6 Implementation

6.1 INTRODUCTION

Once the limits of the future Rouge Park are defined within the Rouge Park Study Areas, it is an objective of the Rouge North Management Plan to bring these lands into public ownership. To achieve this objective, the community, non-government organizations, municipalities, Conservation Authority, Province of Ontario, federal government and Rouge Park Alliance will be collectively responsible for the implementation of the Rouge Park North. The following sections provide an overview of recommendations to guide the activities of the various groups that will be responsible for implementation.

- ***Rouge Park Alliance***

As the body responsible for overseeing the management of the Rouge Park, the Rouge Park Alliance should initiate a number of activities aimed at supporting the recommendations of the Rouge North Management Plan and implementing the Rouge Park North including the following;

- Encouraging and assisting Alliance Partners to support the Rouge North Management Plan and to actively participate in the implementation of the Rouge Park North;
- Encouraging and assisting partner municipalities to negotiate with landowners in the Emerging Development Areas to define the park boundary based upon ecological objectives, where the opportunity exists;
- Encouraging and assisting the province to endorse the Management Plan as a matter of Provincial Interest or to issue the Management Plan as a provincial policy statement as a means to provide municipalities with additional tools to assist in implementation;
- Initiating the preparation of a document to nominate the Rouge River for designation as a Canadian Heritage River;
- Establishing a land trust as a means to bring lands into the park;
- Establishing a fund that can accept financial contributions for the purpose of acquiring lands to build the Rouge Park;
- Providing advice to the public landowner or agency in defining and implementing Park Management Zoning;
- Implementing the Partnership and Stewardship Programs;
- Initiating a fund-raising program aimed at individuals, corporations and governments to secure financial resources for land acquisition;
- Overseeing the establishment of the various programs and committees that will assist in implementing the recommendations of the Rouge North Management Plan; and
- Updating the Rouge North Management Plan on a regular basis.

- ***Municipalities***

The Region of York and the municipalities of Markham, Richmond Hill and Whitchurch-Stouffville will have primary responsibility for overseeing the definition of the park boundary within the planning process and negotiating with landowners to bring lands into public ownership. Consequently, it is imperative that municipalities support the Rouge North Management Plan by:

- Having Municipal Councils endorse the Rouge North Management Plan;
- Amending Official Plans and Zoning Bylaws to achieve the recommendations of the plan;
- Having regard for the objectives and recommendations of the plan in reviewing and approving development proposals within the watershed; and
- Managing lands owned by the Municipality and designated as 'Rouge Park' in accordance with the recommendations of the Management Plan.

- ***Province of Ontario***

  The province can initiate five key activities that will be a significant contribution to the implementation of the Rouge North Management Plan. These include:

  - Endorsing the Rouge North Management Plan as a Provincial Guideline, matter of Provincial Interest or formal policy statement;
  - Contributing financial resources for the purposes of acquiring Rouge Park lands;
  - Finalizing the transfer of the Little Rouge Creek Corridor lands to the TRCA;
  - Managing provincial land holdings in accordance with the recommendations of the Management Plan; and
  - Enacting programs to facilitate the acquisition of Rouge Park lands including amendments to the Planning Act, incorporation in the Natural Areas Protection Program or Living Legacy.

- ***Federal Government***

The Government of Canada can make a significant contribution to the implementation of the Rouge North Management Plan by:

- Defining surplus Transport Canada lands and dedicating these lands to the Rouge Park as a part of the Little Rouge Creek corridor;
- Managing federal land holdings in accordance with the recommendations of the Management Plan;
- Enacting legislation to facilitate the acquisition of Rouge Park lands;
- Negotiating with the Rouge Park Alliance and affected municipalities for the implementation of the Optional Park Corridor through the Transport Canada lands;
- Providing funding for the acquisition of Rouge Park lands; and
- Assisting in the process of designating the Rouge River as a 'Canadian Heritage River'.

- ***Toronto and Region Conservation Authority***

With an extensive body of knowledge and expertise related to the Rouge watershed, as well as the availability of complementary technical resources, the Toronto and Region Conservation Authority is envisioned as a key participant in the implementation of the recommendations of the Rouge North Management Plan. The Authority can assist the Rouge Park Alliance and other partners by:

- Providing staff resources and technical expertise to assist in cataloguing the natural and cultural resources of the Rouge Park;
- Assisting municipalities in working with landowners to define the Rouge Park within the Rouge Park Study Areas;

- Initiating a review of existing policies and legislation to ensure that adequate protection of watercourses and tributaries throughout the Rouge watershed is achieved;
- Compiling a database of mapping and inventory information to assist in the implementation of monitoring programs;
- Managing TRCA land holdings, which may be identified as 'Rouge Park' in accordance with the recommendations of the Management Plan;
- Having regard for the Management Plan when reviewing development proposals; and
- Providing funding for the acquisition of Rouge Park lands.

- ***Non-Government Organizations and Stakeholder Groups***

Non-Government Agencies and Stakeholder Groups can work in partnership with the Rouge Park Alliance and the municipalities to realize the implementation of the Rouge Park North by:

- Participating in the Monitoring and Natural Heritage Programs;
- Participating in the Stewardship Program;
- Participating in restoration initiatives;
- Participating in fund-raising to support land acquisition and the implementation of programs; and
- Supporting the vision, objectives and recommendations of the Rouge North Management Plan.

- ***The Community***

The successful implementation of the Rouge North Management Plan will be determined to a large extent by the support of the residents of the communities within the watershed. Grass roots support for the plan will translate into implementation. Therefore, residents of the communities of the watershed can contribute to the implementation of the Rouge Park North by:

- Participating in the Stewardship Program or Partnership Program;
- Becoming involved in the Community Council, Trails Council and other recommended programs;
- Participating in restoration initiatives and the Monitoring Program;
- Encouraging Municipal Councils to support the recommendations of the plan; and
- Encouraging the Provincial and Federal Governments to contribute to further the implementation of the Rouge Park North.

The following section provides specific direction to guide the implementation of the Rouge North Management Plan.

6.2 IMPLEMENTATION DIRECTIONS - ROUGE PARK NORTH

Rouge Park North consists of lands located along the Rouge River and its tributaries currently owned by the local municipality, the Toronto and Region Conservation Authority or other public agency (see Figure 4.2). Most of these lands are situated within the existing urban areas of the towns of Markham, Richmond Hill and Whitchurch-Stouffville or along the Little Rouge Creek corridor.

Rouge Park North will be expanded over time to include new lands brought into public ownership once the boundary of the park is defined through the planning process.

The first step in implementing the Rouge North Management Plan is to protect these publicly owned lands for park purposes. It is essential that the present owners cooperate and manage these lands in a manner consistent with the Management Plan.

Vegetation Interpretive Signage in a vegetation restoration area.

Local Councils and Committees of Adjustment should have regard to the Rouge North Management Plan when reviewing applications for development. For this reason, local Official Plans should be amended to designate all Rouge Park North lands as open space (see Figure 4.2) and to incorporate policies reflecting their use in terms of the Rouge North Management Zones as described in Section 4.1.1.1, regarding public access, as well as natural and cultural resource management, as lands are delineated through the process.

At such time as the municipalities undertake a review of their Official Plans, newly acquired public lands should be placed in the appropriate open space land use designation and identified with appropriate Rouge Park policies. In addition, the future zoning designation of these lands should be consistent with the zoning of public lands.

A number of secondary study areas within the Rouge River watershed were identified in the Background Technical Appendix for the Management Plan, entitled 'Status of the Watershed and its Constituents'. These secondary study areas comprise the Emerging Development Areas. They are designated as either Hazard Lands or Open Space in the relevant local Official Plan. The precise limits of these lands are determined either through the completion of site-specific environmental studies or by utilizing specific criteria established in the Secondary Plans and the development approval process. Within the Emerging Development Areas, open space valleylands will be conveyed to a public agency through the development approvals process at which point they will formally become part of Rouge Park.

Community interface guidelines are recommended for these areas and they should be followed wherever possible. For example, opportunities may exist for locating public recreational parklands next to the valleylands, thereby expanding the breadth of the park. Opportunities would also be provided to buffer the park from urban development and develop trail and pathway systems on land outside of the park.

Specific recommendations related to the roles and responsibilities of the municipal, provincial and federal governments and the Rouge Park Alliance in the implementation of Rouge Park North are provided in Section 6.3.1.

6.3 IMPLEMENTATION – ROUGE PARK STUDY AREAS

The Study Area designation encompasses the three sub-areas identified in Section 4.2.2 as Middle Reaches, Headwaters and Little Rouge Creek. These lands are held mainly in private ownership and, for the most part, are located in those portions of the Rouge River watershed beyond the urban boundaries of Markham, Richmond Hill and Whitchurch-Stouffville.

Environmental studies, as described in Section 4.2, will be undertaken when development of these lands is proposed. The completion of these investigations would result in the determination of the park boundaries. Lands within the Middle Reaches, Headwaters and Little Rouge Creek should be identified in the local Official Plans as 'Rouge Park North Study Area' (see Figure 4.8). Through the approvals process, the park lands will be identified and should ultimately be conveyed to a public agency. When this is done, the lands should be designated 'Rouge Park' in the local Official Plan. Alternatively, municipalities are encouraged to undertake subwatershed studies to identify the park boundary in advance of the development approvals process.

Designation of the Rouge Park North Study Area lands should not imply that these lands are open to the public or that they will necessarily be purchased by a public agency.

Funding should be made available to bring lands into public ownership as part of Rouge Park North on a priority basis, subject to the approval of the Rouge Park Alliance.

The Rouge North Management Plan should be implemented through the use of land exchanges, long-term leases, easement agreements, land trusts and the placement of conditions on development approvals.

6.3.1 Implementation Actions - Roles and Responsibilities

The successful implementation of the Rouge North Management Plan will require the coordinated effort of government at many levels. The Rouge Park Alliance is envisioned as the coordinating body in the process of implementation. Recommendations to guide the action of each level of government in the implementation process are provided in the following sections.

6.3.1.1 Implementation by Local Municipalities

Local municipalities can contribute to the implementation of the Rouge North Management Plan most effectively by incorporating policies in their Official Plans and enacting zoning amendments and delineating the future park boundary through the planning process. The recommended implementation strategy involves identifying potential Rouge Park North lands. The Official Plan also provides an excellent opportunity to explain the objectives of the Management Plan and to establish policies for land uses in and adjacent the park, in consultation with the Rouge Park Alliance in accordance with the Partnership Memorandum for the Coordination of Land Use Plans and Development Activities.

6.3.1.2 Official Plans

The completion of the Management Plan is timely for incorporating appropriate policies into the Official Plans for the towns of Whitchurch-Stouffville and Richmond Hill backed by subwatershed studies. New servicing initiatives in Whitchurch-Stouffville will likely trigger a review of its Official Plan in the near future. Richmond Hill is currently undertaking a review of its Official Plan.

The Town of Markham adopted its Natural Features Amendment for the Urban Development Area (OPA No. 52) on June 24, 1997. One of the main purposes of this Amendment is to protect, enhance and restore the natural features located within the town's urban area. The natural features subject to the Amendment cover a significant amount of land within the Rouge North Management Plan. The amendment states that Council may consider further amendments to the Official Plan for the purpose of implementing the Rouge North Management Plan, where required.

Local Official Plans should be amended to contain policies that achieve the following:

- Identify lands as 'Rouge Park' and 'Rouge Park North Study Area';
- Identify the type of land uses which are permitted on lands designated as "Open Space" and identified as 'Rouge Park';
- Explain that further study will more accurately delineate Rouge Park North lands within the 'Rouge Park North Study Area';
- Require development that is planned and/or designated on lands adjacent the park to be fully integrated with the park;
- Ensure that development proposed on lands adjacent the park will be designed in accordance with the design guidelines set out in the Rouge North Management Plan;
- Encourage the use of land exchanges, long-term leases, easement agreements, land trusts and the placement of conditions on development approvals, to implement the Management Plan within the Rouge North Study Areas;
- State that Council shall encourage public management of private land within the area encompassed by the Rouge North Management Plan using methods including transfer of lands, land trusts, development agreements or long-term leases with landowners. Such policy should also state that such areas are not open to public use;
- Encourage partnerships with other municipalities, levels of government and agencies to initiate and encourage joint planning and ensure that goals and objectives for Rouge Park North are consistently achieved across municipal boundaries;
- Require that migration routes for wildlife and wildlife movement are provided where future roads and municipal services cross the park;
- Require Council, upon receipt of development proposal in a Partnership Program Area, to consider alternatives including some form of public ownership;
- Provide direction for establishing trails to link Rouge Park, Lake Ontario, the Oak Ridges Moraine (ORM) and the various communities within the watershed;
- Indicate that lands in the 'Rouge Park North Study Area' will be amended to Rouge Park over time, when development applications are approved (i.e. when lands are brought into public ownership); and
- Specify that the tools which will be used to acquire Rouge Park North lands include dedication pursuant to the Planning Act, donations, density transfers, etc.

6.3.1.3 Zoning Bylaws

Lands forming part of Rouge Park North should be placed in an appropriate open space zoning category and identified as 'Rouge Park' as acquired over time. In addition, as park lands are brought into public ownership they should also be placed in this open space zoning category. Each local municipality's zoning bylaw should establish permitted uses and development standards for this zoning category, as described in the Management Plan.

Much of the Rouge Park North land is already covered by a hazard land designation. These controls must be retained in any future zoning.

6.3.1.4 Implementation by the Regional Municipality of York

The Region of York Official Plan (YROP) contains policies that currently support the intent of the Rouge North Management Plan. Once the Management Plan is approved, the region is encouraged to review the Regional Official Plan with the objective of consolidating policies dealing with the Rouge Park in one policy section.

6.3.1.5 Implementation by Provincial and Federal Governments

As stated above, approximately 50% of the lands subject to the Rouge North Management Plan are privately owned. It is, therefore, not possible to successfully implement the Management Plan solely through the municipal planning process. Implementation methods both at the federal and provincial levels of government should be considered.

6.3.1.5(i) Federal Government

Under the Canadian Heritage River System, the Rouge River could be nominated by a federal or provincial agency for designation as a 'Canadian Heritage River'. The objectives of this program are to afford national recognition to Canada's important rivers and to ensure their long-term management.

Criteria for designation under this program include specific Natural Heritage, Resource Heritage and Recreation Values. The process for designation includes the preparation of a nomination document, describing the features of the river system together with a management plan for the river system. Based upon an overview of the requirements of the program, the Rouge River is well positioned for designation as a Canadian Heritage River. In addition, much of the background inventory work required to support the nomination has already been completed through the process of preparing this document and the course of implementing the park designated as Rouge Park south of Steeles Avenue. Therefore, the Rouge Park Alliance should further the process by initiating the preparation of a nomination document for the Rouge River.

The nomination document is subject to review to ensure that the requirements for selection are fulfilled. The designation of 'Canadian Heritage River'' is applied once conformance with selection guidelines is achieved.

6.3.1.5(ii) Provincial Government

There are a variety of methods available to the provincial government for implementing the Rouge North Management Plan. They include:

- Provincial Guidelines - The province could formally endorse the Rouge North Management Plan as a 'provincial guideline' and could encourage the towns of Markham, Richmond Hill and Whitchurch-Stouffville, the Region of York, and any other relevant planning agency to manage the park in accordance with the guidelines.
- Provincial Interest, Provincial Policy Statement - The Rouge North Management Plan could be endorsed by Cabinet as a matter of Provincial Interest pursuant to Section 2(a) of the Planning Act. The responsibility for implementing the plan would include ensuring that appropriate policies are incorporated into the Official Plans of the affected local municipalities. The Minister of Municipal Affairs and Housing could also issue the Management Plan as a formal policy statement under Section 3 of the Planning Act. This would ensure that all relevant planning agencies have 'regard to' the plan.
- Provincial Legislation - The province could enact legislation to recognize the Rouge Park North and facilitate its implementation.

6.3.2 Additional Initiatives

The Rouge North Management Plan sets out a process for identifying lands to be encompassed within the Rouge Park North, utilizing the Study Area methodology described in Section 4.2.2. This methodology is designed to identify lands for designation as "Rouge Park" through the municipal planning process, as development occurs on lands along the river.

However, the Management Plan identifies the following mechanisms for bringing privately owned lands into public ownership outside of the development and planning process with the goal of expanding the physical area of Rouge Park North in areas of the municipalities not likely to be subject to development. Consistent with the principle of respecting the rights of private landowners, it must be recognized that the decision to participate in any of these programs is at the discretion of the landowner. To encourage the dedication of lands into public ownership as part of Rouge Park North, the following options are identified:

- Establishment of a Land Trust
- Land Swaps
- Density Transfers and Bonusing
- Voluntary Sale and Public Purchase
- Rouge Park Legacy Recognition Program
  This program is designed to recognize the contribution of lands to, or financial donations to purchase lands for, Rouge Park North from individuals, corporations, estates or other parties. The Rouge Park Legacy Recognition Program will include the following initiatives:
  - Signage and Monumenting Program - Donated or dedicated lands will be identified with a sign that recognizes the contributor, the date and the area of the parcel. The perimeter of the parcel will be monumented.
  - Central Legacy Monument - The names of all contributors will be listed on a monument located at the Rouge Park office.
  - Certificates of Appreciation - Each participant will be presented with a framed certificate of appreciation recognizing their contribution and identifying the parcel of land dedicated to the park.

There will be a need to expand the designation of park zones to encompass new public lands, and to review the Management Plan to ensure that park objectives continue to be achieved, as the area of Rouge Park grows over time. In response, the Management Plan delineates a process aimed at review and refinement to direct the evolution of the park and the Management Plan over time; this is provided in Section 6.5.6.

6.4 DESIGN GUIDELINES

The lands within the areas defined as Emerging Development Areas are comprised of approved Secondary Study Areas within the towns of Markham, Richmond Hill and Whitchurch-Stouffville.

The Rouge Park North designation, as well as the Rouge Park Partnership and Stewardship Area designations, will be applied as outlined in the previous sections, since the configuration, extent and location of parks, open space corridors, road patterns and development areas within the study area, have been determined and approved. Although the plan of development in these areas has been solidified, the form of development and the physical design of the built form and infrastructure have not been consolidated in all cases. This situation presents two significant opportunities:

- The opportunity to achieve Rouge Park objectives in spite of park limitations related to corridor width or configuration; and
- The opportunity to position Rouge Park as the spine of these emerging communities through the creation of an effective interface that benefits the integrity of the river corridors, the function of the community and the desirability and marketability of the development.

The realization of these opportunities will be achieved through the application of Community Interface Guidelines, which will direct the form of development on lands adjacent to the future Rouge Park North. The Community Interface Guidelines address both urban design and infrastructure, and have been generated to achieve a number of parallel objectives related to environment, community, sustainability, marketability, cost effectiveness and financial feasibility. The approach and preliminary direction, which will guide the detailed development and implementation for both the Urban Design and Infrastructure components of the Community Interface Guidelines are provided in the following sections.

6.4.1 Community Interface Guidelines - Urban Design and Built Form

The principles outlined in this section are intended to guide the form of public and private development that interfaces with Rouge Park North. These principles should be integrated within the municipalities' urban design guidelines for application in areas adjacent to Rouge Park North. It is anticipated that these guiding principles will provide the framework for more detailed urban design guidelines to be developed for the Oak Ridges Moraine, Middle Reaches and Little Rouge Creek segments of the Rouge North Management Plan. It is recognized that each of these segments has unique natural, visual, cultural and built features that should be reflected in the design guidelines. Guidelines for the Oak Ridges Moraine should ensure views to and from the moraine are conserved and that development is integrated with the moraine's landform. In the Middle Reaches, the location of neighbourhood and community social and recreation centres along the interface with the Park during anticipated development should be the primary ambition. Development in the Little Rouge Creek segment should incorporate setbacks and buffers to ensure the integrity of the creek's significant environmental resources.

The guiding principles are based on three ideals:

1. The park should be visible and accessible from the adjacent communities;
2. Development in adjacent communities should be integrated with the Rouge Park; and
3. Buildings along the interface with the park should be designed with public 'faces' on both the street and the park edge.

Viewing corridors to Rouge Park are an essential organizing principle for new development. Views across the river valley, along the river valley edge and to the river corridor are of equal importance and should be provided to ensure a strong sense of connection to the river as well as the irrevocable public status of Rouge Park.

The guiding principles were originally intended to be specific to each of the five categories of land use: residential, institutional, industrial, commercial and parks / open space. However, when examining the opportunities and constraints associated with each land use type, guidelines effectively influenced only two generalized conditions adjacent to Rouge Park:

- Private (either workplace or residence); and/or
- Public or semi-public space (such as roads, parks or schools).

The basic premise of planning the interface is that it is comprised of Rouge Park and the boundary, which is to be determined through site specific environmental studies, with an adjacent 'Stewardship Zone' that would be applied on both private and public lands.

The following guiding principles explore the appropriate form of development along the interface of Rouge Park:

Principle No. 1 - Continuous Public Facade Along Rouge Park to Provide Opportunities for Visual and Physical Access

A primary ambition of the Rouge North Management Plan is to provide a continuous public facade along the interface with the park. There are a number of methods that may be utilized to achieve this objective.

The preferred option is a public road which provides a clear public route, views to the valley and a limit to the encroachment on the park by private development (refer to Figures 6.1 and 6.2). In providing a public road along the edge of the valley in proposed developments, there may be an opportunity to consider locating the road close to the defined Rouge Park North. The opportunity and desirability of implementing this approach will require the assessment of specific areas of the watershed related to potential environmental impacts, as well as transportation and land use goals and objectives. The public road also provides opportunities to separate conflicting trail uses within the park, allowing for more modest trail development and reducing potential environmental impacts.

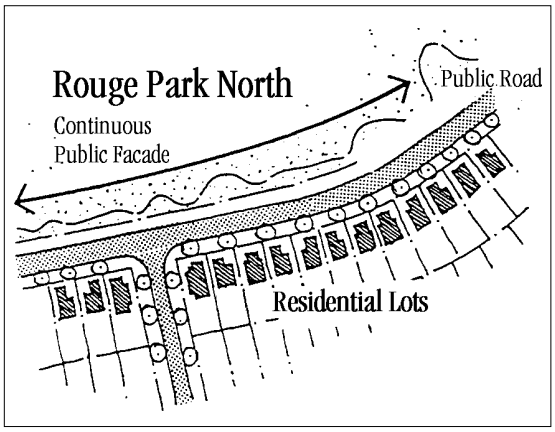

Figure 6.1: Principle No. 1 - Creating a Continuous Public Facade Adjacent the Rouge Park.

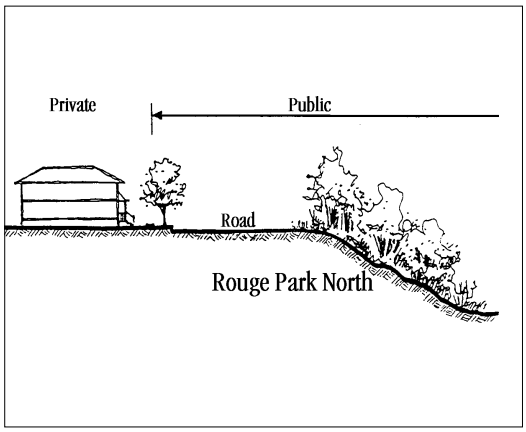

Figure 6.2: Principle No.1 - Alternative Schematic Section.

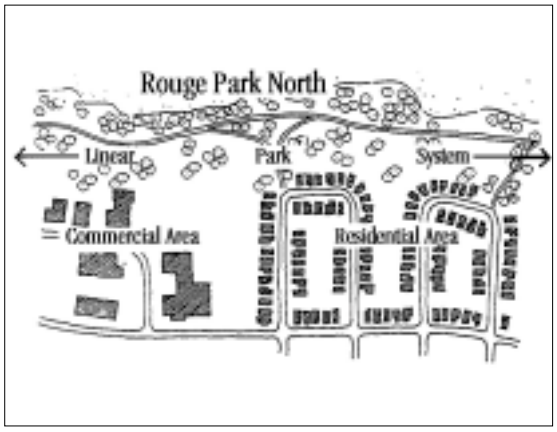

Figure 6.3: Principle No.1 - Linear Park.

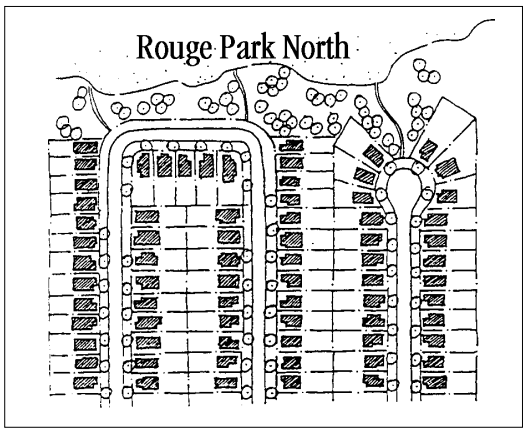

Figure 6.4: Principle No. 1 - Alternative Road and Lot Layout.

Where significant or sensitive environmental features require protection or where existing conditions limit views into the park, an alternative option to a continuous public road is the provision of a linear public park along the edge of the valley, as illustrated in Figure 6.3. If proposed, the linear public park must incorporate significant public 'windows', public open space located at the ends of roads, enabling views and public access to the park from adjacent communities, depicted in Figure 6.4. The potential to implement a linear park

along the river corridor will be affected by the necessity to accommodate other recreational programming requirements within the proposed community.

Principle No. 2 - Locate Social Centres of New Communities Along Rouge Park

There should be opportunities for the recreation nodes, social centres and public gathering places of adjacent communities to be integrated with Rouge Park. This situation will 'enliven' the edge of the park and provide destinations. There is also an opportunity, during the planning and design stages, to use Rouge Park as a central image and identity for adjacent communities by incorporating special social centres, such as urban squares adjacent to the park. Figure 6.5 illustrates one method of achieving Principle 2.

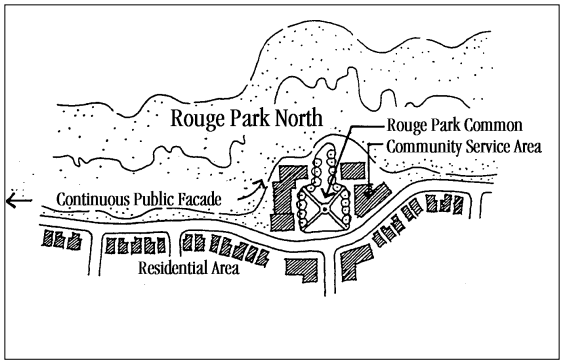

Figure 6.5: Principle No. 2 - Integrating Rouge Park as the Social Centre of the Community.

When achieved, this principle would result in a situation where Rouge Park is the skeleton on which the primary social centre for a community is located. A 'Rouge Park Common' (Figure 6.6) could be the focus for the community's commercial and institutional facilities and/or high-density housing.

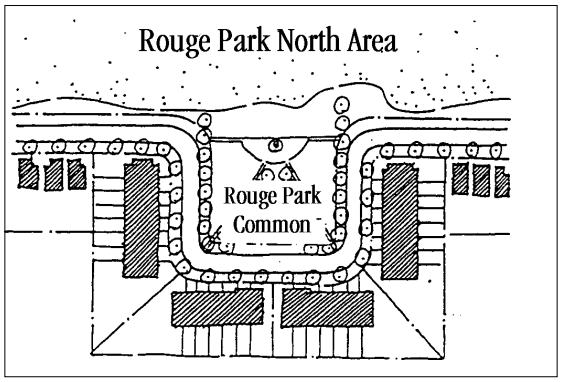

Figure 6.6: Principle No. 2 - Integrating the Social Centre of the Community within Rouge Park North.

Principle No. 3 - Locate Public and Semi-Public Recreation Uses Adjacent to Rouge Park

Recreation uses and open spaces should be located along the edge of Rouge Park to increase public access to this regional resource.

Large scale municipal parks, schools, stormwater management facilities or other uses possessing a high proportion of open space associated with the building should be located along Rouge Park. Such facilities provide an additional buffer to reduce environmental impacts on the park and could provide nodes for public access and recreation.

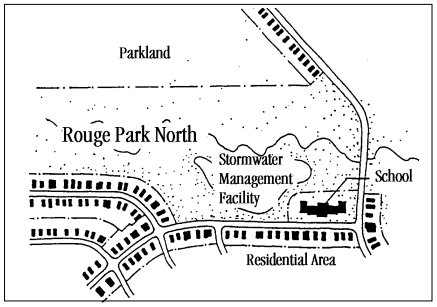

Figure 6.7: Principle No. 3 - Locating Public and Semi-Public Uses Adjacent to Rouge Park North.

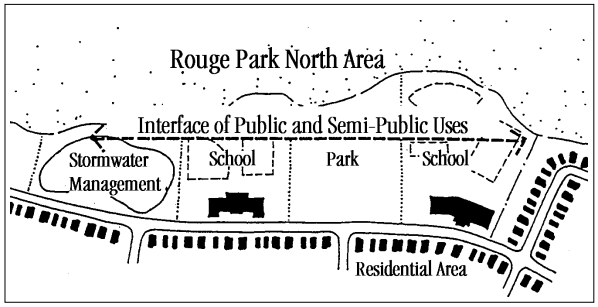

Figure 6.8: Principle No. 3 - Locating Public and Semi-Public Uses Adjacent to Rouge Park North.

Principle No. 4 - Compatible Built Form Adjacent to Rouge Park

The scale and situation of non-ground contact residential buildings and employment uses adjacent to Rouge Park will affect the character and quality of the public open space. Building facades facing the park should be 'people oriented', and include elements such as common use and extensive grass areas to establish an open space link with the park.

Buildings should be designed with facades addressing the public street and the public park. Where buildings are situated in the interface, uses typically located at the rear of buildings would be along the edge of the park. Therefore open storage, extensive loading and parking areas should be carefully located and designed to ensure that the park edge is not degraded with inappropriate development.

Building height and mass must provide a suitable interface to the park. The character of the valley and the context of the proposed development will influence appropriate building height and form. Where buildings are proposed in the interface, consideration should be given to providing access to and from the park in order to enliven the park edge with a mix of activities.

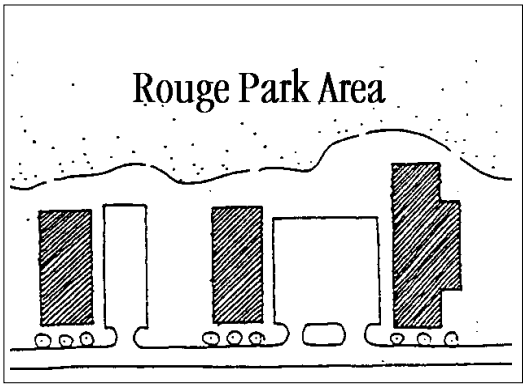

Figure 6.9: Principle No. 4 - Compatible Built Form Adjacent to Rouge Park.

The visual impact of individual development proposals at the park edge on pedestrian use in the river corridor should be carefully assessed to influence decisions on the height and situation of buildings, as well as the disposition of associated site uses. Potential visual impact will depend on building height, the width and depth of the valley, as well as existing and proposed vegetation.

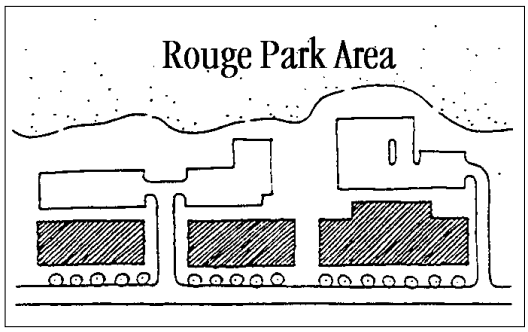

Figure 6.10: Principle No. 4 - Compatible Built Form Adjacent to Rouge Park.

Buildings should be located to ensure an appropriate setback and landscaped buffer adjacent to the park. Setback and buffer treatments will be determined during the site planning and design process. Priority should be given to ensuring public access between the building development and the edge of Rouge Park, as well as to maintaining the visual integrity of the valley corridors.

Principle No. 5 - View Corridors to and in Rouge Park

View corridors to Rouge Park should be carefully considered with appropriate response in community planning. Views along streets to the park, along the park's open space, through building sites, or of appealing landscape settings within the park are examples of locations that merit special attention in planning and design. Sites which terminate view corridors should be designed so that they present attractive architecture or landscape, as these locations will naturally be landmarks within the community. Important features of Rouge Park, for instance access points or areas of exceptional character, should be enhanced as landmark features within the design of the site, landscape and buildings. Additionally, the character of the landscape and architecture of these sites should reinforce the landmark character.

6.4.2 Community Interface Guidelines - Infrastructure

The integrity of the Rouge Park ecosystem is directly and dramatically affected by land use and the by-products of land use, particularly of lands that are tributary to the river. Therefore, the interface between the river corridors and the watershed which sustains them must be designed to minimize any potential impact from the use or development of tableland areas, including impacts related to stormwater runoff, disturbance, or physical encroachment. The Community Interface Guidelines for infrastructure have been generated to address the relationship between development within the watershed and the sustainability of the Rouge Park ecosystem. The infrastructure guidelines address stormwater management, transportation and servicing and were generated based upon the following two principles:

- The implementation of the guidelines must facilitate the protection and enhancement of the integrity and long-term sustainability of the resources of Rouge Park; and
- The recommended solutions to address potential conflicts between development infrastructure and the Rouge Park ecosystem must be efficient, economically viable and effective in order to encourage their use.

Utilizing these principles as a basis, combined with the flexibility afforded by the exploration of the use of alternative design standards through the endorsement of the Concept Plan, the guidelines will address the following:

- Stormwater Management
- Servicing
- Transportation

Decisions to undertake a specific design must take into consideration current practices as well as whether an alternative design is practical, feasible and cost effective from an implementation and maintenance perspective. The guidelines were developed to direct the process of exploring alternatives and generating designs for stormwater management, servicing and transportation infrastructure on lands adjacent the Rouge Park. However, it is recognized that capital works are governed by the Environmental Assessment requirements. Flexibility must be maintained in the plan to ensure that the best alternatives for infrastructure are considered on the basis of environmental impacts in addition to technical and economic considerations.

6.4.2.1 Stormwater Management

Likely the most significant impact on the health of the Rouge River system results from the stormwater discharged from development on adjacent tablelands, both in terms of the quality and the quantity of water entering the river system. Although the municipalities and the regulatory agencies have established standards for the treatment of stormwater runoff, there remains a need to preserve the integrity of the Rouge River and its tributaries as the heart of the Rouge Park ecosystem. This warrants that special consideration be given to the selection, design and implementation of stormwater management initiatives.

Consequently, stormwater management strategies should be developed with a focus on maintaining and enhancing the stability and health of the Rouge River and its tributaries, including water quality and quantity. Environmental impacts and benefits, as well as technical considerations, should be recognized in the process of developing stormwater management strategies. Proposed stormwater management initiatives should be evaluated on the basis of this principle. The following general recommendations are made to guide the development of stormwater management projects on lands tributary to Rouge Park North.

- In discussions with the TRCA, a need was identified to adopt a means of evaluating the implications of development and stormwater management initiatives using the most sophisticated and up to date modelling methods in a standardized process. This will assist in accurately gauging the effects of proposed facilities, and could also become a component of the Monitoring Program.

- The exploration of a range of options to achieve stormwater management targets, with an emphasis on inspiring the generation of creative and effective solutions, includes:
    - The employment of at-source, rather than end-of-pipe, Best Management Practices;
    - The emphasis on infiltration techniques, when considering the range of options to manage stormwater quality and quanitity functions in accordance with the Ministry of the Environment guidelines, with the goal of maintaining and enhancing groundwater quality and quantity, and hydrogeogical functions, particularly in the headwaters of the Rouge watershed;
    - The use of 'third pipe' servicing, where practical and appropriate, with discharges being conveyed to infiltration devices separate from surface runoff;
    - The reduction in the use of in-ground storm sewers in favour of roadside swales;
    - The integration of stormwater management ponds as recreational, aesthetic and ecological amenities adjacent to, but outside of the limits of, the park corridor;
    - The use of cisterns or rain barrels to detain roof leader discharges and encourage conservation of treated water; and
    - The use of landform grading, pocket detention and filter strips, where appropriate, to moderate flows and achieve water quality improvement objectives.

In designing stormwater management facilities, the following principles should be recognized:

- The location of stormwater management ponds within the valley corridors is strongly discouraged. Notwithstanding, the final location for stormwater management facilities will be subject to an appropriate evaluation on a site-specific basis in consideration of environmental implications as well as technical matters. This review process may be undertaken as part of an environmental study such as a subwatershed study, environmental master drainage plan, or similar study prepared as a component of the municipal planning process under the Planning Act.

- Stormwater outfalls should be located away from the edge of the watercourse and should outlet into a plunge pool prior to discharge into the watercourse.

- Ponds and other stormwater management facilities should be designed as recreational, aesthetic and ecological amenities.

- Natural materials should be employed wherever possible in the construction of facilities.

- Stormwater management ponds should not encroach on significant existing vegetation, meanderbelt or other significant natural resources.

The purpose of this section of the Management Plan is to inspire municipalities and developers to consider alternative techniques to manage stormwater and mitigate potential impact on Rouge Park.

6.4.2.2 Servicing

Throughout much of the Rouge River system, servicing infrastructure traverses or parallels the valley corridor, impacting vegetation growth, groundwater movement and the configuration of the river. This infrastructure is primarily related to the distribution of electricity or natural gas and the conveyance of sanitary sewage or water. Guidelines for mitigating impacts resulting from the implementation and requirements for ongoing maintenance of infrastructure include:

- Services within the river corridors parallel to the river should be minimized.

- Utility crossings should be confined to road crossings wherever possible.

- Storm sewer outfalls should be located away from the main branch of the river or creek and should, where possible, be confined to road crossings.
- On roads paralleling the valley corridor, services should be confined to the edge of the right-of-way farthest from the valley edge, where technically feasible.
- The importance of groundwater movement and the potential impact on baseflow in the stream system must be recognized in the design and installation of underground utilities.

The planning of infrastructure proposed in the Rouge Park North must have regard for environment as well as economic and technical considerations.

6.4.2.3 Transportation

The relationship between the existing and future transportation network and the Rouge Park presents some significant challenges, most notably related to fragmentation of corridors and linkages, and potential impacts due to noise, roadway runoff etc.

It must be recognized that the planning and design of municipal and provincial transportation facilities are subject to the requirements of the Ontario Environmental Assessment Act (EA Act) or a municipal planning process (Planning Act). The EA Act requires that effects on all components of the environment be considered through consultation with stakeholders in assessing trade-offs and determining a preferred alternative. It also requires that current legislation, policies and guidelines be addressed. Accordingly, through consultation with the Rouge Park Alliance as well as the municipalities, the objectives associated with the Management Plan would be taken into consideration through the EA process. Where roads are planned and designed under the Planning Act, the objectives associated with the Management Plan should be taken into consideration through the municipal planning and approvals process. In addition, transportation facilities are subject to the Canadian Environmental Assessment Act, where applicable.

Consequently, given that transportation improvements / new facilities are subject to environmental legislation such as the requirements of the EA Act and / or the Planning Act, the policies in the Rouge North Management Plan are to act as guidelines to be considered during these other review and approval processes. The Management Plan does not prohibit transportation facilities from being improved or implemented within the area covered by the park and does not limit such improvements to those that are currently planned or under consideration.

The following guidelines and objectives relate to the planning and design of transportation facilities relative to the Rouge Park.

- Over and above the existing and proposed roadway crossings, as shown in the municipal official plans, secondary plans and associated studies, additional roadway crossings of the park are subject to the municipal planning process under the Planning Act or Class Environmental Assessment and should be minimized where possible without compromising transportation functions.
- Where new roadways are proposed or existing crossings are reconstructed, corridor linkages for fish, wildlife and / or pedestrians should be restored / maintained / protected and enhanced as identified through more detailed studies. Regeneration on a reach-by-reach basis should be considered as a component of the design process.
- Where applicable, roadways on tablelands adjacent to the Rouge Park should be designed to:
    - Enable an interface with the Rouge Park where identified;
    - Provide for buffering where identified;
    - Avoid / minimize any potential adverse impacts on natural features;
    - Take into consideration the aesthetics of the park, for example through compatible landscaping; and

- Provide for pedestrians and cyclists where identified.

During the construction phase, special care should be taken to minimize potential impacts on the ecological resources of the park which could result from the movement of materials and equipment, grading, excavation, sedimentation and erosion controls and other procedures.

6.5 COMMUNITY BASED MANAGEMENT AND OWNERSHIP OF THE ROUGE PARK VISION

Through the course of the community consultation component of the planning process, it became increasingly clear that the long-term stewardship of Rouge Park North could only be achieved if the watershed communities were enlisted as the owners of Rouge Park vision. Community ownership of the vision and a community-based mandate of stewardship is the best means to ensure that the implementation of Rouge Park North is done in accordance with the objectives and recommendations of the Rouge North Management Plan. It is also essential for these objectives and recommendations to persist throughout changes in municipal councils and the administration of the Rouge Park Alliance. These will in turn guide development and preservation initiatives throughout the decades required to fully implement Rouge Park.

To succeed, community-based stewardship must be organized under a formal structure, and the recognition of the efforts of the community must be achieved. The following recommendations are made in this regard:

- Each community within the Rouge River watershed will be encouraged to participate in the management of Rouge Park North within their community.
- The contributions of each participating community should be recognized.
- Although communities will be encouraged to actively participate in the implementation and management of the park, the community-based management program must be flexible in recognition of the differences between communities and their respective degrees of interest in the park.

To facilitate the active involvement of communities in the management of Rouge Park, the establishment of Community Councils is proposed. Community Councils may be most easily formed as subcommittees of existing community or ratepayers' groups; for example, the Cedar Grove Community Club, or the Unionville Ratepayers' Association. Where no potential parent community group exists, the Rouge Park Alliance will be required to take an active role in assembling the Community Council. Membership and composition of the Community Council may vary from community to community.

Community Councils will actively participate in the implementation and management of the park, as well as the long-term evolution of the Management Plan. The role of the Community Council is envisioned to include the following:

- Assist in the identification of potential partners and the implementation and management of Partnership Areas;
- Assist the Trails Council in negotiating public access agreements with landowners within the community;
- Assist the Stewardship Council to identify landowners who may wish to participate in the Stewardship Program, and assist in the implementation and management of the Stewardship Areas;
- Coordinate and participate in the implementation of restoration projects;
- Undertake fund-raising for Rouge Park projects within the community;

- Assist in monitoring the health of the park ecosystem, including the determination of impacts due to mis-management, over-use of trails and other activities;
- Assist in determining appropriate uses as lands are brought into the Rouge Park designation;
- Provide input into planning, construction and management projects on lands adjacent to the park;
- Participate in the cyclical review and update of the Rouge North Management Plan; and
- Work with the Rouge Park Alliance and municipal councils to ensure that the goals, objectives and vision of Rouge Park are achieved over the long-term.

The contributions of committees participating in the program will be recognized through the installation of signage designed to provide, not only a recognizable and common identity for Rouge Park as a whole, but also a unique identity on a branch-by-branch and community-by-community basis. For example, the Little Rouge Creek within the community of Cedar Grove could be identified as 'Rouge Park - Little Rouge Creek Branch - Cedar Grove Community Stewardship Area'. In this way, Rouge Park is identifiable, not only by its ecological attributes, but also by the contributions of the communities of which it is a part.

The establishment of Community Councils and the encouragement of community-based management is a priority, not only in the process of implementing Rouge Park North, but also to ensure that the integrity of the park is maintained over time.

6.5.1 Achieving Trail and Public Access Objectives

One of the goals to be achieved through the implementation of the Rouge North Management Plan is the establishment of a continuous trail network which connects Lake Ontario to the Oak Ridges Moraine via the corridors of the Rouge River and its tributaries. The establishment of such a trail network is important, not only from a recreational perspective, but also because it will afford the following benefits:

- It will contribute to the social and physical health of the residents of the community by providing a range of recreational opportunities and experiences.
- It will be an effective educational tool, instilling in trail users a better understanding and respect for the environmental resources of the park, which in turn will translate into the protection of sensitive resources.
- It will link important natural and cultural features.

To achieve this goal and these benefits, it will be necessary for the trail system to traverse lands held in both public and private ownership. Consequently, two separate strategies are required to facilitate the implementation and management of the proposed trail network:

- A strategy which addresses the lands in public ownership, designated as Rouge Park North lands; and
- A strategy that addresses privately owned lands along the river corridors.

The issues of public access and the development of a trail system within Rouge Park North were highlighted through the public consultation process. The areas of significant concern identified by the public were related to private landowners, potential trail users and the possible impact on the park's ecosystem resulting from the implementation of trails and trail use. Consequently, there was a focus on discussing these issues and identifying solutions at the Weekend Park Planning Workshop and through the Public Advisory Committee process. The direction received from the public and the Public Access Subcommittee of the Public Advisory Committee provided the basis for the formulation of strategies related to publicly owned lands as well as those held in private ownership. These two strategies are described in the following sections.

6.5.1.1 Public Access - Rouge Park North

By definition, lands designated as Rouge Park North are publicly owned lands; consequently, the primary responsibility for the implementation and management of trails within Rouge Park North will lie with the municipality or the Conservation Authority, in partnership with the Rouge Park Alliance. The first steps in implementing a comprehensive trail system for Rouge Park North will be the initiation of a trails, access and use study. This study, which will be similar in scope and objectives to the recently completed Trails and Access Study for Rouge Park (south of Steeles Avenue) should address the following:

- The integration of trails within the ecosystem of the park;
- The integration of trails within the context of the community;
- The need to accommodate a range of trail users; and
- The provision of facilities to provide direction, support trail use and extend the use of the trail system.

In addition, the trails, access and use study should yield a set of trail design standards for each trail type. Design standards should address the following:

- Compatible and conflicting uses;
- Signage and wayfinding techniques;
- Public safety;
- Multi-season use;
- Design for sensitive areas;
- Restriction of access, where required, to protect the integrity of sensitive sites; and
- Barrier free access.

The trails, access and use study, in its initial state, will address only the public lands that comprise Rouge Park North. Since the realization of the park will be an evolutionary, long-term initiative, periodic updates of the study will be required as new lands come into the Rouge Park designation over time.

Although the municipality and/or the Conservation Authority, in partnership with the Rouge Park Alliance, will be implementing the trail system, the community should be encouraged to become actively involved in the maintenance and monitoring of the trail system. This program could be organized by the Rouge Park Alliance, the municipalities or the Conservation Authority, and coordinated through the Community Council (refer to Section 6.5) or local service clubs, corporations or individuals.

6.5.1.2 Public Access - Privately Owned Lands

The issue of public access on privately owned lands was a topic of considerable debate at the Weekend Park Planning Workshop and the Public Advisory Committee sessions. However, the strategy yielded from the sessions provides a framework for the resolution of the key points, which are described below:

- There must be a recognition of, and a respect for, the fact that there is no guarantee of public access to lands held in private ownership. In some instances, it may be necessary to employ alternative routings along road rights-of-way and utility corridors in order to achieve access objectives until lands are conveyed into public ownership.
- The provision of public access on private property must be at the discretion of the landowner and must be the product of negotiation and communication, not legislation.

- To encourage landowners to permit public access over their lands, users of the trail network should be responsible for the following:
    - Improvements to the property in order to facilitate safe passage, mitigate damage to resources and property, and minimize intrusion on the landowner's privacy;
    - The carriage of insurance, not only to save the landowner harmless from potential lawsuits related to injuries incurred by trail users, but also to safeguard landowners' property and possessions;
    - The ongoing maintenance of trails on private property, as well as the monitoring and closure of trails when trail use exceeds the carrying capacity of the resources of the property;
    - The education and policing of trail users to ensure that appropriate use occurs in terms of intensity and mode of transportation, as well as that acceptable standards of behaviour are adhered to by trail users when traversing private property; and
    - The raising of funds to finance improvements and maintenance, and to purchase rights of use over private property.

At the conclusion of the Weekend Workshop, it was agreed that the most appropriate means to achieve public access over privately owned lands, and to address the key points noted above would be through the establishment of a Rouge Park Trails Association. Modelled loosely on the Bruce Trail Association, the membership of the Rouge Park Trails Association would consist of landowners, trail users and stewardship groups, under the direction of the Rouge Park Alliance. The association would be funded through membership, as well as fund-raising initiatives. The mandate of the Rouge Park Trails Association would include the following:

- The orchestration of a program of communication to encourage landowner participation;
- The responsibility for management, maintenance, monitoring and the assurance of appropriate use of trails;
- The responsibility for the carriage of insurance;
- The negotiation of rights of passage or easement, as well as the determination of appropriate incentives or compensation;
- The undertaking of improvements to private property to permit safe and compatible trail use;
- The responsibility for educating trail users and enforcing the appropriate use of trails; and
- The creation and updating of a database identifying:
    - Landowners participating in the program;
    - Trails Association members;
    - Results of monitoring programs, including the condition of trails, levels of use and potential impacts on the environment; and
    - Landowner complaints.

The solicitation and acquisition of permission to access private lands will be a cyclical and ongoing process, and will require a significant commitment of time and energy over a number of decades. It is therefore recommended that trails on private lands be administered by an entity other than the municipality or the Rouge Park Alliance, since it is unlikely that either of these bodies can accommodate the long-term commitment of resources necessary to ensure the achievement of public access objectives. Furthermore, the establishment and momentum of a program of access to privately owned lands is best negotiated at a 'grass roots', community-based level within which specific landowner concerns can be addressed quickly and through one-on-one communication, rather than through a bureaucratic process.

Funding for the Rouge Park Trails Association could be attained from a number of sources. These include:

- Membership Fees - Trails Association members will be charged annual membership fees to support both the association and the construction of trails. Membership in the Trails Association would entitle the member to the following:
    - Use of trails;
    - Newsletters; and
    - The opportunity to participate in Trails Association events and social functions.
- User Fees - Trail users who are not members of the Trails Association will be charged a nominal fee for use of the system of trails which traverse private lands. Proof of payment will be in the form of a recognizable patch or visible ticket. Due to the cost and logistics of enforcement, it is recognized that the user fee system will work primarily on an 'honour' basis.
- Fund-raising - The Rouge Park Trails Association will be encouraged to undertake fund-raising as a means to offset administrative costs and to finance trail construction. One of the first fund-raising programs to be initiated by the association should be a sponsorship program modelled after the Trans Canada Trail program.
- Trail Trust – The Rouge Park Trails Association should establish a trust structured to accept financial contributions. The Rouge Park Land Trust as part of the proposed Legacy Program to be established for Rouge Park should accept land dedications on behalf of the Trails Association.

One of the key functions of the Rouge Park Trails Association will be to encourage private landowners to permit a segment of the trail system to be located on their property. The methodology for approach, negotiation and recognition of the contributions of landowners will be similar to that described in Section 4.2.2, and should be founded on clear communication with the landowner to discuss the objectives of the program, identify issues of concern and establish a basis for an agreement. The Rouge Park Trails Association initiative should be coordinated with the efforts of the Oak Ridges Moraine Trail Association and other groups with similar projects and objectives working within and in the area surrounding the Rouge River watershed.

Incentives should be offered to landowners to encourage participation in the program. These include recognition signage and awards, honorary membership in the Trails Association, property improvements to ensure the rights of the landowner are protected, and financial compensation.

The Rouge Park Trails Association will also be responsible for monitoring the trail system. Of primary concern is the need to monitor levels of trail use relative to the ecological carrying capacity of the river corridors. In addition, the Trails Association may wish to expand the monitoring program to include the monitoring of patterns of use, types of users, and other pertinent data.

The Rouge Park Trails Association will also be invited to participate in the undertaking of studies and the formulation of policies by the Rouge Park Alliance related to trail design, public access and trail use, including:

- The Trails, Access and Use Study;
- Cyclical updates of the Rouge North Management Plan; and
- Trail extensions, as lands are brought into public ownership and designated as Rouge Park.

The successful implementation of the Rouge Park Trails Association is fundamental to achieving the goal of establishing a continuous trail network from the Oak Ridges Moraine to Lake Ontario.

6.5.1.3 Implementing the Trail Network within Rouge Park Partnership Areas

The Rouge Park Partnership Program Areas merit special consideration within the program to achieve public access objectives. Generally, the method for implementing trails on Partnership Program lands will coincide with one of the two strategies described in the previous sections. For example, where Partnership Program lands are owned by a municipality, a strategy similar to that proposed for the Rouge Park North lands will be applied; for some privately owned lands, the implementation of trails through the Rouge Park Trails Association may be the preferred approach. However, in some situations, such as when lands are owned by a school board, utility or corporation, the preferred method of funding, implementing and monitoring trails may be different. In these cases, the partnership agreement will address trail development and maintenance on Partnership Program lands.

6.5.1.4 Principles to Guide Trail Development in Rouge Park North

Although the generation of a detailed trails, access and use study is recommended to direct the detailed design of the trail network for Rouge Park North, a number of basic principles were identified through the course of completing the public consultation and park planning processes. These include the following:

- The determination of the appropriateness of location, design standards, and construction and management techniques for trails will be directed by the objective of protecting the ecological and cultural resources of the park.
- Trails should be located and designed with an emphasis on preserving the integrity of the park ecosystem and protecting natural and cultural resources.
- Pedestrian traffic along foot trails can disturb wildlife, and the trails themselves can affect woodland interior conditions. Therefore, trails should be located whenever possible on the outer perimeter of the main corridor. Trails that follow the edge of the watercourse should be discouraged.
- Foot trails should be kept to the minimum width possible within forested areas. The wider the trail, the more likely that the trail may result in a long linear opening that would affect forest interior conditions. Design techniques aimed at defining the edge of the trail and discouraging short-cutting and widening should be employed.
- Public precautions such as lighting along trails, wide trails and vegetation clearing to improve sightlines tend to conflict with terrestrial corridor protection and enhancement objectives. Consequently, public trails that require these treatments should be confined to the outer perimeter of the corridor.
- The need for temporary trail closures and the provision for the rotation of trails should be considered, as a means to protect resources and mitigate impact on the park environment.
- The trail system should be designed to accommodate a range of uses. However, it is not necessary to provide all types of uses at all locations within the park.
- Trails on road rights-of-way and other lands outside of the park corridor may be required to provide linkages around private property and sensitive sites.
- Where possible, trails should be designed to provide barrier free access.

Building upon these principles, the trails, access and use study should define a preferred network of trails for Rouge Park North. The potential preferred and alternative alignments for the areas of the watershed held in private ownership should be determined in consultation with the Rouge Park Trails Association.

6.5.2 *Natural and Cultural Heritage Program*

In 1996, The Rouge Park Alliance initiated the Natural and Cultural Heritage Program and established the Natural and Cultural Heritage Committee to provide a coordinated and planned approach to implementing natural and cultural heritage projects within the Rouge River watershed. In 1998, the Rouge Park Natural and Cultural Heritage Action Plan was approved by the Rouge Park Alliance. The restorative work that the Rouge Park Alliance has approved and funded is now being undertaken throughout the park and watershed. The following section describes proposed actions that complement the restoration efforts already underway.

6.5.2.1 *Preservation and Management of Heritage Resources*

The Management Plan provides for the protection and integration of significant archaeological and heritage resources through the delineation of Natural Heritage Zones within lands designated as Rouge Park North. However, since the realization of the park in its ultimate form will be the product of a long process spanning decades, there is a need to recommend a strategy for identifying important resources. This is required on a watershed-wide basis in order to integrate resources into the physical and programmatic framework of the park, based upon the following principles, priorities and recommendations.

6.5.2.2 *Cultural Heritage Program*

a) Historical Summary

Prior to Euro-Canadian settlement, the Rouge River area was comprised of a rich habitat of flora and fauna that attracted native aboriginal settlements over many centuries. With Euro-Canadian settlement and cultural concepts of, and predisposition to, 'development' and 'progress', the 19th and early 20th centuries witnessed a transformation of the Rouge River watershed. Settlement shaped the watershed into an agricultural landscape, complete with associated built-up centres of rural settlement and transportation linkages. More recent urbanization has diminished the nature of the former agricultural character of the study area.

Noah Reesor Heritage Home
Source: Rouge Park (1999)

b) Architectural and Landscape Character

The Rouge Park North study area comprises a diverse and contrasting array of landscapes, buildings, views and vistas. The surviving built heritage represents a broad spectrum of building types, styles and construction practice. Notable losses of buildings have occurred with the demise of certain economic activities and related land uses, principally related to agricultural activities.

c) Rouge Park North - Opportunities for Interpretation

Historic centres of settlement identified in the Background Technical Appendix, and those features or areas designated under Parts IV and V of the Ontario Heritage Act by municipal councils, offer an initial opportunity to integrate built resources into the interpretive programming structure developed for the park. Future identification and study of built heritage resources and cultural landscapes through a Heritage Watershed Master Plan will further define the significance of features not included in designated property lists or in municipal inventories beyond the normally listed institutional, commercial and residential features, including the history of the families that settled the watershed, the hamlets and other aspects of human and

sociological heritage. Agricultural features that help define the former character of the study area would be identified more comprehensively through this process.

d) Recommendations

1. Undertake the preparation of a comprehensive, watershed-wide Heritage Master Plan. The primary objective of the proposed Heritage Master Plan for the Rouge watershed would be to provide an accurate understanding of the human-land relationship within the drainage system, from the distant prehistoric past through to more recent historic settlement periods. Data collected through this study would serve to identify known heritage resources, or those found as a result of subsequent research. These resources would be defined within a broader historical context, providing a sound basis for the assessment of their overall significance. This data may then be used to develop appropriate management strategies for the conservation, integration and enhancement of archaeological and built cultural heritage features within the study environment. Management strategies might include policies and procedures for the further delineation and conservation of cultural heritage features, which may be adversely affected by development (e.g. transportation corridors), as well as planning for the wise use (i.e. interpretation) of these features. The proposed Master Plan should build on the TRCA's Cultural Heritage Inventory Project currently underway.

2. It is recommended that the future heritage conservation management and planning of this area encompass the stewardship areas delineated in the Management Plan.

3. In order to ensure a comprehensive approach to heritage conservation, it is recommended that revisions be undertaken to Official Plan policies in the towns of Markham, Richmond Hill and Whitchurch-Stouffville, wherever appropriate. This will reflect the intent to conserve built cultural features identified in a full Watershed Heritage Master Plan.

4. It is recommended that when development is proposed within the Rouge North Management Plan area, either as a public or private undertaking, that the proposed development be considered by the relevant planning authority with respect to applicable conservation and planning guidelines for built cultural resources, including cultural landscapes.

5. Where new development replaces significant former built heritage resources, the new development should be suitably planned to include one or more of the following techniques:

   - The preservation and display of fragments of former buildings, structures and landscaping in their historic context;
   - Marking the traces of former locations, shapes and circulation lines of buildings, structures, travel routes and spaces;
   - The display of graphic material describing the former landscape complex;
   - Recall the former architecture, plan and landscaping in the new development;
   - The salvage of information through archaeological exploration and recording of buildings, structures and landscape through measured drawings and photogrammetry.

6. It is recommended that all works of public agencies consider their impacts upon built heritage resources and cultural landscape with a presumption against any work that would detrimentally affect a valued built heritage resource, cultural landscape or its attributes.

7. It is recommended that, as part of the long-term planning for heritage conservation in the Rouge Park North area, the promotion of a broader appreciation of its history and past activities consider undertaking the following:

   i) Investigate the establishment of a Rouge Park North Heritage Centre to provide interpretive programs developed from information gathered from the Heritage Master Plan, as well as to

provide other facilities as may be considered necessary. The Rouge Park Interpretive Plan recommends that the Markham Museum may be appropriate to accommodate this function.

ii) Mark the traces of former locations, shapes and circulation lines of buildings, structures, pathways and spaces associated with the settlement of the lands, especially the former mill sites associated with the watershed;

iii) Display graphic material describing the former historical activities of the area, particularly those that did not result in tangible remnants in the landscape such as farming practices;

iv) Celebrate former noted inhabitants of the area in any existing or proposed development by recalling and using their names for specific areas or facilities;

8. It is recommended that the Oak Ridges Moraine be celebrated by means of a commemorative plaque indicating its geological formation and its relationship to the associated history of area settlement practices.

9. It is recommended that the Joint Plaquing Committee of the municipalities, participating amenity groups and the Local Architectural Conservation Advisory Committees be consulted in the implementation of a theme plaquing program for the Rouge Park North Stewardship Area.

The general approach of the cultural heritage study for a Rouge watershed master plan would entail a series of tasks and sub-tasks, including the following.

6.5.2.3 Collection and Assessment of Background Cultural Heritage Resources for a Watershed Heritage Master Plan

A comprehensive watershed Heritage Master Plan should be developed to facilitate the protection, management and interpretation of cultural heritage resources. Utilizing the inventory information gathered and documented by the TRCA in the course of preparing the Rouge River Cultural Heritage Inventory Report, Volume 1 - Overview and Volume 2 - Built Heritage as a basis, the following actions are recommended to be undertaken.

1) Review pertinent municipal files, inventories and reports on built heritage resources and cultural landscapes in the study area. Hold discussions with local heritage committees and interested amenity groups. Contact provincial and federal authorities and agencies for comment on cultural heritage features in the watershed.

2) Complete a thematic history of the evolution of settlement throughout the watershed.

3) Undertake a sample inventory of types of features and cultural landscape to identify the variety of resources found in the watershed.

4) Develop plans and policies to manage the long-term care and conservation of the features in coordination with Rouge Park North policies.

5) Outline conservation, preservation and enhancement strategies for built heritage resources and cultural landscapes within the watershed context.

6) Outline the sensitivities of particular important features in the watershed through mapping.

7) Provide a vision for the interpretation of the variety of types of resources for public appreciation and educational purposes.

6.5.3 Preservation, Management and Enhancement of Natural Heritage Resources

The goal of preserving and enhancing natural resources will be achieved through the implementation of two programs: the Natural Heritage Program and the Monitoring Program. Although both programs are proposed as individual initiatives, it is important that the programs be integrated and coordinated with one another in order to provide the following opportunities:

- The opportunity to refine the Natural Heritage Program and establish new priorities based upon the results of the Monitoring Program; and
- The opportunity to modify the Monitoring Program to evaluate the success and benefits of specific protection and restoration initiatives.

The framework for each program is provided in the following sections.

Local residents help clean up stream corridors.
Source: Rouge Park (1999).

6.5.3.1 Natural Heritage Program

The Natural Heritage Program was generated to achieve the primary goal of preserving and enhancing the ecosystem of the Rouge River corridors. Although the program is designed for implementation within the limits of Rouge Park North, it was conceived with a focus on affording ecological benefits on a watershed-wide scale. Since the natural resource characteristics of each river and stream corridor within the park are unique, the Natural Heritage Program is structured to identify goals and targets for resource protection and restoration on a reach-by-reach basis. Recommendations related to groundwater, surface water, aquatic communities, terrestrial communities and stream morphology are addressed for each stream corridor, or sets of similar stream corridors, including recommendations for further study, if required.

The protection and restoration targets for each specific river corridor were refined from a set of general protection and restoration principles related to each functional component of the ecosystem. These general principles are defined below.

a) Terrestrial Resources

- Preserve existing natural vegetation units.
- Protect and preserve habitats for vulnerable, threatened and endangered species and species of concern.
- Optimize size, diversity, composition and connectivity of habitat patches.
- Connect isolated vegetation units to the main corridor.
- Increase the width of the main corridor to promote woodland interior conditions.
- Promote a diversity of natural indigenous vegetation types in association with the main forested corridor.
- Promote the conversion of less natural vegetation units (e.g. conifer plantations and old orchards) to return to more natural conditions.
- Plant only native species indigenous to the watershed.
- Use plants from a local gene pool whenever possible.
- Target the planting of species that may have become rarer in the local area as the result of human activities.
- Avoid planting any monocultures and diversify existing monocultures.

- Avoid introducing landscapes that require extensive maintenance (e.g. mowing, fertilizers, pesticides).

b) Aquatic Resources

- Protect and enhance water quality and quantity with the objective of achieving Provincial Water Quality Guidelines and a more stable flow regime.
- Maintain and enhance baseflow quantity.
- Maintain and lower temperature.
- Protect and enhance natural vegetation communities, particularly in the riparian zone.
- Protect recharge areas.
- Remove barriers to fish migration.
- Maintain and enhance in-stream cover.
- Manage sediment.
- Provide habitat diversity.
- Moderate changes in hydrology.

c) Groundwater Resources

- Protect and enhance groundwater quality and quantity.
- Protect recharge and discharge areas.
- Maintain and enhance forest cover.

d) Stream Morphology

- Protect stable natural channel systems.
- Mitigate erosion of unstable reaches using natural channel design techniques.
- Manage sediment loads.
- Moderate changes in hydrology with the objective of mimicking a more natural or historic flow regime.
- Rehabilitate channelized reaches utilizing natural channel design techniques.
- Protect and enhance native riparian vegetation communities.
- Stream stabilization works should be designed to provide for the natural function of riverine processes within the limits of physical constraints.
- Spot-works or band-aid type solutions should be avoided.
- The degree of control required by stabilization works will vary depending on the physical size of the watercourse and the amount of confinement from existing development. More sophisticated designs will be required on watercourses which are larger (3rd and 4th Order), more confined and/or very unstable.

e) Natural Heritage Program Targets

Figure 6.11 illustrates the location of the individual Natural Heritage Program Areas. Protection and restoration targets are provided for each tributary and reach on the following pages.

(i) UPPER EXHIBITION AND MIDDLE EAST BEAVER CREEKS

Rouge River Fisheries Management Plan Zone Classification: 6B/5A

- Environmental Resources

Groundwater Resources

- Baseflow is primarily from storm sewer infiltration
- Shallow groundwater likely contaminated by nutrients, road salt
- Other baseflow sources may contribute bacteria, low levels of metals, pesticides

Surface Water Resources

- Urban land use results in rapid runoff leading to highly unstable flows and high potential for erosion

Aquatic Resources

- Riparian vegetation primarily non-native, manicured parklands and private lands
- Some old field habitats
- Several storm sewered reaches
- Very tolerant warmwater fish community

Terrestrial Resources

- Very few undisturbed communities
- Sparse, fragmented upland communities, some intact riparian habitats
- High percentage of non-native and invasive alien species

Stream Morphology

- Less than 10% of the watercourses have natural channel systems
- Majority of the watercourses are channelized and encroached upon by historical and current development

Existing Land Uses

- Primarily urban-residential and commercial
- Numerous road crossings
- Are, or will be, highly urbanized tributaries

- Environmental Protection Targets

Groundwater

- Maintain or enhance on-site recharge and discharge volumes
- Enhance current groundwater quality
- Protect groundwater discharge areas and volumes

Surface Water Quantity and Quality (see also Stream Morphology)

- Maintain existing peak flows for the 100 year storm
- Maintain baseflow as a minimum
- Maximum temperature 24°C in headwater streams
- Total Phosphorus £ 0.2 mg/L (annual average for dry / wet weather conditions)
- Suspended Solids £ 20/200 mg/L (annual average for dry / wet weather conditions)
- Dissolved Oxygen 5.0 mg/L minimum at all times
- E. coli. 100/1,000 cts/100 mL (geometric mean conditions for dry / wet weather conditions)
- Other water quality parameters (e.g., heavy metal, pesticides etc.) should be controlled to Provincial Water Quality Objectives (PWQO) on a best efforts basis

Aquatic Communities

- Warmwater aquatic community - redside dace
- Intact, vegetated riparian community
- At least 5% of stream reaches pool: riffle dominated
- Minimum pool depths: 0.2 m
- 30-50% of banks with woody riparian vegetation

Terrestrial Communities

- Use native species for re-vegetating corridors
- Select vegetation community types based on soil moisture / fertility, flooding / water table regime and composition of adjacent communities
- Increase width of wooded corridor
- Manage or eliminate non-native vegetation communities

Stream Morphology

- Maintain post-development shear stress conditions on channel systems to pre-development conditions by controlling bankfull frequencies and durations
- Maintain dynamically stable, natural channel systems
- Balance sediment regime
- Minimize fine sediment loads from runoff
- Restore natural channel morphology

- Key Best Management Practices

  - Stormwater runoff volume controls utilizing large open space areas and centralized end-of-pipe facilities to infiltrate clean runoff for maintaining water budget and stream bankfull flow conditions
  - Stormwater runoff flow controls and detention ponds for flood control, water quality control and stream morphology protection
  - Natural channel design for all stream works
  - Riparian planting along riparian and valley corridor
  - Minimize the potential for contaminant spills and minimize applications of de-icing agents, fertilizers, pesticides etc.

- Potential Future Study Requirements

General

- Environmental Management Planning Studies on a tributary basis (may include studies listed below)
- Develop community (neighbourhood) based stream improvement program linking into natural and cultural heritage programs

Groundwater Resources

- Detailed hydrologic studies on baseflow and water supply impacts resulting from future urban growth and urbanization and for the implementation of stormwater management facilities

Surface Water Resources

- Hydrology and hydrologic update reporting, for managing peak flow and flood plain conditions resulting from urban growth and land use changes, as required

Aquatic Resources

- Identify riparian and valley corridor width based on functional characteristics and existing vegetation features

Terrestrial Resources

- EIS required within / adjacent to all natural features
- Re-vegetation naturalization plans for all riparian / valley corridors and terrestrial regeneration areas

Stream Morphology

- Detailed fluvial geomorphology study to determine design criteria for managing bankfull flow conditions and for natural channel design works, as required

Rouge Park North Natural Heritage Program

(ii) BURNDENET AND LOWER EXHIBITION CREEKS

Rouge River Fisheries Management Plan Zone Classification: 6B

- Environmental Resources

Groundwater Resources

- Baseflow is primarily from storm sewer infiltration
- Shallow groundwater likely contaminated by nutrients, road salt
- Other baseflow sources may contribute bacteria, low levels of metals, pesticides

Surface Water Resources

- Urban land use results in rapid runoff leading to highly unstable flows and high potential for erosion

Aquatic Resources

- Riparian vegetation primarily non-native, manicured parklands and private lands
- Some old field habitats
- Several storm sewered reaches
- Very tolerant warmwater fish community

Terrestrial Resources

- Very few undisturbed communities
- Fragmented upland communities, some intact riparian habitats

Stream Morphology

- 25 percent of the watercourses have natural channel systems
- Majority of the watercourses are channelized and encroached upon by historical and current development

Existing Land Uses

- Primarily urban-residential and commercial
- Numerous road crossings
- Are, or will be, highly urbanized tributaries

- Environmental Protection Targets

Groundwater

- Maintain or enhance on-site recharge and discharge volumes
- Enhance current groundwater quality
- Protect groundwater discharge areas and volumes

Surface Water Quantity and Quality (see also Stream Morphology)

- Maintain, or preferably reduce peak flows for the 100 year storm
- Maintain baseflow as a minimum
- Maximum temperature 24°C in headwater streams
- Total Phosphorus £ 0.2 mg/L (annual average for dry / wet weather conditions)

- Suspended Solids £ 20/200 mg/L (annual average for dry / wet weather conditions)
- Dissolved Oxygen 5.0 mg/L minimum at all times
- E. coli. 100/1,000 cts/100 mL (geometric mean conditions for dry / wet weather conditions)
- Other water quality parameters (e.g., heavy metal, pesticides etc.) should be controlled to Provincial Water Quality Objectives (PWQO) on a best efforts basis

Aquatic Communities

- Coldwater aquatic community - redside dace, rainbow trout, brown trout
- Intact, vegetated riparian community
- At least 5% of stream reaches pool: riffle dominated
- Minimum pool depths: 0.2 m
- 75% of banks with woody riparian vegetation

Terrestrial Communities

- Use native species for re-vegetating corridors
- Select vegetation community types based on soil moisture / fertility, flooding / water table regime and composition of adjacent communities
- Increase width of wooded corridor
- Manage or eliminate non-native vegetation communities

Stream Morphology

- Maintain post-development shear stress conditions on channel systems to pre-development conditions by controlling bankfull frequencies and durations
- Maintain dynamically stable, natural channel systems
- Balance sediment regime
- Minimize fine sediment loads from runoff
- Stabilize eroded banks using biotechnical stabilization and natural channel design techniques

- Key Best Management Practices

  - Stormwater runoff volume controls utilizing large open space areas and centralized end of pipe facilities to infiltrate clean runoff for maintaining water budget and stream bankfull flow conditions
  - Stormwater runoff flow controls and detention ponds for flood control, water quality control and stream morphology protection
  - Natural channel design for all stream works
  - Riparian planting along riparian and valley corridor
  - Minimize the potential for contaminant spills and minimize applications of de-icing agents, fertilizers, pesticides etc.

- Potential Future Study Requirements

General

- Environmental Management Planning Studies on a tributary basis (may include studies listed below)
- Develop community (neighbourhood) based stream improvement program linking into urban renewal and cultural heritage programs

Groundwater Resources

- Detailed hydrologic studies on baseflow and water supply impacts resulting from future urban growth and urbanization and for the implementation of stormwater management facilities

- Hydrology and hydrologic update reporting, for managing peak flow and flood plain conditions resulting from urban growth and land use changes, as required

Aquatic Resources
- Identify riparian and valley corridor width based on functional characteristics and existing vegetation features

Terrestrial Resources
- EIS required within / adjacent to all natural features
- Re-vegetation naturalization plans for all riparian / valley corridors and terrestrial regeneration areas

Stream Morphology
- Detailed fluvial geomorphology study to determine design criteria for managing bankfull flow conditions and for natural channel design works, as required

Rouge Park North Natural Heritage Program

(iii) MORNINGSIDE TRIBUTARY

Rouge River Fisheries Management Plan Zone Classification: 6C

- Environmental Resources

Groundwater Resources
- Baseflow is primarily from storm sewer infiltration
- Shallow groundwater likely contaminated by nutrients, road salt
- Other baseflow sources may contribute bacteria, low levels of metals, pesticides
- Some seepage zones and recharge areas

Surface Water Resources
- Urban land use results in rapid runoff leading to highly unstable flows and high potential for erosion

Aquatic Resources
- Riparian vegetation primarily native, late successional to climax woodland
- Some old field habitats
- Storm sewered headwaters
- Coldwater fish community

Terrestrial Resources
- Native woodland vegetation is under acute stress due to changes in hydrology and bank erosion
- Sparse, fragmented upland communities, some intact riparian habitats

Stream Morphology
- 25 percent of the watercourse has natural channel systems (including allowance for headwater tributaries)
- Majority of the headwater watercourses are channelized, sewered or encroached upon by historical and current development

Existing Land Uses
- Primarily urban-residential and commercial
- Numerous road crossings
- Are, or will be, highly urbanized tributaries

- Environmental Protection Targets

Groundwater

- Protect groundwater discharge areas
- Groundwater discharge minimum 30% average annual daily flow
- Maintain or enhance on-site recharge and discharge volumes
- Maintain or enhance current groundwater quality

Surface Water Quantity and Quality (see also Stream Morphology)

- Maintain existing peak flows
- Maintain baseflow volume
- Maximum temperature 22°C
- Total Phosphorus £ 0.1 mg/L (annual average for dry / wet weather conditions)
- Suspended Solids £ 20/200 mg/L (annual average for dry / wet weather conditions)
- Dissolved Oxygen 5.0 mg/L minimum at all times
- E. coli. 100/1,000 cts/100 mL (geometric mean conditions for dry / wet weather conditions)
- Other water quality parameters (e.g., heavy metal, pesticides etc.) should be controlled to Provincial Water Quality Objectives (PWQO) on a best efforts basis

Aquatic Communities

- Pristine coldwater aquatic community - brook trout, redside dace, rainbow trout, brown trout, atlantic salmon
- Intact riparian and valley corridor

Terrestrial Communities

- Restore native woodland corridor north of Steeles Avenue
- Use native species for re-vegetating corridors
- Select vegetation community types based on soil moisture / fertility, flooding / water table regime and composition of adjacent communities

Stream Morphology

- Restore degraded reaches using natural channel design techniques
- Maintain post-development shear stress conditions on channel systems to pre-development conditions by controlling bankfull frequencies and durations
- Maintain dynamically stable, natural channel systems
- Balance sediment regime
- Minimize fine sediment loads from runoff

- Key Best Management Practices

  - Stormwater runoff volume controls utilizing large open space areas and centralized end-of-pipe facilities to infiltrate clean runoff for maintaining water budget and stream bankfull flow conditions
  - Stormwater runoff flow controls and detention ponds for flood control, water quality control and stream morphology protection
  - Natural channel design for all stream works
  - Riparian planting along riparian and valley corridor
  - Minimize the potential for contaminant spills and minimize applications of de-icing agents, fertilizers, pesticides etc.

- Potential Future Study Requirements

General

- Environmental Management Planning Studies on a tributary basis (may include studies listed below)
- Develop community (neighbourhood) based stream improvement program linking into urban renewal and cultural heritage programs

Groundwater Resources

- Detailed hydrologic studies on baseflow and water supply impacts resulting from future urban growth and urbanization and for the implementation of stormwater management facilities

Surface Water Resources

- Hydrology and hydrologic update reporting, for managing peak flow and flood plain conditions resulting from urban growth and land use changes, as required

Aquatic Resources

- Identify riparian and valley corridor width based on functional characteristics and existing vegetation features

Terrestrial Resources

- EIS required within / adjacent to all natural features
- Re-vegetation naturalization plans for all riparian / valley corridors and terrestrial regeneration areas

Stream Morphology

- Detailed fluvial geomorphology study to determine design criteria for managing bankfull flow conditions and for natural channel design works, as required

Rouge Park North Natural Heritage Program

(iv) LITTLE ROUGE AND ROBINSON CREEKS AND UPPER ROUGE RIVER

Rouge River Fisheries Management Plan Zone Classification: 4B/6A/1B

- Environmental Resources

Groundwater Resources

- Significant baseflow contribution
- Baseflow may be sensitive to groundwater withdrawals
- Highly susceptible to contamination

Surface Water Resources

- Permanent flow from headwaters
- Many, small, private on-line ponds
- Surface water withdrawals are significant

Aquatic Resources

- Riparian and valley corridor well vegetated and extensive
- 60-75% of riparian corridor in natural vegetation
- Brook trout / rainbow trout / redside dace / smallmouth bass

Terrestrial Resources

- Mixture of upland and riparian features including some extensive areas

Stream Morphology

- Majority of natural channel systems in headwater streams with some on-line ponds
- Some reaches altered by crossings, erosion control
- Urban impacts and modifications downstream of 16th Avenue

Existing Land Uses

- Private residential properties
- Some urban and rural estate development
- Agriculture still a dominant use
- Golf courses

- Environmental Protection Targets

Groundwater

- Protect groundwater discharge areas
- Groundwater discharge minimum 30% average annual daily flow
- Maintain or enhance on-site recharge and discharge volumes
- Maintain current groundwater quality

Surface Water Quantity and Quality (see also Stream Morphology)

- Maintain existing peak flows
- Maintain baseflow volume
- Maximum temperature 22°C
- Total Phosphorus £ 0.1 mg/L (annual average for dry / wet weather conditions)
- Suspended Solids £ 20/200 mg/L (annual average for dry / wet weather conditions)
- Dissolved Oxygen 5.0 mg/L minimum at all times
- E. coli. 100/1,000 cts/100 mL (geometric mean conditions for dry / wet weather conditions)
- Other water quality parameters (e.g., heavy metal, pesticides etc.) should be controlled to Provincial Water Quality Objectives (PWQO) on a best efforts basis

Aquatic Communities

- Pristine coldwater aquatic community - brook trout, redside dace, rainbow trout, brown trout, atlantic salmon
- Intact riparian and valley corridor
- Eliminate or provide for the bypass of barriers to fish migration
- Riffles free of silt / fine sand
- Abundant woody debris in channel
- Well vegetated, wooded riparian area: 75% of bank in woody vegetation

Terrestrial Communities

- Protect all natural vegetation features
- Improve diversity on a watershed-wide basis
- Use native species for re-vegetating corridors
- Select vegetation community types based on soil moisture / fertility, flooding / water table regime and composition of adjacent communities
- Establish terrestrial corridor (minimum width 400m) in Little Rouge
- Enhance area of forest interior habitats in the Little Rouge corridor

Stream Morphology

- Maintain post-development shear stress conditions on channel systems to pre-development conditions by controlling bankfull frequencies and durations
- Maintain dynamically stable, natural channel systems
- Balance sediment regime
- Minimize fine sediment loads from runoff

- Key Best Management Practices

  - Stormwater runoff volume controls utilizing large open space areas and centralized end-of-pipe facilities to infiltrate clean runoff for maintaining water budget and stream flow conditions
  - Stormwater runoff flow controls and detention ponds for flood control, water quality control and stream morphology protection
  - Stormwater volume control for bankfull flow control / stream morphology protection
  - Riparian plantings along riparian and valley corridor
  - Development exclusion in all natural features
  - Minimize groundwater / surface water withdrawals adjacent to creek
  - Minimize the potential for contaminant spills and minimize applications of de-icing agents, fertilizers, pesticides, etc.
  - Restoration of unnatural channel reaches

- Potential Future Study Requirements

General

  - Environmental Management Planning Studies on a tributary basis (may include studies listed below)
  - Headwater tributary assessments
  - Develop community (neighbourhood) based stream improvement program linking into urban renewal and cultural heritage programs

Groundwater Resources

  - Detailed hydrologic studies on baseflow and water supply impacts resulting from future urban growth and urbanization and for the implementation of stormwater management facilities

Surface Water Resources

  - Hydrologic update reporting, for maintaining peak flows from proposed land use changes, as required

Aquatic Resources

  - Identify riparian and valley corridor width based on functional characteristics and existing vegetation features

Terrestrial Resources

  - EIS required within / adjacent to all natural features
  - Re-vegetation naturalization plans for all stream / valley corridors and terrestrial regeneration areas

Stream Morphology

  - Detailed fluvial geomorphology study to determine design criteria for managing bankfull flow conditions and for natural channel design works, as required

Rouge Park North Natural Heritage Program

(v) BERCZY AND BRUCE CREEKS

Rouge River Fisheries Management Plan Zone Classification: 2B/3B/5A

- Environmental Resources

Groundwater Resources

  - Significant baseflow contribution
  - Baseflow may be sensitive to groundwater withdrawals
  - Highly susceptible to contamination

Surface Water Resources

- Permanent flow from headwaters
- Many, small, private on-line ponds
- Surface water withdrawals are significant

Aquatic Resources

- Riparian and valley corridor moderately vegetated
- 60-75% of riparian corridor in natural vegetation
- Brook trout / rainbow trout / brown trout / redside dace / smallmouth bass

Terrestrial Resources

- Mixture of upland and riparian features including some large areas

Stream Morphology

- Majority of natural channel systems in headwater streams with some on-line ponds
- Some reaches altered by crossings, erosion control
- Urban impacts and modifications downstream of 16th Avenue

Existing Land Uses

- Urban and rural estate development
- Agriculture
- Golf courses

- Environmental Protection Targets

Groundwater

- Protect groundwater discharge areas
- Groundwater discharge minimum 30% average annual daily flow
- Maintain or enhance on-site recharge and discharge volumes
- Maintain current groundwater quality

Surface Water Quantity and Quality (see also Stream Morphology)

- Maintain existing peak flows
- Maintain baseflow volume
- Maximum temperature 22°C
- Total Phosphorus £ 0.1 mg/L (annual average for dry / wet weather conditions)
- Suspended Solids £ 20/200 mg/L (annual average for dry / wet weather conditions)
- Dissolved Oxygen 5.0 mg/L minimum at all times
- E. coli. 100/1,000 cts/100 mL (geometric mean conditions for dry / wet weather conditions)
- Other water quality parameters (e.g., heavy metal, pesticides etc.) should be controlled to Provincial Water Quality Objectives (PWQO) on a best efforts basis

Aquatic Communities

- Pristine coldwater aquatic community - brook trout, redside dace, rainbow trout, brown trout, atlantic salmon
- Intact riparian and valley corridor
- Eliminate or provide bypass around barriers to fish migration
- Riffles free of silt / fine sand
- Abundant woody debris in channel
- Well vegetated, wooded riparian area: 75% of bank in woody vegetation

Terrestrial Communities

- Protect all natural vegetation features

- Use native species for re-vegetating corridors
- Select vegetation community types based on soil moisture / fertility, flooding / water table regime and composition of adjacent communities
- Enhance terrestrial corridor width
- Link natural vegetation units
- Create forest interior habitat conditions

Stream Morphology

- Maintain post-development shear stress conditions on channel systems to pre-development conditions by controlling bankfull frequencies and durations
- Maintain dynamically stable, natural channel systems
- Balance sediment regime
- Minimize fine sediment loads from runoff

- Key Best Management Practices

  - Stormwater runoff volume controls utilizing large open space areas and centralized end-of-pipe facilities to infiltrate clean runoff for maintaining water budget and stream bankfull flow conditions
  - Stormwater runoff flow controls and detention ponds for flood control, water quality control and stream morphology protection
  - Stormwater volume control for bankfull flow control / stream morphology protection
  - Riparian plantings along riparian and valley corridor
  - Development exclusion in all natural features
  - Minimize groundwater / surface water withdrawals adjacent to creek
  - Minimize the potential for contaminant spills and minimize applications of de-icing agents, fertilizers, pesticides, etc.
  - Restoration of unnatural channel reaches

- Potential Future Study Requirements

General

- Environmental Management Planning Studies on a tributary basis (may include studies listed below)
- Headwater tributary assessments
- Develop community (neighbourhood) based stream improvement program linking into urban renewal and cultural heritage programs

Groundwater Resources

- Detailed hydrologic studies on baseflow and water supply impacts resulting from future urban growth and urbanization and for the implementation of stormwater management facilities

Surface Water Resources

- Hydrologic update reporting, for maintaining peak flows from proposed land use changes, as required

Aquatic Resources

- Identify riparian and valley corridor width based on functional characteristics and existing vegetation features

Terrestrial Resources

- EIS required within / adjacent to all natural features
- Re-vegetation naturalization plans for all stream / valley corridors and terrestrial regeneration areas

Stream Morphology

- Detailed fluvial geomorphology study to determine design criteria for managing bankfull flow conditions and for natural channel design works, as required

Rouge Park North Natural Heritage Program

(vi) MIDDLE ROUGE RIVER

Rouge River Fisheries Management Plan Zone Classification: 5B/6C/6D

- Environmental Resources

Groundwater Resources

- Significant baseflow contributions in upper reaches
- Baseflow also results from storm sewer infiltration
- Other baseflow sources may contribute bacteria, low levels of metals, pesticides

Surface Water Resources

- Permanent base flow in each tributary
- Urban land use results in rapid runoff leading to highly unstable flows and high potential for erosion
- A number of existing stormwater management facilities

Aquatic Resources

- Riparian and valley corridor vegetation a mixture of non-native and native communities, also manicured parkland
- 50% or less of corridor in natural vegetation
- Redside dace / migratory salmonids

Terrestrial Resources

- Mixture of upland and riparian features, some large naturalized vegetation communities

Stream Morphology

- Mix of altered and naturalized reaches

Existing Land Uses

- Primarily urban: residential and commercial
- Many transportation and infrastructure impacts / crossings

- Environmental Protection Targets

Groundwater

- Protect groundwater discharge areas
- Groundwater discharge minimum 30% average annual daily flow
- Maintain or enhance on-site recharge and discharge volumes
- Maintain current groundwater quality

Surface Water Quantity and Quality (see also Stream Morphology)

- Maintain existing peak flows
- Maintain existing baseflow volume
- Maximum temperature 24°C
- Total Phosphorus £ 0.2 mg/L (annual average for dry / wet weather conditions)
- Suspended Solids £ 20/200 mg/L (annual average for dry / wet weather conditions)
- Dissolved Oxygen 5.0 mg/L minimum at all times
- E. coli. 100/1,000 cts/100 mL (geometric mean conditions for dry / wet weather conditions)

- Other water quality parameters (e.g., heavy metal, pesticides etc.) should be controlled to Provincial Water Quality Objectives (PWQO) on a best efforts basis

Aquatic Communities

- Slightly degraded coldwater aquatic community - rainbow / brown trout, smallmouth bass, redside dace
- Intact riparian and valley corridor
- Riffles free of silt / fine sand
- Abundant woody debris in channel
- Well vegetated, wooded riparian area: 75% of bank in woody vegetation

Terrestrial Communities

- Protect all natural vegetation features
- Use native species for re-vegetating corridors
- Select vegetation community types based on soil moisture / fertility, flooding / water table regime and composition of adjacent communities
- Manage or eliminate non-native, invasive vegetation

Stream Morphology

- Maintain post-development shear stress conditions on channel systems to pre-development conditions by controlling bankfull frequencies and durations
- Maintain dynamically stable, natural channel systems
- Balance sediment regime
- Minimize fine sediment loads from runoff

- Key Best Management Practices

  - Stormwater runoff volume controls utilizing large open space areas and centralized end-of-pipe facilities to infiltrate clean runoff for maintaining water budget and stream bankfull flow conditions
  - Stormwater runoff flow controls and detention ponds for flood control, water quality control and stream morphology protection
  - Riparian plantings along riparian and valley corridors
  - Minimize groundwater / surface water withdrawals adjacent to creek
  - Minimize the potential for contaminant spills and minimize applications of de-icing agents, fertilizers, pesticides, etc.
  - Restore altered reaches of natural stream reaches
  - Bypass / remove existing migration barriers

- Potential Future Study Requirements

General

- Environmental Management Planning Studies on a tributary basis (may include studies listed below)

Groundwater Resources

- Detailed hydrologic studies on baseflow and water supply impacts resulting from future urban growth and urbanization and for the implementation of stormwater management facilities

Surface Water Resources

- Hydrology and hydrologic update reporting, for managing peak flow and flood plain conditions resulting from urban growth and land use changes, as required

Aquatic Resources

- Habitat enhancement plans
- Identify riparian and valley corridor width based on functional characteristics and existing vegetation features

Terrestrial Resources

- EIS required within / adjacent to all natural features
- Re-vegetation naturalization plans for all riparian / valley corridors and terrestrial regeneration areas

Stream Morphology

- Detailed fluvial geomorphology study to determine design criteria for managing bankfull flow conditions and for natural channel design works, as required

Rouge Park North Natural Heritage Program

(vii) HEADWATER TRIBUTARIES - ALL BRANCHES

Rouge River Fisheries Management Plan Zone Classification: 1A/3A/4A

- Environmental Resources

Groundwater Resources

- Significant baseflow contribution
- Baseflow may be sensitive to groundwater withdrawals
- Highly susceptible to contamination

Surface Water Resources

- Permanent flow from headwaters
- Many, small, private on-line ponds
- Surface water withdrawals are significant

Aquatic Resources

- Riparian and valley corridor well vegetated and extensive
- 60-75% of riparian corridor in natural vegetation
- Brook trout / rainbow trout / redside dace

Terrestrial Resources

- Mixture of upland and riparian features including some extensive areas

Stream Morphology

- Majority of natural channel systems in headwater streams with some on-line ponds
- Some reaches altered by crossings, erosion control
- Many tributaries are intermittent

Existing Land Uses

- Private residential properties
- Rural estate development
- Agriculture
- Golf courses

- Environmental Protection Targets

Groundwater

- Protect groundwater recharge areas
- Protect groundwater discharge areas

- Groundwater discharge minimum 30% average annual daily flow
- Maintain or enhance on-site recharge and discharge volumes
- Maintain current groundwater quality and quantity

Surface Water Quantity and Quality (see also Stream Morphology)

- Maintain existing peak flows
- Maintain baseflow volume
- Maximum temperature 22°C
- Total Phosphorus £ 0.1 mg/L (annual average for dry / wet weather conditions)
- Suspended Solids £ 20/200 mg/L (annual average for dry / wet weather conditions)
- Dissolved Oxygen 5.0 mg/L minimum at all times
- E. coli. 100/1,000 cts/100 mL (geometric mean conditions for dry / wet weather conditions)
- Other water quality parameters (e.g., heavy metal, pesticides etc.) should be controlled to Provincial Water Quality Objectives (PWQO) on a best efforts basis

Aquatic Communities

- Pristine coldwater aquatic community - brook trout, redside dace, rainbow trout, brown trout, atlantic salmon
- Intact riparian and valley corridor
- Reaches dominated by pool: riffle sequences: minimum 12% pools, 12% riffles
- Minimum pool depths 0.5 m
- Minimum 10% gravel, 50% cobble-boulder in riffles
- Eliminate or provide for the bypass of barriers to fish migration
- Riffles free of silt / fine sand
- Abundant woody debris in channel
- Well vegetated, wooded riparian area: 50-75% of bank in woody vegetation

Terrestrial Communities

- Protect all natural vegetation features
- Improve diversity
- Use native species for re-vegetating corridors
- Select vegetation community types based on soil moisture / fertility, flooding / water table regime and composition of adjacent communities
- Establish east-west terrestrial corridor along Oak Ridges Moraine
- Enhance area of forest interior habitats in the Little Rouge corridor

Stream Morphology

- Maintain post-development shear stress conditions on channel systems to pre-development conditions by controlling bankfull frequencies and durations
- Maintain dynamically stable, natural channel systems
- Balance sediment regime
- Minimize fine sediment loads from runoff

- Key Best Management Practices

  - Monitor existing practices or undertake studies to mitigate potential impacts on groundwater quality and quantity of the Oak Ridges Moraine aquifer complex from the following activities:

    - Gravel pits - gravel washing, mining below the water table
    - Golf courses - irrigation, pesticide and fertilizer loading and water taking
    - Municipal wells - water taking
    - Septics - nitrate loading

- Agriculture - irrigation, pesticide and fertilizer loading and water taking
- Sod farms - irrigation, pesticide and fertilizer loading and water taking
- Industries - stormwater discharge, chemical loading
- Transportation corridors - salt, stormwater discharge
- Bottled water operations - water taking
- Fish hatcheries - water taking
- Landfills - groundwater contamination
- Large snow dump operations
- Fuel storage and transfer - conduct in areas specifically designated and protected against spills

· De-commission abandoned water wells in accordance with Ministry of Environment and Energy regulations to minimize the potential for future impacts to groundwater quality

· Stormwater runoff controls using at-source facilities and infiltration BMPs where runoff quality is acceptable

· Stormwater runoff volume controls utilizing large open space areas and centralized end-of-pipe facilities to infiltrate clean runoff for maintaining water budget and stream bankfull flow conditions

· Stormwater runoff flow controls and detention ponds for flood control, water quality control and stream morphology protection

· Stormwater volume control for bankfull flow control / stream morphology protection

· Riparian plantings along riparian and valley corridor

· Development exclusion in all natural features

· Minimize groundwater / surface water withdrawals adjacent to creek

· Minimize the potential for contaminant spills and minimize applications of de-icing agents, fertilizers, pesticides, etc.

· Restoration of unnatural channel reaches

- Potential Future Study Requirements

General

· Environmental Management Planning Studies on a tributary basis (may include studies listed below)
· Headwater tributary assessments
· Develop community (neighbourhood) based stream improvement program linking into urban renewal and cultural heritage programs

Groundwater Resources

· Detailed hydrologic studies on baseflow and water supply impacts resulting from existing land use, future urban growth and urbanization and for the implementation of stormwater management facilities

Surface Water Resources

· Hydrologic update reporting, for maintaining peak flows from proposed land use changes, as required

Aquatic Resources

- Identify riparian and valley corridor width based on functional characteristics and existing vegetation features

Terrestrial Resources

- EIS required within / adjacent to all natural features
- Re-vegetation naturalization plans for all stream / valley corridors and terrestrial regeneration areas

Stream Morphology

- Detailed fluvial geomorphology study to determine design criteria for managing bankfull flow conditions and for natural channel design works, as required

The Natural Heritage Program will evolve and change in response to the findings of the Monitoring Program and as protection and restoration initiatives are implemented. Targets and techniques should be refined to address any negative changes in the health of the ecosystem, if they occur, or conversely, as restoration and protection targets are achieved.

The implementation of the Natural Heritage Program is a high priority. The responsibility for the administration of the program will be that of the Rouge Park Alliance; however, to be successful, the actual implementation of initiatives should be undertaken in partnership with municipalities, landowners, non-government organizations, environmental groups and the community. The Stewardship Program and the Partnership Program will be important tools to achieve the objectives of the Natural Heritage Program on privately owned lands.

6.5.4 Monitoring Program

The Monitoring Program is an essential component of the overall strategy to protect and enhance the natural resources of the park. The primary goal of the Monitoring Program is to gauge the ecological health of Rouge Park North and the river corridors. To achieve this goal, the Monitoring Program should be integrated with the TRCA Regional Monitoring Program and designed to achieve the following objectives:

- To determine the success of Rouge Park North and its component programs, including:
    - The Stewardship Program;
    - The Partnership Program; and
    - The Natural and Cultural Heritage Program.
- To direct the cyclical modification and refinement of the Management Plan and its component programs to ensure that the goal of ecological health is achieved over the long-term.
- To gain an understanding of the changes occurring in the environment of the park through the evaluation of a range of physical and ecological components.
- To involve the community and non-government organizations as active participants, in partnership with the Rouge Park Alliance, in implementing the Monitoring Program.
- To define a general common protocol for monitoring various indicators and assembling data.

In response, prior to the initiation of the Monitoring Program, the following tasks should be undertaken:

- Prospective individuals and groups who have expressed an interest in participating in the Monitoring Program should be surveyed to determine:
    - Their capabilities and expertise;
    - Their area of interest;
    - The duration of their commitment;

- Seasonal limitations; and
- Potential area of coverage.

Based upon this information, a comprehensive list of participants, a monitoring schedule and a map of areas to be covered can be generated.

- Monitoring sites should be identified and monumented. Sites should be selected throughout the park and along the length of each corridor. Monitoring sites should be selected based upon the following criteria:

  - Sites should be representative of average conditions within a specific reach of the river or length of corridor;
  - Sites should be located to correspond with existing known monitoring or data collection sites (for example, Canada Water Survey gauges, documented fish sampling sites and existing water wells); and
  - Sites should be easily accessible and visible to afford the broadest range of participants, including school age children and older adults.

- Site locations should be surveyed and catalogued in a database.

- The scope and complexity of the Monitoring Program should be adjusted according to the capabilities of the prospective participants.

- The Monitoring Program should be coordinated with other monitoring activities being undertaken throughout the watershed, including those being undertaken as requirements of the development approvals process, to gauge the performance of stormwater management BMPs, MNR fish habitat assessments, TRCA monitoring initiatives and other programs.

- The Monitoring Program should be coordinated by the Rouge Park Alliance, with the objective of establishing a comprehensive database which serves as a 'clearing house' of information on the Rouge watershed.

The Monitoring Program must be implemented with confirmed commitments for funding and participation for a number of years to ensure that the program will be sustainable over the long term.

The Monitoring Program proposed to gauge the ecological health of Rouge Park North and the Rouge River system is described in its component parts in the following sections.

6.5.4.1 Aquatic Resources

Fish and aquatic invertebrates are a product of the environment in which they live. In other words, the health, abundance and diversity of aquatic life in a stream is influenced by a number of factors, namely:

- Streamflow characteristics, particularly baseflow;
- Water quality conditions, particularly oxygen and temperature;
- Riparian vegetation;
- Stream morphology and sediment regime (i.e., stability);
- In-stream habitat diversity; and
- Biological interactions.

Periodic sampling of fish and aquatic invertebrates can serve as an inexpensive indicator of the condition of streams and provide information on what specific components of habitat may be a limiting or degrading factor in the stream environment. Both serve equally as well as an indicator of improvements in the stream environment. Benthic invertebrates, because they are unable to move out of an area (like fish), are often better indicators of water quality degradation. On the other hand, fish are an indicator of a larger portion of the

stream environment because individuals use more stream area than benthic invertebrates. Fish also are at the top of the aquatic food chain and thus reflect any potential contaminants, which may become toxic through bioaccumulation or pose a threat to human health. Table 6.1 describes the species associations typical of stream habitat conditions in the watercourses of the Rouge Park North Study Area.

Table 6.1
Indicators of Stream Health - Aquatic Resources

Coldwater Aquatic Community	**Warmwater Aquatic Community**
FISHERIES	
IBI >36	IBI <36
• brook trout	• redside dace
• rainbow / brown trout	
MACROINVERTEBRATES	
WQI >13	WQI = 11 - 13
At least four of the following: • Leuctra • Ectopria • Diplectrona • Promoresia • Glossosoma • Parapsyche	At least eight of the following: • Isoperla • Baetis • Paraleptophlebia • Amphinemura • Leuctra • Taeniopteryx • Hydroptila • Rhyacophila • Diplectrona • Neophylax • Diamesa

Monitoring of streams can also be undertaken at both a subwatershed and a tributary scale. The frequency of monitoring should be in the order of two years, or more frequently, based upon the rate of change in land use in the watershed; however, more frequent monitoring is appropriate when specific works are undertaken such as stream restoration, riparian plantings and pond retrofits.

At the subwatershed scale, monitoring could include:

- Number of metres of stream restoration;
- Number of metres of riparian plantings;
- Number of metres of streamside fencing to control livestock;
- Number of on-line ponds retrofitted; and
- Number of migration barriers removed.

In addition, a subwatershed-wide fish and benthic invertebrate survey should also be undertaken on a two-year basis. Approximately 25 stations would have to be sampled within the Rouge North Study Area.

On a tributary basis, volunteers could undertake simple surveys on representative reaches on two-year intervals, or more frequently as land use change occurs. Representative reaches would be about 100 to 150 m in length, and the following information would be collected in each of three seasons:

- Stream temperature (particularly summer maximum temperature);

- Observations of fish spawning sites (particularly trout);
- Estimates of streamflow (particularly low flow);
- Stream width and depth;
- Number of riffles and condition (particle size, presence of silt / algae / aquatic plants);
- Average particle size of substrate (pebble count);
- Percent stream shaded by trees / shrubs;
- Percent of in-stream cover (large boulders, logs, undercut banks);
- Observations of fish and benthic invertebrates (use of dipnet or minnow seine); and
- Evidence of degradation of stream conditions.

Photographs could be taken at reference locations to illustrate changes in stream condition.

The location of the representative reaches should coincide with stream morphology monitoring sites. Two reference locations should be established on each tributary and on the Rouge River.

6.5.4.2 Water Resources

(i) Surface Water Resources and Stream Stability

Many of the parameters that would provide an indication of the health of surface water resources in Rouge Park will be sampled and evaluated in the aquatic resources and hydrogeology components of the Monitoring Program. Also, many of the parameters sampled to monitor stream stability can serve as indicators of the health of surface water resources. The framework for monitoring stream stability is founded primarily on an analysis of in-stream conditions and stream morphology.

Stream morphology is dependent on the ability of the stream to convey the water and sediment inputs from upland regions. Changes in water discharge, sediment discharge bed and bank material may cause adjustments of width, depth slope, velocity and planform.

Periodic sampling of stream morphology should be conducted to detect improvements in stream stability and diversity. At-a-station information should be collected at the ten detailed survey stations used to establish baseline conditions for this study. The data collected through these surveys should include:

- The longitudinal profile;
- Cross-sectional profiles;
- The planform; and
- Particle size distribution of substrate.

Downstream trends and the nature of the watercourse upstream of the survey sites can be collected using a video camera. The purpose of this video survey is to document localized impacts not detectable at the detailed monitoring sites. Analysis of the video tapes would require a qualitative assessment of changes in stream morphology to document localized impacts / improvements and downstream trends.

Monitoring on a subwatershed scale can be done in association with the fisheries survey on a two-year sampling frequency. The purpose of this survey is to continue monitoring baseline conditions. This period is considered short enough to detect long-term trends in morphological adjustment and long enough to reduce unnecessary surveying effort. The ten baseline survey stations should be surveyed in detail and video taped. Video tape of the additional 15 survey stations proposed for fisheries monitoring should also be conducted.

More frequent monitoring is appropriate when specific works are undertaken such as stream restoration, riparian plantings and pond retrofits. Morphological changes can occur more quickly after such measures are imposed and should be monitored after the spring freshet for the first two years and the fifth year after the project is completed. A detailed survey site should be established at the site of the remedial measures to monitor changes in the stream morphological diversity. Video footage could be taken of the project site and areas

upstream and downstream where impacts and/or improvements are anticipated. Sampling frequencies can be lengthened to five years if the rate of change decreases.

(ii) Groundwater Resources

Monitoring of the quality and quantity of groundwater and baseflow to local streams should be incorporated into established surface water / aquatic monitoring programs. The Monitoring Program should be coordinated with other agencies such as the University of Toronto, Ministry of Natural Resources, and GSC, who have done extensive work on the Oak Ridges Moraine, and those who may maintain monitoring programs of their own. Local groups or individuals could also collect water levels and water quality data from selected water wells to more effectively monitor the local aquifer system.

It is important to initially establish a good baseline data set, ensuring that existing data from the agencies mentioned above are incorporated. This would involve a comprehensive monitoring and sampling program initially. Subsequently, a number of physical and chemical criteria (i.e. water levels, stream temperature, pH, conductivity) could be selected to be used as screening tools to determine whether more detailed monitoring is warranted by identifying changes in the system. An expanded suite of analyses would be necessary when the screening parameters show a significant change, or at a minimum of every 5 years. Where development is allowed, monitoring requirements could be incorporated into the development plan, with a comprehensive monitoring round, initially reducing the frequency and parameters involved on a pre-determined schedule, that is, if no changes in the system are observed.

Potential studies, which can be undertaken to determine hydrogeological parameters of a particular area, include the following: (Refer to the Oak Ridges Moraine study for additional details)

- Review historical data pertaining to individual areas, including water well records, to determine the existing hydrogeological conditions;
- Calculate water balance for surface water bodies;
- Determine vertical hydraulic gradients using nested piezometers screened at different depths;
- Determine groundwater flux using seepage meters;
- Determine hydraulic conductivities using grain size analyses, permeameter and slug tests;
- Determine underlying stratigraphy of aquifer / aquitard complexes;
- Determine current chemistry of groundwater and surface water;
- Determine local groundwater elevation using shallow piezometers;
- Conduct pumping test to determine potential yield of production wells; and
- Determine current stream baseflows.

One of the most important initiatives to gauge the health of surface and groundwater resources is the establishment of a water budget for the Rouge River. This initiative would have to be undertaken on a watershed-wide basis and would include lands outside of the park area.

(iii) Water Budget Calculations

A water budget or water balance is essentially accounting for all of the water within an area (e.g. a watershed), where input minus output equals the change in storage of the system. Precipitation is the main water input, with evaporation, transportation and runoff being the main outputs to the system, and infiltration being the short-term change in storage. Outlined below are the types of information required to calculate the water budget for a watershed. Not all individual measurements would likely be required for each development,

however, historical data is available for certain parameters. For example, typical evaporation rates are known for various types of vegetative covers within the climate of southern Ontario, and could be used unless more site specific details were warranted.

Measurements required for a typical water budget calculation include:

- Surface area of the watershed;
- Location of groundwater divides, if the underlying geology is complex and they are not coincident with surface water divides;
- Climatic data:
  - Precipitation (rain and snow);
  - Average air temperature, wind speeds, hours of sun, in order to calculate evaporation rates if necessary;
- Evapotransporation rates (dependent on vegetative cover, soil type, wind and sun) from the various types of soil and vegetative zones;
- Lake levels and lake evaporation rates;
- Surface runoff, and the effects of extreme precipitation events;
- Stream flows (baseflow into the stream and surface stream flow);
- Flow rates of natural seeps; possible re-direction of seepage flow to stormwater system;
- Soil moisture and water holding characteristics; and
- Infiltration to groundwater (recharge).

The use and management of groundwater and surface water can also affect the overall water budget in a watershed. These effects must be accounted for, and include:

- Induced infiltration associated with a development area;
- Stormwater management effects (possible gain or loss of stormwater to a watershed through the management of stormwater flows);
- Additional infiltration from water pumped into the watershed and used as irrigation, household use that is infiltrated as septics, loss from the water supply pipes and sewer mains, etc;
- Water supplied from within the watershed (pumping wells) which may be lost to the watershed if disposed of through sanitary sewers, through evaporation if used in irrigation;
- Location of surface water divides relative to groundwater divides (not necessarily the same in the Oak Ridges Moraine) and the effects of large yield pumping wells in adjacent watersheds;
- Additional evaporation from irrigation (domestic lawns, golf courses, sod farms); and
- Pumping of deep groundwater may be recharged to a shallow aquifer after use (irrigation, septics, etc.), changing the water budget between aquifers.

Data related to many of these elements may already exist and could be incorporated into the water budget calculations. In addition, components of, or a framework for, a water budget for the Rouge River watershed may be available from a number of sources, including the TRCA, the University of Toronto and Centennial College. Water budgets should be developed with targets based upon pre-settlement conditions rather than pre-development conditions in recognition of the fact that much of the watershed was cleared of forest cover to

accommodate agricultural activities. To assist in developing a water budget program, the status of existing available information should be confirmed and utilized as a foundation.

6.5.4.3 Terrestrial Resources

Monitoring the health of the terrestrial system can be extremely complex. There are many reasons for fluctuations in numbers or the state of health of individuals, and many of these reasons may have no relation to conditions within the park. For example, changes in the number of breeding birds typical of interior forest conditions in the park can be due to the yearly weather conditions on the wintering grounds, or large-scale cyclical changes in population numbers, as well as changes in conditions in the park. It is important that the program for monitoring terrestrial resources be fairly simple, not too costly, and related clearly to conditions within the park.

Consequently, the most appropriate monitoring would be that of the corridor function itself by looking at the evolution of the state of the vegetation and of forest interior conditions. Aerial photographs and limited ground truthing can easily monitor changes. Components to monitor using this approach include:

- Total area in natural habitat (total and by branch) (more is better);
- Total area in forest interior (total and by branch) (more is better);
- Forest edge / forest area (total and by branch) (lower is better);
- Median and average size of woodland units (total and by branch) (larger is better); and
- Longest stretch of corridor without any woodland cover (total and by branch) (shorter is better);

The Monitoring Program, through the completion of tasks recommended as part of the process of its design and initiation, could include more extensive field surveys in the event that a pool of participants with expertise in the identification of birds, wildlife and vegetation expresses interest in assistance. This would permit the scope and detail of sampling to increase to include the monitoring of the following wildlife and vegetation factors:

- Specific populations of birds and wildlife;
- The presence and extent of breeding and nesting habitat;
- The presence of non-native vegetation or undesirable species of birds and wildlife;
- The determination of the effectiveness of corridors; and
- Increases in overall biodiversity.

The terrestrial resources monitoring program may be most successful if residents living along the river corridors can be enlisted to document the presence of birds and wildlife observed on their properties on an ongoing basis. If widespread participation can be achieved, this could be a very comprehensive and cost effective tool to monitor the bird, wildlife and plant populations over a large area of the watershed.

6.5.4.4 Maximizing the Benefits of the Monitoring Program

It is one of the objectives of the Monitoring Program to assemble a comprehensive, standardized body of data on the various components of the ecosystem. However, the overall goal of the Monitoring Program is to make use of this data to direct the evolution of the Management Plan over the longer term. To maximize the benefits afforded by initiating and maintaining an ongoing Monitoring Program, the following recommendations are made:

- Upon completion of the second year of monitoring, and subsequently on an annual basis, the Rouge Park Alliance should issue a report that provides an overview of the status of the resources and indicates the changes outlined below. The recommendation for an annual report stems from the

recognition of the rapid rate of growth in the watershed. Frequent reporting is required to ensure that trends can be identified and appropriate action taken before extensive impacts occur. The report should indicate:

- Changes, either positive or negative, in the health of the individual components of the ecosystem, including aquatic, terrestrial, surface water and groundwater resources, and stream stability;
- Where changes are occurring in Rouge Park;
- Recommendations for modifications to Natural and Cultural Heritage Program, the Monitoring Program and the management strategy, to ensure that, where protection and enhancement targets are not being met, positive change occurs over time;
- The degree of participation in the Stewardship and Partnership Programs and the distribution of participants;
- The location of restoration sites and the initiative undertaken at each site;
- Issues identified by the Community Councils and recommendations for addressing each; and
- The status of the resource in the prior monitoring report, to identify trends.

The report should be structured as an easy to read 'report card' and should be designed for distribution to the general public.

- On a five-year basis, corresponding with the cyclical review and update process, a more comprehensive summary report should be prepared as a means to direct the evolution and refinement of the Rouge North Management Plan. This report should address the following:

  - The need to modify the Natural and Cultural Heritage Program and the Monitoring Program;
  - The need to establish new restoration targets;
  - Recommendations for changes to the Stewardship Program;
  - Recommendations for changes to the Trails and Public Access Program;
  - Recommendations for changes in the re-designation of Natural Heritage Zones, Activity Zones or Management Zones within the park; and
  - Issues and concerns raised by the Community Councils.

- Public awareness of the success of the park will in turn inspire increased public interest and active involvement in the protection, management and respectful use of the park. Therefore, a capsule summary of the findings of the Monitoring Program should be presented in literature related to the park or other promotional programs, wherever possible.

6.5.6 Mechanisms for Refining the Plan in the Future

The Rouge North Management Plan is envisioned to be a dynamic, living document, developing in harmony with the growth and evolution of the park itself. The plan sets out a vision for the Rouge Park North which will be owned by the Rouge Park Alliance and implemented by the municipalities and the TRCA. It was recognized at the outset that Rouge Park North would be the product of a lengthy process, and that changes occurring in the watershed would require changes in the Management Plan in response, to ensure that park objectives are achieved in perpetuity.

It is not possible to generate a plan that can direct the successful management of the park over the long-term without the foresight to accurately predict the extent, rate or potential influence of change on the health of the park ecosystem. Consequently, the Management Plan sets out a framework to guide the review and refinement process on a cyclical basis, as outlined below.

- Timing - The Rouge Park Alliance will undertake a review and update of the Management Plan on a 5 year cycle, roughly corresponding with the timing of the review of Official Plans.
- Purpose - the purpose of the review process is to refine the various components of the plan to ensure that the vision, goal and objectives of Rouge Park are achieved.
- Process - The Rouge Park Alliance will establish a Rouge Park Review Committee, and administer the review and update in partnership with the municipalities of Markham, Richmond Hill, Whitchurch-Stouffville and the Region of York and the Toronto and Region Conservation Authority. The process will include consultation with the municipalities and the TRCA to review and evaluate the process of implementing the Rouge Park North. The review process will also include a significant public consultation component, as well as consultation with the various groups involved with the delivery of various programs including the following:
    - Stewardship Program
    - Partnership Program
    - Natural and Cultural Heritage Program
    - Monitoring Program
    - Funding and Land Acquisition Program

Reports should be prepared by the bodies responsible for the administration of each program providing a summary of their success and setting out goals for the future. These reports will provide a basis for refining the Management Plan. The Rouge Park Trails Association and members of Community Councils should also be consulted in the review process. Components of the Management Plan which may be refined in response to input received include:

- Natural and Cultural Heritage Program
    - Targets and techniques
- Monitoring Program
    - Monitoring protocol and procedures
- Stewardship Program
    - All components
- Trails and Public Access Program
    - All components
- Partnership Program
    - All components
- Park Management Zonation
    - Designation of zoning on new Rouge Park North lands
    - Re-designation of other zones, with the exception of Nature Reserves
- Implementation
    - All components
- Community Interface Guidelines
    - Revisions to address new techniques and technologies
- Study Areas
    - Refinement of criteria based upon trends indicated as a result of the Monitoring Program

- Heritage Resource Management
    - Update as new sites and structures are designated over time
- Community Based Management
    - Incorporation of new Community Councils
- Optional Park Corridor
    - Revisions in configuration
    - Lease / ownership options

The primary purpose of the cyclical update is to provide a means to improve the effectiveness of the Management Plan and enhance the ability to achieve park objectives. For this reason, the cyclical review is not intended to initiate a change in the vision, principles or objectives set out in the Rouge North Management Plan, including the principles and objectives which directed the development of its various components, recommendations and guidelines. The primary intent of the cyclical review process is to update the status of implementation of the various initiatives recommended in the plan and to refine programs to ensure that ecological objectives are achieved over the long-term.

The cyclical review process will be initiated by the Rouge Park Alliance, which will assemble a committee with representation from the municipalities, the TRCA and various program coordinators to undertake the review. The committee will develop a schedule and work program for the review and will issue notification that the review process is being initiated.

The initial stages of the review will be focused on determining the status of implementation of the park and the various programs. Data will be assembled related to each program and compiled in a 'report card' format. Subsequent stages of the review will include meetings with stakeholders and a public meeting to review the report card and seek input related to the refinement of the plan. Options for amending the various components of the plan will be formulated by the committee and circulated to Alliance Partners for review and comment. A suite of draft preferred amendments will be prepared in response to comments received. The draft document will be finalized based upon comments received and, once approved by the Alliance, presented to the Councils of Richmond Hill, Whitchurch-Stouffville, Markham and the Region of York for endorsement. The review process should be conducted in a timely fashion to ensure that the implementation of various programs is not impeded.

6.5.7 Summary of Recommendations and Implementation Activities

The implementation of the Rouge North Management Plan will require the participation and commitment of government at the local, regional, provincial and federal levels, as well as non-government agencies and the public, working in partnership. This section provides a summary of the recommendations set out to facilitate the implementation and management of Rouge Park North.

Program Initiative

Rouge Park North	· Designate public lands as 'Rouge Park' · Erect identification signage · Implement park zone management recommendations · Incorporate newly acquired public lands along the river corridors as 'Rouge Park' · Designate park zones over newly acquired lands based on criteria set out in the Management Plan
Rouge Park Study Areas	· Incorporate policies in the Official Plans of local municipalities · Amend zoning bylaws to designate appropriate use of 'Rouge Park' lands · Amend Region of York Official Plan to support the implementation of the Rouge

North Management Plan

- Investigate the merit of preparing and submitting a nomination package to designate the Rouge River as a 'Canadian Heritage River'
- Endorse the Rouge North Management Plan as a Provincial Guideline
- Solicit Cabinet endorsement of the Rouge North Management Plan as a matter of Provincial Interest, or issue the Management Plan as a Provincial Policy Statement under the Planning Act
- Establish funding mechanism for the acquisition of lands as 'Rouge Park'

Partnership Program

- Appoint a program coordinator
- Establish a partnership council
- Assemble a roster of technical advisors
- Initiate design / production of recognition signage
- Solicit partnerships with school board, utilities, etc.
- Establish incentive program
  - Sponsorships
  - In-kind contributions
  - Volunteer base
- Draft partnership agreements
- Initiate a fund-raising program

Stewardship Program

- Establish a Stewardship Council
  - Assemble Implementation Subcommittee
  - Establish Landowners Liaison Group
- Establish Stewardship Program office
- Implement a promotion / communication program in accordance with the Rouge Park Communications Plan
- Solicit sponsorships for equipment, vehicles and materials
- Coordinate volunteer forces
- Establish and maintain database
- Initiate design and production of recognition signage
- Solidify incentive programs related to:
  - Cash incentives
  - In-kind compensation
  - Tax rebates
- Prepare stewardship assessments
- Prepare landowner relations guidelines
- Initiate a fund-raising program

Rouge Park Trails Association

- Enable the Trails and Access Subcommittee to establish a Rouge Park Trails Association
- Implement a promotion / communication program
- Organize insurance
- Establish membership program
- Assemble volunteer forces to implement trails and property improvements
- Develop a landowner relations program
- Organize funding and incentive program, including potential sponsorships
- Establish and maintain a database and a trails map
- Organize a policing / monitoring program
- Initiate a fund-raising program

Preservation and Management of Heritage Resources	· Undertake the preparation of a watershed-wide Heritage Master Plan · Revise Official Plan policies to reflect the intent to conserve significant built cultural features identified in the Master Plan · Investigate the potential for the establishment of a Rouge Park North heritage centre · Mark trails and locations formerly associated with heritage features · Display graphic material describing former historical activities · Consult local architectural conservation advisory committees to implement thematic plaquing for the Rouge Park, the Stewardship Reserve and the Partnership Area
Natural and Cultural Heritage Program	· Implement the Natural and Cultural Heritage Program to achieve targets as set out in section 6.5.3.1 and the Rouge Park Natural and Cultural Heritage Action Plan (Published in 1998) · Initiate a process of reviewing existing policies and legislation to ensure adequate protection for tributaries throughout the watershed · Undertake additional studies as required to implement the Program as set out in the Reach-by-Reach basis, including the undertaking of environmental management studies such as: - Detailed hydrologic studies on baseflow and water supply - Hydrology and hydrologic update reporting for managing peak flow - Cataloguing existing riparian and valley corridor widths based upon functional characteristics and existing vegetation features - Preparation of re-vegetation plans for restoration sites - Stream surveys to establish criteria for rehabilitation works · Prepare and manage a database to catalogue restoration initiatives · Establish a community-based stream improvement / restoration program · Assemble and mobilize volunteer forces · Undertake fund-raising and sponsorship programs
Monitoring Program	· Identify potential participants in the Monitoring Program · Identify and monument monitoring sites · Establish monitoring protocol · Implement Monitoring Program · Establish database and reporting protocol · Create and distribute an annual summary report · Generate comprehensive summary reports on a five-year basis
Community Based Management	· Establish Community Councils, based upon existing ratepayer or community group structures · Confirm mandate and protocol of Community Councils · Initiate fund-raising programs
Transport Canada Lands	· Negotiate long-term lease of the Optional Park Corridor through the Transport Canada lands · Negotiate dedication of the valley corridor north of the proposed Markham By-pass, west of Reesor Road, as 'Rouge Park'
Little Rouge Creek Corridor - Rouge Park Lands	· Initiate the preparation of a detailed master plan for the Little Rouge Creek corridor, including the interface with Cornell

Park Zoning - Special Management Zones	· Undertake the preparation of detailed master plans and/or management plans for for each of the designated Special Management Zone
Community Interface Guidelines	· Incorporate community interface guidelines within existing municipal guidelines related to urban design, transportation, servicing and stormwater management
Cyclical Review Program	· Establish a schedule for a five-year cyclical review period · Confirm a process and protocol · Coordinate reporting of Monitoring, Stewardship, Trails and Restoration Programs to ensure timely input into the review process · Amend Management Plan based upon recommendations of cyclical review process

The implementation of these recommendations will require the coordinated and dedicated efforts of many individuals over both the short-term and the long-term, working in partnership to realize the vision of a Rouge Park that extends from Lake Ontario to the Oak Ridges Moraine.

6.6 CONCLUSION

The Rouge North Management Plan was developed as a blueprint to guide the realization of the extension of the Rouge Park northward, creating a system of diverse and sustainable corridors. These corridors will exist, not only as the core of the watershed ecosystem, but also as the centrepiece of the communities of the watershed.

The implementation of the Rouge Park is an ambitious undertaking requiring the commitment of all parties from government agencies to individual residents of the watershed to succeed. The successful realization of the Rouge Park North will require both foresight and a continued focus on the long-term goal.

Although the Rouge North Management Plan is strongly focused on maintaining and enhancing the ecological integrity of the watershed, it was developed with a recognition that human health and ecological sustainability are interconnected. Consequently, the successful implementation of the recommendations of the Rouge North Management Plan in the coming decades will establish a legacy that will benefit generations to come.

A Blue Heron stands in the Little Rouge Creek, searching for fish.
Rouge Park provides diverse habitats for a variety of wildlife species.
Source: Rouge Park (1999).