensure high quality, responsible supervision of the seasonal staff. During the winter the focus of most tasks

will be the organization and improvement of the program for the next season.

Varying terms and job duties should be considered for the seasonal staff who would report directly to the three permanent staff under the Director. It should be anticipated that at least one receptionist, five labourers, including concession operators and four interpreters would be required during peak periods. Day-use figures and program success should be studied to ensure high visitor satisfaction and a comparably high level of site management. From this, a review of the staff requirements can be made and the force adjusted as the study recommends.

Without a commitment to the designated staff, both facilities and programs will suffer.

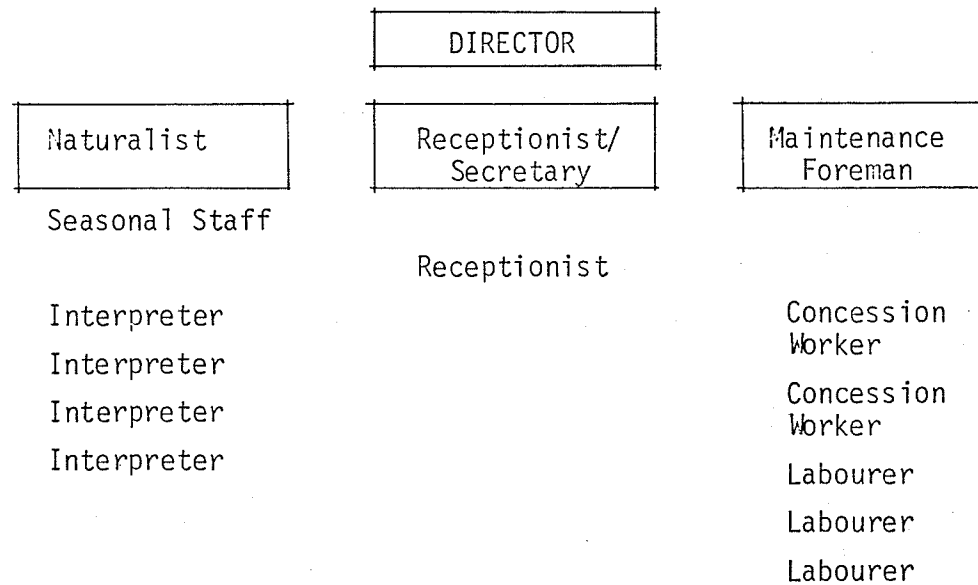


FIGURE 24
Staffing Chart

MANAGEMENT POLICIES

The intent of this section is to propose management guidelines relating to the major activities and facilities of the nature centre.

1. Program Development

- Co-ordinate with civic and provincial interpretive programs.
- Consult with outdoor education representatives to integrate into school curricula.

2. Environmental Quality

- Periodic testing of water quality to assure a high water quality.
- Monitor all fragile and unique features for adverse impacts.
- Observe display ponds and waterfowl to ensure disease-free, aesthetic conditions.
- Monitor woodlot to ensure deer seclusion during winter periods.
- Prohibit removal of any flora and fauna.

3. Group Use

- Make reservations for all groups requiring the Naturalist's guidance.
- Restrict bookings for groups of more than 30 students to one in the morning and one in the afternoon.
- Restrict bookings to groups of less than 60 people.

4. Recreational Activities

- Do not allow intensive recreational activities or sports.

- Restrict picnicking to the shelters, pavilion or the concession area.
- Restrict hiking and bicycling to designated trails.

5. Lake Use

- Do not allow swimming or wading in ponds or lakes.
- Do not allow boats or canoes on the lakes except for maintenance purposes or with written consent of the Naturalist.

6. Winter Use

- Allow visitors on foot or snowshoes to use nature trails.
- Allow cross-country skiing only if a trail is developed in the regional corridor.
- Do not allow skating.
- Do not allow snowmobiles or off-road vehicles.

7. Research

- Encourage research activities with the approval of the resident Naturalist.
- Allow existing research programs to continue to completion.
- Do not allow permanent structures for storage of research instruments or tools.
- Require approval from the Naturalist for all temporary structures.
- Reject research programmes which could be detrimental to existing environmental conditions.
- Have results of research programs made available to the library of the nature centre.

IMPLEMENTATION STRATEGY

This section deals with a general outline of the proposed phasing of Fort Whyte Nature Centre. These phases indicate the priorities for development but do not relate to a specific time frame.

Phase I

The purpose of this first phase is to establish, protect and prepare the nature centre for the subsequent developmental phases.

1. Secure long-term commitments from Canada Cement (Lafarge) Limited and delineate a boundary for the nature centre.
2. Develop a management policy for the site.
3. Secure commitments from the City of Winnipeg to ensure their participation in regional corridor development, zoning and preservation.
4. Refine architectural and detailed landscape architectural plans.
5. Refine the interpretive program in conjunction with a Naturalist.
6. Secure all required permits as they pertain to building construction and migratory birds.
7. Establish a continuing fund for staffing and maintenance.

Phase II

Once a solid basis for the nature centre is established, Phase II can begin. The purpose is to develop the nature centre to an operational level.

1. Construct waterfowl ponds, outdoor display area, shelter and docks for ferry in intensive-use area, and path to extensive use area, complete with planting.
2. Upgrade reception building to accommodate storage area and concession.
3. Construct parking lot, entrance road, service lot, entry pond and walkways complete with planting.

Phase III

This phase will commence once the centre is operational. The intent is to establish areas which will require time to mature.

1. Develop habitat interpretation ponds, waterfowl islands, scraper marsh.
2. Implement a planting plan to develop buffers around the lakes, the habitat pond and to screen the cement plant.
3. Construct and reinforce spits as designated and begin planting plan.
4. Develop pumping station.

Phase IV

Development will be continued in Phase IV.

1. Complete habitat interpretive ponds including viewing areas, observation tower, path system.
2. Develop nature trails as designated and in conjunction with Canada Cement (Lafarge) Limited where required.

3. Construct observation towers and shelter in extensive use area.

Phase V

This final phase will complete the development of the nature centre.

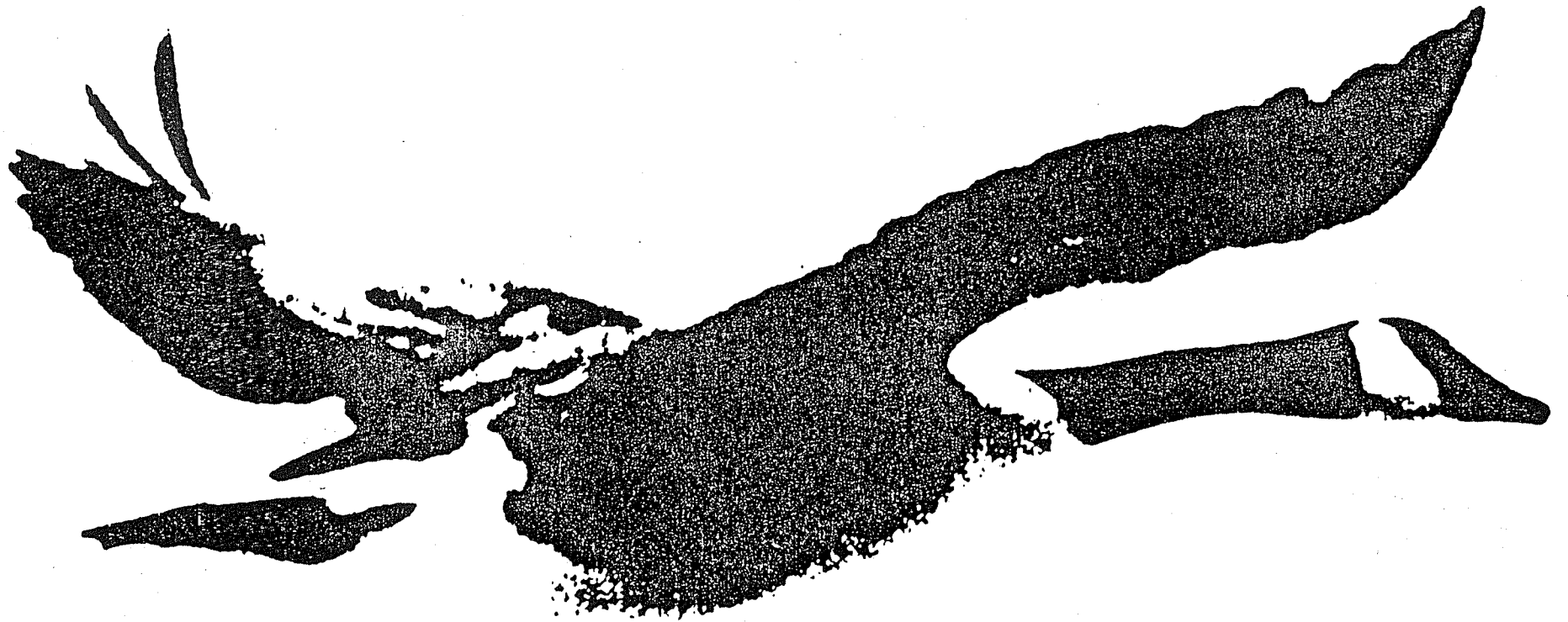
1. Construct dock on north shore for ferry and develop ferry-link.
2. Develop hiking trail around reservoir lakes.
3. Develop bicycle path in conjunction with City of Winnipeg.



conclusion

CONCLUSION

The Fort Whyte Nature Centre will become a major feature of interpretation in the City of Winnipeg. Not only will it fill a gap in the present system with the display of waterfowl, part of the natural heritage of Manitoba, but also it will serve as an introduction to many of the other interpretive areas throughout the Province. The proximity of the site to the industrial area of Canada Cement (Lafarge) Limited will serve as an example of how industry can live beside and contribute to an interpretive facility. The Fort Whyte Nature Centre through the management of the Wildlife Foundation of Manitoba and in co-operation of Canada Cement (Lafarge) Limited, will become a leader in interpretation for Winnipeg and the Prairie Region.



appendices

APPENDIX 1
EXISTING FLORA IN THE REGION¹

¹The Establishment of Assiniboine Forest as an Urban Wilderness Park: Feasibility Study.
Winnipeg: City of Winnipeg, Parks and Protection Division, 1974.

FAMILY: TYPHACEAE

Cattail Family

Typha latifolia	Common Cattail
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FAMILY: GRAMINEAE

Grass Family

<u>Poa sp.</u>	Bluegrass
<u>Beckmannia syzigachne</u>	Slough Grass
<u>Stipa sparea</u>	Porcupine Grass
<u>Spartina pectinata</u>	Cord Grass
<u>Phleum pratense</u>	Timothy
<u>Agrostis scabra</u>	Bentgrass
<u>Agropyron trachycaulum</u>	Slender Wheatgrass
<u>Adropogon gerardii</u>	Big Bluestem
<u>Bromus inermis</u>	Brome Grass

FAMILY: CYPERACEAE

Sedge Family

Carex sp.	Sedge
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FAMILY: LILIACEAE

Lily Family

<u>Lilium philadelphicum</u>	Western Wood Lily
<u>Polygonatum canaliculatum</u>	Common Solomon's-seal
<u>Smilacina racemosa</u>	Solomon's-seal
<u>Smilax herbacea</u>	Carrionflower

FAMILY: SALICACEAE

Willow Family

Salix discolor
Salix interior
Salix planifolia
Populus tremuloides
Populus balsamifera

Pussy Willow
 Sandbar Willow
 Flat-leaved Willow
 Trembling Aspen
 Balsam Poplar

FAMILY: FAGACEAE

Beach Family

Quercus macrocarpa

Bur Oak

FAMILY: ULMACEAE

Elm Family

Ulmus americana

American Elm

FAMILY: CORYLACEAE

Hazel Family

Corylus americana
Corylus cornuta

American Hazelnut
 Beaked Hazelnut

FAMILY: POLYGONACEAE

Buckwheat Family

Rumex crispus

Yellow Dock

FAMILY: RANUNCULACEAE

Anemone canadensis
Aquilegia canadensis

Canada Anemone
 Wild Columbine

FAMILY: RANUNCULACEAE (Contd.)

<u>Caltha palustris</u>	Marsh-marigold
<u>Ranunculus</u>	Bristly Buttercup
<u>Thalictrum</u>	Meadow-rue

FAMILY: ROSACEAE

Rose Family

<u>Amelanchier alnifolia</u>	Saskatoon
<u>Crataegus sp.</u>	Hawthorn
<u>Fragaria virginiana</u>	Wild Strawberry
<u>Geum triflorum</u>	Three-flowered Avens
<u>Potentilla anserina</u>	Silverweed
<u>Potentilla sp.</u>	Cinquefoil
<u>Rosa blanda</u>	Smooth Rose
<u>Rubus ideaus</u>	Raspberry
<u>Spiraea alba</u>	Narrow-leaved Meadowsweet
<u>Prunus virginiana</u>	Chokecherry
<u>Prunus nigra</u>	Wild Plum

FAMILY: LEGUMINOSAE

Pea Family

<u>Astragalus sp.</u>	Milk-vetch
<u>Glycyrrhiza lepidota</u>	Wild Licorice
<u>Lathyrus ochroleucus</u>	Cream-coloured Vetchling
<u>Medicago sativa</u>	Alfalfa
<u>Melilotus officinalis</u>	Yellow Sweet-clover
<u>Trifolium hybridum</u>	Alsike
<u>Trifolium pratense</u>	Red Clover
<u>Vicia americana</u>	American Vetch
<u>Vicia oracca</u>	Canada Pea
<u>Melilotus alba</u>	White Melilot

FAMILY: POLYGALACEAE

Milkwort FamilyPolygala senega Seneca Snakeroot

FAMILY: VIOLACEAE

Violet FamilyViola pensylvanica Yellow Violet

FAMILY: ONAGRACEAE

Evening-primrose FamilyEpilobium angustifolium Fireweed

FAMILY: ARALIACEAE

Ginseng FamilyAralia nudicaulis Wild Sarsaparilla

FAMILY: UMBELLIFERAE

Parsley FamilySium suave Water Parsnip
Zizia aurea Golden Alexander

FAMILY: CORNACEAE

Dogwood FamilyCornus stolonifera Red-osier Dogwood

FAMILY: PYROLACEAE

Wintergreen FamilyPyrola asarifolia Pink Wintergreen

FAMILY: GENTIANACEAE

Gentian FamilyGentiana andrewsii Closed GentianGentiana puberula Downy Gentian

FAMILY: APOCYNACEAE

Dogbane FamilyApocynum androsaemifolium Spreading Dogbane

FAMILY: ASCLEPIADACEAE

Milkweed FamilyAsclepias syriaca Common Milkweed

FAMILY: CONVULVACEAE

Convolvulus FamilyConvolvulus sepium Wild Morning-glory

FAMILY: LABIATAE

Agastache foeniculum Giant-hyssopMentha arvensis MintMonarda fistulosa Wild BergamotStachys tenuifolia Smooth Hedge-Nettle

FAMILY: CAPRIFOLIACEAE

Honeysuckle Family

<u>Lonicera dioica</u>	Twining Honeysuckle
<u>Symphoricarpos albus</u>	Snowberry
<u>Viburnum rafinesquianum</u>	Downy Arrowwood
<u>Viburnum trilobum</u>	High-bush Cranberry
<u>Viburnum lentago</u>	Nannyberry

FAMILY: CAMPANULACEAE

Bluebell Family

<u>Campanula rapunculoides</u>	Harebell
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FAMILY: COMPOSITAE

Composite Family

<u>Sonchus sp.</u>	Sow-thistle
<u>Taraxacum officinale</u>	Dandelion
<u>Achillea lanulos</u>	Woolly Yarrow
<u>Helianthus laefiflorus</u>	Showy Sunflower
<u>Helianthus maximiliani</u>	Narrow-leaved Sunflower
<u>Helianthus tuberosus</u>	Jerusalem Artichoke
<u>Lactuca pulchella</u>	Blue Lettuce
<u>Arctium lappa</u>	Common Burdock
<u>Artemisia frigida</u>	Pasture Sage
<u>Artemisia ludoviciana</u>	White Sage
<u>Artemisia vulgaris</u>	Common Mugwort
<u>Aster brachyactis</u>	Rayless Aster
<u>Aster laevis</u>	Smooth Aster
<u>Aster pansus</u>	Many-flowered Aster
<u>Aster simplex</u>	Panicled Aster
<u>Cirsium arvense</u>	Canada Thistle
<u>Cirsium sp.</u>	Thistle
<u>Cirsium discolor</u>	Tall Thistle

Erigeron strigosus
Grindelia perennis
Liatris punctata
Rudbeckia serotina
Senecio sp.
Solidago sp.

Daisy Fleabane
 Gum Weed
 Dotted Blazingstar
 Black-eyed Susan
 Groundsel
 Goldenrod

FAMILY: ANACARDIACEAE

Cashew Family

Rhus radicans

Poison Ivy

FAMILY: PLANTAGINACEAE

Plantain Family

Plantago major

Plantain

FAMILY: ORCHIDACEAE

Orchis Family

Cypripedium calceolus

Small Yellow Lady's Slipper

APPENDIX 2
EXISTING MAMMALS IN THE REGION¹

¹The Establishment of Assiniboine Forest as an Urban Wilderness Park: Feasibility Study.
Winnipeg: City of Winnipeg, Parks and Protection Division, 1974.

ORDER: INSECTIVORA

FAMILY: SORICIDAE

Shrews

Sorex cinereus
Microsorex hoyi
Blarina brevicauda

Masked Shrew
 Pygmy Shrew
 Short-tailed Shrew

ORDER: CHIROPTERA

FAMILY: VESPERTILIONIDAE

Plainnose Bats

Lasiurus cinereus
Myotis lucifugus
Lasiurus borealis
Lasionycteris noctivagans

Hoary Bat
 Little Brown Myotis
 Red Bat
 Silver-haired Bat

ORDER: LAGOMORPHA

FAMILY: LEPORIDAE

Hares and Rabbits

Sylvilagus floridanus
Lepus americanus
Lepus townsendii

Eastern Cottontail
 Snowshoe Hare
 White-tailed Jack-rabbit

ORDER: RODENTIA

FAMILY: SCIURIDAE

Squirrels

Tamias striatus

Eastern Chipmunk

Squirrels (Contd).

<u>Citellus franklinii</u>	Franklin's Ground Squirrel
<u>Citellus tridecemlineatus</u>	Thirteen-lined Ground Squirrel
<u>Sciurus carolinensis</u>	Eastern Gray Squirrel
<u>Tamiasciurus hudsonicus</u>	Red Squirrel (Spruce Squirrel)

FAMILY: CRICETIDAE

Mice and Voles

<u>Peromyscus maniculatus</u>	Deer Mouse
<u>Clethrionomys gapperi</u>	Boreal Red-backed Vole
<u>Microtus pennsylvanicus</u>	Meadow Vole

FAMILY: ZAPODIDAE

Jumping Mice

<u>Zapus hudsonius</u>	Meadow Jumping Mouse
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ORDER: CARNIVORA

FAMILY: CANIDAE

Dogs, Wolves and Foxes

<u>Canis latrans</u>	Coyote (Brush Wolf)
<u>Vulpes vulpes</u>	Red Fox

FAMILY: PROCYONIDAE

Raccoons

<u>Procyon lotor</u>	Raccoon (Coon, Ringtail)
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FAMILY: MUSTELIDAE

Weasels and Skunks

<u>Mustela erminea</u>	Short-tailed Weasel (Ermine)
<u>Mustela nivalis</u>	Least Weasel
<u>Mustela frenata</u>	Long-tailed Weasel
<u>Mephitis mephitis</u>	Striped Skunk

FAMILY: FELIDAE

Cats

<u>Lynx canadensis</u>	Lynx
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ORDER: ARTIODACTYLA

FAMILY: CERVIDAE

Deer

<u>Odocoileus virginianus</u>	White-tailed Deer
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APPENDIX 3
COMMON BIRDS IN THE REGION¹

¹The Establishment of Assiniboine Forest as an Urban Wilderness Park: Feasibility Study.
Winnipeg: City of Winnipeg, Parks and Protection Division, 1974.

Permanent Residents

Hairy Woodpecker
 Downy Woodpecker
 Blue Jay
 Black-capped Chickadee
 White-breasted Nuthatch

Sharp-tailed Grouse (past)
 Ruffed Grouse (past)
 Great-Horned Owl
 Ring-necked Pheasant (past)
 Gray Partridge

Summer Residents

Killdeer
 Mourning Dove
 Ruby-throated Hummingbird
 Common Flicker
 Eastern Kingbird
 Western Kingbird
 Great Crested Flycatcher
 Barn Swallow
 Common Crow
 House Wren
 Catbird
 Brown Thrasher
 American Robin
 Cedar Waxwing
 Yellow Warbler
 Western Meadowlark
 Baltimore Oriole

Brewer's Blackbird
 Brown-headed Cowbird
 Rose-breasted Grosbeak
 American Goldfinch
 Savannah Sparrow
 Chipping Sparrow
 Clay-coloured Sparrow
 Red-winged Blackbird
 Common Snipe
 Common Nighthawk
 Swamp Sparrow
 Short-eared Owl
 Long-eared Owl
 Screech Owl
 Song Sparrow
 Indigo Bunting

Migrants

Rough-legged Hawk
 Red-tailed Hawk
 Kestrel
 Yellow-bellied Sapsucker
 Hermit Thrush
 Golden-crowned Kinglet

Teal
 Gadwall
 American Widgeon
 Mallard
 Grey-cheeked Thrush
 Swainson's Thrush

Migrants (Contd).

Ruby-crowned Kinglet
Black-and-white Warbler
Myrtle Warbler
Mourning Warbler
Slate-coloured Junco
Tree Sparrow

Red Crossbill
Blackpoll Warbler
American Redstart
Scarlet Tanager
Brown Creeper
Eastern Bluebird

Note: A total of approximately 200 different species of birds have been sighted at least once in the region since 1979.

APPENDIX 4
WHITE-TAILED DEER

GENERAL INFORMATION

White-tailed deer require food, water and cover in combination to survive and produce young. This mammal found suitable requirements in Manitoba about one century ago as the settlers cleared and opened the forests. The edge of settlers' clearings developed into thick borders of shrubs and seedlings attractive to the white-tailed deer. Where this habitat flourished, a deer could spend its entire life within a one square mile. In excellent habitat, about 40 deer could be found within that area. More often, however, deer will move several miles to obtain seasonal habitat but will still use only a small area at a time.

Cover is required to shelter deer from the weather, insects and predators. In Manitoba, winter cover is extremely important since deer begin to lose weight once temperatures drop below freezing. When extremely cold, deer will not leave their cover to obtain food. Therefore, it is extremely important that food be available in areas of winter cover. Favourite forms of cover include thick shrubs, tall leafy plants and clumps of evergreen trees. In addition to the vegetation, a rugged terrain will enhance the habitat. Marsh areas can often be utilized since such tall vegetation as reed grass will provide good windbreaks and maintain an insulating blanket of snow.

Within their habitat deer will feed on a wide variety of plants. In winter the primary food is twigs of shrubs and trees or available herbaceous plants. This will usually vary during other seasons. The summer brings supplies of wild herbaceous plants and the foliage of trees and shrubs. Desirable plants include dandelions, clovers, pea vine, alfalfa and mushrooms. During the autumn,

grain crops, natural browse and acorns become food. At the beginning of winter the fruits of snow-berry are important, and later aspen, hazel, saskatoon, chokecherry, red-osier dogwood, black poplar and rose. Southern exposures with abundant food are critical during the spring when the females, in weakened condition must support fawns. Alfalfa fields, if close to cover, are used extensively. Generally, the most browsed areas of Manitoba are those with hazel brush, and aspen saplings and seedlings. If, however, too much aspen is present the habitat will soon become unsuitable to the deer due to the rapid growth of the aspen. Access to water and snow is vital even though much of a deer's water requirement is satisfied through eating succulent vegetation. Water should not be further away than one day's travel, and should be in or near thick cover to protect the deer from predators.

APPENDIX 5
WILDLIFE CORRIDOR DEVELOPMENT

THE URBAN DEER HERD OF WINNIPEG

Winnipeg's herd of deer is unique for a city of 600,000 people in North America. The herd is spread over numerous areas of the city and region with the largest concentration in the Tuxedo-Charleswood area. The first white-tailed deer appeared in Manitoba about 1881, with Charleswood one of the areas of the city where they were first observed.

As the city continues to grow and the deer habitat dwindles, only careful open-space planning and management will ensure the free-ranging herd will remain in Winnipeg. Collisions with motor vehicles, their browsing of ornamental plants and trampling of gardens, and numerous incidents of harassment by people are the drawbacks to having a herd in Winnipeg. However, the opportunity for urban dwellers to observe deer and other wildlife and to experience their habitat more than compensates for the problems experienced.

To maintain this herd the home range must be kept accessible and managed from the Assiniboine River south to the La Salle River. With each development in the area, this becomes more and more difficult. For instance, high-rise apartments are proposed for the Tuxedo Golf Course, and the growth of industry, led by the C.N.R.'s piggyback terminal, is underway. There is pressure from residents throughout the area, and major changes in transportation with upgrading of roads and development of freeways will result in additional conflicts. Even the deer are their own enemies. The present habitat is not capable of maintaining the current size of herd. The winter food at present is supplemented by leftover sugar beets, waste hay, grain and alfalfa pellets in the area. The

summer sees a dispersion of the herd into isolated woodlots, fence rows, and grain fields. With the eventual development of much of this land, it is unrealistic to expect more than 24-30 deer to survive in a free-ranging herd. Even with this as a goal, careful management and planning is required for success.

DEVELOPMENTAL ISSUES

Study of the region has uncovered a number of pressures, proposals and problems encountered in the development of a natural corridor. The regional map (Figure 25) indicates the major areas of issues noted with letters as related to the following discussion.

A. C.N.R. Piggback Terminal

Construction of the terminal began in 1976 and is now complete. This was a very controversial project with the Federal Government's environmental impact statement of the site being unacceptable to both the City Council and the area's residents for such reasons as noise and traffic. For the deer it poses other problems. The terminal is located directly on the old travel and dispersion route from the Assiniboine Forest to the industrial plants' forests. The increased truck and railway traffic has eliminated this dispersal route.

B. Proposed Freeway and Upgrading of Wilkes Avenue

The Southern Freeway and Suburban Beltway have been proposed for this area. Although only one of these is likely to be developed, either would drastically restrict movement of deer in and out of

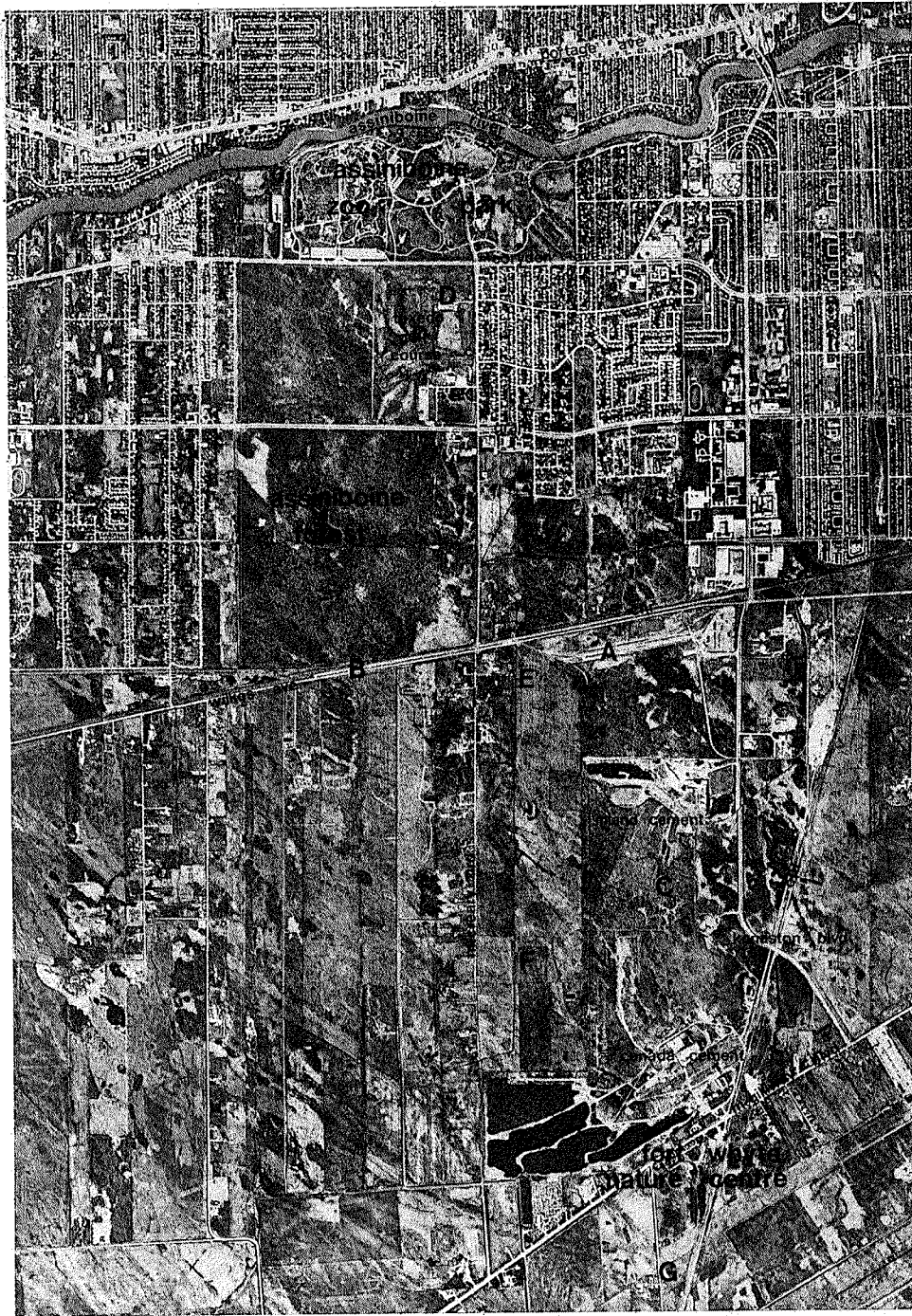


FIGURE 25
REGIONAL DEVELOPMENT ISSUES

the southern portion of the Assiniboine Forest. Even the upgrading of Wilkes Avenue to serve the piggyback terminal is detrimental. Provision for such movement of deer must be associated with any further development.

C. Excavation

Inland Cement and Canada Cement control a large forested area which is the site of expected future excavation. The forest has never been specifically managed for wildlife but remains prime habitat. If this area was turned into excavation sites, without proper planning, prime wintering habitat would be lost.

D. Tuxedo Golf Course

Urban expansion is a major issue faced by the golf course. If the sale of the golf course is approved by the City Council, the proposed high-rise apartments would become a reality. This would dramatically increase the population of the area and require stricter control of public access and penetration into the forest.

E. North-South Linkage

This area represents a key link in the development of the natural corridor. If development proceeds, the system can not exist in the future without this link. The loss of the deer would be inevitable since the Assiniboine Forest is not capable of supporting a herd year-round. If a link is not considered feasible then recreational potential for the region will be substantially reduced.

F. Rural Linkages

One of the major dispersal routes to the La Salle River is along the railway tracks through numerous woodlots. This land must also be protected to maintain the transient herd's connection to the wintering grounds.

Other issues of concern include the general increase of industrial and residential pressure on adjacent areas plus the increased traffic level associated with future development. At present in the area there are many other problems which result in death to deer. Other than deer/car accidents, these do not have a significant effect on deer populations but include illegal shooting, parasites, diseases and harassment by humans and dog packs. Road accidents kill an average of 27 deer per year and must be dealt with directly by providing free movement of deer through the system.

CORRIDOR PROPOSAL

The regional system, although considered to be a "natural" corridor, is not solely for wildlife. The concept (Figure 26) provides free movement of the deer throughout the region while developing a limited-access recreational system for extensive use. The extensive uses such as hiking, cycling, skiing, etc., will link together recreational opportunities at the Fort Whyte nature centre, the Assiniboine Forest, Zoo and Park. The corridor will eliminate any problems in the Wilkes Avenue area through the use of an underpass for people and wildlife.



FIGURE 26
Regional Corridor Concept

The underpass will be the major expenditure in the system and would be developed along with the upgrading of Wilkes Avenue. Design consideration of such an underpass should include the needs of the deer. A wide, open-expanse bridge is required to encourage the deer to pass through underneath. Good natural cover should be provided at each end of the bridge for added encouragement. The underpass should be located to benefit the most recent major dispersal route of the deer. The recreational corridor provided should be fenced and buffered from the wildlife area. The width of this system could be quite small at this point.

From the underpass southward the corridor will link the major woodlots including the wintering grounds. The minimum width of the corridor should be 600 feet to provide satisfactory seclusion for the deer. Buffers along this route should be provided for noise control, and as visual and physical barriers. These will be most critical where adjacent land-uses include residential or industrial development. A minimum 50-foot strip of dense mixed vegetation is required for partial noise control.

RECOMMENDATIONS FOR DEVELOPMENT

General on-site management of the corridor system is required and will include: isolating forest preserves from visitor-use, fencing to restrict access of people and dogs but not deer, fencing to prevent deer crossing roads, managing for a stable food supply and deer population control by live-trapping when necessary. Vegetation management would include the encouragement of early succession in many open areas along the corridor with natural colonizing plants and reclamation of older over-mature stands with a young growth. Areas in critical stages of succession should be fenced in for access only by deer.

The management of the excavation by the cement plants is another aspect of major concern. A series of four cross-sections (Figures 27 and 28) illustrate a conceptual extraction strategy for the area between the two cement plants. The intent is to simultaneously develop the circulation corridor, deer habitat and excavation areas. A basic corridor is established in Figure 26, Section 2, with bicycle trail and succession zone on the existing agricultural field. This corridor is restricted from all excavation throughout the entire scheme. While this is being established, a previous pit is filled to create variable relief, and colonizing vegetation is established. Excavation is then carried on in another area. Section 3 in Figure 27 shows a further development with excavation in a new area and the filling of the previous pit. It should be expected that pressure would be exerted on the neighbouring field and a compatible development approved. A golf course to replace the Tuxedo Golf Course has been illustrated as such a development. The final stage, Section 4, shows a diverse character in the woodlot with various stages of succession involved. A light industrial development which is a compatible land use for the corridor, has been established along Kenaston Boulevard. Rather than disrupting the entire area, the planned system for excavation and reclamation would provide a more suitable forest condition than exists at present. The time span for the process would be great since the present rate of resource consumption is approximately two acres/year with a production expectancy of at least 40 years.

The last area of concern is the linkage to the rural woodlots. With increased traffic flow along

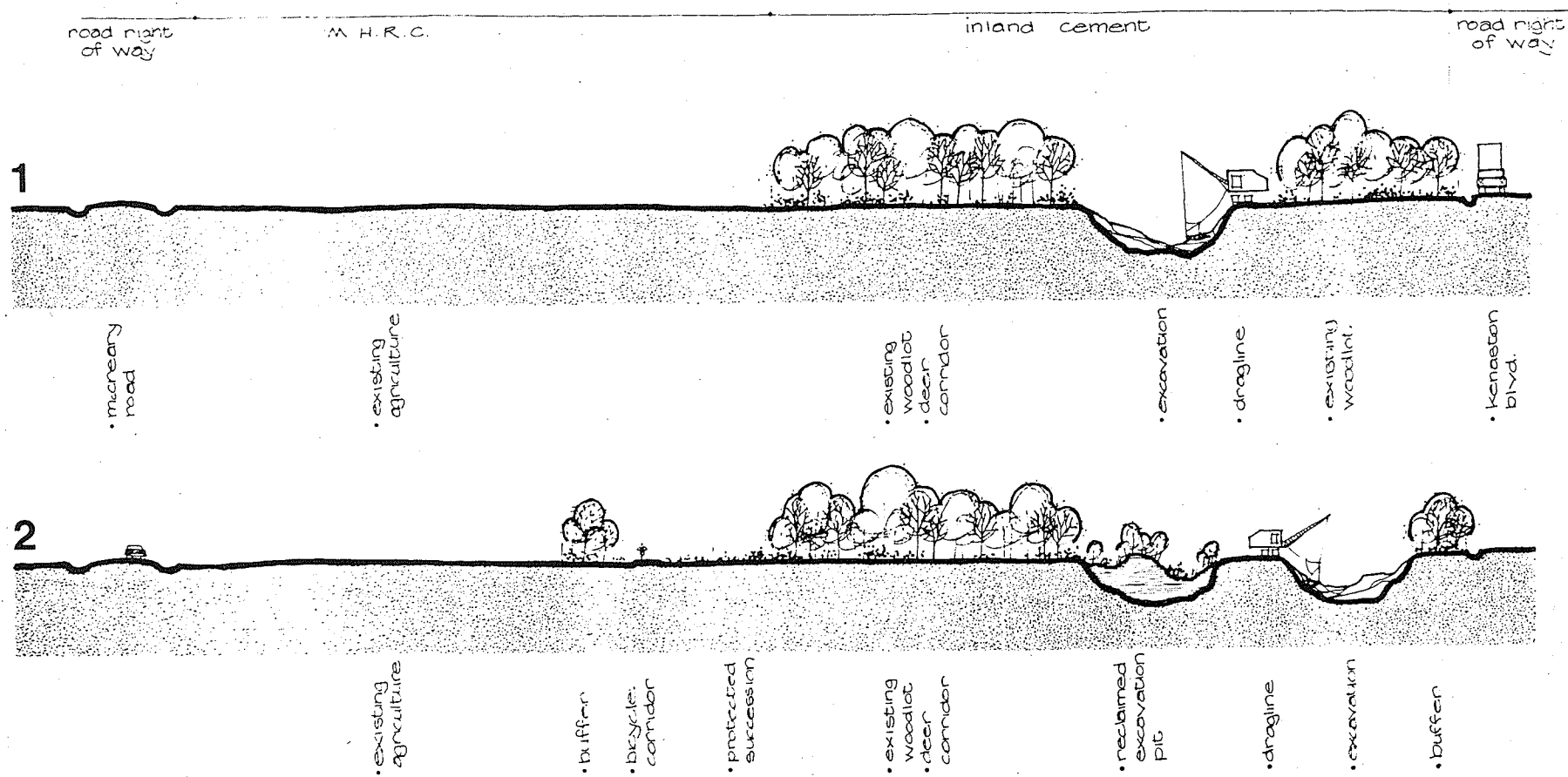


FIGURE 27

Conceptual Development Stages 1 and 2

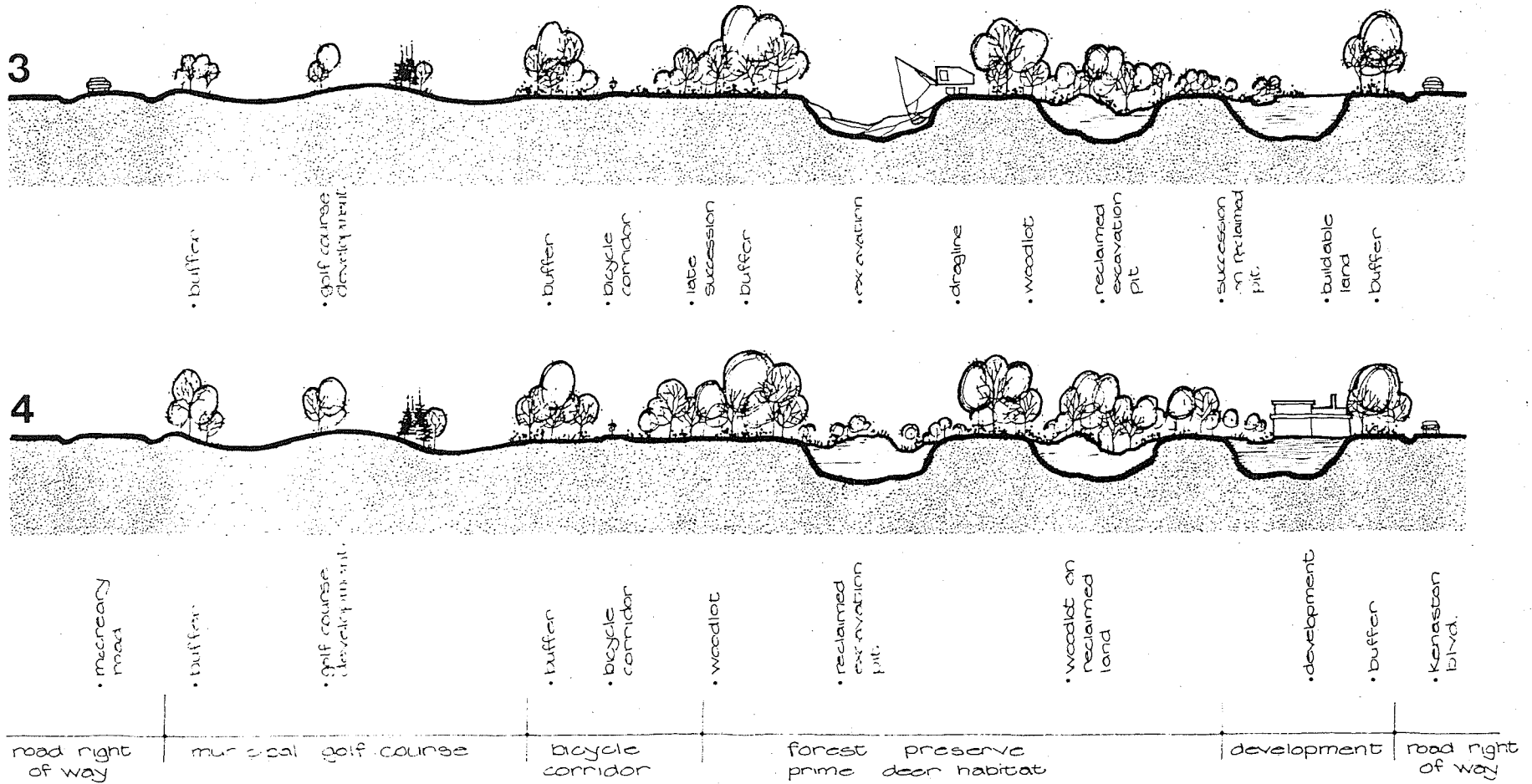


FIGURE 28

Conceptual Development Stages 3 and 4

McGillivray Boulevard due to urban growth, the last problem is the road crossing. A second underpass should be developed for both the natural corridor and the railway tracks, to be established when upgrading is required for McGillivray Boulevard. A final designation of preserved woodlots and corridor would complete the link from the Assiniboine Forest to the rural areas.

The final recommendation for the corridor would be to set up an Advisory Committee, including wildlife managers and biologists, to advise on specific wildlife management problems as they arise and to review applications for proposed land-use adjacent to the corridor.

The benefits of a successful corridor will be many, but the costs are great. It is a very rare occasion for a large city such as Winnipeg to be in a position to develop such a strong interpretive, recreational and natural system. The challenge should be met, for once the land is developed, the opportunity will be lost along with a prime sample of Manitoba's natural heritage.

APPENDIX 6

WATERFOWL

GENERAL INFORMATION

The Family Anatidae includes nearly 150 species of swans, geese and ducks. Of these, about 35 species can be seen in and around the Province of Manitoba, with 16 frequently visible. For the purposes of this study, these common natives of the Family Anatidae will be the waterfowl focused on. Ducks, referring to the smaller species of this family of waterfowl, are by far the most common of the birds.

Ducks can be separated into two distinct categories, dabblers and divers, distinguished primarily by their feeding habits. Dabblers are surface feeders obtaining most of their food by tipping or dabbling along the edge of shallow bodies of water. Puddle ducks, as they are also called, obtain mostly vegetable matter for their food. They are the most important group of ducks and include such varieties as the mallard, gadwall, pintail, green-winged teal, blue-winged teal, American widgeon, shoveler and wood duck. The second category of ducks, divers, as their name suggests, feed by diving for their food. They prefer ponds which are permanent in nature and maintain a depth of at least five feet in which to dive. A large part of their food consists of animal matter found along the bottom. Some species are known to dive to depths of 20-35 feet and remain underwater for about one minute in search of food. Ducks included in this group are the redhead, canvasback, lesser scaup, ring-necked duck, goldeneye and ruddy duck.

Other waterfowl of major importance in Manitoba include varieties of Canada geese, the snow goose and whistling swans. The Canada goose is a very common sight throughout many of the large Manitoba marshes and is the only one which breeds in this part of the Province.

Waterfowl, like all forms of wildlife, require three basic elements to survive: food, water and cover. In addition to these, loafing sites play an important part in the habitat requirements for waterfowl. Each species of waterfowl requires numerous elements in varying combinations to survive and carry on a breeding population. The focus of waterfowl habitat, natural or developed, is always water. This is the only requirement common to all species in the family. Throughout the world, waterfowl have been observed in tremendously varied habitat all with this one central characteristic, water. In Manitoba, most natural habitats are characterized by some open water, shallow water with emergent vegetation and upland cover. Islands are a favourite area both for nesting and loafing as they offer good predator-protection. Most ponds, potholes, small lakes and marshes offer these features and are suitable if there is water until late summer when the broods can fly. These water-based habitats contain a constant source of food for the birds whether animal or vegetable diets are involved. Some areas do not provide cover, which in many cases is either underdeveloped or totally lacking. Trees are not desired as a major component of cover except for wood ducks and goldeneye. Most dabbling ducks prefer cover in the form of grasses or low shrubs as they nest on the ground and need to be concealed on all four sides. Suitable cover is not required adjacent to the water as many birds are prepared to move upland 500 yards or more to obtain cover. The importance of the cover, in any case, is to conceal the birds from predators and protect them from the elements. The woodland areas, especially in the fringe zone, are rich in raccoons, red foxes, badgers, ground squirrels, skunks, owls, crows, etc., all predators of waterfowl. The

divers often nest in areas which are directly over water therefore their cover requirements change. They need a form of emergent vegetation, which will both support and conceal their nests. Open water is required in close proximity to allow for landing and take-offs.

Most waterfowl will nest at greater densities with lesser cover requirements if islands are present. The island itself provides good protection from predators and allows easy access to water. Islands are also used by waterfowl as loafing sites. Each day a bird desires time to sun and preen in an open, exposed area which is safe. After the male leaves the female, usually during incubation, these loafing sites will become densely populated by the males. Often islands as small as 16 square feet are used. Rocks, stumps, muskrat houses and floating mats of vegetation all satisfy the requirements of the birds in this area.

For some birds territory becomes a major part of nesting habitat. For most of our native birds the protection of the female is common, but the defense of a territory is limited. The territory of a duck is usually defined by enclosures of vegetation or other visual restrictions. A small inlet along the shore is a potential area to be defended. A male will usually defend the territory from other males of his species and occasionally other species. A territorial defence is often very fierce with the trespasser usually retreating.

It must be remembered that waterfowl, in general, feel much more secure when in the water than elsewhere. The dabblers are adapted to travel on land but the divers, the ruddy duck in particular, have much trouble when on land. For this reason it is beneficial to maintain habitat requirements close to the water.

FLYWAYS

Each year waterfowl make two major flights, north in the spring to their breeding grounds and south in the fall to their wintering grounds. For generations these migrations have been observed and their mysteries pondered. The destinations and the schedules of these trips remain constant, thus the concept of flyways has been accepted. A flyway is a geographical region over which many species migrate. It incorporates the southern wintering grounds and the northern breeding grounds plus a considerable width of corridor connecting the two. A flyway is not a route. Individual species take their own route within these major flyways. In North America there are four major flyways: the Atlantic, Pacific, Central and Mississippi. In some areas these migration routes overlap. Winnipeg, situated where the migrants of all but the Pacific Flyway can be seen on their journeys, is thus a prime location for the observation and study of waterfowl.

DISEASES

Botulism - Serious

- Caused by flooding of dry land during warm weather which results in the drowning of terrestrial invertebrates and provides nutrient medium for bacteria.
- Receding water-levels which expose mud flats causing the death of aquatic invertebrates and providing a suitable nutrient medium.
- Changes in water quality resulting in death of invertebrate fauna.
- Decaying animal carcasses producing maggots caused by a toxin from anaerobic bacteria.

Fowl Cholera - Serious

- Caused by a bacterium associated with poultry.
- Introduced by contact with domestic birds through contaminated soil, food and water.
- Spread by a diseased bird carrier.
- Rapid spreading in dense number.

Duck Virus Enteritis - Serious

- Not very predictable.

Leucocytozoorosis

- Transmitted by black flies.
- Where black flies and waterfowl share same habitat high incidence in waterfowl.

Intoxications

- Result of careless management, visitors or sadists.
- Sources: build-up of rock salt from winter use, pesticides in grain carrier, granular fertilizers, herbicides, lead poisoning from lead shot, blue-green algae and toxic terrestrial plants.

Frostbite

- Webs of feet susceptible.

Frostbite Contd.

- Once frozen, webbing will be lost.
- Bird can die from bacteria entering through injured blood cells.

APPENDIX 7
HABITAT DEVELOPMENT AND MANAGEMENT

WATER

- Fresh, clean, flowing, constant water supply permanent throughout the season.
- Shallow areas and open water required.
- Permanent water opening, minimum 500 square feet, irregular form with many inlets, small bays and islands throughout.
- Banks, 5:1 maximum.
- Minimum size, 2 acres with half of pond 3 foot maximum depth.
- One-third of shoreline is brush or trees.
- Natural appearance most acceptable.
- Grassy banks for sitting, preening, standing, loafing in the sun.
- Sandy soil best ground.
- Prone to pond edge erosion, a solution is to edge with pebbles, mesh and grass.
- Pond edge maximum slope 22° for ducklings.
- Constant water level to reduce erosion and disease.
- No exposed mud flats because they could cause botulism.

COVER

- Diverse more suitable than single vegetation type.
- Minimum of 10 acres if not fenced for predator protection.
- Dabblers, 2-4 acres cover/acre of marsh.

- Two-thirds grass, one-third legume good combination for cover.
- Natural cover increases nesting opportunity.
- Allow areas for escape of less dominant bird species from aggressive birds.
- Windbreaks, sun screens, shade required.
- High clump grasses and low shrubs desirable.
- Too much cover results in poor human surveillance.
- Grazing for geese requires short upland grasslands.
- Native planting costs less to establish and maintain.

LOAFING

- Muskrat houses, stone piles, islands, partly submerged logs are used.
- Logs should be firmly anchored.
- Four or five sites/acre of marsh recommended.

FOOD

- Require some green forage.
- Most live on a wide variety of food.
- Delta Turkey Starter and No. 1 grade wheat add Furazolidone for disease, 2 lbs./ton is a basic diet.
- For goldeneye add ground rabbit meal.

- For ruddy duck add minerals, protein like midge fly larvae.
- For redheads also add animal material.
- Commercial duck rations poor since they are designed for maximum growth for retail.
- Grit required to digest food and strengthen stomach.
- Never use green food as a major part of diet.
- Excess feed should never be left around feeders, old feed is a source of respiratory disease.
- Feed only as much as they consume.
- Large volume feeders are poor as they spoil feed too quickly.
- During wet rainy weather feed only wheat.
- Feeders: plastic wash basins with about 1 gallon capacity are good.
- Feeders with a base of concrete or plywood are easily cleaned.
- Feeders should be spaced evenly not concentrated in one area.

FEEDING

Spring and Summer

1/2 trout chow

1/2 game bird F & M chow, supplemented with oyster shell and grass

Fall

3/4 game bird chow

1/4 trout chow

Winter

1/2 game bird chow, 1/4 trout chow, 1/4 scratch

ISLAND NESTING

- Geese and gadwalls, high percentage nest on island.
- Pintail and mallards, good density increase with island nesting.
- Redheads and lesser scaup attracted to smaller islands.
- Geese prefer bare sites with variable cover.
- Usually weeds like Canada thistle or nettles preferred to grass.
- Gadwalls and mallards require more concealment.
- Islands 0.3-1.0 acres in size with density of 20-80 sites/acre.

ISLAND CONSTRUCTION

- Fifteen to thirty feet width is required.
- Surrounding water, 100 feet minimum to shore.
- Minimum depth, 18 inches.
- Thick layer of coarse gravel along water's edge.
- Erosion problems from wind and burrowing animals.

PENS

- Fencing 6 feet high, 11 gauge galvanized mesh.
- Posts of wood or pipe (pipe more durable).
- Use mesh underground, 2-2 1/2 feet deep.
- One inch mesh in lower sections for ducklings.

- Use solid wood across water areas.
- Minimum size pen, 6 ft. x 12 ft., one pair of waterfowl.
- Pen 60 ft. x 40 ft. sufficient for 12 compatible pairs of birds provided grass and shrubs are incorporated.
- Maximum breeding 23 types of birds possible in 40' x 40' pen.
- Breeding pen 8 ft. x 18 ft. is a common size.
- Parallel low voltage wires 2 feet below top of fence and 2 feet above ground for predator control.
- Gates must fit tightly.
- Flashing lights 15 feet above ground, bright white or blue light to prevent owl predation if it is a problem.

CAPTIVITY INFORMATION

- Easily adaptable species wood duck, mallard, teal and pintail.
- Keep extra drakes separate.
- Keep teals separate with broods.
- Do not overcrowd ducklings.
- Keep adolescents separate from adults until ten weeks old.
- Lesser scaup and ring-necked ducks are less active and should be separated.
- Shovelers and blue-winged teal can be arranged side-by-side around pond.

- Key to density is restriction of vision.
- Wood ducks readily accept nesting boxes.
- Canvasback seldom breed in captivity.
- No definite rules for breeding success.

BREEDING REQUIREMENTS

- Nutrition (see feeding).
- Physically and emotionally ready.
- Require proper nest sites, well planted island and shoreline to escape other birds and weather.
- Moving birds should be avoided although it may stimulate them.
- Pen individually dominant and docile for breeding.
- Abundance of drakes could cause stress on similar species.
- First and last eggs are usually infertile.

CARE OF EGGS

- Need clean nesting material.
- Store clutches at 40°-45° not over 7 days.
- Collect eggs each day and leave wooden dummies.
- Let hen sit about a week before removing eggs.
- Redheads often lay in other nests.

- If not hatched naturally ducklings can drown in water due to lack of natural oil.

BREEDING PENS

- Natural environment more acceptable within pens.
- Protect from human disturbance at breeding time.
- Only a few pairs of any species in each pen.
- Density can be higher if visual contact is reduced.
- Feeders should be spaced evenly but spread out.

WINTERING

- Mallard, canvasback, redhead, pintail, scaup, wood duck can withstand colder weather.
- Polyethylene shelter recommended for north wall.
- Open water required if birds are allowed outside.
- Teal, shoveler, gadwall, ruddy duck should be kept inside as they are less hardy.
- Indoor pen 10 ft. x 14 ft. will keep 30 birds.
- Temperature 40°-45°F.
- Continuous fresh water for swimming required indoors.
- Birds cannot be healthier in spring than before winter.
- Seven square ft. area required by mallards and similar species.
- Four square ft. area required by teal and similar-sized birds.

- Very little aggressiveness in winter so birds can be confined in smaller areas.
- Birds outdoors are kept in phase with season and changing day lengths, therefore they are better prepared for the breeding season.
- Wintering weeds out weaker birds.
- Many birds become stressed by overcrowding which results in feather picking, poorly groomed plumage, loss of appetite, abnormal posture.
- Separate immediately upon evidence of stress as it will affect breeding success.

OUTDOOR WINTERING

- Require adequate dry loafing areas, open water for drinking and bathing, high-energy diet.
- Use hot water to heat pond and maintain temperature at 2°C.
- Straw and ground for loafing 20 feet away, new straw required each snowfall or when fouled from droppings.

POND MAINTENANCE

- Overgrown areas open by mowing or tramping.
- Drain ponds periodically.
- Pile rocks on ice in winter for pond rebuilding.
- Natural succession on agricultural land, 1-2 years provides good cover.
- In 5-10 years shrubs will dominate.
- Burn or plough areas or cover when too brushy, and replant.

- Do not mow cover area before mid July.
- Burn only at 5-10 year stages to retain wood growth.
- Inspect fence regularly.
- Prune vegetation to control stringy plants and stems with few leaves.
- Unplug flowing water restrictions.
- Examine condition of birds during feeding.

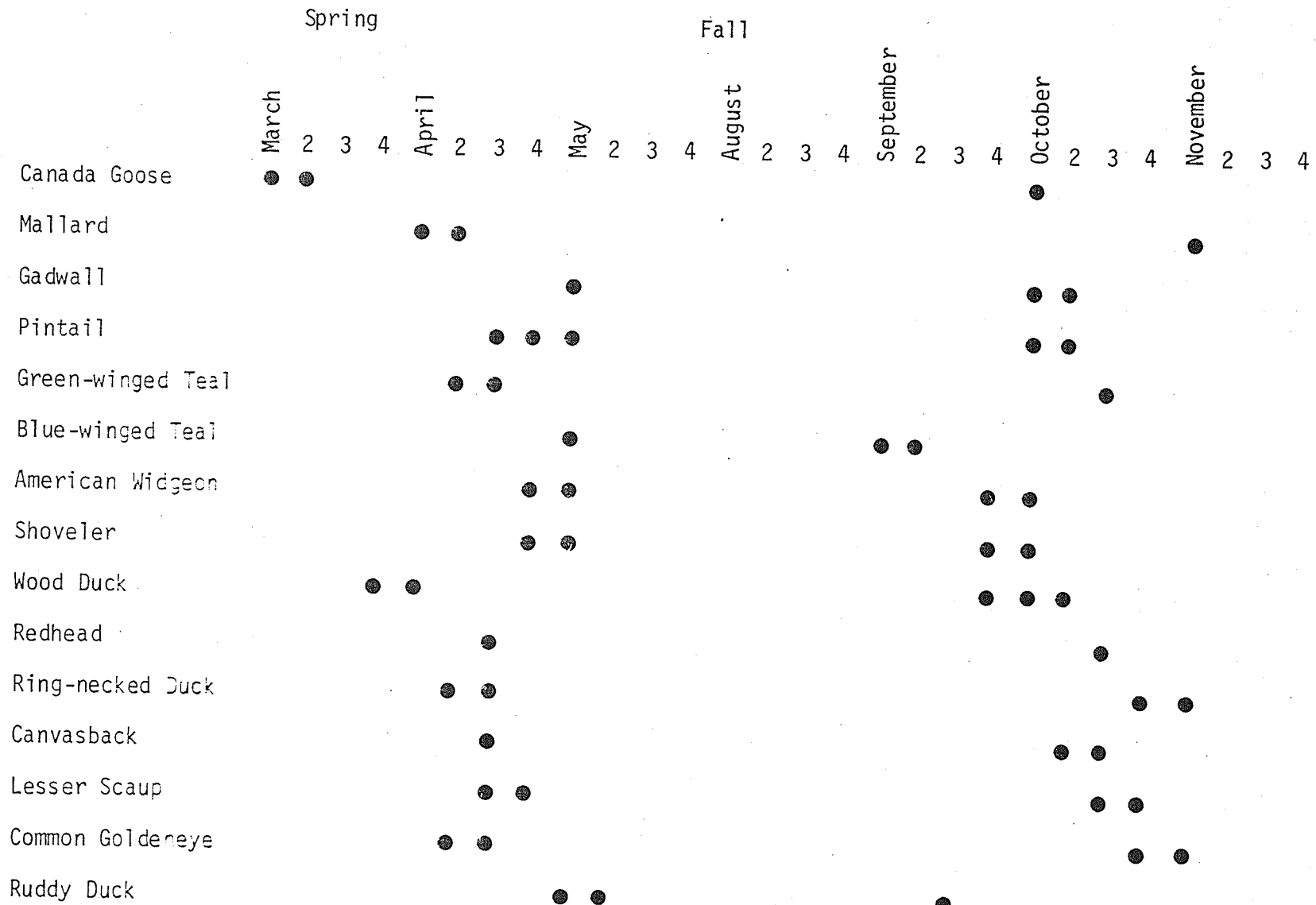
LEGAL CONSIDERATIONS

Wild species of waterfowl in North America are classified as migratory birds and thus fall under the jurisdiction of The Migratory Birds Convention Act. This Act requires Federal authorization for the holding of captive populations of waterfowl. Permits are obtainable from the Canadian Wildlife Service here in Manitoba. Special permits are required to transfer birds from one country to another, but shipments within Canada and between Provinces do not require permits. Birds being imported to Canada from countries other than the United States, require a quarantine period before they can be released from Customs. The avicultural permits necessary for the rearing of waterfowl require that complete records be kept of all aspects of the project. The number of birds of each species reared, killed, bought, sold or exchanged must be reported. It does not permit obtaining waterfowl or their eggs from the wild under any circumstances. Permission from the Canadian Wildlife Service is required for moving any birds and to obtain birds from outside the Province of Manitoba. There are standards set by the Act to govern the number of birds which can be wintered in a building, plus the

protection of the birds from predators and the prevention of their escape to the wild. Many of these restrictions have been developed for the protection of the birds and to prevent the spread of disease in wild birds resulting from contact with captive birds. Other areas of the law may apply to the development of ponds. Where water is diverted permits may be required since changes in natural water flow is covered in our Constitution under Riparian Rights. Also under consideration would be the various laws which prohibit surface and groundwater contamination by any livestock including waterfowl.

APPENDIX 8
CHARACTERISTICS OF NATIVE WATERFOWL

MIGRATION PERIODS



PREFERRED HABITAT

	Dense Marsh	Islands	Cliffs	Muskeg	Grassland	Sedge Meadow	Dry Hillsides	Bottomland Sloughs	Large Willow Ponds	16" Caliper Trees	Floating Islands	Hardwoods	Emergent Vegetation	Limited Emergents	Brushy	Shallow Marshes	Dense Cover	Open Areas	Bare Ground	Mud Bottom
Canada Goose	•	•	•	•																
Mallard	•	•																		
Gadwall		•			•															
Pintail		•																		
Green-winged Teal					•	•	•													
Blue-winged Teal					•															
American Widgeon						•								•	•					
Shoveler					•											•				•
Wood Duck								•	•	•										
Redhead		•											•							
Ring-necked Duck		•		•		•					•									
Canvasback		•											•			•				
Lesser Scaup	•					•					•					•				
Common Goldeneye												•								
Ruddy Duck												•								

PREFERRED COVER

	Phragmites	Bullrush	Cattail	Shrubs	Prairie Grasses	Trees	Sedge	Herbaceous Weeds	Bushy Willow	White Top	Grass	Willows	Driftwood
Canada Goose	●	●		●							●		●
Mallard								●		●			
Gadwall		●						●	●	●			
Pintail								●		●			
Green-winged Teal			●		●							●	
Blue-winged Teal							●				●		
American Widgeon		●										●	
Shoveler		●									●		
Wood Duck						●							
Redhead		●	●				●						
Ring-necked Duck							●						
Canvasback	●	●	●				●	●					
Lesser Scaup							●				●		
Common Goldeneye						●							
Ruddy Duck		●	●				●			●			

FEEDING CHARACTERISTICS

	Diver	Dabbler	Vegetarian	Pondweed	Smartweed	Sedges	Widgeon Grass	Bullrush Seeds	Duckweeds	Wild Rice	Grasses	Sagittaria	Acorns	Cordgrass	Glasswort	Bur Reed	Algae	Water Lily Seeds	Dogwood Fruit	Grasshoppers	Mosquito Larvae	Molluscs	Crustaceans	Insects	Larvae	Dragonflies	Beetles	Small Fish	Barley, Wheat, Corn	
Canada Goose		●	●	●			●	●						●	●															
Mallard		●	●	●	●	●		●	●	●		●	●							●	●			●					●	
Gadwall		●		●	●	●		●									●							●	●					
Pintail		●	●	●	●	●	●	●			●													●				●		
Green-winged Teal		●	●	●		●		●			●														●					
Blue-winged Teal		●	●	●		●	●		●		●												●	●	●					
American Widgeon		●	●	●			●				●						●					●		●						
Shoveler		●	●	●			●	●	●								●							●						
Wood Duck		●		●	●	●			●	●	●		●			●		●	●	●				●		●	●			
Redhead	●		●	●			●	●														●		●						
Ring-necked Duck	●			●	●	●				●	●							●				●		●						
Canvasback	●		●	●		●	●			●	●					●		●				●		●				●		
Lesser Scaup	●			●			●															●		●						
Common Goldeneye	●			●				●														●	●	●				●		
Ruddy Duck	●	●	●			●	●																	●						

WATER REQUIREMENTS

	DESIRED WATER DEPTHS						Open Water	NESTING WATER DEPTHS				
	Feet	0-1	-2	-3	-5	-10		-25	0-6"	6-12"	12-24"	20'
Canada Goose	●	●	●									
Mallard	●	●										
Gadwall	●	●	●	●			●					
Pintail	●	●										
Green-winged Teal	●	●										
Blue-winged Teal	●	●	●									
American Widgeon	●	●					●					
Shoveler	●	●	●	●								
Wood Duck	●	●										
Redhead		●	●	●			●		●			
Ring-necked Duck		●	●	●			●					
Canvasback						●	●	●	●	●		
Lesser Scaup				●	●	●	●					
Common Goldeneye				●	●	●						
Ruddy Duck		●	●	●	●		●		●			

NESTING	SITE CHARACTERISTIC											DISTANCE TO WATER					TERRITORIALITY					NEST SPACING													
	Land	Over Water	Trees	Water's Edge	Inland	Adaptable	Man-made Nest Sites	Old Nests	Muskrat House	Natural Cavity	Good Visibility	Firm Dry Foundation	Partly Isolated	Well Concealed	0-30'	30-60'	60-90'	90-120'	120-150'	Vigorous	Limited	5'	10'	15'	20'	25'	0-10'	10-20'	20-50'	50-100'	100'	Not critical			
Canada Goose	•			•		•	•	•		•	•	•		•	•					•															
Mallard	•			•			•	•			•			•	•	•	•	•	•		•									•					
Gadwall	•										•			•	•	•	•	•	•		•								•						
Pintail	•			•	•	•							•			•	•	•	•		•											•			
Green-winged Teal	•			•	•								•			•					•												•		
Blue-winged Teal	•			•		•												•	•		•							•							
American Widgeon	•			•	•											•					•											•			
Shoveler	•																	•	•		•							•							
Wood Duck		•	•	•			•		•												•												•		
Redhead		•												•							•										•				
Ring-necked Duck		•												•	•							•						•							
Canvasback		•		•										•	•								•						•						
Lesser Scaup	•					•					•			•	•						•														
Common Goldeneye			•						•												•													•	
Ruddy Duck		•																		•								•							

BREEDING

	CLUTCH No. of Eggs							INCUBATION PERIOD Days						FLEDGING PERIOD Weeks							
	0-2	-4	-6	-8	-10	-12	-14	-20	-22	-24	-26	-28	-30	5	6	7	8	9	10	11	12
Canada Goose		●	●	●							●	●					●	●	●		
Mallard					●						●	●					●				
Gadwall					●						●					●	●	●			
Pintail				●					●						●	●					
Green-winged Teal					●				●	●					●	●					
Blue-winged Teal						●				●				●	●						
American Widgeon					●					●	●					●					
Shoveler					●						●						●	●	●		
Wood Duck						●	●						●				●	●			
Redhead					●							●					●				
Ring-necked Duck					●						●	●				●	●				
Canvasback					●						●						●	●	●		
Lesser Scaup					●							●					●	●	●		
Common Goldeneye					●						●	●				●	●				
Ruddy Duck				●				●	●	●							●	●			

APPENDIX 9
LIVING PRAIRIE MUSEUM

¹N. Harburn, The Living Prairie Museum Interpretive Plan. Winnipeg: City of Winnipeg, 1978.

Budget For Operating and Maintenance

1977 \$60,000 includes salaries.

<u>Staff</u>	<u>Man/Years</u>
Naturalist	1
Term Assistant	1
Clerical	.5
Sessional Staff	.1
Seasonal Staff	.3
Janitorial	.6
	<u>3.5</u>

Goal For Operation

<u>Task</u>	<u>Man/Year</u>	<u>Permanent</u>	<u>Term</u>
Reception	.5	.5	
School Group Sessional	.25		.25
Summer Events	1.2		1.2
Planning Program	.7	.7	
Speaking Events	.1	.1	
Children Groups	.6	.6	
Special Events	.4	.4	
Maintenance & Garden	.8		.8
Clerical & Financial	.7	.7	
Publication & Exhibits	.7	.7	
Personnel Management	.3	.3	
TOTAL:	6.2	4.2	2.0

Staff would be responsible for duties outside the Living Prairie. i.e. Resource people for planning management and programming in other city parks.

APPENDIX 10

INTERVIEWS

1. Mr. Micheal Cobus, Parks Canada Interpretation.
2. Mr. Bob Fedorowich, Manitoba Department of Natural Resources.
3. Mr. Norm Harburn, Living Prairie Museum.
4. Mr. Bob Mak, Outdoor Education Association.
5. Mr. Don Muir, Wildlife Foundation of Manitoba.
6. Mr. Phil Old, Ducks Unlimited.
7. Ms. Cheryl Penny, Manitoba Museum of Man and Nature.
8. Mr. Bruce Richards, City of Winnipeg.
9. Dr. Stuart Seim, University of Manitoba.
10. Dr. Jennifer Shay, University of Manitoba.
11. Dr. Merlin Shoesmith, Manitoba Department of Natural Resources.
12. Mr. Wayne Stetski, Manitoba Department of Natural Resources.
13. Dr. Fred Ward, University of Manitoba.
14. Mr. Brent Wark, Ducks Unlimited.
15. Mr. Gene Whitney, Canadian Wildlife Service.

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