Master Plan for Glenorchy Conservation Area:

Stage 3 Report

JANUARY 2010

TCI Management Consultants

UNTERMAN McPHAIL ASSOCIATES

EDA Collaborative Inc.

ACKNOWLEDGEMENTS

The master plan for Glenorchy Conservation Area is the product of collective input from Conservation Halton staff, local residents and key stakeholders. These dedicated individuals addressed important concerns and issues surrounding the development of the master plan.

Those who made an effort to participate in the public meetings and design charrettes will have a greater sense of community ownership and pride, because they helped to shape the master plan concept and recommendations for Glenorchy Conservation Area. The plan for this new conservation area represents the ideas of local citizens combined with the management experience of Conservation Halton and the analytical and design expertise of the consultants, which has produced a master plan concept to guide the future development of this unique and beautiful natural area.

Consultants

EDA Collaborative Inc. was engaged by Conservation Halton in November 2008 to undertake this challenging assignment. This document summarizes the criteria including environmental, social, economic and management policy considerations that were taken into account in order to create an appropriate master plan to guide the future use of the Glenorchy Conservation Area over the next twenty (20) years.

Dillon Consulting Limited provided the environmental analysis and programming with particular attention to restoration plans and resource management policies.

TCI Consulting Inc. provided the economic evaluation, market analysis, and preliminary capital and operating budgets for the Glenorchy Conservation Area Master Plan.

Unterman McPhail Associates provided analysis of the cultural heritage resources.

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Ontario Ministry of Natural Resources
Ontario Parks
Ontario Realty Corporation
Province of Ontario
South Peel Naturalists
The Town of Oakville
Trafalgar Township Historical Society
Union Gas

Ontario

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Assistance for this project was provided by
the Ministry of Natural Resources

EXECUTIVE SUMMARY

The Glenorchy Conservation Area Master Plan consists of development and restoration plans, resource and park management plans, as well as a preliminary assessment of capital and operating costs.

The vision of the master plan is to protect and enhance the significant natural features and ecological functions of the conservation area while providing opportunities for the public to gain an appreciation for this significant area, enjoy the spectacular views, and allow for limited recreational opportunities. This master plan will serve as the principal guiding document for the future planning, design, development and resource management of the conservation area in accordance with all relevant acts and regulations and with the terms and conditions of the property management agreement that Conservation Halton entered into with the Ontario Realty Corporation.

The entire 401 hectares of the property are to be protected and enhanced to achieve sustainability of a range of vegetation communities that will provide habitats for a broad diversity of species. Restoration projects have been prioritized based on the degree of ecological function the project is likely to restore or improve. A large tract of native grassland will be established in the centre of the conservation area. Treed swamp, riparian and other wetlands will be enhanced, restored or created. The tableland forested areas will see significant expansion, creating substantially increased interior forest habitat.

In the first ten years after the approval of this master plan, primarily restoration works will be undertaken. Public access will be limited during this period, until the Town of Oakville has constructed its community park that is cradled in the south end of the conservation area. However, a historic trail linking Palermo Park to the historic zone and a short valley trail adjacent to Oakville's new Fourth Line pedestrian bridge are proposed for construction during the first two years (completion of bridge expected 2010). Future recreational development within the conservation area will primarily consist of a trail system with interpretive nodes. Public access trails will not descend into the valley downstream of the Fourth Line crossing.

Interpretive and educational opportunities will include an interpretive trail system on the least sensitive areas of the upland portion of the site that will direct visitors to various interpretive nodes. Webcams will also be installed to record the actions of species in their habitats as well as the progress of the restoration works in the most sensitive areas of the site. Interpretive signage will be an important element of the trail system.

Initial discussions indicate that the Town of Oakville is willing to pursue a partnership with Conservation Halton to provide park amenities such as parking and washroom facilities on the adjacent parklands. This presents opportunities for collaboration in designing, locating and building such amenities.

In addition to the park management zoning plan, policies have been developed for species at risk; forest sustainability; dead and hazardous trees; plant and seed

collection; invasive species; herbicides, pesticides and suppressants; vegetation; fisheries and wildlife.

Conservation Halton is currently receiving an annual base level of funding from the Ontario Realty Corporation (ORC) for the management of the Glenorchy Conservation Area. However, the costing analysis presented in this report indicates that substantial additional funding will be required to complete and maintain the restoration works and recommendations of the Master Plan into the future. Potential sources of funding have been identified in this report and will be pursued. As an example, a portion of the ORC annual base funding should be dedicated to restoration, supplemented with potential assistance from the Region of Halton, Town of Oakville and others to facilitate a multi-year restoration project. In the past, Conservation Halton has also been successful in collaborating with various stakeholder and volunteer groups. It is anticipated that such parties will step forward to assist Conservation Halton in creating a vibrant, diverse and healthy natural environment.

Key actions outlined in the implementation of this plan include:

- Close and restore existing unauthorized roads and trails
- Secure the property from unauthorized and/or illegal uses such as hunting, dumping, motorized vehicles
- Prepare a detailed restoration plan for forest, wetland/riparian and grassland/prairie habitats
- Establish the proposed trail system and associated amenities such as interpretive signage, lookouts and webcams
- Develop a Visitor Impact Management program
- Monitor and protect species at risk
- Manage for invasive species
- Encourage and seek partnerships that support cost sharing and sponsorships

Evaluation of this master plan suggests that while the environmental sustainability of the area is ensured, further educational opportunities would benefit the community as well as the financial viability of the conservation area. The addition of an interpretive centre has been a much-debated component of this planning process. Currently, an interpretive centre is not proposed but the plan suggests this could be reconsidered in years to come based on evolving community needs (including a Town of Oakville official plan amendment and rezoning) and availability of financial resources.

TABLE OF CONTENTS

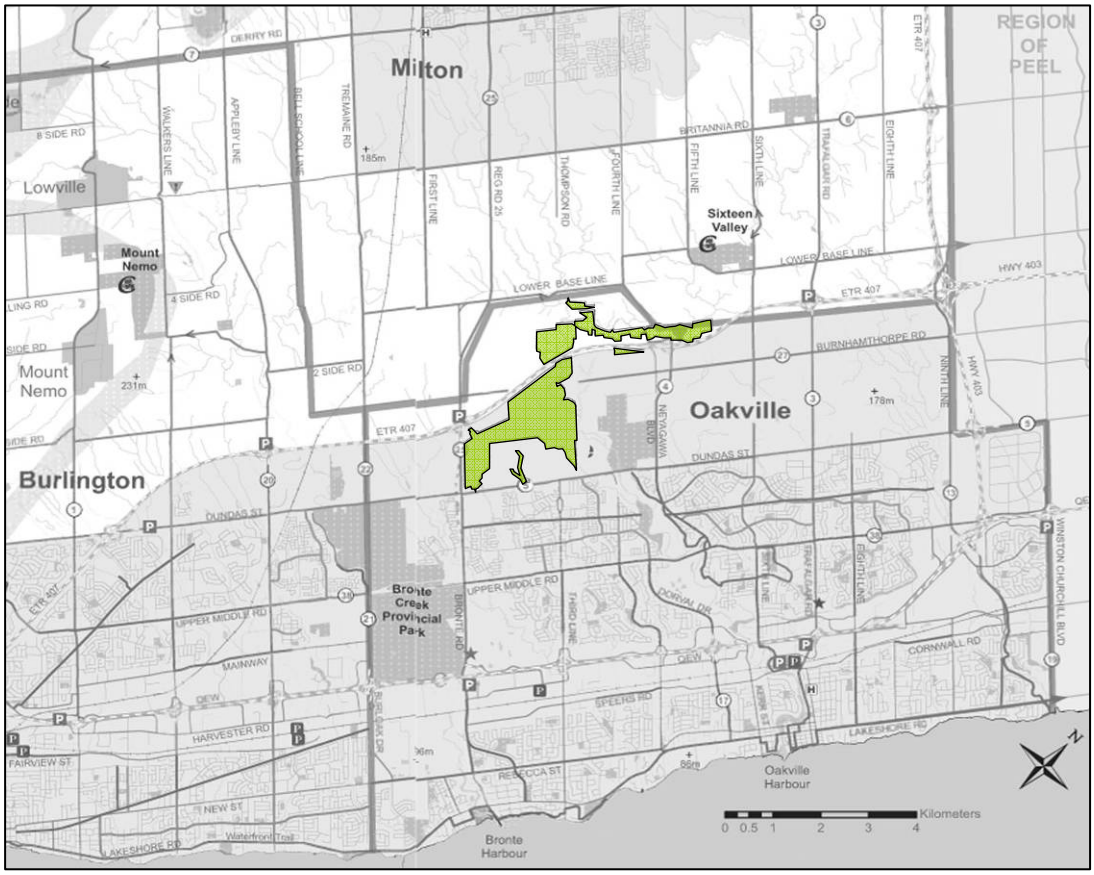
LIST OF FIGURES AND TABLES

SECTION ONE: INTRODUCTION

1.1 Background

Master planning for the new Glenorchy Conservation Area is being undertaken to provide Conservation Halton with a sustainable management plan for the site to operate as a conservation area and key component of the North Oakville Natural Heritage System. This process is important to the protection and management of the 401 hectare site located in the northern portion of the Town of Oakville (Figure 1-1: Location Map).

Figure 1-1: Location Map



Legend
Glenorchy Conservation Area

1.1.1 Evolution of the North Oakville Natural Heritage System

The Sixteen Mile Creek valley has long been recognized as an area of substantial ecological value. It was highlighted in early environmental studies such as the *Sixteen Mile Creek Conservation Report 1958* (Department of Planning and Development 1958), which coincided with the formation of the Sixteen Mile Creek Conservation Authority, and was adopted as a guide to conservation management in the watershed.

The Sixteen Mile Creek Conservation Report 1958 recommended the establishment of the Glenorchy Conservation Area consisting of 303 hectares, with the key land base centering around the Sixteen Mile Creek Valley in Concessions I and II North of Dundas Street. The Conservation Authority subsequently acquired the Sixteen Valley Conservation Area consisting of 28 hectares at Lower Base Line and the Sixteen Mile Creek. The Province of Ontario (Ontario Land Corporation and Ministry of Government Services) assembled approximately 1,482 hectares of land in the Towns of Oakville and Milton for future housing and the potential creation of a satellite community. Lands were also assembled by the province as part of the Parkway Belt West Plan. By 1983, the Conservation Authority's Interim Watershed Plan recommended that negotiations occur with the province to establish a regional conservation area on the provincial lands along the Sixteen Mile Creek and the East Sixteen Mile Creek to protect the significant forested valley lands.

To protect and ensure the viability of the natural features in North Oakville within an expanding urban environment, a priority was placed on the development of a linked natural heritage and open space system. According to the Town of Oakville, development in North Oakville will balance the preservation of natural resources with sustainable, community conscious development initiatives. This also includes walkable neighbourhoods, public transportation and a network of trails for people to enjoy.

The importance of protecting a natural heritage system through North Oakville was recognized as an integral part of future urban expansion proposed for North Oakville. Official Plan Amendment (OPA) 198 designated North Oakville as an 'Urban Special Study Area." The area comprised close to 3000 ha (7,500 acres) and was intended to accommodate a planned population of approximately 55,000 people. OPA 198 was approved by the Town in May 2002 and the Ontario Municipal Board (OMB) in September 2003.

OPA 198 envisioned that a series of studies would be undertaken to provide the necessary framework for secondary planning in North Oakville. To this end, the Town embarked on the North Oakville Creeks Subwatershed Study. Further, the Ministry of Natural Resources undertook additional field research with respect to provincially significant wetlands, Life Science and Earth Science Areas of Natural and Scientific Interest (ANSI), species and communities at risk, woodlands, valleys, streams, and fisheries. The Life Science ANSIs included a detailed examination of the Sixteen Mile Creek Valley and the Oakville-Milton Wetlands and Uplands Candidate ANSIs. The Earth Science ANSI investigations examined the Trafalgar Moraine. The information collected was incorporated into the subwatershed study.

In addition, a priority was placed on the development of a linked natural heritage/open space system. A natural heritage system looks to create a network of various habitat features and functions including woodlots, creeks, meadows and thickets rather than isolated greenspaces separated by homes, businesses and roads. The systems approach is considered the best opportunity to preserve and

enhance living natural systems. A natural heritage system allows plant and animal species to maintain vital populations and to thrive.

The planning process continued to move forward in North Oakville to develop these lands, and Conservation Halton provided technical expertise on the natural heritage aspects including, but not limited to, ecology, planning and water resources.

The Town, in consultation with the Province, Region and Conservation Halton, initiated a Planning Authorities Interagency Review. The purpose of the Interagency Review was to "develop a common policy framework with respect to the potential elements of the natural heritage/open space system which would be suitable for the urban context of North Oakville and reflect provincial smart growth principles for input to the subwatershed study, which in turn was an input to the Secondary Plan".

Throughout the process all parties involved made efforts to reach negotiated settlements to provide a balance between nature and development. The approach has been recognized as an innovative approach to protect natural heritage in the Province. The end result is a natural heritage system consisting of a network of parks, trails, woodlots, wetlands and meadows for those who live and work in North Oakville to enjoy, as well as other watershed residents and visitors to the area. The natural heritage/open space system forms a central feature of the North Oakville East and West Secondary Plans. It is composed of Core Preserve Areas, Linkage Preserve Areas, and High and Medium Constraint Stream Corridors.

The North Oakville East Secondary Plan was approved on January 11, 2008. The North Oakville West Secondary Plan was approved on November, 23, 2009 with the exception of a small area centred on Regional Road 25 that still remains before the Ontario Municipal Board at the time of writing.

On March 31, 2008 Conservation Halton entered into a management agreement with Ontario Realty Corporation to assume responsibility for the long term protection and management of 401 hectares of land which were previously part of the province's Oakville Land Assembly. This land base forms an important component of the North Oakville natural heritage system and includes the Fourteen Mile Creek East Core (Core Area #2) and portions of the Sixteen Mile Creek Valley Core (Core Area #3) and expands on the linkages originally proposed to connect the cores. Many community residents, organizations and public officials assisted in securing this new conservation area: these included Oakvillegreen Conservation Association, Kevin Flynn, MPP and Councillor Alan Elgar. As part of the agreement, Conservation Halton was responsible for preparing a management plan for the property to guide its use over the next 20 years.

Conservation Halton held a contest to involve Oakville residents in naming the new conservation area. The name selected was Glenorchy, a small community that existed many years ago in North Oakville in the area that is today near the Highway 407, Burnhamthorpe Road and Fourth Line area. The name has Scottish origins meaning "valley of tumbling waters".

View into the Sixteen Mile Creek valley with the Highway 407 bridge in the background.

Much effort has been put in to ensure that this master plan is in harmony with this history. Celebrating this unique, diverse and vibrant natural heritage system of which the Glenorchy Conservation Area is a key component. In addition, it has been the master plan's task to balance the need to protect and enhance the natural heritage system with the needs of the human population that is about to inhabit North Oakville. Moreover, the provision of appropriate opportunities for educational and recreational activities is also required to ensure that respect for these natural heritage environments, environmental awareness and appreciation of such areas is ingrained.

1.2 Site Characteristics

View of the shale bluffs along the Sixteen Mile Creek.

The Glenorchy Conservation Area is endowed with a wide variety of landscape features sited on 401 hectares of environmentally sensitive land. These lands are distinguished by their vast beauty, consisting of rolling countryside, intensely forested slopes, attractive creeks and wetland areas, unique rock face and outcrops, as well as a spectacular gorge containing the Sixteen Mile Creek. Sixteen Mile Creek itself varies greatly in character within the Glenorchy Conservation Area. In some locations, it is wide and calm, while in other areas it

is narrow and turbulent. Along the valley, scenic shale bluffs are evident in several areas. Most of the river valley is composed of wooded slopes; however, in some areas, striations caused by varying geological layers are exposed creating a stunning and dramatic effect. Man-made rural features can also be found on the tableland areas of the site such as open agricultural fields and defining hedgerows.

The Glenorchy Conservation Area contains a number of unique characteristics including:

- Headwater streams and several local streams;
- Diversity of habitat types including upland forest, moist tablelands, kettle marshes, riparian areas, open fields and valleylands; and,
- Species considered at risk or rare in the region or province.

View of the wetland near the Palermo Park site.

Recognizing these distinctive attributes, the Sixteen Mile Creek Monitoring Program Draft Report explains:

> *Each habitat provides unique opportunities for different species of flora and fauna to flourish. Specific areas, those of which represent unique habitats, contain a high degree of biodiversity or simply occur in areas of increased development, require additional protection through federal, provincial and regional policy. These policies are set forth to protect the lands from development and preserve our natural heritage. Many of these designations are recognized at a variety of scales and as such, some designations may overlap (Dunn and Jamieson, 2006).*

Applicable designations and policies are described briefly in the following section.

1.3 Site Ecology and Policy Context

Protected areas within or adjacent to the Glenorchy Conservation Area are shown on Figure 1-2: Priority Conservation Lands and include the following:

- Sixteen Mile Creek Environmentally Sensitive Area (Halton Region)
- Oakville Milton Wetlands and Uplands Life Science Candidate Area of Natural and Scientific Interest
- Sixteen Mile Creek Life Science Candidate Area of Natural and Scientific Interest
- Trafalgar Moraine Earth Science Candidate Area of Natural and Scientific Interest
- Natural Heritage System (NOWSP, NOESP, NOCSS)
- Provincially Significant Wetlands

Most of these designations result in development constraints. In the case of the Glenorchy Conservation Area, the most relevant policy document is the *North Oakville West Secondary Plan* (NOWSP).

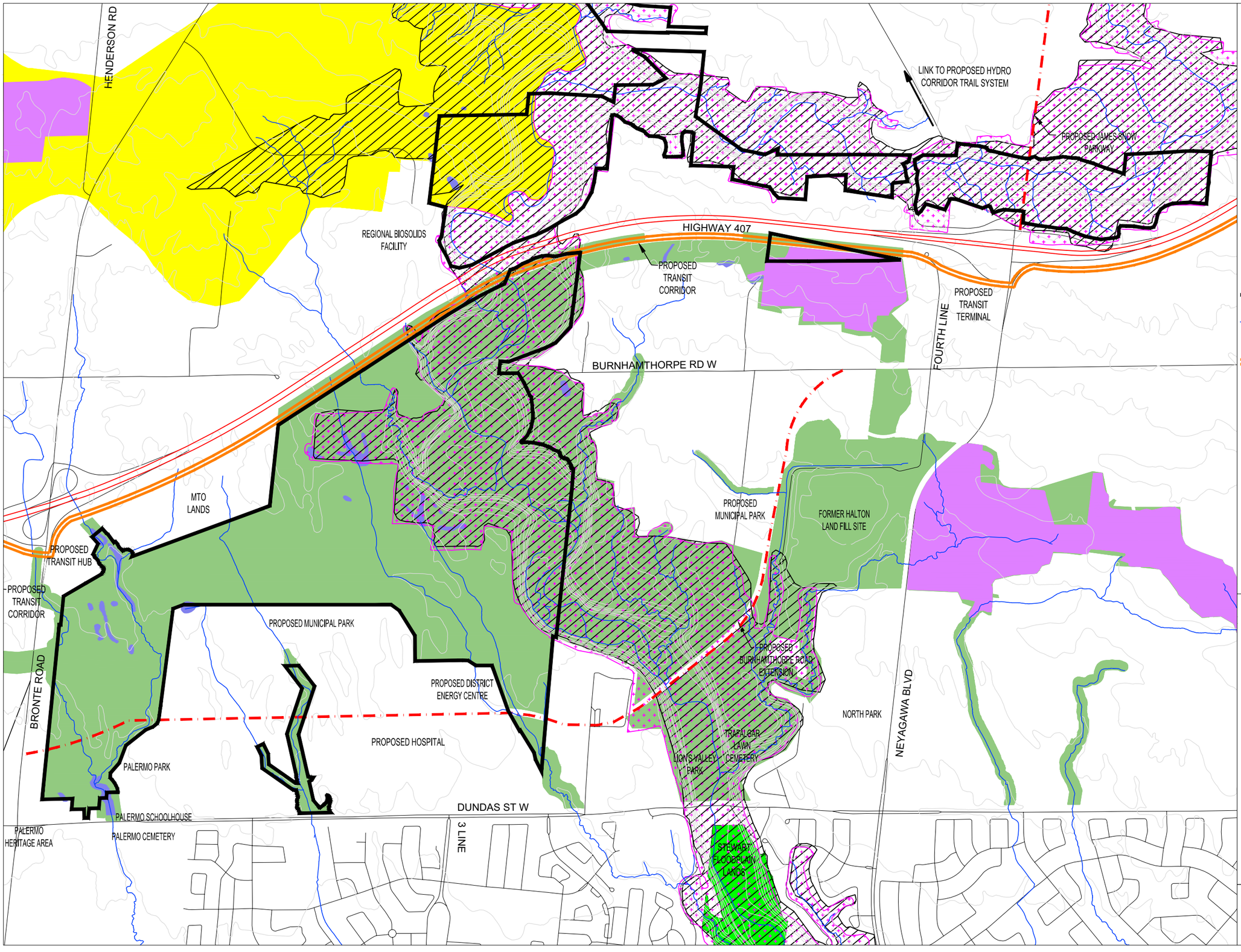
In addition, the master plan must conform to numerous planning acts and policies, including but not limited to the Planning Act, Provincial Policy Statement, Greenbelt Plan, Places to Grow Act, Conservation Authorities Act, Halton's Regional Official Plan, Town of Oakville Official Plan, North Oakville East Secondary Plan and the North Oakville Creeks Subwatershed Study, etc. The policies outlined in these documents have helped to shape the final master plan for the Glenorchy Conservation Area.

Many policy documents and plans have mandated that the open landscape character of much of Halton Region be protected (i.e., *The Greenbelt Plan, Provincial Policy Statement* and the *Parkway Belt West Plan)*. Halton Region has also made some bold plans to maintain that character and to protect the natural environment to the greatest extent possible, partially because the nearness of the countryside and the wilderness is one of the things that is most appealing about living in the area.

> *The Greenlands System in Halton is a plan that is incorporated into the Halton Region Official Plan. It identifies natural areas across the region where some level of protection is needed. [. . . .] The goal is to permanently maintain an interconnected structure of natural cores and corridors that will preserve ecologically significant habitat and a healthy functioning landscape in Halton. (Carolinian Canada, since 1984)*

The Town of Oakville has also made the environment a priority. Their *Environmental Strategic Plan* (2004) is exceptionally broad in scope and comprehensive in detail. Furthermore, many studies have been conducted to identify the valuable natural heritage features in the town, and the North Oakville Secondary Plans ensure that everything within the designated Natural Heritage System will be preserved. One of the guiding principles of the North Oakville Secondary Plans is "developers' plans had to ensure the preservation of a sustainable natural heritage system that could maintain a diversity of species and landscapes within an urban context."

> *The establishment of a Natural Heritage System in North Oakville as a "first priority" of planning is a precedent-setting achievement. The permanent protection of about 30% of the 3,075 hectares (7,600 acres)*



CONSERVATION HALTON

Glenorchy Conservation Area

Priority Conservation Lands FIGURE 1-2

Legend

- Glenorchy Conservation Area Boundary
- Road Centreline
- Watercourse
- Contours 5m Interval
- Proposed Road
- Proposed Transit Corridor
- Conservation Halton Lands
- Sixteen Mile Creek Life Science Candidate Area of Natural and Scientific Interest
- Sixteen Mile Creek Environmentally Sensitive Area
- Oakville Milton Wetlands and Uplands Candidate Area of Natural and Scientific Interest
- North Oakville Natural Heritage System
- Trafalgar Moraine Earth Science Candidate Area of Natural and Scientific Interest
- Wetland

0 500 1000 metres

Scale: 1:23,000

of recently urbanized area will protect water quality and wildlife, provide recreational and educational opportunities, and contribute to the overall quality of life for Oakville residents. The Natural Heritage System was developed through a scientific inventory of the area that studied its flora, fauna, geographical and hydrological features. The inventory found 89 regionally rare species.

The Natural Heritage System is comprised of environmentally significant core preserve areas, buffers for those areas and linkages between them. This system supports a high diversity of wildlife including migratory birds, raptors (e.g. hawks), frogs, salamanders and rare songbirds that depend on large woodlands. Rather than disconnected, scattered parks, the Natural Heritage System is a plan for a preserved ecological system that will ensure the long-term sustainability of the region's natural heritage in an urban context.
(Carolinian Canada, since 1984)

Details about the provisions of the North Oakville Secondary Plans of relevance for Glenorchy Conservation Area are documented in Section 4.1 of this report.

Also in 2006, the Town prepared a *Parks, Recreation, Culture and Library Master Plan* in which they expressed the intention to provide accessible green space, to preserve and enhance natural features and to develop a trail system to link the parks. This plan responded in part to a perceived shift in user needs: a growing demand for unstructured leisure activities and open green spaces.

1.4 Land Use Context

1.4.1 Regional Setting

The Town of Oakville lies within the Regional Municipality of Halton, located at the west end of the Greater Toronto Area (GTA). Even though this area is experiencing phenomenal population growth and will continue to do so for the foreseeable future, most of the land base associated with North Oakville currently has a rural character.

1.4.2 Urban Context

1.4.2.1 Land Use

Glenorchy Conservation Area is located in the area of the Town of Oakville designated as North Oakville. Two secondary plans have been prepared for this area: the *North Oakville East Secondary Plan* (NOESP), which has been approved by the Ontario Municipal Board, and the *North Oakville West Secondary Plan* (NOWSP), which has been approved by council. Both plans will apply to the Glenorchy Conservation Area, but no development is proposed in the portion of the conservation area covered by the NOESP; that is, the lands east of Sixteen Mile Creek and south of Highway 407.

Existing Land Use

Current land uses in the North Oakville area are almost entirely agricultural, rural residential and natural heritage features. There are a few commercial horse stables east of Sixteen Mile Creek off Burnhamthorpe Road as well as some service related businesses. Other existing land uses include a small active park, Palermo Park, in which Phase I of construction has been completed. This park houses three baseball diamonds and a temporary off-leash dog park. Another large municipal park on Neyagawa Boulevard is under construction; it is envisioned to satisfy the recreation needs of current and future residents of the Town of Oakville. This park, named North Park, will have several soccer fields, BMX and skateboard facilities, a splash pad, a quad arena as well as ample pathways and seating facilities. This park will be linked by the proposed North Oakville trail system to another community park that is to be built in a small neighbourhood to the northwest. Part of the lands appropriated for North Park will be preserved as a Natural Heritage Area that borders on the Glenorchy Conservation Area lands (Figure 1-3: Planned Land Use Map).

Proposed Land Use

The Town of Oakville, for both the *North Oakville East* and *West Secondary Plans,* based future land uses on a community development model known as new-urbanism, which features a denser, more pedestrian-friendly and transit-oriented environment (Figure 1-3: Planned Land Use Map). Oakville has attempted to use the best urban design practices to create a green community, minimizing traffic, travel times, energy costs and servicing costs. Maximization of natural areas and open space drove these planning decisions.

The proposed trail system is meant to promote active transportation so people can commute to work by bicycle or on foot. The new hospital will also be located in North Oakville West; the site is bounded by the proposed realignment of Burnhamthorpe Road West on the north and Third Line on the east, directly south of the Glenorchy Conservation Area. Two municipal parks will border on Glenorchy Conservation Area: Palermo Park and a new community park south of the agricultural lands,

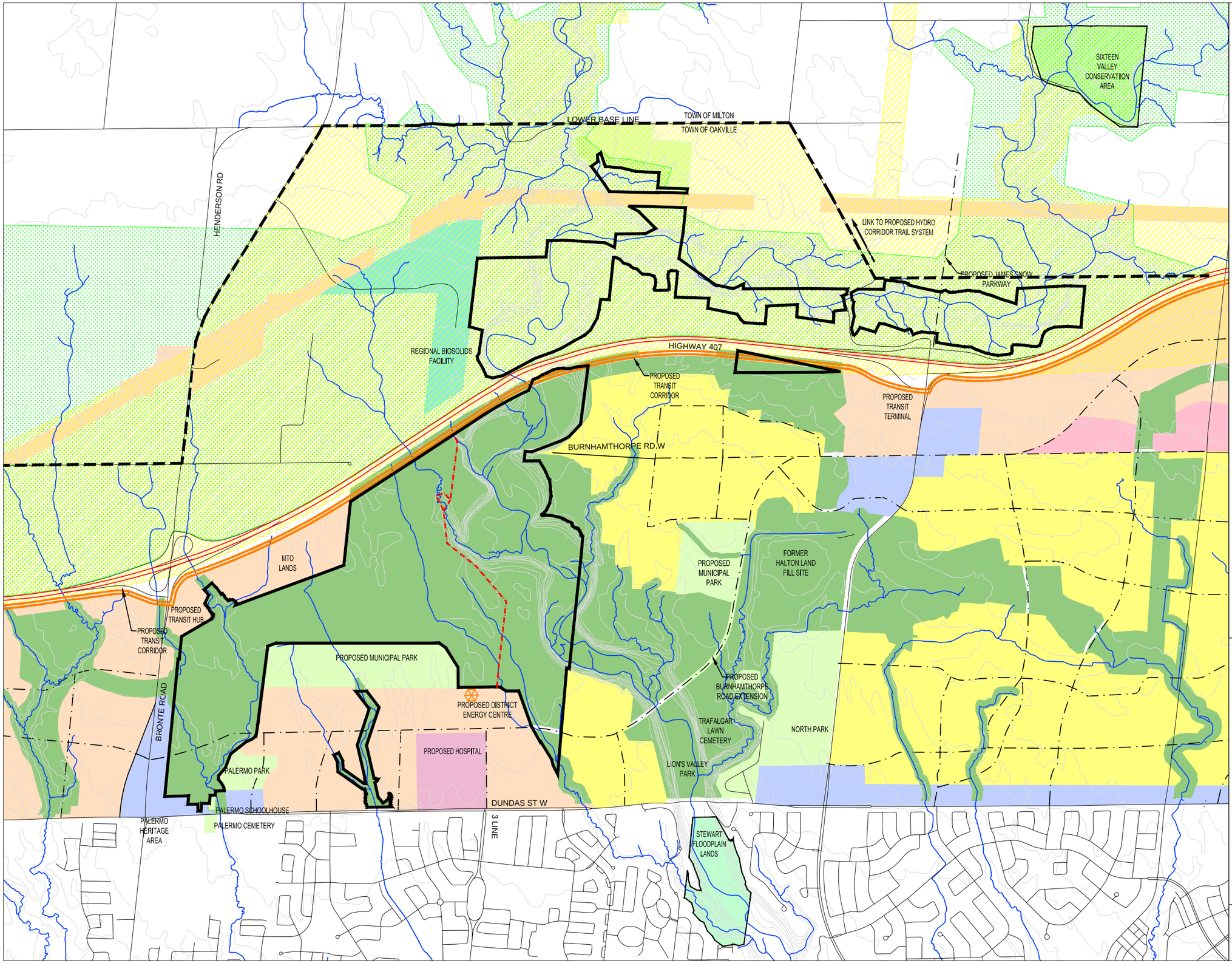
1.4.2.2 Road System

The bulk of the Glenorchy Conservation Area lands are bound by Highway 407 to the north, Dundas Street to the south, Bronte Road to the west, and Neyagawa Boulevard is approximately 1.5 kilometres to the east. There are interchanges on Highway 407 at both Bronte Road and Neyagawa Boulevard.

In the vicinity of the Glenorchy Conservation Area, Burnhamthorpe Road is currently a rural road which is severed by Highway 407 and the Sixteen Mile Creek. As it continues east through Oakville and Mississauga it becomes a major east-west arterial. The Region of Halton has proposed a new alignment of Burnhamthorpe Road which will extend across the length of North Oakville from

CONSERVATION HALTON

Glenorchy Conservation Area Planned Land Use Map FIGURE 1-3



Legend

- Municipal Boundary
- Conservation Area Boundary
- Waterways
- Highway
- Contour Line (5m intervals)
- Existing Roads
- Proposed Roads
- Proposed Transit Corridor
- Union Gas Pipeline
- Parkway Belt West Plan
- Greenbelt Plan
- Other Conservation Area
- Oakville Lands
- Natural Heritage System
- Employment District
- Neighbourhood Area
- Urban Core Area
- Transitional Area
- Proposed Hospital
- Hydro One Lands
- Regional Biosolids Facility

0 500 1000 metres

Scale: 1:18,000

Bronte Road to Highway 403 The proposed alignment will cross the Glenorchy Conservation Area in two locations, immediately east of Bronte Road and also through the southeastern lobe west of the Sixteen Mile Creek (see Figure 1-3). An Environmental Assessment for this project is underway.

Public Transport

The *Transportation Master Plan* (2007) suggests Transit Nodes at or near the intersections of Highway 407 and Bronte Road, Neyagawa Boulevard and Trafalgar Road, as well as at Dundas Street and Bronte Road. The transit terminal south of Highway 407 and west of Bronte Road is located within metres of the Glenorchy Conservation Area.

Trails

All of the references to proposed trails within North Oakville in this document should be read with the following statement from the NOESP in mind:

> *7.5.5.11 Bicycle/Pedestrian Trail System*
>
> *An extensive system of recreational trails will be developed related to the Natural Heritage and Open Space System as well as along certain public road rights of way [. . . .] However, any proposed trail development within the Natural Heritage and Open Space System shall be subject to further study as part of the Implementation Strategy to the satisfaction of the Town, in consultation with the Region of Halton and Conservation Halton.*
>
> *(NOESP, February 2008).*

A preliminary trail system is illustrated in the *North Oakville West Secondary Plan.* Trails are proposed along Burnhamthorpe Road, as well as bordering some natural heritage system areas outside of the Glenorchy Conservation Area. The *North Oakville East Secondary Plan* shows trails around the perimeter of the conservation area east of Sixteen Mile Creek. Figure 1-4: Trails and Amenities Plan illustrates this trail network along with the proposed trail network for the Glenorchy Conservation Area.

The *North Oakville East Trails Plan* Section 2.7 reads: "The trails network will limit intrusions into the Natural Heritage System. The trails network will provide a cohesive system of trails to control access and to discourage the creation of unauthorized trails through the Natural Heritage System."

One of the principles of the trails plan is that higher use paths are to be restricted to the edges of the NHS and cross the NHS only in a few strategic locations. The trail and multi-use path network will also connect to community parks and neighbourhood parks. While the 2008 trails plan is only conceptual, it should be noted that the Town of Oakville is currently in the process of producing a *Town-Wide Active Transportation Master Plan*.

1.5 Study Purpose

The vision of the master plan is to protect and enhance the significant natural features and ecological functions of the conservation area while providing

opportunities for the public to gain an appreciation for this significant area, enjoy the spectacular views, and allow for limited recreational opportunities. This master plan will serve as the principle, guiding document for the future planning, design, development and resource management of the conservation area in accordance with all relevant acts and regulations and with the terms and conditions of the property management agreement that Conservation Halton entered into with the Ontario Realty Corporation.

1.6 Study Goals and Objectives

"…develop a plan that portrays a community ideal of a balance between resource management, environmental protection and public use."

The primary goal of the Glenorchy Conservation Area Master Plan is to develop a plan that portrays a community ideal of a balance between resource management, environmental protection and public use. This ultimate goal has been met through a phased and integrative planning and consultation process. Objectives of the master plan include:

- Establish priority protection areas for all significant natural and cultural features;
- Identify natural heritage system, conservation and restoration area components;
- Establish details of the type and location of proposed uses;
- Develop appropriate park zoning, development guidelines and management policies;
- Prepare a Visitor Impact Management program;
- Recommend a species at risk monitoring and habitat management program;
- Prepare various resource management plans; and,
- Conduct financial assessment of capital and operating costs and budgets.

1.7 Study Process

The primary purpose of a master plan is to provide a long-range vision to guide development over a period of many years. Stage 1 of the study provided the context and foundation for the master plan developed for the Glenorchy Conservation Area. The report summarized the site's existing environmental, social and economic features and factors. This was accomplished through an extensive inventory and analysis process, which identifies opportunities and constraints for the site.

Stage 2 consisted of the preparation of three potential development options for the Glenorchy Conservation Area. These concepts ranged from nature preserve to a more integrated passive recreation area. All of the alternatives were based on an *"environment first"* approach where the natural heritage features were to be protected and / or restored to the maximum extent possible. The differences came into play relative to the degree of intervention necessary to accommodate educational, interpretive and programmatic elements.

The first option placed an emphasis on conserving and protecting the natural environment while offering some limited (often remote) opportunities for environmental

education; the second was characterized by a balanced approach between environmental preservation and education; the third aimed to integrate the site with its surrounding urban setting while protecting the environment to the maximum extent possible and offering a strong educational component for the community.

These three options were presented to interested members of the public and key stakeholders for review and discussion. The consultants completed a sustainability evaluation of the three concepts. The sustainability evaluation was based on a range of environmental, social and economic factors with the environmental factors being assigned a weighted value two times greater than that of the social or economic categories.

The numerical scores from the sustainability evaluation indicated that the highest score was achieved by Concept B – Nature Exploration. Concept A achieved the highest score relative to environmental considerations only, and Concept C achieved a higher score from a social / educational perspective and some elements of the economic considerations including revenue generation, partnership potential and positive economic benefits for the community.

It was recommended that Concept B be carried forward as the basis for the Glenorchy Conservation Area Master Plan, together with a range of detailed planning considerations and refinements. Infurther developing the preferred concept, the consultant has also considered the ways in which the preferred scheme can be strengthened to meet as many of the objectives as possible.

The outcome of the Stage 2 Report: Concept Alternatives suggested that the following efforts were required.

- Ensure conformance with the intent of the North Oakville Secondary Plans and the North Oakville Creek Subwatershed Study;
- Explore the potential for sharing various infrastructure and support facilities (e.g. parking lots, washrooms, etc) within the proposed Town of Oakville community park versus on-site opportunities;
- Explore the potential for the inclusion of an interpretive centre outside the boundary of the natural heritage system to address and enhance educational and economic considerations;
- Take into account adjacent urban developments as well as adjacent public lands;
- Explore the potential for acquisition of additional lands that would assist in the protection and management of the natural heritage system within and adjacent to Glenorchy Conservation Area;
- Clarify trail connections within Glenorchy Conservation Area as well as with the surrounding proposed municipal trail system and future transit facilities; and,
- Carry out further public consultation relative to the preferred concept to gather more detailed comments and feedback from stakeholders and the community prior to preparation of the master plan.

Through these efforts, a *refined* preferred concept was developed and again presented at a public meeting. The refined concept and its evaluation is presented in Section 2 of this report.

During this third and final stage of the master planning process, the refined preferred concept was further developed into the final master plan, which will be submitted to the Conservation Halton Board of Directors for approval. This master plan also includes a phased implementation and management plan for Glenorchy Conservation Area, and will be submitted to the Ontario Realty Corporation upon completion and approval by the Conservation Halton Board of Directors.

CONSERVATION HALTON
Glenorchy Conservation Area

Trails and Amenities
FIGURE 1-4

HENDERSON RD
LINK TO PROPOSED HYDRO CORRIDOR TRAIL SYSTEM
PROPOSED JAMES SNOW PARKWAY
2 benches
REGIONAL BIOSOLIDS FACILITY
HIGHWAY 407
PROPOSED TRANSIT CORRIDOR
PROPOSED TRANSIT TERMINAL
FOURTH LINE
SECURITY AND MAINTENANCE ACCESS POINT
BURNHAMTHORPE RD W
10m Bridge
10m Boardwalk
LOOKOUT POINT 4 benches
30m Boardwalk
80m Boardwalk
30m Boardwalk
MTO LANDS
PROPOSED MUNICIPAL PARK
FORMER HALTON LAND FILL SITE
PROPOSED TRANSIT HUB
PROPOSED TRANSIT CORRIDOR
40m Boardwalk
ACCESS POINT
10m Boardwalk
ACCESS POINT
10m Bridge
10m Bridge
ACCESS POINT
ACCESS POINT
PROPOSED MUNICIPAL PARK
PROPOSED BURNHAMTHORPE ROAD EXTENSION
BRONTE ROAD
PROPOSED DISTRICT ENERGY CENTRE
NORTH PARK
NEYAGAWA BLVD
PROPOSED HOSPITAL
TRAFALGAR LAWN CEMETERY
LION'S VALLEY PARK
50m Boardwalk
PALERMO PARK
PALERMO SCHOOLHOUSE
PALERMO HERITAGE AREA
PALERMO CEMETERY
DUNDAS ST W
3 LINE
STEWART FLOODPLAIN LANDS

Legend

- Conservation Area Boundary
- Waterways
- Roads
- Union Gas Pipeline
- Proposed Roads
- Proposed Trails
- Proposed Trails on Existing Trails
- Oakville Proposed Trails
- Contour Line (5m intervals)
- Proposed Transit Corridor
- Interpretive Signage
- Webcam Location
- Bridge or Boardwalk
- Observation Deck
- Heritage or Character Building
- Cultural Heritage Area
- Access Point
- Palermo Heritage Area
- Provincially Significant Wetlands

0 500 1000 metres

Scale: 1:23,000

SECTION TWO: MASTER PLAN OVERVIEW

2.1 Evaluation and Evolution of Refined Preferred Concept

The plan was further refined based on input from the Town of Oakville relative to shared infrastructure and facilities, trail access potentials and consistency with various planning criteria and objectives.

The Town of Oakville noted that the draft concept plan deviates from the recommendations in the North Oakville Creeks Subwatershed Study (NOCSS) insofar as one area that the NOCSS suggested be preserved as open country habitat, this master plan suggests should be restored as pit and mound forest. While this is not in agreement with the NOCSS, it should be stated that Conservation Halton's master plan for the Glenorchy Conservation Area provides for *more* grassland than would be created under the original NOCSS plan as well as creating significantly more interior forest, both of which provide for better ecological function and enhanced habitat. Relocation of the proposed grasslands under the master plan will now provide for forest restoration adjacent to existing forests, which will eventually create a larger interior forest habitat area and greater overall ecological functions and enhanced natural habitat. In addition, the proposed restoration plan will assist the Town in achieving its goal of 40% forest canopy cover. Thus, this deviation provides the net benefit of improved environmental conditions for both wildlife and people.

Community inputs to the plan were also acknowledged and addressed. Key themes from the Open House (October 21, 2009) and online questionnaires included:

- Protection and enhancement of the natural heritage system should be the main priority;
- Ecological restoration should be a priority;
- Acknowledge the agricultural history of the site;
- Respect the North Oakville Creeks Subwatershed Study (NOCSS) and the North Oakville secondary plans;
- Protect and enhance east / west ecological connections;
- Ensure that trails do not intrude into sensitive areas of the site;
- Concerns relative to the proposed sewer main through the site;

These consultations led to revisions to the refined preferred concept. The resultant master plan is described briefly in Section 2.2 below and discussed in detail in Sections 3, 4, 5 and 6.

2.2 Master Plan Implementation

Glenorchy Conservation Area is classified as a Natural Heritage System area in the *North Oakville West and East Secondary Plans*. The main function of the conservation area is to protect and enhance the natural environment. In the preferred concept for Glenorchy Conservation Area, almost all 401 hectares are to

be restored, enhanced, protected and managed for maximum ecological advantage, with the only development being limited to a low-impact trail system.

The implementation of the plan can be considered in two phases: the first, a 10-year phase, consisting largely of restoration activities; the second phase consists of providing access to the site for educational and interpretative activities, starting approximately in year 11 and beyond. Additionally, in Phase 1, two small interpretive trails are proposed in conjunction with the adjacent Fourth Line bridge and the Trafalgar Historical Society facilities. Specifically, one trail will link to the Palermo Schoolhouse, which is in the Palermo Cultural Heritage Area centred around the intersection of Bronte Road and Dundas Street (see Figure 1-4). During the restoration phase, increased surveillance of the property will be provided by restoration work crews as well as Conservation Halton security staff. Fences will also be required for security; Figure 4-1 illustrates the existing and proposed fences. Approximately 8 km of new fences are proposed. It is considered unnecessary to fence densely wooded areas or areas of steep slope. It is recommended that fencing be installed between the conservation area and adjacent residential developments. In addition, fences shall be constructed on the property line between the conservation area and municipal parks.

The timing of installation of the fences will be determined during the implementation stage. Some areas will require fencing almost immediately to discourage unauthorized access, especially by all-terrain vehicle riders. Generally, Conservation Halton constructs post and wire fences for such purposes. As roads are opened up as part of the development in North Oakville, more fencing will be required in these areas. However, given that developers of urban areas, including the Town, will need to fence their properties, a collaborative effort with Conservation Halton will be undertaken to identify the appropriate type of fencing to be installed. The developers will be responsible for the costs of the fencing.

During Phase 2, increased human presence both within and surrounding the conservation area will increase security to some extent; however, demand for access to the property for passive recreation will also increase. For this reason, proper trails must be constructed in appropriate configurations, and measures put into place to encourage people to stay on the trails so as not to damage sensitive ecosystems. Various techniques are envisioned to accomplish these objective including limited access points and trail heads, clearly defined trail routes, ecologically sound surfacing, construction materials and techniques, boardwalks and observation platforms, educational and interpretive signage and strict rules relative to pack in / pack out of garbage and litter.

2.2.1 Restoration Plan

A restoration plan concept has been prepared for the proposed wetland, grassland and forest ecosystems. This plan is based on state-of-the-art restoration techniques, which will be phased over a period of ten to twenty years, depending upon the availability of funding. Restoration projects undertaken by qualified restoration specialists can be costly to implement, but Conservation Halton is likely

to affect substantial cost savings through various creative methods. Conservation Authority staff has long been assisted by volunteers in planting and weeding operations. It is envisioned that other techniques to control costs would include partnerships and cost sharing initiatives.

The overall purpose of the restoration plan includes habitat creation, wildlife corridor enhancement, reestablishment of habitat types that existed historically, and greater species diversity. The three general types of restoration envisioned for Glenorchy are summarized below and detailed in Section 3.

2.2.1.1 Forest Restoration

The largest area of restoration at Glenorchy is devoted to forest restoration. This strategy dovetails with the Town of Oakville's objective of achieving 40% forest canopy coverage Town-wide. The degree of restoration will introduce succession planting in open areas of the site so that various ages of species are also present simultaneously in the plantings. Three types of forest restoration are proposed:

- Pit and Mound Micro-Topography - a variety of micro-habitats in close proximity to each other encourages broad species diversity; and,
- Forest Nucleation - agricultural fields on the edge of forest zones are to be returned to forest, which will help increase functionality, species and age diversity within the entire forest community;
- Successional Forest - succession forest planting efforts would increase vegetation diversity and direct regeneration towards an appropriate community type, which complements mature vegetation in adjacent areas. This will increase diversity and encourage faster restoration, increasing connectivity between patches sooner.

2.2.1.2 Wetland and Riparian

There are numerous smaller areas within the upland areas of the conservation area where wetland and riparian areas are proposed for expansion, as well as creation of new wetlands in both open site areas and forested areas. Cool water thermal regimes can be enhanced through the planting of various trees and shrubs that shade the water to protect species that are sensitive to warm temperatures.

2.2.1.3 Grassland/Prairie

The large upland areas of the site have been devoted to agricultural activities up until this year. While these open areas have been under cultivation, a fabric of linear hedgerows and forest edges remains on the site. These hedgerows will be retained, as long as it is feasible, to indicate the historical settlement patterns and acknowledge the agricultural history of this area. There is an excellent opportunity to devote much of this open area to restoration of a grassland / prairie habitat spotted with small wetlands and riparian zones as noted above, providing suitable habitat for some rare species or species at risk. This is particularly valuable since much of this type of habitat across Southern Ontario has historically been depleted due to agricultural activities and development.

2.2.2 Management Policies

A number of management policies have been prepared to ensure Glenorchy Conservation Area's sustainability into the future. Firstly, a system of Park Management Zones has been established to set policies based on the sensitivity of various areas. Secondly, a recommended Visitor Impact Management (VIM) program has been designed for Conservation Halton to implement at its conservation areas. Finally, several management policies are outlined focusing on a range of considerations including forest sustainability, invasive species, fisheries, wildlife and species at risk. These policies are detailed in Section 4.

2.2.3 Educational and Recreational Facilities

The provision of educational, interpretive and passive recreation facilities and programs are an integral part of the master plan. Access to the site is to be strictly controlled and monitored, with a variety of opportunities provided for nature appreciation and interpretation. Access is provided to particular areas based on the sensitivity of the natural heritage features.

- No physical access is provided to the most sensitive areas of the site, but visual access is provided in selected locations via web cam;
- Observation platforms are provided with interpretive signage and information overlooking natural areas or in areas where uncontrolled access may create impacts;
- A limited trail system is proposed in areas where access is possible, impacts are low and manageable and where opportunities exist for education and interpretation;
- A variety of interpretive themes are proposed that provide the visitor with an interesting range of educational material on the natural heritage system and the human history of the area. These include information on other conservation areas in the Conservation Halton system, watershed management, forest habitats, prairie and grassland habitats, wetland and riparian habitats, restoration activities and management, as well as pre-settlement native history, agricultural history and settlement of North Oakville;
- Potential passive recreational activities envisioned in the conservation area include hiking and walking, bird watching and nature observation, photography and painting, winter hiking and snow-shoeing on designated trails and active participation in the supervised restoration activities on the site;
- Currently no infrastructure or buildings are proposed in the master plan; however, the future need for such facilities is recognized and is anticipated to be realized through cooperation with the Town of Oakville utilizing shared facilities (parking and public washrooms) on the proposed community park immediately south of the conservation area and at Palermo Park.;
- An existing barn is located within the southern limits of the Glenorchy Conservation Area. Consideration may be given to future historical interpretation within this Historical Zone;

- Through public consultation, interest has been expressed in the possibility of including an interpretive centre associated with Glenorchy. However, the current policies in the North Oakville Secondary Plans do not permit a development of this nature, nor does the current Zoning By-law. The need for this type of facility could be considered in the future in concert with the development of the Town of Oakville's adjacent community park master plan. If it does not prove feasible to locate an interpretive centre on town lands, further consideration could be given to locating a facility within the low priority protection zone. This, however, would be subject to further public consultation and would necessitate an amendment to the Town's Official Plan.

2.3 Potential Additional Land Securement

The potential to fully develop and round-out a contiguous Natural Heritage System, some of which is currently outside the boundary of Glenorchy Conservation Area is an important consideration. Additional land acquisition should be investigated to achieve and / or support natural heritage system goals as well as ecological management and operational functions. See Section 5.1.2.1 for further discussion of this issue.

2.4 Sustainability Evaluation Overview

The sustainability evaluation of the proposed master plan reflects considerations relative to the natural heritage environment, social environment and the fiscal environment (see Table 2-1 for criteria and numerical rankings).

These considerations are measured as follows and summarized below:

- High Values – The plan provides a strong level of support for the criterion.
- Medium Values – The plan provides a good level of support for the criterion.
- Low Values – The plan provides little or no support for the criterion.

Table 2-1: Glenorchy Conservation Area Master Plan Evaluation

Environmental

10	Little to no negative impact on the environment or potential for positive impact
5	Some negative impact on the environment,
0	Significant negative impact on the environment,

Environmental	
a) Avoidance of impacts and encroachment on very high and high priority protection areas (PPA's)	7
b) Avoidance of impacts on natural heritage functions such as spread of invasives, trampling, loss of natural cover, habitat fragmentation, noise and increased imperviousness	7
c) Potential to restore or improve natural features and natural heritage systems, diversity and connectivity,	8
d) Achieve long-term ecological function and native biodiversity	8
e) Conformity to national, provincial, regional or local plans with respect to natural heritage objectives	8
Total Environment (weighted)	76 / 100

Social

10	Access or provision of appropriate opportunities,
5	Moderate access or provision of opportunities,
0	Little access or provision/opportunities

Social	
f) Accessibility – physical, visual, transportation, affordability	7
g) Provision of educational opportunities / facilities	6
h) Provision of outdoor recreational opportunities	7
i) Access to views, quiet spaces, contemplative areas	4
j) Conformity to provincial, regional & local recreational plans	6
Total Social	30 / 50

Economic

10 Low cost or high revenue potential,
5 Moderate cost and/or revenue potential,
0 High cost and/or low revenue potential

Economic	
k) Capital costs (cumulative over 10 year period)	7
l) Operating costs	7
m) Direct revenue generation potential	1
n) Sponsorship or partnership potential	6
o) Potential for positive economic impact upon the community	3
Total Economic	24 / 50

Total Points	**130 / 200**

2.4.1 Natural Heritage Environment

- High values associated with protection of the natural heritage environment;
- High values associated with the proposed restoration plans;
- High values associated with net reduction in unauthorized access and trails on the site;
- High values associated with not building trails in the sensitive areas of the site;
- High values associated with fences in terms of controlled access, also taking account of the need for wildlife corridors.

2.4.2 Social Environment

- Physical Accessibility: Medium to high values associated with connections to streets, adjacent trail systems and transit facilities. Medium values associated with accessibility via wheelchair. Low to medium values for potential lack of accommodation for vehicular parking;
- Educational Opportunities: Low values associated with non provision of built educational facilities and related multi-use amenities on site; medium values associated with the provision of interpretive and educational features on the site in the form of web-cams, signage and viewing platforms;
- Recreation Opportunities: Medium values associated with provision of features addressing public health and recreational opportunities provided by the limited trail system and connection to The Town of Oakville's proposed trail system for North Oakville;

- Access to views, quiet spaces and contemplative areas: Medium to high values for views associated with the trail system webcams and observation platforms; Low to medium values due to lack of access to the valley, which is the quietest and most contemplative sensitive area in the conservation area;
- Conformity to recreational plans: Medium values associated with contribution to the applicable recreation plans since more pedestrian and cyclist links to the Town of Oakville system are possible.

2.4.3 Fiscal Environment

- Capital Costs: Relatively high values associated with cost of restoration;
- Operating Costs: Relatively low costs due to provision of minimal facilities;
- Revenue Generation: Low values associated with the prospect of raising additional revenue other than restoration partnerships due to non-provision of educational / multi-use facilities;
- Sponsorship or Partnership Opportunities: Medium values associated with potential sponsorship and partnership opportunities offered relative to natural heritage system restoration; (e.g. Hydro One and Métis Nation of Ontario). Medium values associated with the potential (and need) to involve other agencies, organizations and groups as partners in capital development, programming and operations;
- Economic Impact on Community: Relatively low values since visitors will not pay admission.

Evaluation of this master plan suggests that while the environmental sustainability of the area is ensured, further educational opportunities would benefit the community as well as the financial viability of the conservation area. The addition of an interpretive centre has been a much-debated component of this planning process. Currently, an interpretive centre is not proposed but the plan suggests this could be reconsidered in years to come based on community needs and availability of resources. Provision of such a facility is currently not permitted. An official plan amendment and rezoning of a portion of the site, would be required to allow this type of facility to be built in the future

SECTION THREE: ENVIRONMENTAL CONSIDERATIONS

3.1 Restoration Plan

3.1.1 Rationale

The Sixteen Mile Creek Valley ANSI, which includes part of the Glenorchy Conservation Area, supports 73 vegetation community types and is discussed in detail in the Candidate Sixteen Mile Creek Valley Life Science Area of Natural and Scientific Interest (ANSI) report (MNR 2006). The MNR (2006) report documents canopy, understory and herb layer species common to vegetation communities (e.g. dry tableland forest, tableland wetlands, etc.) in the ANSI. Detailed ecological inventory was completed by Conservation Halton staff of the Glenorchy Conservation Area. This information combined with the MNR data were used to help determine appropriate restoration goals.

The underlying philosophy of the restoration plan is based on the notion that a rich landscape has representation of all natural habitats that occurred historically, which are well connected to adjacent habitat types. Not only should a wide range of habitats be represented in a landscape or study area, a range of successional stages of each habitat should be present. Each habitat and each age class of habitat has the potential to support different plant and wildlife species. Rich landscapes enhance biodiversity and reduce the effects of natural catastrophes such as diseases or insect infestations. Successive restorative actions in a variety of locations throughout the watershed can improve the overall conditions of the natural system by increasing forest cover, riparian vegetation and interior habitat.

All restoration should comply with the intent of the North Oakville Creeks Subwatershed Study. However, in one area, a forest habitat restoration has been recommended in place of the grassland habitat as proposed by the NOCSS. While this is not in agreement with the NOCSS, the Conservation Halton's master plan for Glenorchy Conservation Area provides for more grassland than would be created under the original NOCCS plan, and thus is consistent with its intent. Replacing the NOCSS grassland area within Glenorchy Conservation Area with forest allows for the creation of significantly more interior forest, which provides for better ecological function and enhanced habitat. In addition, the proposed restoration plan will assist the Town in achieving its target of 40% forest canopy cover. Thus, this deviation from the NOCSS provides a net benefit of improved environmental conditions for both wildlife and people.

Vegetation buffers should be considered in areas adjacent to municipal parks, Highway 407 and future transit way, etc. to reduce the impacts of adjacent land uses on the conservation area as well as protect viewsheds.

Restoration should be guided by the Principles and Guidelines for Ecological Restoration in Canada's Protected Natural Areas (Parks Canada and the Canadian Parks Council 2008), where possible. In some cases, there may be advantages to implementing strategy that relies primarily on natural restoration to

reduce costs. The restoration plan must be flexible in order to adapt to changing conditions, such as funding opportunities, change in restoration needs over time (e.g. allowance for more natural regeneration) or other circumstances as they occur and are deemed appropriate by Conservation Halton management.

Additional examples of alternative cost effective approaches are provided in Table 6-2.

The following sections provide a conceptual habitat restoration plan for the Glenorchy Conservation Area which will be refined as specific restoration initiatives are advanced in the future. This will allow opportunities to reestablish vegetation communities which occur on the site that have experienced significant declines locally or are known to be rare or vulnerable provincially, nationally or globally. The extent of wetlands in MNR Site District 7E4 is estimated to have been reduced by over 60% as a result of agriculture and urbanization. Restoration of treed wetlands and open marshes as a component of forest and grassland restoration will aid in the recovery of these lost habitats. Similarly reestablishing oak woodlands along the valley rim of the Sixteen Mile Creek will also assist in this remnant community's recovery.

3.1.1.1 Riparian

Small headwater streams are highly dependant upon vegetative cover for stream temperature moderation and the input of organic matter from adjacent vegetation. Environment Canada (2004) recommends that riparian areas be vegetated to improve water quality and increase shade to reduce water temperatures. As such, these areas have been identified as an important part of a complete restoration program that requires a specific treatment type and species allocation. The restoration of riparian vegetation being proposed along High and Medium constraint corridors is consistent with the recommendations of the *North Oakville Creeks Subwatershed Study* and the *Secondary Plans.* Where possible, restoration of low constraint riparian areas should be considered for specific restoration in a manner that improves the overall surface water system and integrates them with possible new wetland areas being created.

In some cases, the NOCSS has approved the realignment of creeks, such as McCraney Creek and Glen Oak Creek (Sixteen Mile Creek Watershed).

3.1.1.2 Grassland

Grassland is used as a general term to refer to areas where the vegetation is dominated by grasses or sedges of natural, semi-natural or cultural origin. Specific grassland communities such as prairie and savanna habitat formerly occurred sporadically across much of southern Ontario. As climatic conditions changed, disturbances from either First Nations agricultural practices or natural disturbance maintained these areas. As southern Ontario was settled, much of the prairie or savanna vegetation was extirpated. It is estimated that less than 3% of pre-settlement tallgrass prairie and savanna areas remain in Southern Ontario (Tallgrass Ontario 2005).

Restoring prairie or a reasonable mix of prairie/cultural meadow area within the conservation area would be of benefit. For example, grassland birds in North America have experienced some of the most pronounced population declines of any group of birds on the continent and these declines appear to be continuing unabated (Vickey et al. 1999; Blancher 2003; Murphy 2003; Sauer et al. 2005 from McCracken 2005). Vickey et al. (1999) suggest the replacement of much of the pre-settlement prairie habitat by intensive human-modified agricultural grassland habitats (pastures, hayfields, fallow land) somewhat buffered population declines of grassland birds. However these areas are now undergoing significant decline from changes in agricultural practices as well as the removal of the habitat as a result of urban expansion and population growth. Grassland restoration in Glenorchy Conservation Area will help offset the removal of grasslands that currently exist in areas approved for development. The size of grassland provided in the final restoration plan should be of a sufficient size to support a diverse grassland community.

3.1.1.3 Forest

In terms of restoration opportunities, the "infilling" of irregular forest patches can offer considerable benefits in terms of increasing interior habitat conditions and decreasing the edge effect (Environment Canada 2004). In addition, larger patches of forest tend to have a greater diversity of habitat niches and therefore are more likely to support a greater richness and/or diversity of wildlife species. The restoration of forest cover in Glenorchy Conservation Area will also assist the Town in achieving its forest canopy cover target of 40%.

3.1.1.4 Wetland

Wetlands are rare in Ecodistrict 7E4 and upwards of 80% of natural wetlands have been removed from the landscape over time (MNR 2006). Wetlands can provide benefits anywhere in a watershed, but particular wetland functions can be achieved by rehabilitating wetlands in key locations, such as headwater areas that moderate groundwater discharge and recharge and flood plains and provide flood attenuation. In many cases, adjacent lands form a vital part of the wetland ecosystem, providing a variety of habitat functions from upland foraging areas (e.g. waterfowl) to nesting sites (e.g. turtles). Environment Canada (2004) recommends a minimum 100m of undisturbed habitat adjacent to marsh and swamp communities. Special attention should be paid to the site and soil conditions of historic wetland locations (Environment Canada 2004).

The focus of wetland restoration in Glenorchy Conservation Area should be two fold, including enhancement of existing wetlands and the creation of new wetlands in appropriate areas. Lands adjacent to the best quality wetlands should be restored so that these natural features can be fully functioning. In addition, the creation of new wetlands and the enhancement of degraded portions of existing wetlands is appropriate in areas where overland drainage collects for a short duration in natural depressions (e.g. former kettle wetlands). Restoration should strive for enhancement or create representative wetland communities as described

in the Provincially Significant North Oakville-Milton West Wetland Complex (MNR 2006).

3.1.2 Estimate of Restoration Costs

The conceptual restoration plan being recommended will in some cases require multiple decades to implement. Given the extent of the proposed restoration and limitation of available funds, restoration treatments have been prioritized to direct effort to those that provide the greatest improvement to the ecological system. Prioritization of restoration is based on several criteria including:

- Ability of habitat to regenerate towards high quality communities on its own;
- Benefit of restoration to the natural system (e.g. increase biological and structure diversity in key areas); and
- Ability of restoration to encourage faster regeneration.

Lower priority restoration treatments tend to be the most inexpensive, have the shortest time horizons and be easiest to implement. Therefore, it may be appropriate to carry out some of the lower priority restoration treatments as funds and staff/volunteers become available. This should be completed in a manner that does not prevent the implementation of the higher priority restoration treatments.

For the purpose of costing, this report assumes a generic native species type that covers a diverse range of sizes and forms, ideal planting densities and generalized design criteria. This was necessary as many variables remain unknown (e.g. site condition, specific level of restoration effort, etc.) and require further investigation and assessment to identify the most appropriate restoration implementation. Detailed design at the implementation stage will determine the specific native species mix.

Cost per hectare pricing has been derived from the consultant's unit price schedule (Table 3-1). These costs are based on historical supply and installation pricing for the estimated quantities of materials known at this preliminary stage. Each cost per hectare is a combination of three main factors including:

- General earthworks (e.g. clearing and grubbing, blade and grade or excavation);
- Re-vegetation (and bioengineering supply costs); and
- Management (e.g. invasive species, plant replacement, etc)

The percent of the total cost these three components represent for each restoration treatment type is presented in Tables 3-4 to 3-11 and provide a basis for understanding how costs relate to implementation. Exact quantities of cut, fill and materials handling are not available at this stage. Assumptions of the area to be covered are based on standard contractor outsourcing costs related to recent smaller scale projects. These assumptions provide a budget framework on which the detailed design can be based and refined during the implementation stage. Substantial savings through the application of different restoration techniques may be achieved (i.e. volunteers, lower densities, smaller stock, etc.).

TABLE 3-1: Unit Costs for Restoration

Conservation Halton - Glenorchy

GENERAL EARTHWORK ITEMS	Size	Qty.	Unit	Unit Price	Price/m2	Total
Mobilization / Demobilization	-	0	L.S.	$5,000.00	$ -	$ -
Trail Signage	-	0	ea	$200.00	$ -	$ -
Access paving protection and restitution	-	0	L.S.	$1,000.00	$ -	$ -
Heavy Equipment Clearing and Grading	-	0	m²	$1.50	$ 1.50	$ -
mudtracking/road clean-up		0	L.S.	$1,000.00	$ -	$ -
Trail Markers		0	ea	$10.00	$ -	$ -
Wood Box Culvert		0	ea	$220.00	$ -	$ -
CMP culvert		0	ea	$ 300.00	$ -	$ -
Light Equipment Clearing and Grading		0	m²	$6.50	$ 6.50	$ -
Topsoil Stripping and stockpile for reuse		0	cu.m.	$28.00	$ 9.30	$ -
Midden / Refuse / Fence Removal		0	hec	$5,000.00	$ 0.50	$ -
Site sourced woody debris		0	L.S.	$500.00	$ -	$ -
Bridge Crossing single wood		0	m²	$86.00	$ 86.00	$ -
Trailhead Closures		0	ea	$1,500.00	$ 100.00	$ -
Dewatering (pump-and-pipe)	-	0	L.S.	$5,500.00	$ -	$ -
Pedestrian and tree protection fencing	-	0	l.m.	$10.00	$ -	$ -
Silt fence-install, maintain and remove	-	0	l.m.	$15.00	$ -	$ -
Excavation and Grading (removal offsite)	-	0	m²	$16.66	$ 16.66	$ -
Trail Double granular		0	m²	$46.00	$ 9.20	$ -
Trail Double Mulch		0	m²	$7.50	$ 7.50	$ -
invasive species removal		0	m²	$0.50	$ 0.50	$ -
Eagle bridge single wide 7.5m x 1.8m		0	ea	$20,000.00	$ 1,500.00	$ -
ecoblanket terraseed		0	m²	$ 3.50	$ 3.50	$ -
Imported topsoil	-	0	cu.m.	$35.00	$ 11.66	$ -
400-500mm Rip Rap	-	0	cu.m.	$76.50	$ 38.25	$ -
700g/sq.m. Coir Cloth (ECB - 4m wide)	-	0	m²	$8.00	$ 8.00	$ -
Straw much / photodegradable netting ECB	-	0	m²	$1.95	$ 1.95	$ -
REVEGETATION ITEMS						
Caliper Trees						
Acer saccharinum, Silver Maple	40mm cal.	0	ea	$ 300.00		$ -
Quercus macrocarpa, Bur Oak	40mm cal.	0	ea	$ 300.00		$ -
Whip Size Trees						
Juniperus viginiana, Red Cedar	150cm hgt	0	ea	$ 85.00		$ -
Acer saccharum, Sugar Maple	150cm hgt	0	ea	$ 85.00		$ -
Quercus macrocarpa, Bur Oak	150cm hgt	0	ea	$ 85.00		$ -
Tilia americana, Basswood	150cm hgt	0	ea	$ 85.00		$ -
Populus tremuloides, Trembling Aspen	150cm hgt	0	ea	$ 85.00		$ -
Native Shrub Mix						
Rosa palustris , Wetland Rose	50cm hgt #2	0	ea	$ 40.00		$ -
Spirea latifolia , Meadowsweet	50cm hgt #2	0	ea	$ 40.00		$ -
Rhus typhina, Staghorn Sumac	50cm hgt #2	0	ea	$ 40.00		$ -
Amelanchier canadensis, Serviceberry	100cm hgt. #5	0	ea	$ 85.00		$ -
Lindera benzoin, Spicebush	50cm hgt #2	0	ea	$ 40.00		$ -
Cornus alternifolia, Alternate leaved Dogwood	50cm hgt #2	0	ea	$ 40.00		$ -
Cornus sericea, Red Osier Dogwood	50cm hgt #2	0	ea	$ 40.00		$ -
Salix exigua, Sandbar Willow	75cm hgt #2	0	ea	$ 35.00		$ -
Symphoricarpos albus, Snowberry	75cm hgt #2	0	ea	$ 35.00		$ -
Rubus idaeus, Wild Raspberry	50cm hgt #2	0	ea	$ 35.00		$ -
Sambucus canadensis, Elderberry	50cm hgt #2	0	ea	$ 35.00		$ -
Viburnum lentago, Nannyberry	50cm hgt #2	0	ea	$ 35.00		$ -
Plugs and other forms						
Upland basic grass mix	drill seed	0	m²	$ 0.25	$ 0.25	$ -
Aquatic Plugs	50mm plug	0	ea	$ 3.50		$ -
Forbs	100cm pot	0	ea	$ 5.00		$ -
VPL Shrubs	20-60cm	0	ea	$ 35.00		$ -
I year Transplant	125cm hgt #1	0	ea	$ 25.00		$ -
2 year Transplants	200cm hgt #2	0	ea	$ 45.00		$ -
conifer seedlings	15cm hgt	0	ea	$ 5.00		$ -
Live willow stakes	-	0	ea	$ 5.00	$ 10.00	$ -
Shoreline Herbaceous Native Regeneration Seed Mix	-	0	m²	$ 4.50	$ 4.50	$ -
					Revegetation subtotal	$ -

The Conceptual Cost Estimates provided herein is for budgetary purposes only and may vary considerably from a Contractor's quotation. All plant material is restoration quality. One year warranty at 70% take.

COST SUMMARY	
General Earthworks Items	$ -
Revegetation Items	$ -
Subtotal	$ -
15% contingency	$ -
TOTAL COST	**$0.00**

Table 3-2: Estimate of Restoration Costs

Restoration Type	Restoration Area (ha)	Existing Conditions	Surrounding Area	Soil Conditions	Restoration Treatment Description	Costing per hectare	Total Cost	Management Considerations
Enhanced Riparian Planting	18.2	Agriculture, Cultural Meadow, Cultural Savannah	Agriculture, Deciduous Forest, Cultural Meadow	Jeddo, Chinguacousy	Tree, shrub and shoreline planting with some habitat and shade structures such as raptor poles and woody debris. Thirteen percent of total area is assumed a wet regime.	$65,000	$1,183,000.0	Refer to Conservation Halton Table 1: Hydrologic/Moisture Zone Planting Guide. Invasive and undesirable species removal required.
Succession Forest Planting	27.0	Agriculture, Deciduous Forest, Cultural Meadow, Cultural Thicket	Agriculture, Urban	Oneida, Chinguacousy	Pioneer tree species and shrub planting in fifty percent of designated buffer areas.	$36,000	$972,000.0	Invasive species removal may be required prior to planting.
Option A/B: Pit and Mound Microtopography	64.1	Agriculture, Hedgerow	Deciduous and Mixed Forest, Agriculture	Oneida, Jeddo, Chinguacousy	Excavation and fill placement in various sizes and random pattern to replicate natural process. Fifty percent coverage of total area.	$46,000	$2,948,600.0	Hydroseed used to deliver native cover species.
Constructed Wetland	2.0	Various conditions	Agriculture, Mixed and Deciduous Forest, Cultural Meadow	Generally, Jeddo, Chinguacousy	Excavation, shaping and lining of clay basins of various depths. Provide habitat structures and aquatic vegetation.	$80,500	$161,000.0	Some on-going invasive and nuisance (geese) species controls are necessary for long-term success.
Wetland Enhancement Planting	1.0	Various wetland types	Agriculture, Mixed and Deciduous Forest, Cultural Meadow	Jeddo, Chinguacousy	Remove invasive or undesirable species. Reshape and plant benches with emergent, fringe and submergent native species	$35,000	$35,000.0	Some on-going invasive and nuisance (geese) species controls are necessary for long-term success.
Forest Nucleation Cell Planting	17.3	Agriculture, Cultural Meadow	Deciduous and Mixed Forest	Oneida, No Data	Diverse species, hierarchal sizes, random (100m2) cells of tree and shrub. Twenty-five percent coverage of overall area.	$34,500	$596,850.0	Regional native species. Ideal program to promote volunteerism.
Grassland/Prairie Restoration	49.7	Agriculture	Hedgerow, Agriculture	Oneida, Jeddo, Chinguacousy	Native grasses and forb species terraseeded in compost over irregular grading.	$74,500	$3,702,650.0	Additional maintenance (prescribed burning) required in prairie program. Grassland restoration would not require prescribed burning. Grassland option would cost 25% less.
Trailhead Closures	0.5	various	various	various	Signs, seed, shrubs, trees or woody debris and boulders placed in locations of unauthorized access. Minimum 10 points covering approx. one-half hectare.	$99,000	$49,500.0	Continuous monitoring and maintenance is recommended to maintain security and integrity of program beyond year five.
Cost estimate has been provided for budgetary purposes only and may vary from a contractor's quotation. Cost per hectare pricing has been derived from Dillon Conceptual unit price cost estimate schedule. Each cost per hectare is a combined estimated percentage of various earthworks, revegetation and management cost. Taxes and Consultant fees have not been included.					Total Cost of all restoration types		**$9,648,600**	

Table 3-2 reflects the cost per hectare for a contractor's supply and install pricing using certified nursery grown plant materials. These materials would be specified at a size that provides an established root system and gives the plant its best chance for long-term survival. The costs would be significantly lower if bare root, field-sourced, or dormant harvest cuttings (live stakes) were specified. These types of cost saving measures are often used in situations where the restoration site is remote, qualified personnel familiar with these restoration planting techniques particular to these plant materials are available and where project schedules allow for dormant harvest and bare-root material to be used.

Table 3-3: Previous Project Costing Examples - Restoration Treatment Types Being Considered for Glenorchy Conservation Area

Reference Project	Size	Project Description
Solar Farm - Under Construction Estimated Cost: $575,000	4.12ha	Combination of tall grass prairie, nucleation plant cells and pit and mound micro-topography.
Industrial Restoration Site - Completed 2007 Total Cost: $92,000	<5ha	Enhancement of existing woodlot and repair of industrial disturbances using successional forest buffers and open meadow restoration treatments.
Restoration of Rouge River Riparian Areas - Under Construction. Estimated Cost: $500,000	>1km of river	Extensive repair and restoration to several Rouge River Tributary sites protecting municipal infrastructure and enhancing the ecological system. Work included riparian habitat improvements and channel realignment to provide flood relief.
West Side Marsh - Completed 2004 Total Cost: ~$2,300,000	<25ha	Enhancement to existing wetlands as well as construction of new wetland areas, providing multiple habitat types including: pike nursery, littoral shelves, raptor poles, nesting islands, bass basin shelters and hibernacula.
Edge Management Plan - Under Construction Estimated Cost: $250,000	>10ha	Woodlot management in new community development. Works included trail design, successional planting and trailhead closures.
Industrial Restoration Site - Under Construction Estimated Cost: $85,000	<5ha	Restoration to woodlot edge and lakeside slope disturbed by industrial activity using nucleation plant cells.

General earthworks and re-vegetation costs represent the cost of establishing the restoration treatment onsite. The way that this cost is implemented over time can be scheduled based on funding and staff availability. The total cost of each restoration treatment type is summarized in Table 3-2. Recent project cost examples for comparison are provided for each restoration treatment type in Table 3-3.

The preliminary estimate provided reflects real costs associated with contractor installation and are for budgetary purposes only. This estimate represents an idealized budget for the purposes of providing a suitable restoration plan which maximizes the potential of each dominant habitat type of the conservation area. The installation costs noted here should be considered the upper end of pricing that would normally be submitted during the competitive bid process. Costs can be reduced through refinement of restoration methodology at the implementation stage, selecting additional areas for natural regeneration as the primary restoration technique or through Conservation Halton internal programming. Should Conservation Halton complete restoration using internal resources, one could expect that costs could be reduced by up to two thirds. This reduction in cost is estimated based on possible volunteer effort and historical labour and equipment costs known to Conservation Halton.

All contracted restoration projects should be performed by qualified restoration personnel. One-year warranty is assumed for contracted planting. Typical design or contract administration fees are not included in the estimated costs. Monitoring of restoration efforts are recommended with site inspections at a variety of milestone dates to determine success and potential need for adjustments.

3.1.3 Trailhead Closures

There are areas where unauthorized access to the conservation area is occurring; these areas need to be renovated and restored to discourage entry. It will also be necessary to close existing unsanctioned trails in the conservation area where a new trail system is to be implemented. Where unauthorized access has created deep rutting, it will be necessary to rehabilitate these areas during trailhead closure.

Trail closures form an important mitigation measure for protecting the natural features of the conservation area, which should reduce unauthorized access and access to pre-existing trails prior to the implementation of the master plan. Therefore, this restoration type has been given a high priority level of 1.

The restoration plan will consist of a limited amount of light equipment use to source and install large fallen logs, boulders and possibly gated structures. Large rutted areas will need to be regraded and restored with vegetation. Smaller rutted areas may be left to naturalize on their own. The trail closures will allow restoration of interior portions of the trail to progress naturally. Detailed design at the implementation stage will determine the specific design details. For pricing we have assumed construction projects such as trailhead closures, gate installations and fencing will be executed by qualified Conservation Halton operations staff.

A summary of the budget required to undertake this restoration treatment type is provided in Table 3-2. Trailhead closures are estimated to have a total cost of $49,500 based on a minimum of ten closure structures and signage. The total cost for general earthworks, re-vegetation and management is outlined in Table 3-4.

3.1.4 Grassland/Prairie Restoration

Grassland/prairie restoration is envisioned in the central portion of the Glenorchy Conservation Area. This area is currently being used for the production of agricultural crops with some hedgerow scattered throughout. The area to be restored covers 49.7 hectares (see Figure 3-1).

It is intended that the creation of a grassland or prairie community would provide habitat for species known to be in decline. The size of the area proposed for restoration was maximized to the extent possible to provide more appropriate habitat for species known to require larger patches of continuous grassland/prairie habitat. Restoration of this area is considered one of two primary restoration efforts in the conservation area adding significant benefits to the natural heritage system over the longer-term. As such, this restoration type has been given a priority level of 1.

The restoration plan will consist of a limited amount of earthworks to improve soil composition, eliminate invasive and undesirable species prior to terraseeding. It will be an opportunity to return a sizeable area of Glenorchy Conservation Area to an ecologically significant vegetation community.

Detailed design at the implementation stage will determine the specific native species mix, calculate seed application rates and establish design criteria.

A summary of the budget required to undertake this restoration treatment type is provided in Table 3-2. The grassland/prairie restoration planting is estimated at $74,500 per hectare based on a comprehensive soil restructuring to mitigate agricultural practices. It is likely that additional intensive management of this community (e.g. prescribed burns, removal of invasive species, etc.) will be necessary on an on-going basis. This has been included in the cost presented as part of a phased management schedule that would specify prescribed burning, invasive plant removals, and selective additional planting. The percent of the total per hectare cost for general earthworks, re-vegetation and management is outlined in Table 3-5.

Tallgrass prairie installations are common in the central states and provinces and seed supply stocks are readily available however, local seed collection and soil preparation are two factors that will increase the cost of installation. A more diverse species list is desirable, but would also drive costs higher. The costs noted in Table 3-2 reflect the more costly seed sourcing and also incorporate terraseed as the delivery system for the seed mix. A seeded compost blanket is applied in a 50 – 100 mm thickness that will fill in some of the irregularities from grading and provide a stable germination environment less susceptible to temperature and moisture fluctuations. The elements in the compost add nutrient

value to the site soils that may be exhausted from years of agriculture. The terraseed system has demonstrated the greatest measure of success when compared to hydroseeding; however, large remote areas may not allow these techniques to be utilized. Conventional drill seeding may be necessary to access the site and will provide substantial cost savings.

3.1.5 Pit and Mound Micro-topography

It is intended that reforestation of this area would serve to increase the overall size and width of the forest associated with Sixteen Mile Creek as well as significantly improving the shape and reducing the forest edge to interior ratio. The use of the pit and mound micro-topography technique will increase structural as well as vegetation diversity. This restoration treatment will significantly add to wetland/vernal pool areas within Glenorchy Conservation Area. Restoration in this area is considered one of two primary restoration efforts in the conservation area adding significant benefits to the natural heritage system over the long-term. As such, this restoration type has been given a priority level of 1.

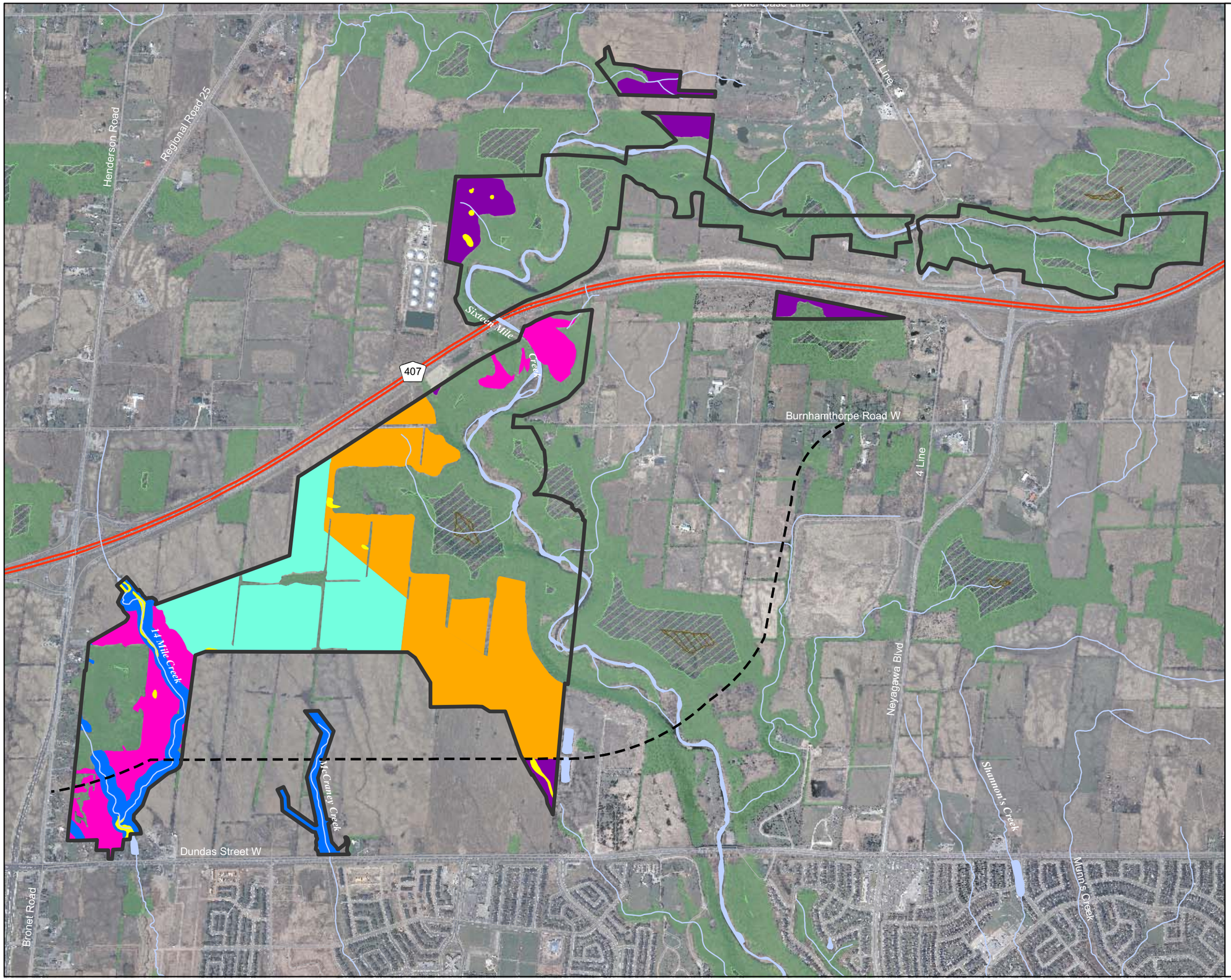
Pit and Mound Micro-topography restoration is being proposed for the central core of Glenorchy Conservation Area in areas adjacent to existing mature forest associated with Sixteen Mile Creek. This area encompasses a total of 64.1 hectares, which currently consists of agricultural lands and hedgerows (see Figure 3-1). Initial restoration efforts will consist of a limited amount of excavation and re-grading to remove inorganic materials, refuse stockpiles, fencing, middens and the abandoned portion of Burnhamthorpe Road West. The Pit and Mound Micro-topography restoration technique is a relatively new restoration treatment used primarily on much smaller project scale (i.e., Clear Creek Forest Nature Reserve). While this is an ambitious proposal, the significant need to restore forest cover and reinforce the existing forest edge makes it a desirable undertaking. The specialized grading to replicate a series of naturally occurring depressions and raised mounds will be simplified to make the best use of low impact tracked skid steer or backhoe type equipment and minimize the use of heavy equipment. The excavation and fill placement will be random and irregular and create wetland/vernal pool communities within the forest feature. The final surface will be hydro seeded with a basic mix of native wet/dry tolerant grass. The mix will also include a limited amount of wildflower and pioneer tree species. After this initial stage of restoration, which is intended to encourage canopy development over many years, some additional strategic plantings of more diverse shade tolerant species are randomly planted with various junior forms of trees, shrubs and marginal aquatic plants that complement naturally occurring forest communities.

Detailed design at the implementation stage will determine the specific native species mix. Important design considerations will include the use of different plant forms. Special attention to seed specification and collection to promote local and regional seed stock will be important considerations. For tableland forest, especially Pit and Mound/Micro-topography, initial shade-intolerant species that become established, will differ from the desired end restoration goal of mature shade-tolerant communities. Therefore, it is important that ongoing management

Table 3-4: Trailhead Closures Cost

Priority	Restoration Type	Phase	Project Element	Unit	Cost	Percent of Treatment Coverage	Percent of Project Cost	Total Cost per Hectare
One	**Trailhead Closures approx. 0.5ha** (100% coverage) *Three to Five Year Implementation Plan with substantial completion in the third year and an established mamagement plan in place for five years.*	General Earthworks	Mobilize/demobilize - equipment floating, materials staging and project preparation necessary for each stage of work throughout length of implementation.	L.S.	$5,000.00	100%	71%	$5,000.00
			Light Equipment Clearing and Grading	m2	$6.50			$65,000.00
		Revegetation	Site sourced woody debris	L.S.	$500.00	100%	14%	$5,000.00
			Native seed mix (dry upland)	m2	$3.50	25%		$8,750.00
		Management	Invasive species removal	m2	$0.50	25%	15%	$1,250.00
			Native seed mix (dry upland)	m2	$3.50			$8,750.00
			Midden/refuse/fence removal	m2	$0.50	100%		$5,000.00
				*Totals			100%	$98,750.00

***Note: consultant fees, approvals and permit fees, taxes are not included in totals. A) General earthworks phase refers to specialized equipment and labour forces and may not be suitable project element for staff/volunteers. B) Revegetation phase refers to handtools, small mechanized equipment and unskilled labour that may be suitable for staff/volunteers. C) Management phase refers to time period after substantial completion and project elements are siutable for staff/volunteers. The Percentage of Project Cost is based on full implementation of the restoration type over the project's entire area. The cost during any one phase of implementation or specific location of the planned restoration type may vary considerably due to site specific requirements. These requirements will become clear during the detailed design stage of the Implementation Plan.**



CONSERVATION HALTON

Glenorchy Conservation Area
Areas of Conceptual Habitat Restoration
FIGURE 3-1

Legend

- Burnhamthorpe Road Extension
- Secondary Roads
- Highway
- Stream
- Glenorchy Conservation Area*
- Waterbodies
- Forest*
- 100m Interior Forest*
- 200m Interior Forest*

Revegetation Types

- Enhanced Riparian Plantings
- Forest Nucleation Cell Plantings
- Grassland/Prairie
- Pit and Mound/Micro-Topography
- Successional Forest Plantings
- Wetland Enhancement

*This mapping was produced by Conservation Halton and should be used for information purposes only. Data sources used in its production are of varying quality and accuracy and all boundaries should be considered approximate. Conservation Halton disclaims all responsibility for any and all mistakes or inaccuracies in the information and further disclaims all liability for loss or damage, which may result from the use of this information. This mapping is provided as a public service and does not constitute advice or endorsement by Conservation Halton of any specific product, service, organization or agency. This map is protected by copyright (© 2008) and may not be reproduced without written consent from Conservation Halton. Any copying, redistribution or republication the content thereof, for commercial gain is strictly prohibited. Produced by Conservation Halton GISP.

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Table 3-5: Grassland / Prairie Restoration Costs

Priority	Restoration Type	Phase	Project Description	Unit	Cost	Percentage of Project Coverage	Percentage of Project Cost	Total Cost per Hectare
One	**Grassland Prairie, 49.7ha** (100% coverage) *Five to Ten Year Implementation Plan with substantial completion in the fifth year and an established management plan in place for ten years.*	General Earthworks	Mobilize/demobilize - equipment floating, materials staging and project preparation necessary for each stage of work throughout length of implementation.	L.S.	$15,000.00		18%	$301.81
			Light Equipment Clearing and Grading	m2	$6.50	20%		$13,000.00
		Revegetation	Terraseed Native Grassland Mix	m2	$4.50	100%	60%	$45,000.00
		Management	Invasive species removal	m2	$0.50	25%	22%	$1,250.00
			Prescribed burning	m2	$1.53	95%		$14,535.00
			midden/refuse/fence removal	m2	$0.50	10%		$500.00
					*Totals		100%	$74,586.81

***Note: consultant fees, approvals and permit fees, taxes are not included in totals. A) General earthworks phase refers to specialized equipment and labour forces and may not be suitable project element for staff/volunteers. B) Revegetation phase refers to handtools, small mechanized equipment and unskilled labour that may be suitable for staff/volunteers. C) Management phase refers to time period after substantial completion and project elements are siutable for staff/volunteers. The Percentage of Project Cost is based on full implementation of the restoration type over the project's entire area. The cost during any one phase of implementation or specific location of the planned restoration type may vary considerably due to site specific requirements. These requirements will become clear during the detailed design stage of the Implementation Plan.**

of restoration sites, especially forest communities, be designed in a manner that will facilitate this transition overtime.

A summary of the budget required to undertake this restoration treatment type is provided in Table 3-2. The Pit and Mound Micro-topography is estimated at $46,000 per hectare based on a maximum 50% coverage configuration. Some areas at the outermost edge of this zone may be developed at a lower coverage. The remaining areas will be left undisturbed or seeded with a native grass/wildflower mixture to stabilize soils and improve soil conditions. The percent of the total per hectare cost for general earthworks, re-vegetation and management is outlined in Table 3-6.

3.1.6 Enhanced Riparian Planting

Portions of Fourteen Mile Creek and McCraney Creek riparian vegetation have been removed or significantly degraded from agricultural activities over the years. Degraded riparian areas typically consist of herbaceous vegetation immediately adjacent to the channel with either agricultural crop or oldfield vegetation located further from the channel. These areas have been identified as headwater areas for their respective aquatic systems as well as potential fish habitat. Enhanced riparian plantings have been given a priority level of 2 as they are likely to regenerate on their own over many years. Given the previous degradation of the area it is recommended that targeted restoration efforts would increase the speed of regeneration and add important biological and structural diversity.

The riparian areas and their respective buffers, as defined by the *North Oakville Creeks Subwatershed Plan*, encompass a total of 18.2 hectares of stream corridor (see Figure 3-1 Areas of Conceptual Habitat Restoration). The riparian enhancement planting costs have been calculated initially based on intensive restoration in the first four metres either side of the line of normal water level. This wet regime comprises approximately 13% of the total enhanced riparian planting area. The remaining portion of the riparian zone will receive additional plantings at a reduced density in areas with the greatest need.

The riparian restoration will consist of a limited amount of excavation and re-grading to remove some invasive species and improve drainage conditions. Detailed design at the implementation stage will determine the specific native species mix.

The implementation plan will encourage a wide diversity of plant materials including aquatic fringe, shoreline and flood fringe plants. The area beyond the maximum water level is considered upland and will be in the associated buffer areas. Standards for shading the water surface and habitat creation will be met with both live material and placement of site-sourced natural materials such as raptor poles, fallen logs and woody debris.

A summary of the budget required to undertake this restoration treatment type is provided in Table 3-2. The enhanced riparian planting is estimated at $65,000 per hectare based on an intense planting program in the wet regime area and no plantings of tree or shrubs in areas of existing natural woody vegetation cover of

good quality. The remaining areas within the stream corridor buffer will be left undisturbed, seeded with a native meadow mixture and some limited woody plantings. The percent of the total per hectare cost for general earthworks, re-vegetation and management is outlined in Table 3-7. This cost breakdown is provided to communicate where dollars have been allocated (e.g. re-vegetation material, etc.) as well as to aid in the staging of implementation.

3.1.7 Wetland Enhancement and Creation

All the wetlands associated with the North Oakville - Milton West Wetland Complex are less than 2 hectares. Isolated or kettle wetlands constitute 29% of the complex. They are dependent on diffuse spring overland flows of rainfall and snowmelt from the surrounding isolated catchment basin. The wetlands typically draw down in the summer months and most are dry by mid-summer. The remaining 71% of the wetlands are palustrine wetlands along headwater streams that largely have intermittent flows. A few of the isolated and palustrine wetlands are deep enough to support permanent water. Wetland cover consists of cattail marsh (15%), graminoid marshes (40%), herbaceous marshes (8%), open water aquatic communities (10%), swamps including thicket swamps cover the remaining 27% of wetlands. Dominant species of these wetland types are provided in the Provincially Significant North Oakville-Milton West Wetland Complex (MNR 2006).

Wetlands within Glenorchy Conservation Area, which will benefit from restoration comprise approximately one hectare. There are also small pockets with sufficient relief in agricultural areas, adjacent to areas of overland flow, which may have previously or could in the future support wetland plant species. Existing wetland environments have been identified as *Provincially Significant Wetlands* (PSW) and those more exposed to anthropogenic land uses (e.g. agriculture) have been degraded as a result of sedimentation and lack of vegetation diversity.

Some sensitive wildlife species are known to occur in the two most westerly PSW wetlands. Proposed restoration will need to take wetland status, hydrology, and existing floral and fauna sensitivities into consideration during the detailed design and implementation stage. It may be that hydrologic conditions preclude the need for, or effectiveness of, restoration in all or some wetland locations identified. All restoration in existing wetland areas (enhanced wetland restoration) will need to be completed in a sensitive manner that provides improvement of form and function that is consistent with historical wetland characteristics for the area. It will also be necessary to consult with appropriate agencies (e.g. MNR) during the detailed design and prior to implementation of restoration.

Available information suggests the ability of existing wetland areas to improve their form and function naturally may be impeded by previous impacts and current dominant vegetation. In addition, areas of lower relief currently under cultivation are likely too far removed from existing wetland communities to allow effective natural re-establishment and, therefore, may also benefit from restoration efforts (created wetland). Figure 3-1 shows wetlands being considered for rehabilitation. It is assumed that approximately one hectare of existing wetlands in the

Table 3-6: Pit and Mound Restoration Costs

Priority	Restoration Type	Phase	Project Element	Unit	Cost	Percentage of Project Coverage	Percentage of Project Cost	Total Cost per Hectare
One	**Pit and Mound Microtopography, 64.1ha** (50% coverage) *Five to Twenty Year Implementation Plan with substantial completion by the fifth year and an established management plan in place for twenty years.*	General Earthworks	Mobilize/demobilize - equipment floating, materials staging and project preparation necessary for each stage of work throughout length of implementation.	L.S.	$15,000.00	50%	8%	$117.00
			Heavy Equipment Clearing and Grading	m2	$1.50			$3,750.00
		Revegetation	Hydroseed native regeneration seed	m2	$0.43	50%	89%	$2,150.00
			Whip sized trees	m2	$3.52			$17,600.00
			Shrubs	m2	$2.50			$12,500.00
			Seedlings	m2	$0.90			$4,500.00
			Aquatic plugs	m2	$0.70			$3,500.00
			Site sourced woody debris	L.S.	$500.00			$500.00
		Management	Invasive species removal	m2	$0.50	5%	3%	$250.00
			Plant replacement (no warranty)	m2	$1.50	5%		$750.00
			Midden/refuse/fence removal	m2	$0.50	5%		$250.00
					*Totals		100%	$45,867.00

***Note: consultant fees, approvals and permit fees, taxes are not included in totals. A) General earthworks phase refers to specialized equipment and labour forces and may not be suitable project element for staff/volunteers. B) Revegetation phase refers to handtools, small mechanized equipment and unskilled labour that may be suitable for staff/volunteers. C) Management phase refers to time period after substantial completion and project elements are siutable for staff/volunteers. The Percentage of Project Cost is based on full implementation of the restoration type over the project's entire area. The cost during any one phase of implementation or specific location of the planned restoration type may vary considerably due to site specific requirements. These requirements will become clear during the detailed design stage of the Implementation Plan.**

Table 3-7: Enhanced Riparian Restoration Costs

Priority	Restoration Type	Phase	Project Element	Unit	Cost	Percentage of Project Coverage	Percentage of Project Cost	Total Cost per Hectare
Two	**Enhanced Riparian Restoration, 18.2ha** (87/13% dry/wet regime coverage) *Five to Ten Year Ideal Implementation Schedule with substantial completion of the plan by the fifth year and an established management plan in place for ten years.*	General Earthworks	Mobilize/demobilize - equipment floating, materials staging and project preparation necessary for each stage of work throughout length of implementation.	L.S.	$30,000.00	13%	39%	$12,679.63
			Light Equipment Clearing and Grading	m2	$6.50	20%		$13,000.00
		Revegetation	Coir Cloth ECB (700 gm/m2)	m2	$8.00	13%	53%	$10,400.00
			Hydroseed native regeneration seed	m2	$0.43	87%		$3,741.00
			Native seed mix (shoreline)	m2	$4.50	13%		$5,850.00
			Whip sized trees	m2	$12.75	10%		$1,657.50
			Shrubs	m2	$17.50	10%		$2,275.00
			Aquatic plugs	m2	$126.00	5%		$8,190.00
			Site sourced woody debris	L.S.	$500.00	5%		$2,500.00
		Management	Invasive species removal	m2	$0.50	10%	7%	$500.00
			Native seed mix (shoreline)	m2	$4.50	5%		$2,250.00
			Native seed mix (dry upland)	m2	$3.50	5%		$1,750.00
			midden/refuse/fence removal	m2	$0.28	10%		$280.00
					*Totals		100%	$65,073.13

***Note: consultant fees, approvals and permit fees, taxes are not included in totals. A) General earthworks phase refers to specialized equipment and labour forces and may not be suitable project element for staff/volunteers. B) Revegetation phase refers to handtools, small mechanized equipment and unskilled labour that may be suitable for staff/volunteers. C) Management phase refers to time period after substantial completion and project elements are siutable for staff/volunteers. The Percentage of Project Cost is based on full implementation of the restoration type over the project's entire area. The cost during any one phase of implementation or specific location of the planned restoration type may vary considerably due to site specific requirements. These requirements will become clear during the detailed design stage of the Implementation Plan.**

conservation area may undergo enhanced wetland restoration. In some cases, additional wetlands may be constructed in appropriate areas. Restoration has assumed an area of approximately two hectares of created wetlands restoration may occur in the conservation area. Wetland enhancement and created wetlands have been given a priority level of two for restoration treatment.

Some removal of undesirable wetland species that have overwhelmed many wetland areas may be required prior to any restoration. The restoration plan will consist of a limited amount of excavation and re-grading to remove as much as is practical of the existing undesirable or invasive species. Some dredging and sediment removals may be necessary and should be contemplated in conjunction with hydrologic conditions. Any dredging would need to be consistent with the intent of the *Provincial Policy Statement*.

The wetland enhancement plantings have been estimated primarily to cover two metres around the pond perimeter and above the line of normal water level in random patches temporarily protected from geese by deterrent fencing. This wet regime is a small percentage of the total planting area. The implementation details will also encourage a wide diversity of plant materials including, shoreline and flood fringe plants. The area beyond the maximum water level is considered wet meadow and disturbed areas will be seeded with native wet meadow mixture. Standards for shading the water surface and wildlife habitat will be met with both live material and placement of site-sourced natural materials such as root wads, fallen logs and woody debris.

A summary of the budget required to undertake both wetland restoration types is provided in Table 3-2. The created wetland costs are estimated at $80,500 per hectare based on a comprehensive ecological restoration program that will require some additional monitoring and maintenance to discourage geese predation and the influx of invasive and undesirable plants. The cost of this additional maintenance is covered in the successive phasing of the schedule. The percent of the total per hectare cost for general earthworks, revegetation and management is outlined in Table 3-8.

The wetland enhancement plantings are estimated at $35,000 per hectare based on a selective ecological restoration program that pinpoints areas of degradation from sediment loading and a general lack of plant diversity. These installations will also require some additional maintenance to discourage geese predation and control invasive plants. The percent of the total per hectare cost for general earthworks, revegetation and management are outlined in Table 3-9.

3.1.8 Forest Nucleation Cell Planting

There are several agriculture fields within the north and east areas of Glenorchy Conservation Area. These areas are relatively small, isolated and found on the edge of the forest zones (see Figure 3-1). These areas make up 17.3 hectares in total and would help improve the existing natural features if returned to forest. The environment has been fragmented and a forest nucleation cell planting plan, adapted from Havinga and Daigle (1996) is proposed to restore its connectivity.

It is intended that reforestation of this area would serve to increase the overall size of tableland forests, improve their shape (reduce the forest edge to interior ratio) and act as a buffer to wetland enhancement areas in the immediate area. The majority of this area would likely naturally regenerate towards a forest community over time if left undisturbed. Restoration efforts would speed up this process and help increase functionality, species and age diversity within the entire forest community. Therefore, this restoration type has been given a priority level of 3.

The restoration plan will consist of a limited amount of excavation and re-grading, where necessary, to improve soil composition and prepare 100 m²-cell planting zones for a diverse native species mix of trees and shrubs. Detailed design at the implementation stage will determine the specific native species mix, calculate planting densities and establish design criteria.

Important design considerations will include the use of no fewer than 4-6 native early pioneer species placed in random, natural layouts of hierarchal sizes. Natural plant associations that reflect the succession forest design will be established.

The Forest Nucleation Cell Planting is estimated at $34,500 per hectare based on a maximum of 25% coverage of the entire open field community being restored. The remaining areas within the oldfield and pasture will be left undisturbed or seeded with a native grass/wildflower mixture. The percent of the total per hectare cost for general earthworks, re-vegetation and management is outlined in Table 3-10.

3.1.9 Succession Forest Planting

Succession forest planting is being proposed for areas of Glenorchy Conservation Area where regeneration is already established to varying degrees. It is intended that succession forest planting efforts would increase vegetation diversity and direct regeneration towards an appropriate community type, which complements mature vegetation in adjacent areas. Current information suggests these areas could benefit from restoration activities to increase diversity and encourage faster restoration, increasing connectivity between patches sooner. This restoration type has been given a priority level of 3 as regeneration is occurring naturally. Restoration efforts would serve to increase the speed of regeneration and add important biological and structural diversity.

Successional forest planting encompasses a total of 27.0 hectares along portions of Fourteen Mile Creek and small, localized portions of the Sixteen Mile Creek Valley (see Figure 3-1). Some of the area identified, particularly those lands within the Sixteen Mile Creek valley, may be allowed to regenerate without further active restoration depending on its degree of natural succession. This restoration type may consist of a limited amount of re-grading, as determined appropriate during detailed design, to remove some invasive species, rehabilitate unauthorized trails, improve soil composition and provide planting zones for whip-sized trees. Detailed design at the implementation stage will determine the specific native species mix, calculate planting densities and establish design criteria. Important

Table 3-8: Constructed Wetland Restoration Costs

Priority	Restoration Type	Phase	Project Element	Unit	Cost	Percentage of Project Coverage	Percentage of Project Cost	Total Cost per Hectare
Two	**Constructed Wetland, 2.0ha** (100% coverage) *Five to Ten Year Implementation Plan with substantial completion in the fifth year and an established management plan in place for ten years.*	General Earthworks	Mobilize/demobilize - equipment floating, materials staging and project preparation necessary for each stage of work throughout length of implementation.	L.S.	$5,000.00	N/A	44%	$2,500.00
			Light Equipment Clearing and Grading	m2	$6.50	20%		$32,500.00
		Revegetation	Native seed mix (shoreline)	m2	$4.50	5%	51%	$2,250.00
			aeromat straw mulch ECB	m2	$1.95			$975.00
			VPL Shrubs	m2	$8.75	20%		$17,500.00
			Marginal forbes	m2	$5.00	25%		$12,500.00
			Aquatic plugs	m2	$126.00	25%		$3,150.00
			Site sourced woody debris	L.S.	$500.00	N/A		$5,000.00
		Management	Invasive species removal	m2	$0.50	20%	5%	$1,000.00
			Plant reinforcement (no warranty)	m2	$1.50			$3,000.00
				*Totals			100%	$80,375.00

***Note: consultant fees, approvals and permit fees, taxes are not included in totals. A) General earthworks phase refers to specialized equipment and labour forces and may not be suitable project element for staff/volunteers. B) Revegetation phase refers to handtools, small mechanized equipment and unskilled labour that may be suitable for staff/volunteers. C) Management phase refers to time period after substantial completion and project elements are suitable for staff/volunteers. The Percentage of Project Cost is based on full implementation of the restoration type over the project's entire area. The cost during any one phase of implementation or specific location of the planned restoration type may vary considerably due to site specific requirements. These requirements will become clear during the detailed design stage of the Implementation Plan.**

Table 3-9: Enhanced Wetland Restoration Costs

Priority	Restoration Type	Phase	Project Element	Unit	Cost	Percentage of Project Coverage	Percentage of Project Cost	Total Cost per Hectare
Two	**Enhanced Wetland, 1.0ha** (100% coverage) *Five to Ten Year Implementation Plan with substantial completion in the fifth year and an established management plan in place for ten years.*	General Earthworks	Mobilize/demobilize - equipment floating, materials staging and project preparation necessary for each stage of work throughout length of implementation.	L.S.	$2,500.00	N/A	16%	$2,500.00
			Light Equipment Clearing and Grading	m2	$6.50	5%		$3,250.00
		Revegetation	Native seed mix (shoreline)	m2	$4.50	5%	72%	$2,250.00
			aeromat straw mulch ECB	m2	$1.95			$975.00
			VPL Shrubs	m2	$8.75	5%		$4,375.00
			Marginal forbes	m2	$5.00			$2,500.00
			Aquatic plugs	m2	$126.00	1%		$12,600.00
			Site sourced woody debris	L.S.	$500.00	N/A		$2,500.00
		Management	Invasive species removal	m2	$0.50	20%	11%	$1,000.00
			Plant reinforcement (no warranty)	m2	$1.50			$3,000.00
				*Totals			100%	$34,950.00

***Note: consultant fees, approvals and permit fees, taxes are not included in totals. A) General earthworks phase refers to specialized equipment and labour forces and may not be suitable project element for staff/volunteers. B) Revegetation phase refers to handtools, small mechanized equipment and unskilled labour that may be suitable for staff/volunteers. C) Management phase refers to time period after substantial completion and project elements are siutable for staff/volunteers. The Percentage of Project Cost is based on full implementation of the restoration type over the project's entire area. The cost during any one phase of implementation or specific location of the planned restoration type may vary considerably due to site specific requirements. These requirements will become clear during the detailed design stage of the Implementation Plan.**

Table 3-10: Forest Nucleation Cell Planting Restoration Costs

Priority	Restoration Type	Phase	Project Element	Unit	Cost	Percentage of Project Coverage	Percentage of Project Cost	Total Cost per Hectare
Three	**Forest Nucleation Planting Cells, 17.3ha** (25% coverage) *Ten to Twenty Year Implementation Plan with substantial completion in the tenth year and an established management plan in place for twenty years.*	General Earthworks	Mobilize/demobilize - equipment floating, materials staging and project preparation necessary for each stage of work throughout length of implementation.	L.S.	$10,000.00		10%	$578.03
			Heavy Equipment Clearing and Grading	m2	$1.50	20%		$3,000.00
		Revegetation	Hydroseed native regeneration seed	m2	$0.43	20%	71%	$860.00
			Whip sized trees	m2	$4.25			$8,500.00
			Shrubs	m2	$3.25			$6,500.00
			Seedlings	m2	$2.25			$4,500.00
			Aquatic plugs	m2	$0.75			$1,500.00
			Site sourced woody debris	L.S.	$500.00			$2,500.00
		Management	Invasive species removal	m2	$0.50	25%	19%	$1,250.00
			Plant reinforcement (no warranty)	m2	$1.50			$3,750.00
			midden/refuse/fence removal	m2	$0.28	50%		$1,400.00
					*Totals		100%	$34,338.03

***Note: consultant fees, approvals and permit fees, taxes are not included in totals. A) General earthworks phase refers to specialized equipment and labour forces and may not be suitable project element for staff/volunteers. B) Revegetation phase refers to handtools, small mechanized equipment and unskilled labour that may be suitable for staff/volunteers. C) Management phase refers to time period after substantial completion and project elements are suitable for staff/volunteers. The Percentage of Project Cost is based on full implementation of the restoration type over the project's entire area. The cost during any one phase of implementation or specific location of the planned restoration type may vary considerably due to site specific requirements. These requirements will become clear during the detailed design stage of the Implementation Plan.**

Table 3-11: Succession Forest Planting Restoration Costs

Priority	Restoration Type	Phase	Project Element	Unit	Cost	Percentage of Project Coverage	Percentage of Project Cost	Total Cost per Hectare
Three	**Succession Forest Planting, 27.0ha** (50% coverage) *Ten to Twenty Year Implementation Plan with substantial completion in the tenth year and an established management plan in place for twenty years.*	General Earthworks	Mobilize/demobilize - equipment floating, materials staging and project preparation necessary for each stage of work throughout length of implementation.	L.S.	$15,000.00	20%	9.8%	$555.56
			Heavy Equipment Clearing and Grading	m2	$1.50			$3,000.00
		Revegetation	Hydroseed native regeneration seed	m2	$0.75	10%	89.7%	$375.00
			Whip sized trees	m2	$12.75	30%		$19,125.00
			Shrubs	m2	$8.75			$13,125.00
		Management	Plant replacement (no warranty)	m2	$1.50	25%	0.5%	$187.50
					*Totals		100%	$36,368.06

***Note: consultant fees, approvals and permit fees, taxes are not included in totals. A) General earthworks phase refers to specialized equipment and labour forces and may not be suitable project element for staff/volunteers. B) Revegetation phase refers to handtools, small mechanized equipment and unskilled labour that may be suitable for staff/volunteers. C) Management phase refers to time period after substantial completion and project elements are suitable for staff/volunteers. The Percentage of Project Cost is based on full implementation of the restoration type over the project's entire area. The cost during any one phase of implementation or specific location of the planned restoration type may vary considerably due to site specific requirements. These requirements will become clear during the detailed design stage of the Implementation Plan.**

design considerations will include the use of no fewer than 4-6 native species placed in random, natural layouts. Natural plant associations that reflect the successional forest design intent will be established. Shrub buffers will be used primarily to mitigate the harmful seasonal effects to new plantings from sunscald, snow deposition and harsh winds.

A summary of the budget required to undertake this restoration treatment type is provided in Table 3-2. The succession forest planting is estimated at $36,000 per hectare based on a 50% coverage configuration, which targets areas with less canopy cover and will increase connectivity to existing patches. Remaining areas will be left undisturbed or, if appropriate, seeded with a native grass/wildflower mixture. The percent of the total per hectare cost for general earthworks, re-vegetation and management is outlined in Table 3-11.

3.2 ESA Boundary Evaluation

Environmentally Sensitive Areas (ESAs) are land and water areas within the regional Greenlands System containing natural features or ecological functions of such significance as to warrant their protection in the best long-term interests of the people and environment of Halton. While the Region maintains mapping showing the general boundaries of the ESAs, the precise boundaries of ESAs can be refined through an Environmental Impact Assessment (EIA) or similar process.

The master plan recognizes the important function of the Sixteen Mile Creek ESA and defined it as a High Priority Protection Area in the Stage One Report. It was clear from previous work completed as part of the North Oakville Creeks Subwatershed Study, North Oakville East and West Secondary Plans, public input, ecological inventory by Conservation Halton and MNR, and an assessment of natural features contained within the boundaries of the ESA that protection of this feature was paramount.

The boundary of the ESA contained in the conservation area generally follows the edge of mature forest vegetation or wetland community adjacent to Sixteen Mile Creek. This boundary includes all features that could reasonably meet the ESA criteria. The lands to the west of the ESA boundary are agricultural and do not meet the primary criteria for an ESA, as defined in Section 121 of the *Regional Official Plan (2005)*. The proposed master plan alternatives do not recommend any development within the boundaries of the ESA, except a limited, low-impact trail system. Therefore, the ESA boundary as it currently exists is appropriate and no refinement to the boundary is being proposed.

The Region of Halton has recently adopted a new Regional Official Plan (ROPA 38) that has recognized the importance of protecting a connected natural heritage system throughout Halton Region. This moves beyond Environmentally Senstive Areas to protecting a more functional system which includes large core areas connected by ecological linkages which can protect significant features and functions, preserve and improve biodiversity, and allow for wildlife movement. The North Oakville natural heritage system, including all of Glenorchy Conservation Area, has been included in the Halton Natural Heritage System designation.

3.3 Priority Protection Ranking

The Glenorchy Conservation Area Master Plan utilizes a priority protection area system to identify appropriate designations, which will direct use and management. The priority protection areas were determined through a comprehensive background review, inventory and analysis of the natural heritage system and each component's potential sensitivity to passive recreation and related infrastructure. The assessment of Priority Protection Areas (PPA) took into consideration the appropriate legislation and policies promoting the protection of important natural features as well as the requirements of fully functioning natural systems. See Table 3-12 for a summary of the criteria being evaluated and the rationale for the priority protection provided for each criterion. Figure 3-2 shows the results of this inventory and analysis. In many cases, multiple criteria overlap and it is the most restrictive of these that appear on the figure. Table 3-13 below provides a summary of each priority protection area and the percentage of the conservation area that it covers.

Each priority protection area has specific management policies associated with it. These policies are presented in Section 4.2.2.

Table 3-13: Summary of Priority Protection Areas by Size

Priority Protection Area	*Acres*	*Hectares*	*% in Glenorchy Conservation Area*
Very High	132	53	13 %
High	512	207	51 %
Moderate	353	143	35 %
Low	12	5	1 %

3.3.1 Very High Priority Protection

The purpose of this area is to provide for the long term protection of all Glenorchy Conservation Area natural features deemed to be particularly sensitive to passive recreation or related infrastructure. Trail routing will avoid Very High PPAs except where existing trails must be maintained for the Union Gas pipeline easement and emergency access

Very High Priority Protection areas include:

- Provincially Significant Wetlands;
- High constraint stream corridors;
- Rare vegetation communities;
- Species at risk;
- Halton/Ecodistrict rare species;
- Vernal pools;

- Seeps;
- Open shale bluff; and
- EMAN plot and Forest Bird Monitoring Stations.

3.3.2 High Priority Protection

The purpose of this area is to protect natural areas with high quality attributes, which contribute essential habitat or add essential components to the natural heritage system while allowing for public access for a variety of low impact recreational purposes including, hiking, scenic lookouts, nature viewing or other passive recreational activity deemed appropriate.

High Priority Protection Areas include:

- Environmentally Sensitive Areas;
- Areas of Natural and Scientific Interest (Life Science);
- Natural portions of Cores Area (North Oakville Creeks Subwatershed Study);
- Forest cover;
- Medium constraint stream corridors;
- Species at risk;
- Halton/Ecodistrict rare species;
- Non-Provincially Significant Wetlands; and
- Veteran mast trees.

3.3.3 Moderate Priority Protection - Restoration

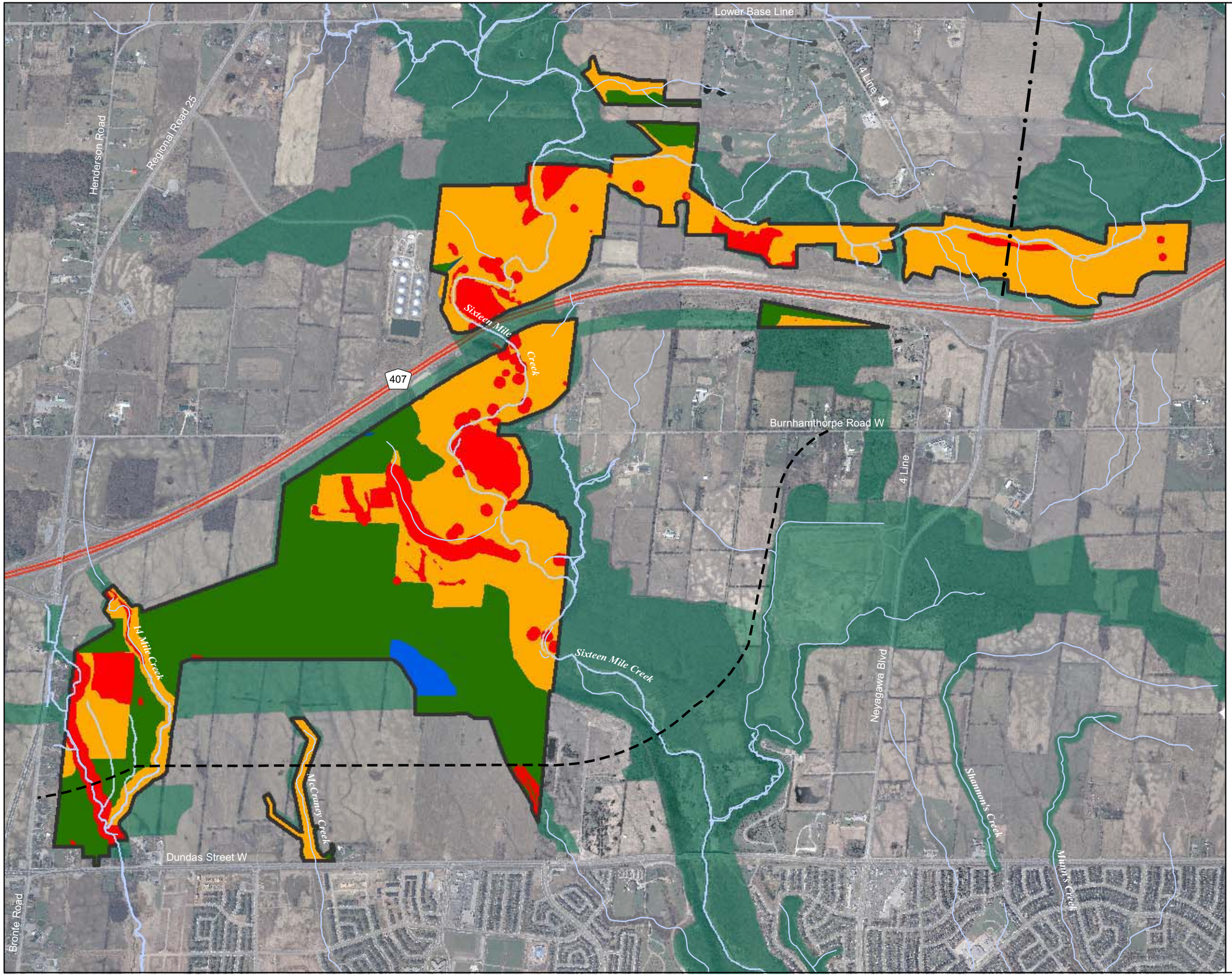
The purpose of this area is to provide areas of active restoration management in order to restore and/or buffer Very High and High priority protection areas and significantly expand Glenorchy Conservation Area's natural heritage system. Permitted uses will include natural resource management practices as well as restoration of a variety of habitat types (e.g. forest, wetland, grassland, riparian, etc.). Secondary uses of low intensity recreational activities are also permitted.

Moderate Priority Protection Areas - Restoration include:

- Area of Natural and Scientific Interest (Earth Science);
- Linkage areas;
- Hedgerows;
- Lookouts; and
- Restoration areas.

Category	Primary Evaluation Criteria	Secondary Evaluation Criteria	`	Priority Protection
Priority Conservation Lands	Environmental Sensitive Areas		Regional designation based on an area meeting several primary and secondary criteria which generally include relatively high native species richness, connections to natural system, diverse/rare plant and animal communities, relatively undisturbed, Species at Risk, earth science features, contribution to groundwater recharge/discharge/quality, surface water quality, scientific research and/or education.	High
	Areas of Natural and Scientific Interest	Earth Science ANSI	MNR designation for areas of land and water containing natural landscapes or features which have been identified as having values related to natural heritage protection, scientific study, or education. Development and site alteration shall not be permitted in significant areas of natural and scientific interest unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions (PPS 2005).	Moderate
		Life Science ANSI		High
	Provincially Significant Wetlands		Historically, wetland coverage within the Great Lakes Basin exceeded 10% (Detenbeck et al. 1999). The number of wetlands remaining in the Southern Ontario Landscape has been reduced to allow for urban settlements, shoreline development and agriculture. Wetlands have been shown to reduce the amount of water flowing out of a watershed, reduce flooding, create higher base flows, and reduced occurrence of high flows (Hey and Wickencamp 1996). Development and site alteration shall not be permitted in significant wetlands (PPS 2005).	Very High
	North Oakville Creeks Subwatershed Study Natural Heritage System	Core Area	Work completed as part of the *North Oakville Creeks Subwatershed Study* identified two Core Areas and a number of Linkage Areas as a key component of the natural heritage system, which overlap the Glenorchy Conservation Area. Core Areas include key natural features or groupings of key natural features, together with required buffers and adjacent lands intended to protect the function of those features and ensure the long term sustainability of the natural heritage component of the system within the urban context. Linkage Areas help maintain and enhance Core Area environmental sustainability. Areas currently vegetated are provided a High priority protection. Lands adjacent to these vegetated areas, which are typically tilled crop, may require restoration and have been provided a Moderate priority protection.	High / Moderate
		Linkage Area		Moderate
Areas of Functional Ecological Importance	Forest Cover	Fringe Forest (<100m) Forest Interior (≥ 100m) Deep Forest Interior (≥ 200m)	Factors such as overall forest cover, patch size and shape (i.e. interior forest) all have a positive affect on the viability of habitat for flora and fauna. Overall forest cover appears to be the single most important factor in protecting bird species diversity but at the very large scale (160,000 ha), forest interior the amount of 200m forest in a patch was correlated with species richness.	High
	Hedgerows		Hedgerows can provide corridor function for a variety of wildlife species and can help maintain overall biodiversity in the landscape. Species within hedgerows tend to be less sensitive to disturbance as more sensitive species have likely been extirpated due to previous disturbances (e.g. agriculture).	Moderate
	New Habitat (Habitat Restoration)		Similar to forest ecosystems, non-forest habitat cover (e.g. grassland), patch size and shape all have a positive affect on the viability of flora and fauna. Patch size and interior space has been maximized, where possible.	Moderate
	Stream (North Oakville Creeks Subwatershed Study Constraint and Setback Criteria)	High Constraint	High and Medium Constraint streams must be protected in their existing locations for hydrological and ecological reasons. Medium Constraint streams may be re-aligned or deepened provided that the watercourse feature, as well as the function of the watercourse, is maintained. Low Constraint streams do not need to be maintained, but the function of the watercourse must (The Corporation of the Town of Oakville 2007). Setbacks, based on the criteria identified in the North Oakville Creeks Subwatershed Study, are defined as meander belt width (Figure 5.8.2) + factor of safety (10% of meander belt) + 7.5m. This results in a maximum setback of 85m for Fourteen Mile Creek, 101m for McCraney Creek and 51.5m and 84.5m for tableland tributaries to Sixteen Mile Creek.	Very High
		Medium Constraint		High
		Low Constraint		Low
Areas of Functional	Rare Vegetation Community		Rare vegetation communities may arise as a result of rare growing conditions including, soil attributes (nutrients), water availability, and sun exposure. Or, more commonly in urbanized environments, rare vegetation communities arise as a result of being one of the few remaining examples of a once more common community.	Very High

Category	Primary Evaluation Criteria	Secondary Evaluation Criteria	`	Priority Protection
Priority Conservation Lands	Environmental Sensitive Areas		Regional designation based on an area meeting several primary and secondary criteria which generally include relatively high native species richness, connections to natural system, diverse/rare plant and animal communities, relatively undisturbed, Species at Risk, earth science features, contribution to groundwater recharge/discharge/quality, surface water quality, scientific research and/or education.	High
	Areas of Natural and Scientific Interest	Earth Science ANSI	MNR designation for areas of land and water containing natural landscapes or features which have been identified as having values related to natural heritage protection, scientific study, or education. Development and site alteration shall not be permitted in significant areas of natural and scientific interest unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions (PPS 2005).	Moderate
		Life Science ANSI		High
	Provincially Significant Wetlands		Historically, wetland coverage within the Great Lakes Basin exceeded 10% (Detenbeck et al. 1999). The number of wetlands remaining in the Southern Ontario Landscape has been reduced to allow for urban settlements, shoreline development and agriculture. Wetlands have been shown to reduce the amount of water flowing out of a watershed, reduce flooding, create higher base flows, and reduced occurrence of high flows (Hey and Wickencamp 1996). Development and site alteration shall not be permitted in significant wetlands (PPS 2005).	Very High
	North Oakville Creeks Subwatershed Study Natural Heritage System	Core Area	Work completed as part of the *North Oakville Creeks Subwatershed Study* identified two Core Areas and a number of Linkage Areas as a key component of the natural heritage system, which overlap the Glenorchy Conservation Area. Core Areas include key natural features or groupings of key natural features, together with required buffers and adjacent lands intended to protect the function of those features and ensure the long term sustainability of the natural heritage component of the system within the urban context. Linkage Areas help maintain and enhance Core Area environmental sustainability. Areas currently vegetated are provided a High priority protection. Lands adjacent to these vegetated areas, which are typically tilled crop, may require restoration and have been provided a Moderate priority protection.	High / Moderate
		Linkage Area		Moderate
Areas of Functional Ecological Importance	Forest Cover	Fringe Forest (<100m) Forest Interior (≥ 100m) Deep Forest Interior (≥ 200m)	Factors such as overall forest cover, patch size and shape (i.e. interior forest) all have a positive affect on the viability of habitat for flora and fauna. Overall forest cover appears to be the single most important factor in protecting bird species diversity but at the very large scale (160,000 ha), forest interior the amount of 200m forest in a patch was correlated with species richness.	High
	Hedgerows		Hedgerows can provide corridor function for a variety of wildlife species and can help maintain overall biodiversity in the landscape. Species within hedgerows tend to be less sensitive to disturbance as more sensitive species have likely been extirpated due to previous disturbances (e.g. agriculture).	Moderate
	New Habitat (Habitat Restoration)		Similar to forest ecosystems, non-forest habitat cover (e.g. grassland), patch size and shape all have a positive affect on the viability of flora and fauna. Patch size and interior space has been maximized, where possible.	Moderate
	Stream (North Oakville Creeks Subwatershed Study Constraint and Setback Criteria)	High Constraint	High and Medium Constraint streams must be protected in their existing locations for hydrological and ecological reasons. Medium Constraint streams may be re-aligned or deepened provided that the watercourse feature, as well as the function of the watercourse, is maintained. Low Constraint streams do not need to be maintained, but the function of the watercourse must (The Corporation of the Town of Oakville 2007). Setbacks, based on the criteria identified in the North Oakville Creeks Subwatershed Study, are defined as meander belt width (Figure 5.8.2) + factor of safety (10% of meander belt) + 7.5m. This results in a maximum setback of 85m for Fourteen Mile Creek, 101m for McCraney Creek and 51.5m and 84.5m for tableland tributaries to Sixteen Mile Creek.	Very High
		Medium Constraint		High
		Low Constraint		Low
Areas of Functional	Rare Vegetation Community		Rare vegetation communities may arise as a result of rare growing conditions including, soil attributes (nutrients), water availability, and sun exposure. Or, more commonly in urbanized environments, rare vegetation communities arise as a result of being one of the few remaining examples of a once more common community.	Very High



CONSERVATION HALTON

Glenorchy Conservation Area Priority Protection

FIGURE 3-2

Legend

- Burnhamthorpe Road Extension
- James Snow Parkway Extension
- Secondary Roads
- Highway
- Stream
- Glenorchy Conservation Area*
- Waterbody
- Natural Heritage and Open Space
- Very High
- High
- Moderate
- Low

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3.3.4 Low Priority Protection

The purpose of this designation is to provide an area of access and staging for entering the Glenorchy Conservation Area and its low intensity recreational activities. It is anticipated that active parking and facilities such as washrooms will be constructed on lands owned by the Town of Oakville. The Town of Oakville will be undertaking a master planning process for its community park within the next ten years. It is during this master planning process that potential shared facilities will be determined.

The low priority protection area has been located in an area that does not contain significant environmental, cultural features or impact potential ecological linkages.

Low Priority Protection Areas include:

- Agricultural fields

3.4 Environmental Sustainability Evaluation

Glenorchy Conservation Area contains numerous designated natural features, rare vegetation communities, Halton rare, threatened, endangered and special concern species and diverse wildlife habitat, each of which contribute significantly to the natural heritage system of North Oakville as well as the Region of Halton. Environmental features of Glenorchy Conservation Area are detailed in Section 3.2 of the Stage One Report.

The evaluation of potential impacts integrates relevant policies of the *Species at Risk Act*, *Endangered Species Act*, *Provincial Policy Statement*, Region of Halton (e.g. ESAs) and Town of Oakville (*North Oakville Creeks Subwatershed Study*; *North Oakville West and East Secondary Plans*) including:

- Protect natural features and areas for the long term;
- Maintain natural features and natural heritage systems (e.g. diversity and connectivity) and their long-term ecological function;
- Restore the natural heritage systems;
- Do not propose any development or site alteration in significant habitats (e.g. PSW, etc.);
- Maximize the overall benefit to the natural features or their ecological functions (e.g. woodlands, significant wildlife habitat; ANSIs, ESAs and greenlands);
- Ensure that proposed development and site alteration on adjacent lands does not impact significant natural heritage features;
- No development or site alteration is to occur in fish habitat;
- No development or site alteration is to occur in the habitat of endangered or threatened species.

3.4.1 Avoidance of Impacts and Encroachment to Very High and High Priority Protection Areas

The areas adjacent to Glenorchy Conservation Area will become significantly more urbanized over the next decade. It is anticipated that this urbanization will place additional pressure on the natural features of the conservation area as individuals seek natural recreational opportunities in their 'backyard'. Current experiences of Conservation Halton security staff have shown that the presence of people is the best deterrent to unauthorized access and uses, which can be very damaging to priority protection areas. The management of the area by Conservation Halton will allow for a greater staff presence, which significantly deters unauthorized access; however, no amount of presence is likely to prevent unauthorized access in its entirety.

The planned locations of webcams may vary based on the priority protection designation and protection needs. Webcams and associated equipment should be installed on an independent support pole, outside of the most sensitive features. Provided installations are done with care and knowledge of sensitive features within the Very High and High priority protection designations, the installation of the webcams are anticipated to have little or no encroachment on the priority protection areas.

New fencing is required for the conservation area adjacent to very high and high protection areas along the southeast boundary adjacent to the Burnhamthorpe Road extension as well as along the west boundary, north of Highway 407 (Management 4-1: Park Zones and Existing and Proposed Fences). However, the erection of this fencing (potentially to be built by adjacent landowners) may disturb up to a 3m wide swath affecting a variety of priority protection areas. Fencing will not be located within the valley lands and areas of steep slopes. The majority of impacts associated with the construction of a perimeter fence are short-term localized effects that will have little or no negative impact on the priority protection areas. Fencing will consist of page wire or high tensile fencing which generally allows for wildlife passage.

The routing of maintenance roads has not been determined as part of the master plan with the exception of an access point off Highway 407 west of Sixteen Mile Creek. It is envisioned that maintenance roads would only be required for security purposes and property management, and would generally correspond to the proposed trail system. These roads are to be designed to avoid the most sensitive features, including those in the very high and high priority protection areas, and are intended to use the least amount of land possible.

Observation platforms are located outside the conservation area boundaries and as a result, little to no negative impact is anticipated to the priority protection area features or functions.

The master plan trail system does cross sections of very high and high priority protection areas, 455 metres and 1811 metres respectively (see Figure 3-3: Proposed Trails in Relation to Priority Protection Areas for an illustration). It is

anticipated that this trail system would have limited negative impact on the priority protection areas, if properly managed and maintained.

Priority Protection Type	*Length (m)*
• Very High	455
• High	1811
• Moderate	5745
• Low	337

A Union Gas pipeline (Figure 1-3) easement right of way is located within the Glenorchy Conservation Area west of the Sixteen Mile Creek. This pipeline bisects Highway 407 just east of the Regional Biosolids facility and continues south through the existing tableland forest. The pipeline turns southeastward and continues through the second tableland forest then continues south through the agricultural fields. This pipeline corridor is approximately 10 metres in width and will require ongoing vegetation clearing along its length for safety reasons. Through the forested areas it is currently a 2.5 metre wide trail which will continue to be maintained regardless of Conservation Halton's Master Plan or the North Oakville Natural Heritage System. A detailed ecological survey was completed along the extent of the pipeline and trail within the very high and high priority protection area. Results from this three-season survey indicated that no provincially or regionally rare species were found within the area. Given the above, it is appropriate and desirable to locate a trail along this alignment. As part of the plan, management considerations will include rehabilitating trail rutting (a result of unauthorized all-terrain vehicle usage) and installing raised boardwalks to keep passive recreational users off small wetland pockets.

With trail design, means will be implemented to keep passive recreational users on the trail using railings, wooden barriers and other innovative techniques. Interpretive signage will detail the sensitivity of the surround habitats and encourage visitors to be effective stewards of these public lands.

3.4.2 Avoidance of Impacts on Natural Heritage Functions

The master plan recommends site-specific perimeter fencing to control unauthorized access. Interaction with sensitive natural heritage system features should be confirmed prior to fence construction and an appropriate protection plan prepared.

This master plan presents the optimal scenario for protecting the natural heritage functions of Glenorchy Conservation Area, while allowing for some limited visitor use, which will have minimal or no negative impact on the natural heritage functions.

The proposed trail system crosses natural heritage features and habitat types. Boardwalks or culverts proposed in stream corridors, wetlands, or low-lying areas will be constructed in a manner which maintains their hydrological function and natural integrity. The restoration plan being proposed will likely further enhance the water quality being conveyed to downstream aquatic habitat.

It is anticipated that some negative impact on the natural heritage functions could occur because of trail and visitor presence and maintenance requirements (see Figure 3-3 for extent of trails in relation to priority protection areas). Examples of potential impacts that could occur without proper management include increased invasive species in areas adjacent to trails, trampling of sensitive vegetation from off trail use and increased noise in interior forest areas during core breeding bird season.

3.4.3 Potential to Restore or Improve Natural Features and Natural Heritage System

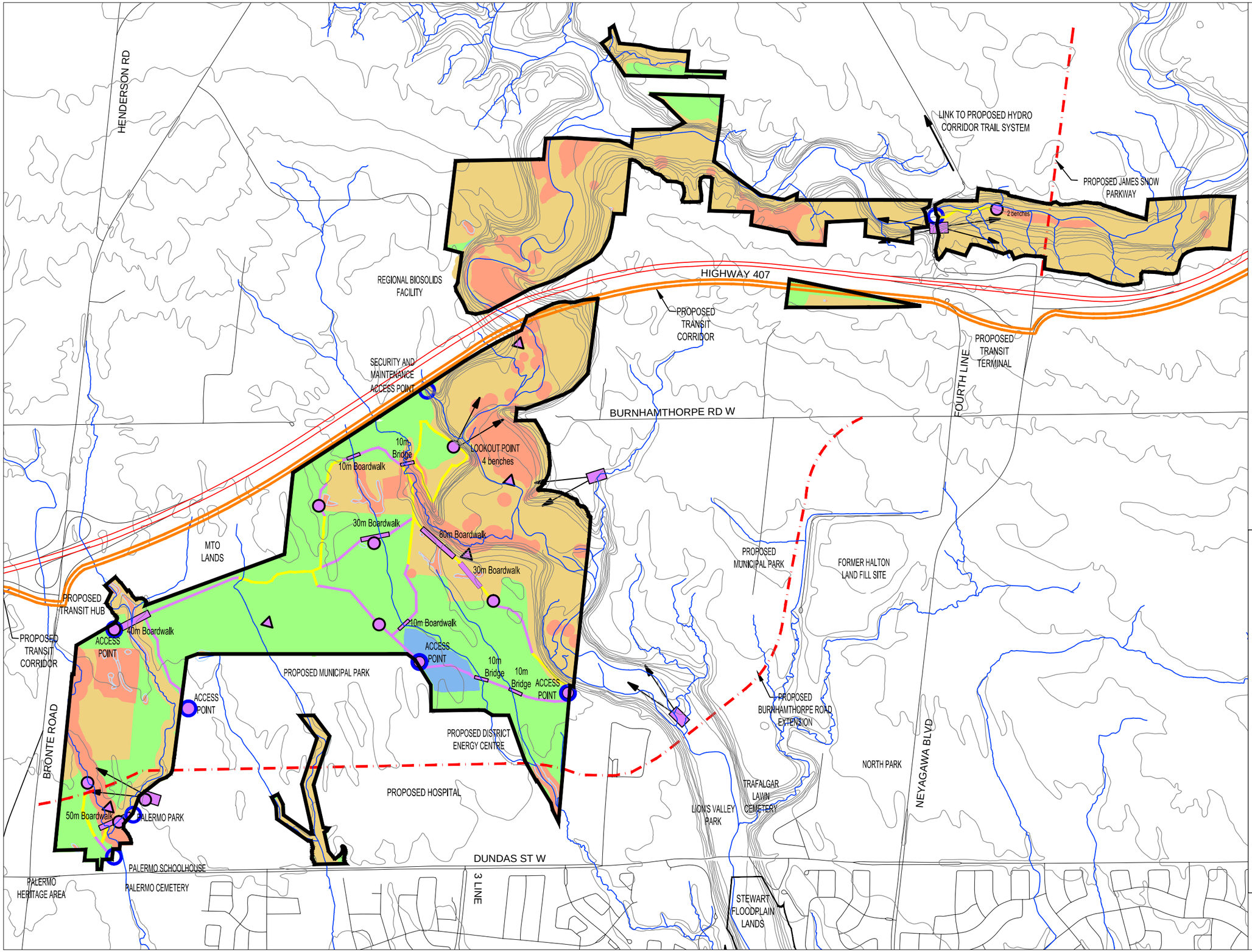
The natural heritage features and functions are restored and improved by this master plan. Restoration plans maximize the protection of the natural heritage system, its diversity and connectivity. The restoration plan establishes a large natural connection between two existing core natural features that have previously been separated by agricultural uses. Further, restoration strengthens the overall size and shape of natural vegetation communities.

3.4.4 Achieve Long-term Ecological Function

The proposed elements of the master plan will significantly increase the ecological function and native biodiversity of the area. The limited proposed infrastructure, including the trail system, will not significantly affect habitat restoration, diversity or ecological function. Over the long-term, disturbance effects on wildlife are not likely to be considered significant based on the elements of the master plan. The master plan offers public education and access to a significant portion of the natural heritage system in North Oakville, while preserving natural features and their functions for the long-term.

3.4.5 Conformity to Policy Context

The master plan conforms to all national, regional and local plans as well as to the intent of the *Species at Risk Act*, *Endangered Species Act*, *Provincial Policy Statement* and Region of Halton *Official Plan*. This master plan provides a significant enhancement to the North Oakville Natural Heritage System, which will help achieve a large portion of the Town of Oakville's *North Oakville Creeks Subwatershed Study* and *North Oakville East and West Secondary Plans'* vision for the North Oakville area.



CONSERVATION HALTON

Glenorchy Conservation Area

Proposed Trails in Relation to Priority Protection Areas FIGURE 3-3

Legend

- Conservation Area Boundary
- Waterways
- Roads
- Proposed Roads
- Contour Line (5m intervals)
- Very High Priority Protection Area
- High Priority Protection Area
- Medium Priority Protection Area
- Low Priority Protection Area
- Interpretive Signage
- Webcam Location
- Bridge or Boardwalk
- Observation Deck
- Proposed Trails
- Access Point

0 500 1000 metres

Scale: 1:23,000

SECTION FOUR: MANAGEMENT POLICIES

4.1 Park Classification

The Town of Oakville has classified these lands as a Natural Heritage System Area, the purpose of this designation is to "protect, preserve and where appropriate, enhance the natural environment;" and under such designation, passive recreational uses are permitted.

Allowable activities and facilities are outlined in the *North Oakville West Secondary Plan* (Section 8.4.7.3 c) iv) as follows:

> *Trails, interpretative displays or signage or other similar passive and recreation uses consistent with the purpose of the applicable designation provided that:*
>
> *- for lands in the Linkage Preserve Area designation on Figure NOW3, such uses shall generally be located in the Linkage Preserve Area, but adjacent to the boundary of the linkage;*
>
> *- trails shall be permitted within the setback from the edge of the Sixteen Mile Creek Valley, and may be permitted within the Valley subject to the review of their impact on any environmentally sensitive features;*
>
> *- trails in stream corridors other than the Sixteen Mile Creek shall be permitted adjacent to the valley in the buffer; and,*
>
> *- trails in the Natural Heritage System Area designation be designed and located to minimize any impact on the natural environment.*

Regarding any other development, the Official Plan states:

> *The only permitted uses in the Natural Heritage System Area designation shall be legally existing uses, buildings and structures, and fish and wildlife conservation management. Development or land disturbances will generally be prohibited.*

As noted in Section 2.2.3 - Educational and Recreational Facilities, the future need for a visitor interpretive facility is recognized. The most desired scenario is to have such a facility on lands adjacent to the conservation area. However, any future consideration of such a facility within the boundaries of the Glenorchy Conservation Area would require additional public consultation as part of an Official Plan Amendment process. Such an amendment would likely be subject to the same policies as the potential permitted uses listed in section 8.4.7.3 c), which are:

> *[such uses will be] subject to the satisfaction of the Town, in consultation with the Region of Halton and Conservation Halton, provided that prior to approving the location/construction of such uses a study shall be undertaken, except where an Environmental Assessment is required:*
>
> > *i) identifying potential negative impacts on the functions and features of the applicable designation during construction and post-construction phases; and*

ii) demonstrating that alternative methods and measures for minimizing impacts have been considered and appropriate methods and measures will be applied. (Section 8.4.7.3 b)

Should any additional use or development be requested in the future, the fieldwork and environmental evaluation undertaken in the preparation of this report can be seen to constitute the first half of the study required by clause 8.4.7.3 b), as cited above. The second proviso requires that "alternative methods and measures have been considered and will be applied". Additionally an interpretive centre within the Glenorchy Conservation Area would require reworking of the ORC Management Agreement as well as rezoning.

4.2 Park Management

Conservation Halton's portfolio of conservation areas offers a wide range of services and amenities. Each conservation area is managed and monitored by a team consisting of resource managers, in conjunction with forestry and ecology staff. The management of each conservation area is influenced by its core features and by the visitor experience and activities promoted within the conservation area. Conservation Halton has developed operational standards that are shared by several of its properties with similar features; however, there is the opportunity to design management strategies that address more site-specific impacts in Glenorchy Conservation Area.

Conservation area activities are subject to the Conservation Authorities Act (R.R.O. 1990, Regulation 116). Under Ontario Regulation 365/88 it is a prohibited activity for the public to kill, trap, pursue or disturb a wild bird, reptile or animal in a Conservation Halton conservation area. Also prohibited by this regulation are hunting, dogs off-leash and motorized vehicles (except when used for emergency or security, maintenance and restoration purposes).

Bookings for educational programs will be organized, delivered and invoiced by the conservation area manager. The staging or hosting of special, historic or tourism events shall typically be organized and operated by Conservation Halton staff as an integral component of natural and cultural education services. Additional special events will also be permitted by private groups or individuals at various locations subject to negotiation and issuance of a special use permit by Conservation Halton. Additional special events permits shall be negotiated on a case-by-case basis.

Trail use and any other recreational or educational activity permitted in the conservation area will be allowed to take place as long as:

- the capacity of proposed facilities is not exceeded;
- no environmental degradation of the natural resource base; and
- the Visitor Impact Management system (VIM) is implemented to monitor and provide management with a means to curtail recreational overuse and provide corrective measure.

Event activity areas will generally be restricted to the Historic and Restoration Management Zones of the conservation area with the exception of specialized activities that may require utilization of the trails system. Permitted events will only include those that are deemed compatible with the general nature and capacity of the conservation area to hold such without negatively impacting park resources or users. Permits or bookings shall be negotiated and approved by senior Conservation Halton staff.

Specific management programs included in this master plan, and detailed below, are a system of park management zones with appropriate policies, a Visitor Impact Management program, and recommendations for the preparation of several resource management plans.

4.2.1 Park Management Zones

The Glenorchy Conservation Area Master Plan has utilized the zoning system of the Niagara Escarpment Parks and Open Space System (NEPOSS). This system consists of the following six standard park zones: Nature Reserve Zone, Natural Zone, Access Zone, Historical Zone, Development Zone and Resources Management Zone. The Glenorchy Conservation Area Master Plan adds a Nature Reserve "Special" Zone and a Restoration Management Zone. The Nature Reserve Special Zone has been utilized to better recognize and protect high quality or fragile resource areas. Figure 4-1 illustrates the park management zones assigned to different portions of the conservation area. This section of the report sets out the management policies and permitted uses for each of these zones.

The boundaries of the zones have been determined through a comprehensive process of inventory and analysis based on the practices of integrated landscape planning and natural heritage strategies. By means of prioritizing and ranking all the features identified in the natural heritage system together with the core conservation areas of ESA's and ANSI's, the Priority Protection Areas Map (Figure 3-2) was developed. This map was then utilized as the basis for defining the boundaries of the park zoning system (Figure 4-1). Under the Niagara Escarpment Plan, zoning is stipulated as essential to the orderly planning, development and effective management of the park.

Park zones are intended to fulfill the following functions:

- They identify and provide recognition of the features and attributes of the park;
- They serve to delineate areas on the basis of their differing requirements for management; and
- They serve to ensure park users get the most out of individual parks through the use of various types of zones.

4.2.1.1 Nature Reserve "Special" Zone

The Nature Reserve "Special" Zone shall preserve and protect the unique valleylands contained within the conservation area. The emphasis will be on long-term protection and exclusion of virtually all human activity or encroachments.

Permitted uses will be restricted to environmentally appropriate scientific research, interpretation and limited forest management services such as hazard tree removal and invasive species management.

Controlled nature interpretation may be facilitated under special permit approval in the form of guided tours for school children or environmental groups.

All of the valleylands downstream of the Fourth Line bridge crossing have been determined to require the extra protection provided by the Nature Reserve "Special" Zone designation. There will be no cycling within this designation. Cyclists travelling on the former Fourth Line must remain on the pedestrian trail and bridge being built by the Town of Oakville.

4.2.1.2 Nature Reserve Zone

The Nature Reserve Zone shall preserve and protect lands that serve important ecological functions with emphasis on their long-term protection and management. The areas to be so designated are generally forested areas that buffer the Nature Reserve "Special" Zone.

Permitted activities will be restricted to only passive and low intensity recreation including hiking and limited cycling, environmentally appropriate scientific research and forest and wildlife management practices that contribute to the sustainability and or enhancement of the natural system. Development will generally be restricted to trails and signage.

A small section of valleylands east of the Fourth Line bridge is designated Nature Reserve where an existing trail will be maintained for public access adjacent to the stream. This trail will be approximately 300 metres long and will be closed seasonally when the stream is at risk of flooding. It will terminate in a small resting area consisting of two benches overlooking the water where hikers may pause on a longer journey. There will be a strict pack-in/pack-out policy in effect.

4.2.1.3 Historical Zone

The purpose of this zone is to provide long-term protection and management of significant archaeological or historical park resources.

This zone includes the small irregularly shaped area in the southwest quadrant, which is near the Palermo heritage hamlet just off Dundas Street and currently houses a barn and lands that are classified as a cultural meadow. This area offers opportunities for special themed interpretive facilities about rural settlement life and the importance of agriculture in this region.

New development shall generally be restricted to trails, fencing and interpretive facilities, but may include consideration for additional heritage structures subject to an Official Plan Amendment and ORC approval.

Archaeological works may be permitted under approval of the Ministry of Citizenship and Culture and consideration should be given to investigate the

CONSERVATION HALTON

Glenorchy Conservation Area

Park Zones and Existing and Proposed Fences FIGURE 4-1

HENDERSON RD
REGIONAL BIOSOLIDS FACILITY
HIGHWAY 407
LINK TO PROPOSED HYDRO CORRIDOR TRAIL SYSTEM
PROPOSED JAMES SNOW PARKWAY
2 benches
PROPOSED TRANSIT CORRIDOR
PROPOSED TRANSIT TERMINAL
FOURTH LINE
SECURITY AND MAINTENANCE ACCESS POINT
BURNHAMTHORPE RD W
10m Bridge
10m Boardwalk
LOOKOUT POINT 4 benches
30m Boardwalk
80m Boardwalk
30m Boardwalk
MTO LANDS
PROPOSED MUNICIPAL PARK
FORMER HALTON LAND FILL SITE
PROPOSED TRANSIT HUB
40m Boardwalk
ACCESS POINT
10m Boardwalk
ACCESS POINT
10m Bridge
10m Bridge
ACCESS POINT
PROPOSED TRANSIT CORRIDOR
ACCESS POINT
PROPOSED MUNICIPAL PARK
PROPOSED DISTRICT ENERGY CENTRE
PROPOSED BURNHAMTHORPE ROAD EXTENSION
BRONTE ROAD
NEYAGAWA BLVD
NORTH PARK
PROPOSED HOSPITAL
50m Boardwalk
PALERMO PARK
TRAFALGAR LAWN CEMETERY
LION'S VALLEY PARK
DUNDAS ST W
PALERMO SCHOOLHOUSE
PALERMO CEMETERY
PALERMO HERITAGE AREA
3 LINE
STEWART FLOODPLAIN LANDS

Legend

- Conservation Area Boundary
- Waterways
- Roads
- Union Gas Pipeline
- Proposed Roads
- Proposed Trails
- Proposed Trails on Existing Trails
- Oakville Proposed Trails
- Contour Line (5m intervals)
- Proposed Transit Corridor
- Existing Fencing
- Proposed Fencing
- Special Nature Reserve Zone
- Nature Reserve Zone
- Restoration Management Zone
- Historical Zone
- Interpretive Signage
- Webcam Location
- Bridge or Boardwalk
- Observation Deck
- Heritage or Character Building
- Cultural Heritage Area
- Access Point

0 500 1000 metres

Scale: 1:23,000

historic significance of the existing barn, and feasibility of use and maintenance costs.

4.2.1.4 Restoration Management Zone

The purpose of this zone is to provide intensive restoration of natural heritage features in order to restore, complement or buffer adjacent Nature Reserve or Nature Reserve "Special" Zones. Permitted uses will include extensive restoration works as well as the implementation of the resource management plans set out in Section 4.4 of this report. Refer to the Restoration Plan (Section 3-1) for details of the proposed works. Low intensity recreational uses will also be permitted. The portion of the restoration management zone containing the low priority protection area may be used as staging trailhead area and may be considered for a future interpretive centre/facility, subject to all necessary approvals, as discussed in Section 4.2.2 below.

4.2.2 Priority Protection Area Management Policies

4.2.2.1 Very High Protection Area

The Very High Priority Protection shall preserve and protect areas with emphasis on long-term protection and management. Generally, this designation should preclude activities except those deemed appropriate for environmental stewardship purposes. In some cases, localized restoration may be necessary to improve the quality and function of the larger feature (e.g. riparian areas). Limited visitor usage may be considered where it has been established that there will be no negative impacts from the proposed use. Public access adjacent to these areas should be managed carefully through the Visitor Impact Management (VIM) program and the provision of material educating the public on the reason for the areas/features sensitivity should be considered.

4.2.2.2 High Protection Area

Trail and forest management will be required to enhance the natural system components in the area immediately adjacent to areas of higher use. Management should be directed towards safety, confining use to the preferred areas, trail maintenance and mitigation of impacts. In some cases, localized restoration may be necessary to improve the quality and function of the larger feature (e.g. riparian areas). Forest management should be guided by the sustainable forest policy.

Recreational use should be restricted to defined areas and the public should be educated on the reasons for, and impacts of off-trail use. Where necessary, management plans should allow for seasonal trail closure, as required. Development will generally be restricted to the minimum necessary to support the low intensity recreational activities.

4.2.2.3 *Moderate Protection Area*

All restoration activities will be undertaken following, and in conjunction with, applicable legislation, policy and guidelines. Re-vegetation shall be undertaken only with plans that promote the utilization of native species, appropriate succession planting and which increase wildlife habitat. Prior to undertaking restoration of habitat a detailed restoration plan and implementation plan should be approved.

Trails and trailhead infrastructure necessary to support the larger trail system are possible uses. Development of trailhead infrastructure and any site alteration should be limited to the essential components and complement, to the degree possible, the natural features of the conservation area.

4.2.2.4 *Low Protection Area*

This area may provide basic staging support facilities for the associated low intensity recreational activities. Support facilities may include the necessary infrastructure associated with a trailhead. All development shall be kept to a minimum, conform to good site planning standards and shall not conflict with the general landscape character.

More intensive, active recreational facilities will be located in the adjacent community park outside of the Glenorchy Conservation Area and the natural heritage system.

The desire for a potential interpretative centre was identified through the public consultation process. This type of facility could be considered in the future in concert with the development of the Town of Oakville's adjacent community park master plan. If it does not prove feasible to locate an interpretive centre on town lands, consideration could be given to locating a facility within the low priority protection area. However, the current policies in the Secondary Plans do not permit a development of this nature within the Glenorchy Conservation Area. The need and desire to proceed with such a facility would be subject to further public consultation and would necessitate an amendment to the Town's Official Plan.

4.3 Visitor Impact Management

The master plan objective to provide a Visitor Impact Management (VIM) program that will be a framework to monitor impacts to the Conservation Authority portfolio of properties was outlined in the Stage One Report. Traditional resource management plans that are based on carrying capacities and limits of acceptable change were determined to be unsuitable for a variety of reasons.

The weakness of the carrying capacity framework is its reliance on a visitor threshold value to set user limits. These thresholds tend to be a fixed number for an area that most often does not take the variety of uses or seasonal changes into account. In many cases, the impacts created by specific visitor types will be vastly different.

Table 4-1 Visitor Impact Management Program							
Visitor Experience	**Permitted Use Areas**	**Service Level**	**Ecological and Physical Impact Indicators**	**Carrying Capacity**	**Development and Operational Standards**	**Probable Cause of Impact**	**Potential Management Strategy**
Exterior Observation	Observation Deck, Parking Area, Observation Tower	Observational Deck, Parking, Access Roads, Webcams, Maintenance Roads	litter, graffiti, vandalism, surface wear or damage	structural limitations of the structure modified to enhance user experience, (max. 0.25person/m2)	provide vandal resistance materials, avoid placement of amenities in unmonitored areas, provide portable washroom and waste receptacle	unauthorized access, seasonal wear and tear	enhanced security, informational signage, regular maintenance, vandal resistance materials and reporting program
Public Access	Access Roads, Maintenance Roads, Limited off road use at staff discretion	municipal standard	surface wear patterns, rutting and widening of shoulders, vandalism	parking space threshold, no apron parking	handicap accessible, no curbs, vegetated buffer shoulder.	poor or negative drainage, seasonal wear and tear, improper use	deterrent paving, speed bumps, shoulder protection, signage, paint markings, utilize Adopt-a-Road maintenance program.
Trail Use	maintenance trails for staff, scientific study, approved staff tours and limited public use for hiking and biking on designated trails only	primitive for access to most sensitive areas	trail widening, unsanctioned or braided trails, litter, vegetation loss, rutting, evidence of hunting or unapproved activities.	permitted and limited public use only, 1-5 groups/1500m, no biking	single wide vegetated trail , avoid high protection areas, locate trails in areas of stable slopes and soil, avoid wet habitat unless protection measures are provided.	excessive group size, lack of supervision and proper etiquette instruction, unsanctioned access by young people or outdoor enthusiasts	informational and instructive signage, regular trail maintenance and temporary closure, limit group sizes, no unsupervised access, signed code of trail conduct by restoration contractors/staff/volunteers
		moderate for general circulation (located in less sensitive areas)		permitted and limited public use, 5-20 groups/1500m, no biking	generally single (1.2m wide) width with areas of double (2.0m wide) width where small equipment access is necessary for restoration or scientific purposes, avoid high protection areas, locate trails in areas of stable slopes and soils, avoid wet habitat areas unless protection measures are provided, minimize intrusion into interior forest habitat or through wildlife corridors, maximum 3.0m wide working trail for equipment necessary for fence installation.		
		high for trails linking visitors to amenities on/off site such as picnic shelter, washrooms and other amenities, access to restoration staging area		permitted and limited public use, 5-20 groups/1500m, 10-20 bikes/1500m on designated trails only	maximum 3.0m wide compacted granular on access trails of visitor use and for restoration staging area.		
Visitor Centre (if approved in the future)	Parking lot (75cars), picnic area, picnic shelter, washrooms (10) and learning facilities	LEED building (10,000sqft), parking, classrooms and picnic area with shelter, washrooms and trails	turf compaction/damage , litter, graffiti, vandalism,	parking space threshold (75cars) no apron parking, 0.1person/m2 comfortable carrying capacity for picnic area (4persons/table).	provide vandal resistance materials, avoid placement of amenities in unmonitored areas, provide washrooms, benches and waste receptacles in practical, convenient locations, universally accessible. Provide healthy turf areas and strategic plantings of trees and shrubs for shading and privacy.	excessive group size and incorrect use of facilities, poor coordination of services	informational and instructive signage, regular turf maintenance and temporary closure, limit group size, distribute groups throughout picnic area

The limits of acceptable change framework, was developed to consider factors beyond carrying capacity and emphasizes achieving a desired condition. For a variety of biophysical and social impacts the amount of use is only one factor contributing to impact; the type of use, size of party, visitor behavior, management actions, developer practices and environmental characteristics may be more important. In addition, the limits of acceptable change process can be a more complicated and costly tool to maintain when the site is subject to high staff turnover. Site managers will find unskilled seasonal employees are often not equipped to follow consistently the process without training, support and communication protocols. Without this attention to detail, the limits of acceptable change can devolve into an unsustainable exercise in damage control.

This master plan recommends utilization of the VIM program as described below. However, it is recognized that financial and personnel constraints have previously posed a barrier to the implementation of this program by Conservation Halton. Additionally, to implement the VIM program the establishment of indicators and standards are crucial and has yet to be undertaken.

4.3.1 Recommendations

Several case studies, put forth in the Stage 2 Report, demonstrated how students and volunteerism have played an important supporting role in addressing specific issues related to the sustainable development and management of natural resources and visitor experience. Each of the case studies has proven to be a practical process grounded in participatory planning. All have common framework elements involving allegiance with “friends” associations and volunteer organizations. Each in its own way reflects the basic tenants of a strong management plan; simple, practical and inclusive.

The consulting team has reviewed the Kelso Conservation Area Master Plan and found the VIM framework described there to be similar to the case studies cited in this document. The eight steps described in the Kelso process model is a suitable starting point for all Conservation Halton holdings and should be expanded to include monitoring, reporting, and implementation steps that actively involve Conservation Halton staff, partners and volunteers. The VIM matrix, which outlines specific management needs for visitor experience such as permitted uses, ecological and physical indicators as well as proposed standards for the Conservation Area are provided in Table 4-1.

4.3.2 Implementation

The proposed VIM program will be incorporated into the work plan of Conservation Halton staff as per the proposed coordinator position outlined in Section 6.3.

The management plan should have an information technology component that informs the management team. Social network sites and communication tools should be used to provide feedback information and a communication link with volunteers and visitors. This simple strategy would help in providing information on user impacts, management issues, and assist in the management of the conservation area.

It is recommended that a Visitor Impact Management Advisory Committee is established to develop and launch the VIM program. This committee could be comprised of Conservation Halton staff combined with representatives from local community groups such as naturalists' clubs, Oakvillegreen, Trout Unlimited and Halton Multi-Cultural Council, and local outdoor, hiking or recreation clubs.

4.4 Resource Management

Glenorchy Conservation Area and surrounding natural landscape are key components of the Natural Heritage System (NHS) in Halton Region. The conservation area crosses three watersheds including Sixteen Mile Creek, McCraney Creek and Fourteen Mile Creek and is considered a vital ecological corridor and habitat for several of Halton's rare flora and fauna species, as well as provincial and federal species at risk. The lands within and surrounding Glenorchy Conservation Area include Areas of Natural and Scientific Interest (ANSIs), Provincially Significant Wetlands and a regional Environmentally Sensitive Area (ESA).

The purpose of the resource management section is to identify key recommendations that require specific attention during the management of the conservation area. This section and its recommendations should guide the protection of the natural heritage system for the long-term, using an adaptive management approach that may involve both active and passive management. In some cases, resource management recommendations will require the collection of additional information or the development of guidance material prior to their full implementation.

4.4.1 Land and Water Management

The landform and landscape character of Glenorchy Conservation Area together with the natural hydrological regime shall be protected to the highest level while still providing compatible opportunities for recreation. Conservation area operations or development shall comply with the following:

- any grading will be restricted to approved components of the master plan;
- no soil or fill material shall be imported onto this site unless in conjunction with an approved component of the master plan and accompanied with certificate of fill quality from a certified laboratory;
- surface and groundwater is to be protected from any pollution or contaminants; and
- waste consisting of natural materials will be reused or composted within the conservation area where feasible and appropriate. Otherwise, all solid waste will be removed from the conservation area for recycling or disposal.

4.4.2 Vegetation Management

The proper protection and management of the vegetation communities and planned restoration areas is critically essential to the health and well-being of

Glenorchy Conservation Area, North Oakville Natural Heritage System, as well as the larger watershed.

4.4.2.1 Forest Sustainability Policy

The forests within Glenorchy Conservation Area are part of two Areas of Natural and Scientific Interests (ANSI) including the Candidate Sixteen Mile Creek Valley Life Science ANSI and Candidate Oakville-Milton Wetlands & Uplands Life Science ANSIs. Both of these ANSIs contain diverse vegetation communities, which have been selected for their representation of valley, bottomland and drier tableland forests, kettle and riparian wetlands and areas of prairie bluffs considered to be of regional importance. However, threats from climate change, disease, invasive species, forest pests (e.g. Emerald Ash Borer *Agrilus planipennis*), etc. are a concern to the future quality of forests. Management of Conservation Halton forest resources requires a cohesive strategy that promotes forest health, regeneration, and conservation of the ecology of forest communities over timber production. A cornerstone to achieving this is the establishment of a new Forest Management Plan to implement sustainable forest management practices that are adaptive, and rely on the most current forest information and silvicultural techniques. The forest ecosystem should be considered as Green Infrastructure in all management decisions. Forest sustainability should incorporate the following principles:

- Large, healthy, diverse and productive forests and their associated ecological processes and biological diversity should be protected and restored;
- Long-term health and vigour of forests should be provided for by using forest practices that, within the limits of silvicultural requirements, emulate natural disturbances and landscape patterns while minimizing adverse effects on plant life, animal life, water, soil, air and social and economic values, including recreational values and heritage values;
- Assess and prioritize forest unit protection needs, identify an appropriate management regime for areas with different sensitivities (e.g. Provincially Rare vegetation communities) and management requirements (e.g. Passive Management, Active Management, etc.);
- Incorporate global warming information into management plans including documenting the role Conservation Halton forests play as sinks for greenhouse gasses;
- Assess and manage invasive species, forest pests and disease;
- Promote species at risk recovery and conservation, where appropriate;
- Assess appropriate forest fire management;
- The White-tailed Deer (*Odocoileus virginianus)* carrying capacity of the conservation area should be evaluated to determine the optimal size of deer population that may be sustained. This evaluation should assess browse impact on forest habitats and possible influence on the regeneration of young trees. This study should include all forest habitats in the study area, especially areas under restoration; and

- Increase habitat and biodiversity within managed forest landscapes in a manner that is consistent with the restoration plan for the conservation area.

Every forest operations prescription shall include descriptions of the following:

- Current structure and condition of the forest in the area to which the prescription applies;
- Forest renewal and maintenance activities to promote forest health, regeneration and biodiversity;
- The expected results and future structure and condition of the forest; and
- Standards or guidelines used in developing the prescription.

All prescription activities must comply with good forestry practices as described in the Region of Halton Tree Conservation By-Law. The forest management plan should demonstrate leadership in forest management by applying international standards for sustainable forestry practices as embodied by one of the three independent Forest Certification systems in Canada (e.g. Canadian Standards Association's Sustainable Forest Management Standard, the Forest Stewardship Council Standard and the Sustainable Forestry Initiative). This management system should also complement the restoration plans for the conservation area and where appropriate, refine the management of forest restoration areas in a manner that allows the development of mature forest communities found in the adjacent natural areas.

4.4.2.2 Dead and Hazardous Trees

Generally, the existing Conservation Halton protocols for the management of dead and hazardous trees will be implemented in Glenorchy Conservation Area. Safety will be the largest factor in decisions for hazardous tree removal however, the importance of dead tree material and downed woody debris must be considered to provide wildlife habitat. In addition, Glenorchy Conservation Area has numerous butternut trees that are considered endangered by the provincial *Endangered Species Act*. If for safety reasons the removal of this species becomes necessary, the removal must conform to applicable laws, associated health assessments and permitting requirements (Ontario Regulation 242/08).

4.4.2.3 Plant and Seed Collection

Where existing vegetation may be lost due to development of trails, access roads, etc., plants may be transplanted for naturalization and restoration purposes within the conservation area. Plant salvages may be possible with the construction of Burnhamthorpe Road, James Snow Parkway, and the transit terminal at Highway 407 and Bronte Road.

Seed may be collected for use in propagation and planting within the conservation area for restoration and naturalization purposes. Harvesting effort should be spread throughout the conservation area and not concentrated on any one area. The amount of seed collected will be based on the species, as determined in consultation with Conservation Halton forestry and ecology staff.

The establishment of propagation areas may be considered on a case-by-case basis for supplying the conservation area with the required plant material for restoration and naturalization purposes. Prior to establishing a propagation area an appropriate evaluation of its goals, objectives, economic viability, target species and potential positive and negative impacts should be completed.

4.4.2.4 Invasive Species

Invasive species removal should be an integral part of maintaining high quality ecological assemblages within the Glenorchy Conservation Area. The complete eradication of invasive species is not always realistic and therefore prioritization of effort is necessary. Introduced species should be evaluated for invasive tendencies based on appropriate federal, provincial or municipal guidance material. For example, invasive plants and their invasive tendencies are summarized in Priority Invasive Plants in Southern Ontario (Havinga et al. 2000). Monitoring and research should be directed to prioritize the threat posed by invasive species and the feasibility of effective control. Based on this threat analysis a species-specific management protocol should be established for those species that pose the greatest threat or have a high success rate versus effort.

It is noted that priority invasive plant species identified within Glenorchy Conservation Area include:

- Giant Hogweed *Heracleum mantegazzianum* (Sixteen Mile Creek valley lands – human health risk and habitat threat)
- White Sweet Clover *Melilotus alba* (Dry Tallgrass Woodland Ecosite – habitat threat)
- Phragmities (wetlands – habitat threat)
- Garlic mustard *Alliaria petiolata* (floodplain and upland forests – habitat threat)

- Gypsy Moth (*Lymantria dispar*), an invasive forest insect, has been identified within Glenorchy Conservation Area. Emerald Ash Borer (*Agrilus planipennis*) and Asian Long-horned Beetle (*Anoplophora glabripennis*) have both been identified in the province of Ontario and are known to pose significant risks to forests. The potential presence of these species may be relevant to the management of the area in the future.

Other groups of invasive species groups (e.g. fish, crustaceans, mussels, etc.) should also be evaluated, as deemed appropriate by management.

4.4.2.5 Herbicides, Pesticides and Suppressants

Chemical herbicides, pesticides and suppressants will not be used for any vegetative management purposes except for the eradication of non-native species, existing interim agricultural operations or establishment of native plantings where it has been demonstrated that other methods with less residual impacts are not feasible or for the control of noxious plants in publically accessible areas. Biological controls will be employed wherever possible.

4.4.2.6 Vegetation: Damage and Removal

Under Ontario Regulation 365/88 it is a prohibited activity for the public to cut, remove, injure or destroy a plant, tree, shrub, flower or other growing thing in a conservation area of Conservation Halton.

4.4.3 Fisheries Management

Fishery management activities will be aimed at the maintenance and enhancement of native, self-sustaining fish populations. Fishery-habitat improvement projects will be undertaken in consultation and direction of Conservation Halton ecology staff and the MNR. The main branch of Sixteen Mile Creek south of the 407 becomes large and wide resulting in warmer stream temperatures. The fish community for the reach of Sixteen Mile Creek flowing through the conservation area is classified as a warmwater sportfish community. Although these species dominate the reach, it is also used as a spawning and migratory corridor for non-native migratory salmonids (HHSWP 2008).

Fourteen Mile Creek headwaters begin within and north of Glenorchy Conservation Area. Groundwater inputs and the grassy, herbaceous riparian areas associated with the creek provide suitable conditions for potential coldwater conditions southeast of Dundas Street. Within the conservation area, Fourteen Mile Creek has fish species indicative of a warmwater thermal regime.

Thirty fish species have been documented to occur within or immediately adjacent to the conservation area boundaries. Twenty-nine species were recorded in the Sixteen Mile Creek watershed system. Another eight species were recorded downstream of Glenorchy Conservation Area within the Fourteen Mile Creek watershed. Of the species observed:

- Two (2) are considered Species at Risk:
    - Redside Dace *Clinostomus elongatus*, endangered
    - Silver Shiner *Notropis photogensis*, special concern

These aquatic resources associated with the conservation area are highly significant and should be protected and enhanced. The planned restoration of riparian areas will form vegetative buffers to stabilize water temperatures, enhance the food supply and improve the filtering of nutrients, contaminants and sediments entering the water. Any restoration efforts within or adjacent to watercourses shall be in accordance with the federal *Fisheries Act* with said works timed to occur within an approved instream construction window.

4.4.4 Wildlife Management

Wildlife species and habitat was documented in the Glenorchy Conservation Area and surrounding Environmentally Sensitive Area during the Halton Natural Areas Inventory (NAI) and the candidate ANSI report for the Sixteen Mile Creek. NAI data is compiled from several data sources including natural area reports. Data from the NAI was augmented with species information collected during biological inventory completed by Conservation Halton staff in 2008. Using this information,

general species diversity and species at risk possibly occurring in the conservation area were developed.

4.4.4.1 Birds

Eighty-four bird species were observed to utilize the Glenorchy Conservation Area and surrounding Environmentally Sensitive Area during the breeding season. Of these species observed:

- One (1) is considered threatened provincially and federally:
  - Chimney Swift Chaetura pelagica
- Two (2) are considered Threatened federally:
  - Common Nighthawk *Chordeiles minor*; and
  - Canada Warbler Wilsonia canadensis
- One (1) is considered of special concern provincially
  - Bald Eagle Haliaeetus leucocephalus
- Six (6) are rare in Halton Region
  - Yellow-billed Cuckoo *Coccyzus americanus*;
  - Yellow-rumped Warbler *Dendroica coronata*;
  - Blackburnian Warbler *Dendoica fusca*;
  - Magnolia Warbler *Dendroica magnolia*;
  - Osprey Pandion haliaetus; and
  - Carolina Wren Thryothorus ludovicianus.

4.4.4.2 Mammals

Seven incidental mammal observations were noted for Glenorchy Conservation Area. Of the species observed, all are considered common. One of the common occurrences in the area that also requires some possible management consideration is White-tailed Deer.

White-tailed Deer populations can occur at levels that put pressure on vegetation within natural areas. In addition, areas that are undergoing restoration are vulnerable to deer browse as many plants are at a young stage of development and establishment of plants are limited (Also see Section 4.4.2.1).

4.4.4.3 Reptiles

Eight reptilian species have been observed in the Glenorchy Conservation Area and surrounding Environmentally Sensitive Area including five snake species and two turtle species. Of these species observed:

- Two (2) are considered of special concern federally and provincially
  - Milksnakes *Lampropeltis triangulum*
  - Eastern Ribbonsnake *Thamnophis sauritus septentrionali*s

- Two (2) are rare in Halton Region
  - Northern Ring-neck Snake *Diadophis punctatus edwardsii*
  - Smooth Greensnake *Opheodrys vernalis*

4.4.4.4 Amphibians

Thirteen amphibian species (frogs and salamanders) have been recorded in Glenorchy Conservation Area and surrounding Environmentally Sensitive Area. Of these species observed:

- One (1) is rare in Halton Region
  - Common Mudpuppy *Necturus maculosus maculosus*

4.4.4.5 Lepidoptera

Fifty-four lepidopteran species have been documented in the Glenorchy Conservation Area and surrounding Environmentally Sensitive Area. Of these species observed:

- One (1) is of special concern
  - Monarch *Danaus plexippus*
- One (1) is globally and provincially rare
  - Mottled duskywing *Erynnis martialis*

4.4.4.6 Odonata

Thirty Odonata species have been documented in Glenorchy Conservation Area and surrounding Environmentally Sensitive Area. Of these species observed:

- One (1) is provincially rare
- River Bluet Enallagma anna
- Ten (10) are rare in Halton Region
  - Powdered Dancer *Argia moesta*
  - Springtime Darner *Basiaeschna janata*
  - Fawn Darner *Boyeria vinosa*
  - Northern Bluet *Enallagma annexum*
  - Rainbow Bluet *Enallagma antennatum*
  - Boreal Bluet *Enallagma boreale*
  - Stream Bluet *Enallagma exsulans*
  - American Rubyspot *Hetaerina Americana*
  - Sweetflag Spreadwing *Lestes forcipatus*
  - Swamp Spreadwing *Lestes vigilax*
  - Wandering Glider *Pantala flavescens*

Wildlife management practices at Glenorchy Conservation Area will predominantly deal with habitat protection as well as restoration/enhancement. Details of the

habitat restoration planned for the conservation area is detailed in preceding sections.

Under Ontario Regulation 365/88 it is a prohibited activity for the public to kill, trap, pursue or disturb a wild bird, reptile or animal in a conservation area of the Halton Region Conservation Authority.

4.4.5 Species at Risk Monitoring Strategy

Five species at risk were documented as occurring within the Glenorchy Conservation Area. These species have been identified as at risk in Canada and/or Ontario by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the Committee on the Status of Species at Risk in Ontario (COSSARO). Species at risk observed as occurring in Glenorchy Conservation Area include Butternut, Bald Eagle, Eastern Milksnake, Monarch and Silver Shiner. The habitat of threatened and endangered species is protected under the *Endangered Species Act* as well as the *Species at Risk Act*, in the case of migratory birds and fish. Where possible, recovery actions will be implemented in the conservation area in a manner that is consistent with recovery strategies. The conservation area also contains several species and vegetation communities that are considered provincially rare. The appropriate management and monitoring of these species/vegetation communities should be encouraged through the development of specific management plans. In some cases, it may be beneficial to consider their management as an assemblage.

Below, the status, general habitat, threats and potential monitoring strategy for each species at risk is discussed. Provincially rare species are identified below and should be examined in greater detail to establish appropriate protection/management protocols, where necessary.

4.4.5.1 Butternut

Several occurrences of butternut have been documented in Glenorchy Conservation Area. This species is designated as endangered by COSSARO and COSEWIC. Within its Canadian range, butternut is widespread, primarily found as a minor component of hardwood stands, but also occurring as extensive pure stands on flood plains. A very conservative estimate of the population of butternut in Ontario is approximately 13,000 trees. Available information in Ontario indicates high levels of incidence of butternut canker; poor health of many butternut trees and initial reports of mortality is presumably due to the butternut canker (Nielsen et al. 2003).

Butternut canker is a serious threat to the species. Butternut mortality in the United States is estimated at 77%. Accurate information on mortality rates in Canada is not available but observational data on butternut mortality indicate that the mortality rates are similar to those experienced in the U.S. (Nielsen et al. 2003).

There is no known cure for the canker disease, nor any effective techniques to slow or prevent the spread of the disease. The Ontario Forest Gene Conservation

Association has established a Butternut Conservation Group, and one of its main objectives is to locate disease-resistant individuals and use these to propagate tree seedlings for planting (Nielsen et al. 2003).

Butternut is shade-intolerant and conservation area managers can promote natural regeneration by planting butternut seed, sourced from local retainable trees, or small trees as part of the proposed forest restoration. Controlling competition can also increase survivorship of established seedlings. Monitoring of this species should be directed at identifying additional butternut trees in the conservation area and monitoring the health, regeneration and survivorship of the species on a biannual basis following the guidelines set forth by the Forest Gene Conservation Association in the *Butternut Health Assessment in Ontario* manual.

4.4.5.2 Bald Eagle

The bird documented in the Stage One Report consists of a single observation flying over Glenorchy Conservation Area during fall migration on November 6, 2008. Although Sixteen Mile Creek does appear to provide suitable habitat for nesting and/or foraging Bald Eagles, currently, only one Bald Eagle nest site has been recorded in the larger area in 2009 at Cootes Paradise, Hamilton. COSSARO has designated the Bald Eagle as special concern in Ontario south of the French and Mattawa River. Although Bald Eagles are widespread in Canada and the United States, their abundance varies regionally. In 2005, 53 active nests were documented in southern Ontario (Laing 2006).

Beginning in the 1950's, Bald Eagle populations in eastern North America declined because of the widespread application of organochlorine pesticides such as DDT. The use of these chemicals is now restricted in Canada and the United States, and Bald Eagle populations in many areas are no longer experiencing pesticide-related reproductive failures. Today Bald Eagles remain susceptible to illegal shooting, accidental trapping, poisoning and electrocution (Brownell and Oldham 1984).

Emphasis for monitoring this species should be on opportunistic presence/non-detection basis while staff members are in the area doing other biological monitoring studies. Opportunistic monitoring is recommended as the observation occurred well outside the breeding season and current information does not suggest a nesting pair in the area. If additional monitoring is desired a combination of passage migration counts and area search methodology could be used. Passage migration counts consist of an observer standing at a lookout over Sixteen Mile Creek that provides the maximum vantage point of the valley. The duration of observation can be variable but should be recorded. Area search methods can be completed along a drivable route that allows the maximum vantage of Glenorchy Conservation Area and the immediate surrounding areas with suitable habitat.

4.4.5.3 Eastern Milksnake

Several occurrences of the Eastern Milksnake have been documented in and around the Glenorchy Conservation Area over the last decade. The majority of observations have been associated with Sixteen Mile Creek. Quantitative estimates for provincial populations of are not available for either Ontario or Quebec and there have been no population or ecological studies of this species in Canada (Fischer 2002). This species is considered special concern by COSSARO and COSEWIC.

In Canada, Milksnakes go into hibernation in late October or early November. They select sites, such as mammal burrows, hollow logs, gravel or dirt banks, old wells, or old building foundations that have enough moisture to prevent them drying out over the winter. They emerge from their hibernacula in April or May when most mating occurs. Females appear to gather at communal egg-laying sites in early June. Eggs are laid in a variety of locations, including compost or manure piles, stumps, under boards or in loose soil (Fischer 2002).

The two greatest causes of population decline are likely road mortality and deliberate killing by humans. Milksnakes are also affected by habitat loss and modification due to urbanization, as well as predation by domestic dogs and cats (Fischer 2002).

Monitoring for this species during warm days during April to June and October to November should be considered. The emphasis of monitoring should be to locate either hibernacula or egg laying sites. Random or wandering transect methods could be used for surveys. Surveys can be completed on an as available basis.

Consideration should be given to constructing hibernacula as part of the restoration efforts. Removal and use of the old Burnhamthorpe Road could be potentially used for this purpose.

4.4.5.4 Monarch

This species is considered special concern by COSSARO and COSEWIC. The Monarch is widely distributed from Central America to southern Canada and from coast to coast. There are three populations of the Monarch: western, central, and eastern. The eastern population of the Monarch is the largest of the three, and includes all Monarchs that occur east of the Rocky Mountains, from the Gulf coast to southern Canada, and from the Great Plain States and Prairie Provinces east to the Atlantic coast. The entire population over-winters annually at approximately 12 sites in a mountain range in central Mexico (Species at Risk Public Registry[a]).

Monarchs in Canada exist primarily wherever milkweed (*Asclepias*) and wildflowers (such as Goldenrod, asters, and Purple Loosestrife) exist. These areas include abandoned farmland, along roadsides, and other open spaces where these plants grow. Monarch wintering habitats include Eucalyptus trees along the Californian coast, and the Oyamel Fir forest in central Mexico. The distribution of the Monarch has gradually shifted eastward over the past century, due to a combination of clearing of deciduous forests in the eastern USA and

southeastern Canada, and loss of habitat to agricultural development in the Great Plains (Species at Risk Public Registry[a]).

Environmental conditions and loss of breeding habitat pose threats to all Monarchs. However, there are population-specific threats as well. The eastern population of the Monarch is limited by loss of habitat to logging, human disturbance, and predation, especially while wintering in Mexico. Widespread and increasing use of herbicides in North America is another significant threat, which kills both the milkweed needed by the caterpillars and the nectar-producing wildflowers needed by the adults (Species at Risk Public Registry[a]).

No specific monitoring for this species is recommended. The restoration plan for Glenorchy Conservation Area recommends establishing a large area of grassland/prairie that will provide suitable habitat and forage plants for this species.

4.4.5.5 Silver Shiner

There is one record of a Silver Shiner for the Sixteen Mile Creek area associated with Glenorchy Conservation Area. This species is considered to be of special concern by COSSARO and COSEWIC. The fish is endemic to North America. In Canada, it occurs only in southern Ontario, in the watersheds of the Grand and Thames Rivers and Bronte Creek, Sixteen Mile Creek, and in the drainages of Lakes Erie, St. Clair and Ontario (Species at Risk Public Registry[b]).

This fish is found in moderate to large, deep, relatively clear streams with swift currents, and moderate to high gradients. Stream widths at capture sites in an Ontario study mostly ranged from 30 to 100 metres. Most capture sites were in deep swift riffles and faster currents of pools below the riffles. The species may avoid areas with submersed vegetation. Stream sections where the water temperature is warmer may be preferred by the fish in the spring (Species at Risk Public Registry[b]).

Climatic conditions may be important in determining winter survival and spawning success for this fish, since the Canadian populations are at the edge of the species' range. Habitat quality should be protected for this species by assessment and restriction, if necessary, of dam construction, channelization and similar undertakings. Deteriorating water quality (turbidity, pollution and impoundments) have been responsible for population declines in Ohio. Stream gradient appears to have limited the species' distribution in the Grand River watershed to sections with a gradient between 0.3 and 5.7 m/km (Species at Risk Public Registry[b]).

Biannual monitoring of fish biomass/species presence should occur at the existing fish sampling station where this species was originally observed using the Ontario Stream Assessment Protocol. The addition of other monitoring sites may be appropriate to determine the potential presence of this species in other areas of the conservation area.

4.4.5.6 Globally and Provincially Rare Species

Globally and provincially rare species (G1-G3, S1–S3) observed in or immediately adjacent to Glenorchy Conservation Area (see Table 4-2) should be examined in greater detail to establish appropriate protection/management protocols, where necessary.

Table 4-2 Provincially Rare Species observed in or immediately adjacent to Glenorchy Conservation Area.

Common Name	Scientific Name	Halton Region Status	GRANK	SRANK	Source
Burning Bush	*Euonymus atropurpurea*	Rare	G5	S3	CH 2008
Virginia Bluebells	*Mertensia virginica*	Rare	G5	S3	NHIC 2004
Cooper's Milk Vetch	*Astragalus neglectus*	Rare	G4	S3	MNR 2006
Prairie Warbler	*Dendroica discolor*	Casual	G5	S3B	CH 2008
Mottled Duskywing*	*Erynnis martialis*	Rare	G3	S2	NAI 2006
River Bluet	*Enallagma anna*	Rare	G5	S2	CH 2008

* *identified in close proximity but outside of the Glenorchy Conservation Area boundary*

Mottled Duskywing (*Erynnis martialis)* is globally vulnerable (G3) and provincially "imperiled" (S2) and is being assessed by COSEWIC to determine if it is 'at risk' nationally. Further monitoring of the presence of this species within Glenorchy Conservation Area should be carried out. It is only found where its hostplants occur. In Ontario this includes New Jersey Tea (*Ceanothus americanus*) and Prairie Redroot (*Ceanothus herbaceous*), in North Oakville it is restricted to New Jersey Tea.

New Jersey Tea colonies are known to occur within a variety of habitats including oak woodland, pine woodland, roadsides, river banks, oak savannahs, shady hillsides, tall grass prairies and alvars but it is always associated with dry, usually sandy, soils. At Glenorchy Conservation Area this corresponds to the Dry Tallgrass Woodland Ecosite vegetation community.

4.4.5.7 Rare Vegetation Communities - Globally and Provincially

Six vegetation communities documented in the conservation area are considered provincially Vulnerable (SRank - S3) or are given an intermediate ranking between Imperiled (S2), Vulnerable (S3) and Apparently Secure (S4) (i.e. SRank – S2S3 and S3S4). The Dry Tallgrass Woodland Ecosite is considered a critically imperiled (S1) and globally rare to uncommon (G3) vegetation community in Ontario due to its extreme rarity and steep declines experienced in the province.

- Dry Tallgrass Woodland Ecosite (G3 / S1);
- Fresh - Moist Black Walnut Lowland Deciduous Forest Type (S2S3);
- Fresh - Moist Black Maple Lowland Deciduous Forest Type (S3?);
- Fresh - Moist Sugar Maple - Black Maple Deciduous Forest Type (S3?);
- Dry - Fresh Hickory Deciduous Forest Type (S3S4); and
- Dry - Fresh Mixed Oak Deciduous Forest Type (S3S4).

These vegetation communities should be protected, maintained and restored, where necessary. Where deemed necessary, a vegetation management plan should be prepared to investigate appropriate management protocols for the community.

Considering the provincial rarity of Dry Tallgrass Woodland Ecosite, limited established area in Glenorchy Conservation Area and potential threats, this vegetation community should be expanded, where appropriate. This tallgrass woodland community should be a long-term target for areas of restoration. For the existing community, removal of invasive (i.e. White Sweet Clover) and other competitive woody species should be considered as part of the management regime. To assess the response of native vegetation to management treatment, monitoring should follow the procedures described in *Monitoring the Effects of Prescribed Burns in Oak Savannahs and Woodlands: Field Methods* (Johnson et al. 2003). This should be carried out as part of efforts outlined under restoration and invasive species.

4.4.6 Security and Interim Property Management

In order to preserve and protect the existing natural heritage features of this property from unauthorized entry or inappropriate uses (i.e. ATV's) and to provide proper control and management of the property while the phased multi-year implementation of the plan takes place, this plan recommends that the following security and management practices be implemented immediately or maintained as part of the current Conservation Halton site management practices:

- Completion of recommended fencing as currently underway for those areas as set out in this plan to curtail unauthorized access;
- Erect and maintain conservation area signage to inform the public of the significance of this area, phasing, implementation and elements of the conservation area master plan and permitted and prohibited park uses;
- Conservation Halton Security personnel shall continue to provide staff presence on the site with regularly scheduled site inspections including implementation of the Visitor Impact Management program and park zoning policies until such time as a full-time park coordinator is hired;
- Lobby for funding and partnership opportunities to undertake restoration works as set out in the master plan;
- Refine seed collection protocols and objectives for collection within the conservation area for propagation and restoration purposes;

- Maintain the existing agreement with Highway 407 allowing use of a limited access gate off the highway for security and staff access purposes;
- Prohibit and enforce no public access rule to all sections of the conservation area where proposed components of the master plan have yet to be implemented or where prohibited by management zoning policies unless access granted under special permit (i.e. scientific, education, etc.) as issued by Conservation Halton;
- Issue warnings or trespass to property tickets to unauthorized persons on the property;
- Maintain the existing practice of agricultural crop production on existing agricultural lands with a progressive phasing out of this practice in concert with the restoration implementation schedule. Current agricultural practices are deemed to provide the interim benefit of preventing weed seed build-up in the proposed restoration areas and opportunities for enhanced field preparation prior to restoration;
- Develop a land restoration transition plan in conjunction with the tenant farmer(s) in order to leave the land in the best possible state for restoration purposes;
- Implement an immediate agricultural lease clause stipulating a perimeter field setback of 25 metre from all forests and treed fencerows to permit natural successional re-growth from the native adjacent seed sources;
- Develop and maintain the Glenorchy Conservation Area web posting on the Conservation Halton website to best assist in the protection and enhancement of this area and the implementation of the Glenorchy Master Plan.
- Remove horse access and use of lands north of Dundas St. West to aid in restoration of the cultural meadow and Provincially Significant Wetland;
- Continue monitoring species at risk, EMAN plot, Forest Bird Monitoring Program and fish sampling stations;
- Develop and implement removal and/or eradication program for priority invasive plant species, initially focusing on Common Periwinkle and Giant Hogweed; and
- Begin rehabilitation of all-terrain vehicle trail ruts and widening.

SECTION FIVE: ELEMENTS OF THE MASTER PLAN

5.1 Introduction

Community needs and social values are considered an integral part of the master plan for the Glenorchy Conservation Area. These were explored through a comprehensive Community Engagement process held at various key points during the planning process. While a wide range of ideas, uses and functions were explored during this process, an evaluation of their fit with various criteria to determine their acceptability and potential viability was carried out. Consideration relative to potential uses includes criteria from the *North Oakville West Secondary Plan* (NOWSP), the management agreement with the Ontario Realty Corporation (ORC) and the mandate of Conservation Halton.

The Glenorchy Conservation Area is currently somewhat isolated from the surrounding community. Of course, this will change in the future as the surrounding lands are developed, at which time access to the lands will become possible from the proposed trail and road systems and surrounding land uses. The management of access and impacts from human use will therefore become much more of a concern in the future.

5.1.1 Existing and Proposed Adjacent Infrastructure

Existing and proposed infrastructure elements that have the potential to impact Glenorchy Conservation Area are discussed below.

5.1.1.1 Utilities

An existing natural gas main traverses the site in a north-south direction through the tablelands west of the valley (see Figure 5-1). There is an existing trail along the gas main alignment that is used occasionally for inspections and maintenance (for further discussion of this topic refer to Section 3.4.1). Maintenance of a trail for pipeline inspection is an accepted part of this master plan.

In addition, the proposed Boyne Trunk Sewer is planned beneath the surface of the conservation area at its narrowest point just east of Bronte Road, south of Highway 407. There are no anticipated construction impacts or surface related features associated with the trunk sewer within the conservation area, as the method of construction is proposed to be subsurface directional drilling.

The Town of Oakville proposes to construct a district energy centre south of Glenorchy Conservation Area and just north of the proposed hospital (see Figure 1-4). According to the Town:

District energy, also known as district heating and cooling, is the technology for providing heating (and possibly other forms of energy) from a central plant to multiple users. District energy can save money for users, conserve resources and reduce air emissions. Where the potential for implementing district energy exists, the Town expects projects to incorporate this technology. Developers may also consider small-scale localized energy solutions, such as the installation of geothermal technology.

North Oakville Sustainable Development Checklist & User Guide: Subdivision and Site Level Design. May 20, 2008

The proposed plant is currently slated to provide heating and cooling services for the hospital. This is a cleaner form of energy generation for the community; however, it may have negative impacts in the immediate vicinity, such as noise, odor and visual pollution. Conservation Halton will work with the developers of this facility and the Town of Oakville to try to mitigate any negative impacts to the conservation area.

5.1.1.2 Transportation Facilities

Roads

Part of the North Oakville Secondary Plan is the intent to re-align Burnhamthorpe Road such that it passes through the Glenorchy Conservation Area in two places as illustrated in Figure 1-4.

The proposed extension of the James Snow Parkway will also have a section in the Glenorchy Conservation Area north of Highway 407 (see Figure 1-4).

Conservation Halton will work with the Region of Halton and other appropriate agencies to ensure that the environmental impact of these developments is minimal, that site rehabilitation is thorough, or that comparable compensation is made.

Transit Corridor and Terminal

A portion of land has been set aside for the Ministry of Transportation with the intention of developing a transit terminal near the northwest corner of the conservation area. A transit corridor, for which a right-of-way of 60m is proposed on the south side of Highway 407 (see Figure 5-1). Conservation Halton will work with the Ministry of Transportation and other appropriate agencies to ensure that the environmental impact of these developments is minimal, that site rehabilitation is thorough, or that comparable compensation is made.

5.1.1.3 Parks

New Community Park

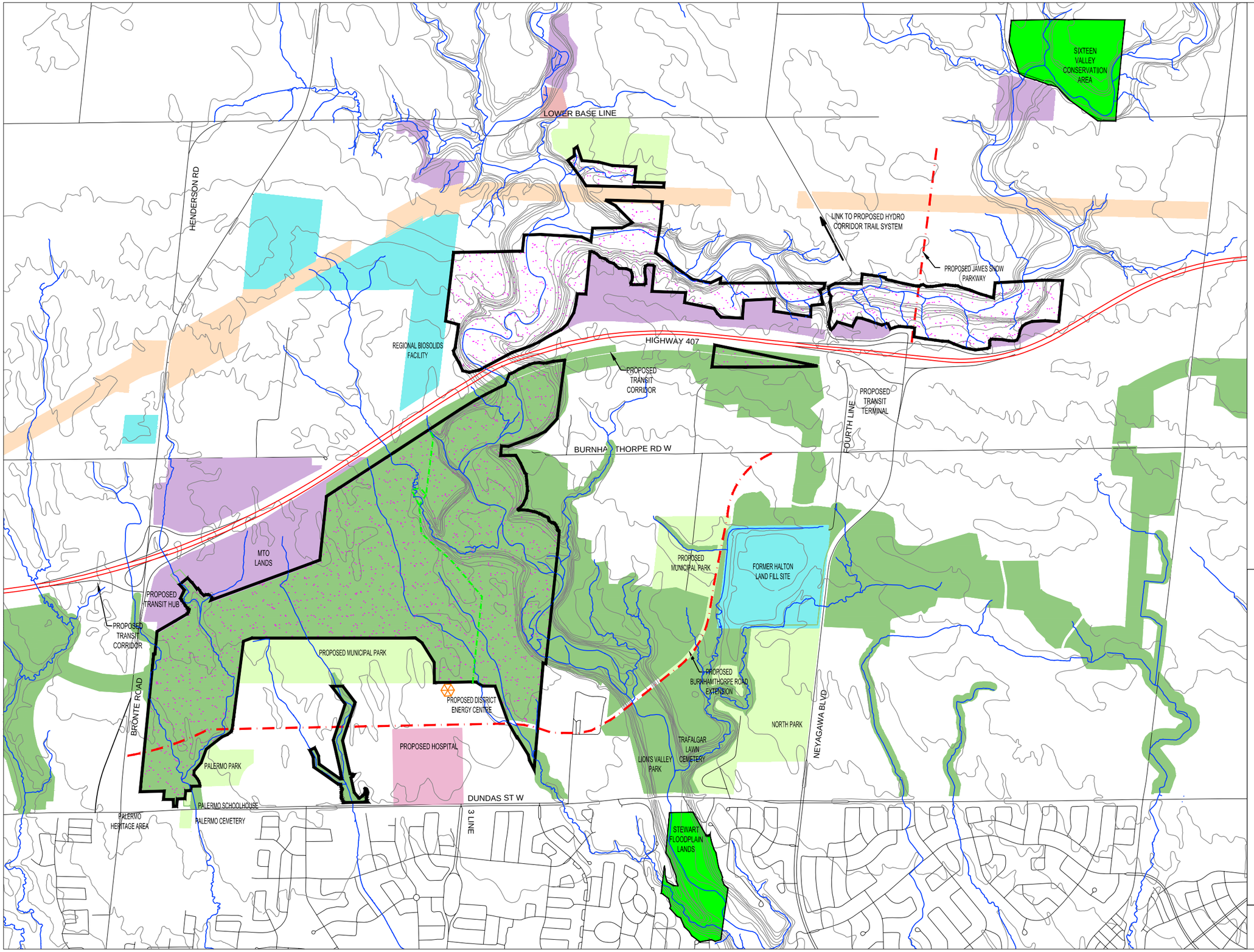
The Town of Oakville has set aside a 25-hectare (82 acre) parcel south of Glenorchy Conservation Area for an active recreation community park. This park will include several soccer fields and other lit active recreational facilities. Conservation Halton will work with the Town of Oakville to ensure that the

CONSERVATION HALTON

Glenorchy Conservation Area

Current and Proposed Public Lands and Infrastructure

FIGURE 5-1



Legend

- Glenorchy Conservation Area Boundary
- Waterways
- Roads
- Proposed Roads
- Contour Line (5m intervals)
- Conservation Halton Lands
- Town of Oakville
- Town of Milton
- Halton Region
- Hydro One
- Ontario Realty Corporation
- Proposed Hospital
- Glenorchy Conservation Area
- North Oakville Natural Heritage System

0 500 1000 metres

Scale: 1:18,000

environmental impact of these developments is minimal, that site rehabilitation is thorough, or that comparable compensation is made.

Palermo Park

A small, 7.28-hectare (18 acre), active recreation park is being built near the historic zone of Glenorchy Conservation Area. Phase I of this park, which is complete, consists of two large, lit baseball diamonds, a small trail system and a parking lot. A temporary off-leash park is currently occupying part of the area set aside for Phase II of this park. The trails are surfaced with compacted limestone screenings on the periphery of the park where buffer plantings separate the park from natural heritage areas, while asphalt trails are proposed for in the interior portions of the park. Phase II is proposed to include another baseball diamond, a waterplay area, a small shelter and a small park building.

Impacts of this development have been minimized by the use of limestone screenings, naturalized drainage swales and native plantings in buffer areas; however, concern has been expressed about the use of high-power lighting to light the baseball fields. Conservation Halton will work with the Town of Oakville to mitigate the effect of light pollution on the surrounding natural area.

5.1.1.4 Other

Hospital

A regional hospital is to be built on a 20.23-hectare (50 acre) parcel at the corner of Dundas Street and Third Line (see Figure 1-3). Patients and visitors at the hospital will be able to take advantage of the conservation area as a benefit to physical and mental health. Conservation Halton will work with the Region of Halton, the Town of Oakville and the hospital consultants to ensure that the environmental impact of these developments is minimal, that site rehabilitation is thorough, or that comparable compensation is made.

5.1.1.5 Overall Policy - Adjacent Development

Plans and development will conform to all municipal, regional and provincial environmental policies in addition to the following minimum criteria:

- Construction, excavation, fill storage and equipment movement must be restricted to the area inside a defined limit of work line with adjacent vegetation designated for preservation protected with the erection of temporary fencing throughout the construction period
- Construction fencing and warning signage shall be erected around all hazardous sites for the protection of park visitors
- Regrading shall be minimized in the vicinity of root systems of vegetation that is to be retained
- If earth moving or construction activities are to occur within an area of natural vegetation then consideration should be given for the salvaging of existing plants and topsoil seed bank and root systems

- Construction scheduling should be staged to minimize potential soil erosion losses (limit the area and duration of soil exposure and schedule work during dry weather periods) and optimize the re-establishment of vegetation
- Appropriate erosion and sediment control measures must be installed prior to any construction activities occurring. Bioengineering solutions shall be the preferred method to resolve potential erosion problems.
- Development activities should be planned and monitored to minimize any potential negative impacts to water quality (temperature, nutrients, contaminants, sedimentation, and turbidity), baseflows, infiltration, or groundwater recharge areas.

5.1.2 Environmental Context

The Glenorchy Conservation Area is a significant part of the natural heritage system for North Oakville and an integral part of the North Oakville West and East Secondary Plans, which form the basis for decisions relative to potential uses and functions on the lands. The *North Oakville West Secondary Plan* identifies a range of restrictive sustainable design criteria for future development of all the lands in the area with particular emphasis on the protection of the natural heritage system.

Another factor in the evaluation of potential uses within the Glenorchy Conservation Area is the management agreement between the Ontario Realty Corporation and Conservation Halton. The agreement requires Conservation Halton to manage and operate the lands as a conservation area. It is noted that under the current agreement, revenue generated on the lands would flow back to the Ontario Realty Corporation. While this may be re-negotiated in the future, it remains a part of the agreement at this time.

Conservation Halton is the community based environmental agency that protects, restores and manages the natural resources in its watershed. Conservation Halton's mandate includes a variety of roles relative to environmental protection, watershed resources management, forest resources management, lifelong education and recreation. These values are represented to the community through the various programs, facilities and activities developed at the conservation areas within the watershed. Typically, though not in all cases, conservation areas provide vehicular road access and parking, pedestrian trails, educational and interpretive programs and facilities as well as passive recreation opportunities and multi-use areas such as picnicking and related activities compatible with the natural and cultural heritage of the lands.

Given the above considerations, it is noted that proposed uses on the Glenorchy Conservation Area must be consistent with these existing requirements and restrictions. However, the master plan must also facilitate the proper management and operation of the conservation area to ensure protection, enhancement and restoration of the natural heritage system as well as provide a framework that can accommodate existing and future needs relative to appropriate and suitable types and levels of environmental education, interpretation and passive recreation. In

addition, the master plan also indicates the need to develop partnerships that may provide capital as well as operating funds to achieve the programs and activities, facilities and amenities and related development requirements.

5.1.2.1 Potential Additional Land Securement

The potential to fully develop and round-out a contiguous Natural Heritage System, some of which is currently outside the boundary of Glenorchy Conservation Area is an important consideration. Additional land acquisition should be investigated to achieve and / or support natural heritage system goals as well as ecological management and operational functions.

The accompanying map (Figure 5-1) illustrates the extent of publicly owned lands near Glenorchy Conservation Area. Several opportunities are evident based on these holdings that may benefit the conservation area and the Natural Heritage System. The options for these lands to become part of the Glenorchy Conservation Area lands or as partnership opportunities with other government agencies should be investigated in more detail.

Certain strategic adjacent lands currently in the possession of the Ontario Realty Corporation or privately held could become part of Glenorchy Conservation Area. These include the open lands north of Highway 407 (Figure 5-1). Securement of these lands will provide for contiguous natural habitat from Highway 407 to the East Sixteen Mile Creek valley. Links to natural areas north of these lands should also be reviewed, perhaps providing a connection to the Sixteen Valley Conservation Area.

Other potential areas for consideration to become part of the conservation area include links to various parcels of land owned by the Region of Halton and the Town of Oakville that may act as buffers north of the existing conservation area. The Ontario Realty Corporation and the Town of Milton also own isolated parcels of lands that are within and adjacent to the Sixteen Mile Creek ESA.

In addition, other lands in the area currently identified as part of the North Oakville Natural Heritage System will at some point come into public ownership with portions (particularly valley lands) given to Conservation Halton to manage. Any adjacent lands contained within an ESA or ANSI should also be considered for inclusion in the conservation area (see Figure 1-2). It is hoped that other adjacent lands, not acquired, will be developed and managed in a manner compatible with the environmental management of the conservation area.

In regards to adjacent private land holdings, there are future opportunities to investigate the possibility of establishing stewardship agreements with the private landowners in the area as well, much in the same way that is contemplated in the Rouge Park North Park Plan in Toronto/Markham.

5.2 Physical Components

The major components of the master plan include the protection, enhancement and restoration of the natural heritage system and elements of the human history

where appropriate. These features form the essence of the Glenorchy Conservation Area and are described in Section Three: Environmental Considerations and Section Four: Management Policies.

Physical development in the Glenorchy Conservation Area beyond that associated with the restoration activities will be limited in accordance with the *North Oakville East and West Secondary Plans* and the *North Oakville Creeks Subwatershed Study* (NOCSS).

Key development features of the master plan address requirements relative to trail development, programming, educational and interpretive activities and facilities, and passive forms of recreation such as walking, nature appreciation and observation, including:

- Pedestrian trail system;
- Interpretive nodes; and,
- Webcams.

A range of infrastructure and support services, facilities and amenities are also envisioned, which are anticipated to be accommodated off site. These include but are not limited to:

- Observation platforms;
- Parking lot for cars and buses;
- Washrooms; and,
- Picnic shelter.

These facilities will need to be discussed and negotiated with the Town of Oakville and Region of Halton for possible inclusion on other adjacent public lands.

5.2.1 Trail System

Granular Hiking Trail

A limited-access, non-motorized trail system is proposed for the Glenorchy Conservation Area. This system is intended to provide visitors with access to selected parts of the site for passive recreation, nature appreciation, interpretation and educational purposes. Prohibited activities which have been identified to date include:

- Motorized vehicles such as all-terrain vehicles and snowmobiles (with the exception of Conservation Halton authorized vehicles used for security, monitoring and restoration purposes)
- Horseback riding and mountain biking

Hiking and limited cycling will be allowed on authorized trails.

5.2.1.1 Context

The proposed trail system outlined in the North Oakville East and West Secondary Plans is recognized and connections are recommended where they are consistent with the park zoning system classifications and objectives of the Glenorchy Conservation Area.

5.2.1.2 System Description

The proposed trail system is based on the utilization of existing trails where appropriate, together with the recognition of appropriate access points at boundaries (see Figure 1-4). The trail system is organized as a system of stacked loops that will provide users with a variety of short and longer sections that visit various points of interest throughout the accessible part of the site. All trails are located on the upland areas of the site predominantly within restoration lands, with no trail access into the valley lands downstream of the Fourth Line pedestrian bridge crossing. Limited access into the valley is only provided east of the Fourth Line bridge.

Limited initial trail development and public access may be commenced in the first phase pending final design and necessary approvals for the Palermo historic trail or the Fourth Line creek-side trail.

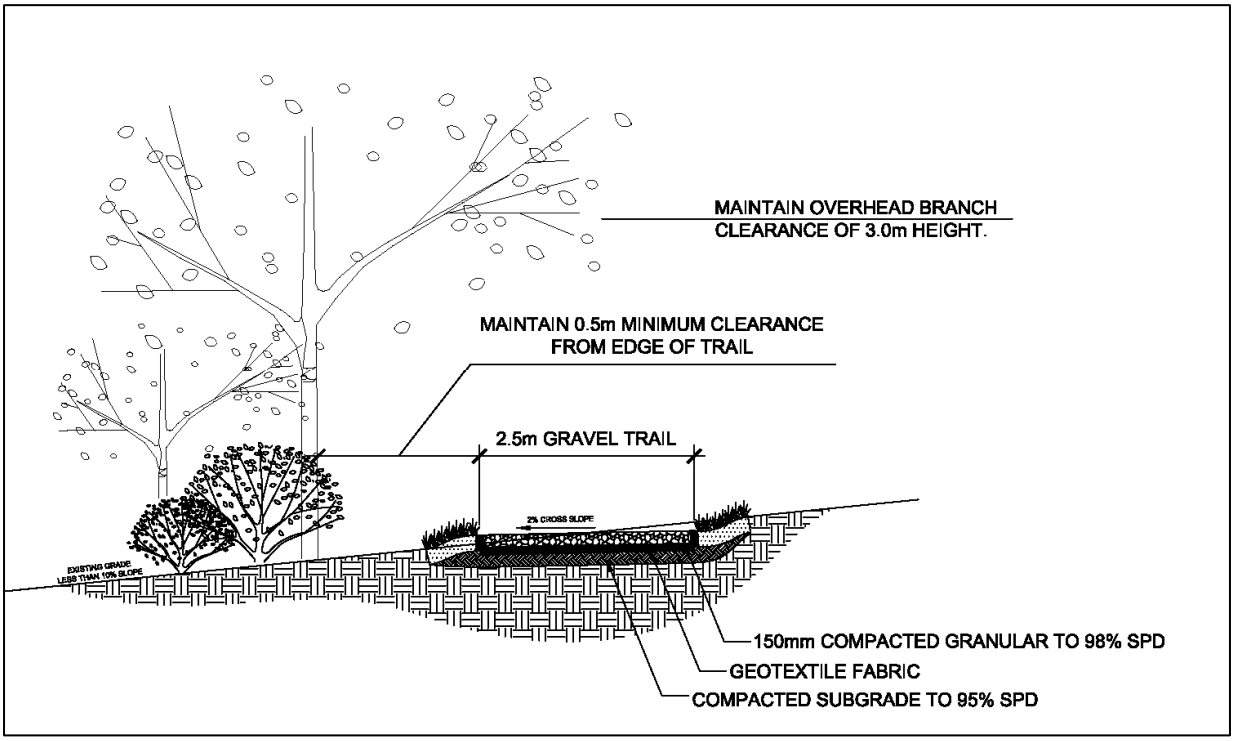


Figure 5-2: Hiking / Walking Trail Cross Section

5.2.1.3 Standards and Amenities

Trails will be 2.5 metres wide or less and composed of compacted granular material to accommodate emergency or service vehicles. Local materials shall be used in the construction of the trails. It is likely that a large amount of local shale will be excavated as development takes place in the immediate area, which could potentially be reused in the Glenorchy Conservation Area. There are a total of 7.9 kilometres of trails in the system. See Section 3.2.1.1 for a detailed account of trail distribution by priority protection area. There are a few existing trails in or

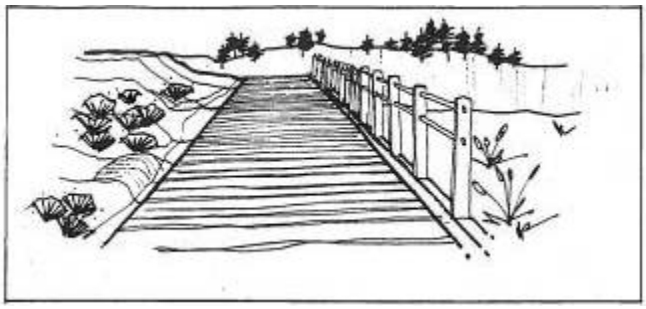
adjacent to some areas ranked very high in the priority protection scale. These trails will remain, as they follow a utility right of way and are needed for utility maintenance. Nevertheless, any future work in these areas will take place in the most environmentally advantageous way possible. Some trails also occur in areas that are ranked high; these too will be constructed in the location and method that will have the smallest impact on the natural features, for example by installing raised boardwalks to keep passive recreational users off small wetland pockets Trails will also be designed to keep passive recreational users on the trail using railings, wooden barriers and other innovative techniques. Interpretive signage will detail the sensitivity of the surrounding habitats and encourage visitors to be effective stewards of these public lands.

5.2.1.4 Boardwalks, Bridges and Culverts

Boardwalks through Sensitive Areas

Where trails cross intermittent swales, streams or wetland areas, boardwalks, bridges or culverts are proposed. Only in the case of low constraint stream corridors will culverts be considered, as these streams are not essential habitat for any wetland species and only their hydrological function needs to be maintained. Boardwalks and bridges will be constructed in such a way as to minimize impact on the natural features. Boardwalks should have a minimum width of 2.5 -3.0 m. and be constructed of non-pressure treated timber materials. The exact location and length of bridges and boardwalks will be determined during the implementation phase based on observed site conditions.

Figure 5-3: Boardwalk Conceptual Sketch



5.2.2 Interpretive Nodes

Interpretive Node

A series of interpretive nodes and look out points are situated according to representative ecological areas and points of interest where educational and interpretive signage may be located. Based on site amenities and points of interest, a variety of themes are proposed including:

- Conservation Area Introduction Theme
  - Located in conjunction with the Palermo historic theme trail to introduce the public to the conservation area and its protection / restoration goals

- Historical Themes
  - Near Dundas Street and the Palermo Park / historic school house
  - Old farm site south of Highway 407
- Ecological Themes
  - Grassland restoration
  - Forest restoration, both pit and mound type and dry oak woodland
  - Wetland protection and restoration
  - Species at risk and their required habitats
  - Geological processes

Interpretive Signage

Interpretive nodes will consist mainly of interpretive signage, highlighting natural, cultural and historical features. Only a select number of nodes will have benches and there are to be no garbage cans in the conservation area. It will be operated on a strict pack-in/pack-out policy. The interpretive node north of Highway 407 will feature two benches, but it is assumed that the Town of Oakville will provide sufficient garbage facilities on the adjoining trail system. The look out point south of Highway 407 will feature 4 benches, and it is likely that a safety fence will have to be installed. The fence will be designed to be aesthetically pleasing and not impede views.

Interpretive Installation

The plan has proposed an initial 14 interpretive signs (other than those located at observation platforms); however, should it be decided in the future that more interpretive nodes or benches will be beneficial, the addition of such amenities is not proscribed by this plan.

5.2.3 Observation Platforms

Major interpretive locations would also have observation platforms to allow views into areas such as wetland or grassland restoration areas where viewing is difficult. None of the proposed observation platforms occur within the conservation area. Rather, it is suggested that the Town of Oakville consider constructing such structures, in partnership with Conservation Halton, along the municipal trail system. Several vantage points have been determined; however, the exact location and built form will be determined during the implementation phase. In addition to the observation platforms to be built in conjunction with the Town, there is an opportunity to negotiate with the Region of Halton for inclusion of a platform with the construction of the Burnhamthorpe Road extension, which will provide pedestrians with a view over the spectacular Sixteen Mile Creek Valley.

Observation Platform

5.2.4 Webcams

In the most sensitive areas, webcams are proposed to allow visual access. Access to viewing these locations might be explored relative to cell phone technology where users may dial-in to access the view. The webcams are recommended to be installed early in the implementation phase to allow the public to follow the restoration work occurring on the lands. Webcams may be moved seasonally in order to focus on particular species during active periods such as

mating or nesting. Students from local colleges and universities may acquire footage from these webcams and create nature documentaries for school projects or for broadcasting on the local cable channel.

5.2.5 Facilities and Amenities

The proposed range of facilities is intended to provide limited accessibility, development, programming and educational opportunities in the Glenorchy Conservation Area, consistent with the site constraints and opportunities and the North Oakville Secondary Plans' Sustainable Development Guidelines. However, as noted above, several required facilities and amenities are not generally permitted within natural heritage areas such as roads, parking lots, buildings and other structures.

The master plan identifies the need for some basic facilities in public arrival areas that may include a parking lot, washroom, shelter and some level of interpretive or educational centre. Preliminary discussions have been held with representatives of the Town of Oakville relative to the location of such facilities on the adjacent community park site at the south end of the Glenorchy Conservation Area. The proposed community park is currently envisioned to provide active recreation facilities such as lit soccer fields and related facilities including an access road, parking lot, washroom and possibly a shelter. It is also understood that the size of the park was determined to accommodate these facilities, but not an interpretive centre.

The master plan for Glenorchy Conservation Area recognizes the opportunity to negotiate an agreement with the Town of Oakville relative to the sharing of infrastructure development and operation including site services, road, parking lot, washroom, shelter, etc., to service the conservation area in the future. Development of the adjacent community park and surrounding lands (i.e. employment and residential development) will also need to consider mitigation strategies to reduce possible impacts to the Glenorchy Conservation Area and its natural heritage system. For example, protection from impacts from the soccer field lights at night would be among the issues to be addressed. The initial recommendation in this plan is that they be lit in such a way that does not negatively impact the restoration opportunities/natural heritage features of Glenorchy Conservation Area. Lighting sources should be directed away from the natural area and shielded to maintain the natural light regime of the property.

The realization of these and other programs, activities, undertakings and facilities cannot be carried out by Conservation Halton alone. They will require a variety of partnerships, funding sources, volunteer participation and other such programs to be properly realized.

5.3 Social Components

As identified by the Ontario Ministry of Health Promotion and supported by the Active 2010 initiative, a number of benefits of recreational open space and trails have been identified. This initiative indicates that a well-connected and integrated

open space and trail system is important for human well-being and quality of life. Access to open space, recreational opportunities, learning experiences and different forms of volunteer engagement helps to create a healthier, happier more engaged citizenry, who in turn make better contributors to the community in a number of ways. Benefits of recreational open space and trails include:

Better Health – A cohesive parks, recreation and open space system supports an active lifestyle and improves health. Healthy communities can lower the burden put on the health care system.

Strong Communities – Pride and appreciation of community recreational space is socially valuable and meaningful, creating stronger communities. The construction and maintenance that is completed through partnerships among community and user groups, businesses, local owners and residents will build and solidify a strong community.

Conserving and Appreciating the Environment – Recreational space and trails can lead people through a variety of natural and urban landscapes. The opportunity for interpretive signage to enhance the system is important and enhances our appreciation of the natural and cultural heritage. This appreciation leads to environmental education and a commitment to environmental conservation.

The master plan for the Glenorchy Conservation Area contributes to the creation of an integrated open space network as described below.

5.3.1 Physical Accessibility

Physical accessibility is provided by linking to the proposed municipal trail system and related future proposed parks as well as to and from the proposed transit hub. The plan has the capacity to accommodate people with physical mobility impairments as it proposes compacted granular trails, which are useable for people with electric wheelchairs or strong caregivers. No public vehicular access is permitted on the property, requiring visitors to the conservation area coming by car to find parking facilities outside its boundaries. The coordination of parking facilities and related visitor amenities are recommended as a point of negotiation with the Town of Oakville as part of the development program for its future adjacent park. The proposed transit terminal will provide good public access via transit.

5.3.2 Educational Opportunities

The master plan offers excellent opportunities and potential for environmental education, through schools, universities, and through programs offered by Conservation Halton. The major themes around natural heritage and human history should be explored through the provision of interpretive nodes with informative signage, special guided nature hikes, scientific research and environmental monitoring activities. Should an interpretive centre be developed in the future, it would provide opportunities for expanded curriculum, visitor amenities and services, interpretive displays and multi-functional indoor and outdoor spaces in support of programmed and self guided educational opportunities.

5.3.3 Recreation Opportunities

With 7.9 kilometres of proposed trails, the master plan offers excellent opportunities for passive recreational activities such as hiking, walking and jogging, nature appreciation and viewing, bird watching, photography, painting and other related outdoor activities. Bicycles will be allowed on some trails subject to common trail etiquette guidelines; however, mountain biking will not be not allowed.

5.3.4 Access to Views, Quiet Spaces and Contemplative Areas

The master plan provides visual access from strategically located observation platforms and webcams. However, internal views are somewhat limited insofar as there is only one lookout point over the valley. Restricted access to the valley, the quietest and most contemplative area within the conservation area, limits this aspect of visitor enjoyment but protects the natural heritage system.

5.3.5 Conformance to Policy Context

The master plan conforms to a number of the social objectives of the *Conservation Halton Strategic Plan 2009-2013*, by offering a variety of educational opportunities, recreational programs and volunteer opportunities.

The master plan contributes to the North Oakville Secondary Plans' objective of building a walkable community and improving its residents' quality of life. Moreover, the Town of Oakville *Parks, Culture, Recreation and Libraries Master Plan* (2006) states: "it is the role of this Master Plan to strongly advocate for the public interest, which includes a strong desire for trail expansion". In addition, it sets out the following policies:

> *C24: To improve access to and throughout the Town's natural heritage system, the Town should continue to develop pathways and linkages among components of its park and open space system.*
>
> *C28: The Town should establish as a high priority allocating additional resources to trail management, as this is a service that most Oakville residents value and would like to see expanded.*
>
> *C29: The Town should continue to promote and enhance its Adopt-a-Trail program as a way of improving maintenance and offsetting some costs.*
>
> *C31: The Town should consider establishing a paved trail loop/route in a park (or a combination of connected parks) in North Oakville in order to provide additional opportunities for inline skating, biking, walking, etc. in the community (particularly the north end as the south has the Waterfront Trail). This trail should be linked to the Town-wide trail system.*

The Glenorchy Conservation Area is not a municipal park, but it is part of the Town's Natural Heritage System and Open Space System and as such is expected to contribute to these objectives. The preferred trail layout is in conformity with the North Oakville East and West Secondary Plans as it is set back from the valley wall and is designed in respect to the sensitive natural heritage features of the property.

In the regional context, the *Halton Region Official Plan* (2006) Part 4 - Healthy Communities: Cultural and Recreational Services includes the following:

> *161. The objective of the Region is to support the provision of a diverse range of accessible cultural and recreational facilities and services.*
>
> *162. It is the policy of the Region to:*
>
> > *162(2). Encourage the coordination of recreational services in Halton between the Conservation Authorities and Local Municipalities to avoid duplication and to increase diversity in programming.*
> >
> > *162(5). Encourage the Local Municipalities to ensure that opportunities exist for all people to participate in and have access to a variety of leisure, spiritual and cultural enrichment activities*

The Glenorchy Conservation Area will contribute a distinctly different type of outdoor recreational and cultural heritage experience opportunity from those presently existing in the Region. Coordination of these recreational services between Conservation Halton and the Town of Oakville is required to ensure accessibility and the provision of appropriate amenities to support the specific leisure and cultural enrichment activities contemplated in this master plan.

As part of its Active 2010 initiative, the Ministry of Health Promotion produced the Ontario Trails Strategy (2005), which states its vision as follows: "A world-class system of diversified trails, planned and used in an environmentally responsible manner that enhances the health and prosperity of all Ontarians."

Glenorchy Conservation Area provides the opportunity to contribute meaningfully to the Ontario Trails Strategy. The master plan identifies the creation of a network of 7.9 kilometres of pedestrian trails in a natural setting that are intended to interconnect with the proposed Town of Oakville trail system for the use and enjoyment of local and regional residents.

SECTION SIX: FINANCIAL CONSIDERATIONS

The following section will detail the three principal costs of the master plan being restoration costs, capital (development) costs and on-going costs of maintenance, replacement and operations. Additional information is provided on the implications of labour and staffing costs and finally the revenue-generation implications of the plan.

At the outset, it must be emphasized that these costs assume a very specific development program over a 20-year period. It is very unlikely that this specific development scenario will actually happen – Conservation Halton may well, in the years ahead, decide to change certain of the variables considered here in response to changing strategic priorities, funding opportunities, etc. For example, a more (or less) ambitious interpretation program with more (or fewer) signs phased in at different times will alter slightly the capital and maintenance costs outlined in this specific scenario. This consideration is true of any of the variables underlying the cost estimates presented here. Accordingly, these estimates should be treated as order-of-magnitude approximations for planning purposes, not as specific targets or forecasts.

Specific note should be given to the restoration costs that may appear high since they are based on current standard contractor outsourcing costs. Conservation Halton staff believe that the proposed restoration costs might not be feasible from a funding perspective and have therefore included examples of restoration projects which used alternative implementation methods at a significantly reduced cost. Table 6-2 provides costs of similar projects undertaken by parks and conservation organizations who have built strategic partnerships with funding organizations, environmental groups and volunteers. However, to adopt prudent management approach to the examination of potential costs, we have used 'contractor outsourcing' costs.

In order to implement this alternative restoration approach the following recommendations are made:

- Hiring of a full-time Restoration Coordinator to research and prepare restoration implementation strategy and detailed work plans including grant submissions, develop partnerships, volunteer solicitation/coordination, and public media briefs from the outset of the work
- Commitment to annual restoration works based on sustaining funding through government partners or grants, donations and volunteer labour.
- Partnership development with organizations such as: the Conservation Halton Foundation, Province of Ontario, Regional Municipality of Halton, Town of Oakville, Oakvillegreen, Hydro One, Trees Ontario Foundation and various other community and volunteer groups.

6.1 Restoration Costs

Table 6-1 presents the standard contractor outsourcing costs of restoration for the conservation area. This table shows the proposed total area for each type of

restoration, the anticipated development timeframe and the projected cost. (All costs are measured in terms of 2010 Canadian dollars.)

As shown, the total anticipated cost of restoration, over a twenty-year time horizon, is just under $10 million if conducted under the standard contractor outsourcing.

Table 6-2 below provides alternative restoration cost examples that may be utilized to develop a more cost efficient restoration plan.

Table 6-2 – Alternative Restoration Cost Examples

Restoration Type	Location	Size (Hectares	Cost / Hectare	Comments
Prairie Restoration	Bronte Creek Provincial Park	47.7	$7,413	2/3's Species at Risk funding, contract installation by Rural Lambton Stewardship Network, mtc. costs excluded
Native Grassland	Lake Erie Farms	53.6	$1,875	Seed and installation cost only with assistance by Nature Conservancy of Canada (NCC), volunteers and Pterophylla; mtc. costs excluded
Pit and Mound	Clear Creek Forest – Provincial Nature Reserve	69	$850	Partnered with NCC, mtc. costs excluded
Pit and Mound	Dunnville Site, Grand River Conservation Authority	6.5	$465	Pit & Mound gradework only
Pit and Mound	Essex		$1,300	Pit & Mound gradework and seeds and planting
Mixed Native Forest Restoration	Waterdown Field, Conservation Halton	2.02	$20,267	Full cost accounting incl. Conservation Halton staff time, field preparation, materials, installation, maintenance and monitoring
Multi-story Mixed Native Forest Restoration	Vastis ESA 16 Restoration (Adjacent to Glenorchy Conservation Area)	10	$25,000	Full cost accounting including contractor time, field preparation, materials, installation. Maintenance and monitoring

As mentioned, in order to be most prudent and conservative in our approach to the analysis presented here, we have assumed full contractor outsourcing costs – in other words, that no volunteer labour, in-kind contributions, corporate sponsorships, etc. would be involved in the costing of the development plan.

Table 6-1 – Summary of Restoration Costs

Type of Restoration	Priority	Total Area (Hectares)	Cost per Hectare	Total Estimated Development Cost	Development timeframe for substantial completion (80%) - *years*	Development timeframe for residual completion (20%) - *years*
Trailhead Closures *(Table 3-4)*	1	0.5	$99,000	$49,500	1 - 3	4 - 5
Grassland / Prairie Restoration *(Table 3-5)*	1	49.7	$74,500	$3,702,650	1 - 5	6 - 10
Pit and Mound Topography *(Table 3-6)*	1	64.1	$46,000	$2,948,600	1 - 5	6 - 20
Enhanced Riparian Planting *(Table 3-7)*	2	18.2	$65,000	$1,183,000	3 - 7	8 - 10
Constructed Wetland *(Table 3-8)*	2	2.0	$80,500	$161,000	3 - 7	8 - 10
Wetland Enhancement Planting *(Table 3-9)*	2	1.0	$35,000	$35,000	3 - 7	8 - 10
Forest Nucleation Cell Planting *(Table 3-10)*	3	17.3	$34,500	$596,850	6 - 10	11 - 20
Succession Forest Planting *(Table 3-11)*	3	27.0	$36,000	$972,000	6 - 10	11 - 20
Total		179.8 ha		$9,648,600		

Table 6-3 – Assumptions Underlying Costs for Glenorchy Conservation Area Master Plan

Element of Development Concept	Assumptions Related to Number and Size	Assumptions Relating to Timing and Phasing	Assumptions Relating to Cost
Restoration Cost	179.8 hectares being restored	- specific timing for each type of restoration will be as outlined in Table 6-1, above - restoration costs will be spread out as detailed in Table 6-3	- on-going maintenance costs for restoration projects is included in Dillon estimate
Interpretive Signs	14 signs	- assume 3 signs installed in Years 2 and 3 (1 in Year 2; 2 in Year 3) as part of initial trails development - assume all remaining signs put in place in year 10	- costs estimated at $2,500 per sign); maintenance / replacement / depreciation allowance $500 per year
Trails	7.9 km, 2.5m wide, compacted granular	- first 2 trails (500 metres [rounded] developed in years 2 and 3 (half in each year) - remaining trails developed in equal increments over years 9 through 12	- average cost estimated at $31,500 per km; maintenance / replacement / depreciation allowance $1,600 per km. per year
Benches	6	- assume all benches put in place in year 11	- costs estimated at $1,500 per bench; maintenance / replacement / depreciation allowance $500 per year
Webcams	5	- would be put in during restoration phase; assume 1 every 2 years	- costs estimated at $1,000 per camera; maintenance / replacement / depreciation allowance $200 per year
Boardwalk	270 metres at 3 metre. width	- initial length of 50 metres built in Year 2 as part of initial trails - remaining boardwalk (220 meters)would be developed at beginning of public access phase: in years 9-12; cost spread evenly over these years	- costs estimated at $1,000 per metre; maintenance / replacement / depreciation allowance $100 per metre per year

However, as the foregoing has shown, such savings could be significant and should be explored, which would be one of the duties of the Restoration Coordinator position.

6.2 Capital Budget by Year

In addition to the restoration costs for the Glenorchy Conservation Area Master Plan, there are other development costs related to access and interpretation. The assumptions relating to the parameters of each cost element (i.e. size and number), the phasing and specific timing in which each element will be brought on-stream, and the assumptions relating to development and maintenance costs, are outlined in detail in Table 6-3.

The specific development costs implied by these assumptions over the 20-year development horizon for Glenorchy Conservation Area are shown in Table 6-4. As shown, the overall cumulative development cost is just over $10 million (in $2010) for the contractor-outsourced option over the twenty-year development period.

6.3 Maintenance and Operations Budget by Year

In addition to the restoration costs, and other capital and development-related items, for the Glenorchy Conservation Area Master Plan, there are on-going operating costs related to maintenance, replacement and depreciation. Assumptions relating to these costs for the physical components of the plan are outlined in Table 6-3; the actual implications of these assumptions are portrayed in Table 6-5.

In addition to the maintenance of the physical aspects of the plan, there will also be the costs of staffing specifically dedicated to the conservation area operation, which would be in addition to the labour component embedded within the costs of the development and maintenance work itself. Likely costs in this regard would be:

- Restoration Coordinator during the restoration period (assume 1 full-time equivalent [FTE]);
- Security presence (another FTE); and
- In 'Phase 2' when the conservation area is open to public programming, there will be some staff time for interpretive activities.

Thus over the 10 year primary development period associated with the restoration and development of the conservation area, there might be an additional 2.0 FTEs associated with the on-going costs. A further 1.0 FTE would be added to operations after Year 10 for interpretation and programming activities. This is detailed more specifically in the next section.

6.4 Labour Requirements Contained in Above Estimates

Shown below in Table 6-6 are the estimated full-time job equivalent (FTE) costs associated with the development and operation of the master plan. Key

assumptions underlying the estimates presented here are as with all dollar figures presented here, costs are measured in terms of 2010 dollars;

- assume that 50% of all costs, on average, are associated with the labour cost of development (as opposed to equipment and materials);
- further assume that the average cost per full-time job equivalent for Conservation Halton is $59,654 including benefits (taken from Conservation Halton 2009 budget figures); and
- as outlined above, an additional two (2) FTEs will be associated with the operations of the conservation area over the development period, for planning and supervisory duties. Once the conservation area opens up into its more public phase (i.e. after Year 10) an additional FTE will be required for interpretation and public activities.

An example using the Year 1 development cost for the conservation areas will illustrate the process. The development cost for Glenorchy in the first year is estimated to be $1,087,400 (see Table 6-4). Of this, we assume that 50% will be the labour component, and the remaining 50% will be the cost of equipment and materials. (Like any construction project, the labour component is the cost of the wages and salaries of those hired to do the work.) So 50% of the total estimated cost of $1,087,400 is $543,700.

Next, to translate this labour cost component into person years of employment, we divide by the average wages and salaries paid by Conservation Halton. In 2009, this was $59,654 – this is in effect the average salary paid by CH in that year (taken from the 2009 budget). Dividing the labour cost component of the total cost (i.e. $543,700) by the average annual salary paid by CH (i.e. $59,654) gives an estimate of 9.11 person years of employment (as shown in Table 6.6). In other words, then, the amount of employment generated by the development of Glenorchy in the first year is estimated to be 9.11 person-years of employment (or FTEs – full time equivalents).

Table 6-4 – Development Costs for Glenorchy Conservation Area Master Plan

Cost Element	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Pit and Mound Topography *(Table 3-6)*	$471,776	$471,776	$471,776	$471,776	$471,776	$39,315	$39,315	$39,315	$39,315	$39,315	$39,315	$39,315	$39,315	$39,315	$39,315	$39,315	$39,315	$39,315	$39,315	$39,315
Grassland / Prairie Restoration *(Table 3-5)*	$592,424	$592,424	$592,424	$592,424	$592,424	$148,106	$148,106	$148,106	$148,106	$148,106	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Trailhead Closures *(Table 3-4)*	$13,200	$13,200	$13,200	$4,950	$4,950	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Enhanced Riparian Planting *(Table 3-7)*	$0	$0	$189,280	$189,280	$189,280	$189,280	$189,280	$78,867	$78,867	$78,867	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Constructed Wetland *(Table 3-8)*	$0	$0	$25,760	$25,760	$25,760	$25,760	$25,760	$10,733	$10,733	$10,733	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Wetland Enhancement Planting *(Table 3-9)*	$0	$0	$5,600	$5,600	$5,600	$5,600	$5,600	$2,333	$2,333	$2,333	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Forest Nucleation Cell Planting *(Table 3-10)*	$0	$0	$0	$0	$0	$95,496	$95,496	$95,496	$95,496	$95,496	$11,937	$11,937	$11,937	$11,937	$11,937	$11,937	$11,937	$11,937	$11,937	$11,937
Succession Forest Planting *(Table 3-11)*	$0	$0	$0	$0	$0	$155,520	$155,520	$155,520	$155,520	$155,520	$19,440	$19,440	$19,440	$19,440	$19,440	$19,440	$19,440	$19,440	$19,440	$19,440
Service Road	$10,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Trails	$0	$7,875	$7,875	$0	$0	$0	$0	$0	$58,275	$58,275	$58,275	$58,275	$0	$0	$0	$0	$0	$0	$0	$0
Interpretive Signage	$0	$2,500	$5,000	$0	$0	$0	$0	$0	$0	$0	$27,500	$0	$0	$0	$0	$0	$0	$0	$0	$0
Benches	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$9,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Webcams	$0	$1,000	$0	$1,000	$0	$1,000	$0	$1,000	$0	$1,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Boardwalk	$0	$50,500	$0	$0	$0	$0	$0	$0	$60,500	$60,500	$60,500	$60,500	$0	$0	$0	$0	$0	$0	$0	$0
TOTAL	$1,087,400	$1,139,275	$1,310,915	$1,290,790	$1,289,790	$660,077	$659,077	$531,370	$649,145	$650,145	$225,967	$189,467	$70,692	$70,692	$70,692	$70,692	$70,692	$70,692	$70,692	$70,692
CUMULATIVE	$1,087,400	$2,226,675	$3,537,590	$4,828,380	$6,118,170	$6,778,247	$7,437,323	$7,968,693	$8,617,838	$9,267,983	$9,493,950	$9,683,417	$9,754,108	$9,824,800	$9,895,492	$9,966,183	$10,036,875	$10,107,567	$10,178,258	$10,248,950

Table 6-5 - Maintenance Costs for Glenorchy Conservation Area Master Plan

Cost Element	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Pit and Mound Topography *(Table 3-6)*																				
Grassland / Prairie Restoration *(Table 3-5)*																				
Trailhead Closures *(Table 3-4)*																				
Enhanced Riparian Planting *(Table 3-7)*																				
Constructed Wetland *(Table 3-8)*	$1,284	$2,568	$4,089	$5,605	$7,120	$7,960	$8,800	$9,501	$10,202	$10,904	$11,072	$11,240	$11,408	$11,577	$11,745	$11,913	$12,081	$12,250	$12,418	$12,586
Wetland Enhancement Planting *(Table 3-9)*																				
Forest Nucleation Cell Planting *(Table 3-10)*																				
Succession Forest Planting *(Table 3-11)*																				
Service Road	$0	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
Trails	$0	$0	$400	$800	$800	$800	$800	$800	$800	$3,760	$6,720	$9,680	$12,640	$12,640	$12,640	$12,640	$12,640	$12,640	$12,640	$12,640
Interpretive Signs	$0	$0	$500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000
Benches	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000
Webcams	$0	$0	$200	$200	$400	$400	$600	$600	$800	$800	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
Boardwalk	$0	$0	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$10,500	$16,000	$21,500	$27,000	$27,000	$27,000	$27,000	$27,000	$27,000	$27,000	$27,000
Staffing	$119,300	$119,300	$119,300	$119,300	$119,300	$119,300	$119,300	$119,300	$119,300	$119,300	$119,300	$179,000	$179,000	$179,000	$179,000	$179,000	$179,000	$179,000	$179,000	$179,000
TOTAL	$120,584	$122,868	$130,489	$133,405	$135,120	$135,960	$137,000	$137,701	$138,602	$147,764	$162,092	$233,420	$242,048	$242,217	$242,385	$242,553	$242,721	$242,890	$243,058	$243,226

Table 6-6 – Staffing (FTE) Implications

Summary Table	Development	Operations		Total
		Associated with Maintenance	Associated with Management	
Year 1	9.11	0.01	2.00	11.12
Year 2	9.55	0.03	2.00	11.58
Year 3	10.99	0.09	2.00	13.08
Year 4	10.82	0.12	2.00	12.94
Year 5	10.81	0.13	2.00	12.94
Year 6	5.53	0.14	2.00	7.67
Year 7	5.52	0.15	2.00	7.67
Year 8	4.45	0.15	2.00	6.60
Year 9	5.44	0.16	2.00	7.60
Year 10	5.45	0.24	2.00	7.69
Year 11	1.89	0.36	3.00	5.25
Year 12	1.59	0.46	3.00	5.05
Year 13	0.59	0.53	3.00	4.12
Year 14	0.59	0.53	3.00	4.12
Year 15	0.59	0.53	3.00	4.12
Year 16	0.59	0.53	3.00	4.12
Year 17	0.59	0.53	3.00	4.12
Year 18	0.59	0.54	3.00	4.13
Year 19	0.59	0.54	3.00	4.13
Year 20	0.59	0.54	3.00	4.13

6.5 Development, Maintenance and Management Costs

Table 6-7 shows the capital (development) and operating cost implications of the development of the master plan for Glenorchy Conservation Area, based upon the assumptions outlined above. As shown, the capital and development costs approximate $1.0 to $1.3 million each year in the first 5 years, then drop considerably in years 6 through 10. After this period, the development of the conservation area according to this plan is largely complete. Cumulative development costs after this time (i.e. by year 20) are estimated to be just over $10.0 million, again, measured in terms of 2010 Canadian dollars.

6.6.1 Cost Sharing and Sponsorships

The development plan as outlined above does include several possibilities for partnerships and cost-sharing arrangements with potential future partners. We have previously mentioned organizations such as the Conservation Halton Foundation, Province of Ontario, Regional Municipality of Halton, Town of Oakville, Oakvillegreen, Hydro One, Trees Ontario Foundation and various other community and volunteer groups. The possibilities in this regard include:

- cost-sharing arrangements with specific logical partners regarding certain aspects of access and programming; for example, (as discussed above); with the Town of Oakville regarding observation towers and interpretive facilities looking into the conservation area at key vantage points, etc;
- corporate sponsorships and/or foundations for specific restoration projects (such as the wetlands restoration project), or the various web-cams proposed as part of the interpretive programming;
- public fundraising and donations for specific aspects of the development plan (e.g. benches); and
- use of volunteer labour where possible to reduce the labour cost component of specific projects.

As a new Conservation Area in a prosperous and well-regarded community, Glenorchy should be very attractive to potential sponsors and partners. With economic turnaround (inevitable at some point over the 20-year development horizon for this plan) there will undoubtedly be significant opportunities for partnerships and sponsorships of various types. To the extent that Conservation Halton actively solicits such partnerships and opportunities (for example, by proactively promoting the fact that it is open to various ideas and projects that would help develop the area along the lines of the scenario outlined here) such partnerships may be more likely than not. One of the key roles of the Restoration Coordinator could be to seek out and develop potential joint initiatives in this regard.

6.6.2 Revenue Generation from Visitors

It is anticipated that the Glenorchy Conservation Area will attract approximately 8,000 visitors annually (as outlined in the Stage One report). This is deemed to be too low a figure to warrant charging an admission fee (i.e. the cost of collection would likely exceed the revenues collected). In addition, the 'porous' nature of the configuration of the conservation area (not having a single or very few controllable entry point[s]) would make charging admission difficult. Accordingly, revenue from visitors was assumed to be nil.

However, the very fact that Glenorchy would be a freely available opportunity for the general public could be a very positive aspect from the potential for sponsorship and partnership development. Greater accessibility (through free admission) may well make the area more attractive and valuable a property with which potential sponsors – particularly corporate sponsors – could be associated.

SECTION SEVEN: CONCLUSION

The Glenorchy Conservation Area Master Plan consists of development and restoration plans, resource and park management plans, as well as a preliminary assessment of capital and operating costs. This master plan protects and enhances the significant natural features and ecological functions of the conservation area while providing opportunities for the public to gain an appreciation for this significant area, enjoy the spectacular views, and allow for limited recreational opportunities. The entire 401 hectares of the property are to be protected and enhanced to achieve sustainability of a range of vegetation communities that will provide habitats for a broad diversity of species. Interpretive and educational opportunities will include a trail system that will direct visitors to various interpretive nodes. Webcams will also record the actions of species in their habitats as well as the progress of the restoration works in the more sensitive areas of the site.

Elements of the restoration and management plans that will ensure the environmental sustainability of the conservation area include:

- Develop park uses in accordance with the park management zone designations
- Close and restore existing unauthorized roads and trails
- Secure the property from unauthorized and/or illegal uses such as hunting, dumping, motorized vehicles
- Prepare a detailed restoration implementation plan for forest, wetland/riparian and grassland/prairie habitats
- Develop a Visitor Impact Management program
- Monitor and protect species at risk
- Manage for invasive species, etc.

This master plan encourages partnerships that support cost sharing and sponsorships. Potential sources of funding have been identified in this report and will be pursued. Conservation Halton will continue to meet with the Town of Oakville to explore the potential for a partnership to provide park amenities such as parking and washroom facilities on the adjacent parklands.

The Glenorchy Conservation Area benefits the Town of Oakville by providing a significant natural heritage open space with community access where natural processes are protected and enhanced, as well as providing opportunities for education, recreation and research. In addition, overall benefits to the Town of Oakville will be realized through the contribution that Glenorchy Conservation Area will provide relative to the town-wide target of 40% forest cover. Links to future municipal trails will increase the benefit of the trail system to the residents of Oakville.

Evaluation of this master plan suggests that while the environmental sustainability of the area is ensured, further educational opportunities would benefit the community, as well as the financial viability of the conservation area. The addition

of an interpretive centre has been a much-debated component of this planning process. Currently, an interpretive centre is not proposed, but the plan suggests this could be reconsidered in years to come based on evolving community needs and availability of financial resources. Such a facility would require a Town of Oakville official plan amendment and rezoning.

Future needs may necessitate updating this master plan. It is recommended that the plan be reviewed every five years to assess its continuing suitability.

GLOSSARY OF TERMS

Adjacent Lands: Those lands bordering the Glenorchy Conservation Area.

Area of Natural and Scientific Interest (ANSI): Areas of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education.

Committee on Status of Endangered Wildlife in Canada (COSEWIC): A committee of experts that assesses and designates which wildlife species are in some danger of disappearing from Canada.

Ecological Land Classification (ELC): This approach classifies natural environments based on a limited number of ecological factors such as interactions among landforms, soil, water, climate, fauna and human activities, none of which is predominant. The Ecological Land Classification provides tools and techniques for consistent description, identification, classification and mapping of ecological community types. The ELC is now becoming a standard method across Ontario to meet the needs of ecosystem management and land use planning.

Environmentally Sensitive Area (ESA): Environmentally Sensitive areas are areas where the landscape, wildlife, ecological function or historic value is of importance or is endangered.

Grasslands: Habitats that consist predominately of grasses, forbs (herbaceous vegetation) and sedges, where few or no trees grow and include prairies and savannas.

Hydrologic Function: The functions of the hydrological cycle that include the occurrence, circulation, distribution and chemical and physical properties of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere, and water's interaction with the environment including its relation to living things.

Linear metre: Term used to describe a one metre length of any long, narrow object. Typical objects measured and sold by linear meters include boards, pipes and fencing.

Linkage Area: These areas form part of a central corridor system that supports or has the potential to support movement of plants and animals among the Natural Core Areas, Natural Linkage Areas, river valleys and stream corridors.

Natural Heritage Features and Areas: These features and areas, including significant wetlands, significant coastal wetlands, fish habitat, significant woodlands, significant valleylands, significant habitat of endangered species and threatened species, significant wildlife habitat, and significant areas of natural and scientific interest, which are important for their environmental and social values as a legacy of the natural landscape of the area.

Natural Heritage System: A system made up of natural heritage features and areas, linked by natural corridors necessary to maintain biological and geological diversity, natural functions, viable populations and indigenous species and ecosystems. These systems include lands that have been restored and areas with the potential to be restored to a natural state.

Negative impacts: In regard to natural heritage features and areas, degradation that threatens the health and integrity of the natural features or ecological functions for which and areas is identified die to single, multiple or successive development or site alteration activities.

Ontario Ministry of Natural Resources (OMNR): This Ministry manages and protects Ontario's natural resources for wise use across the province, contributing to the environmental, social and economic well-being of Ontario.

Ontario Realty Corporation (ORC): The Ontario Realty Corporation provides sustainable, enterprise-wide real estate solutions for the Ontario public service, allowing efficient and effective delivery of government programs to the public, optimizing the value of the government's real estate portfolio and providing cost-effective solutions for public service accommodation.

Provincially Significant Wetlands (PSW): Provincially Significant Wetlands are wetlands that, in the opinion of the Ministry of Natural Resources contain habitats of critical importance to fish or wildlife, have a significant hydrologic role in the watershed in which they exist, provide significant social or economic benefits and have unique or provincially significant features. Development is not permitted in Provincially Significant Wetlands.

Sensitive: Concerning surface water features and ground water features, means areas that are particularly susceptible to impacts from activities or events including, but not limited to, water withdrawals and addition of pollutants.

Species at risk (SAR): Species listed or categorized as such by the Ontario Ministry of Natural Resources' Species at Risk in Ontario (SARO) List or on the COSEWIC list, as updated and amended periodically. The SARO list definitions include:

- Endangered: Facing extinction or extirpation
- Threatened: At risk of becoming endangered
- Special Concern: Sensitive to human activities or natural events which may cause it to become endangered or threatened

Species at Risk Act (SARA): This Act is a key federal government commitment to prevent wildlife species from becoming extinct and secure the necessary actions for their recovery. It provides for the legal protection of wildlife species and the conservation of their biological diversity.

Valleys and Valleylands: Depressional features associated with the river or stream, whether or not they contain a watercourse.

Visitor Impact Management (VIM): This tool covers a range of processes and techniques for managing visitors, their activities, and their impacts, in a specific area. It is a key aspect of tourism management by both private and public organizations, especially in natural areas with special values that need protection.

Watershed: An area that is drained by a watercourse and its tributaries.

Wetland: As defined by the Ontario Ministry of Natural Resources, an area (including swamp, marsh, bog, prairie pothole, or similar area) having a predominance of hydric soils that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support and that under normal circumstances supports the anaerobic condition that supports the growth and regeneration of hydrophytic vegetation.

Wildlife: All wild mammals, birds, reptiles, amphibians, fish, invertebrates, plants, fungi, algae, bacteria and other wild organisms.

Wildlife Habitat: Areas where plants, animals and other organisms live, and find adequate amounts of food, water, shelter and space needed to sustain their

populations. Specific wildlife habitats of concern may include areas where species concentrate at a vulnerable point in their annual or life cycle; and areas important to migratory or non-migratory birds.

Woodlands: Treed areas that provide environmental and economic benefits to both private landowners and the public, such as erosion protection, hydrological and nutrient cycling, provision of clean air, provision of wildlife habitat, outdoor recreational opportunities, and the sustainable harvest of a wide range of woodland products. These include treed areas, woodlots or forested areas and can vary in their level of significance at the local, regional and provincial levels.

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