APPENDIX A

Niagara-on-the-Lake Watershed Plan
Terms of Reference
(April 2005)

Introduction

The *Niagara Water Quality Protection Strategy* (*NWQPS*) (2003) has identified the need to manage Niagara's watersheds in such a manner as to "sustain healthy rural and urban communities in harmony with a natural environment, rich in species diversity". Recent changes to the Provincial Policy Statement (PPS), issued under the Planning Act, now includes policies whereby Planning Authorities shall protect, improve or restore the quality and quantity of water by using the watershed as an ecologically meaningful scale for land use planning. The Niagara-on-the-Lake (NOTL) Watershed Plan will make recommendations to Planning Authorities on the best way to protect, improve and restore water quality and quantity in the land use planning process as well as recommend a restoration program and associated strategies to achieve the NWQPS vision.

A Watershed Plan is a proactive document created cooperatively by government agencies and the community to manage the water, land/water interactions, aquatic life and aquatic resources within a particular watershed to protect the health of the ecosystem as land uses change. The NOTL Watershed Plan will provide strategies that will allow the community to care for water resources, natural heritage, settlement and agriculture in the context of land use planning documents (e.g., Official Plans). It will also provide strategies for implementing the watershed initiatives and specify who is responsible for remedial actions outside of the land use planning process (e.g., restoration opportunities on public and private lands). The NOTL Watershed Plan will generally follow the process described in *Water Management on a Watershed Basis: Implementing an Ecosystem Approach*, (MOEE, MNR 1993).

The NOTL watershed plan will include Local Management Area (LMA) 1.10 and a portion of 2.16 as identified in the NWQPS. The NOTL watershed contains all of NOTL except for the One Mile Creek watershed, which already has its own watershed plan. Several subwatersheds form the NOTL watershed including Eight Mile Creek, Four Mile Creek, Four Mile Creek Pond, Six Mile Creek, Two Mile Creek, and Lake Ontario subwatersheds 2,3,4,5,6, 7 and 8 (Figure 1). Urban areas in the watershed include a small portion of the Town of NOTL (south western edge), Virgil, Queenston, St. David's, Glendale and a small section of Niagara Falls.

The NOTL watershed plan should also take into consideration the Lake Ontario Shoreline Management Plan (1994). The major goals of the shoreline management plan were to minimize danger to life and property damage from flooding, erosion and associated hazards along the shoreline, and to ensure that shoreline development adequately addressed these hazards.

The Niagara Escapement is located along the southern edge of the watershed. Slopes of varying steepness are found along the escarpment, but the remainder of the watershed is a flat plain the slopes gently to Lake Ontario. The watershed is characterized by good quality agricultural land for tender fruit and grape production. Aquatic habitat is also considered good in the watershed. For example, the lower reaches of Eight Mile, Six Mile, Four Mile and Two Mile Creeks are classed as critical fish habitat, and the upper reaches are classed as important fish habitat. Many of the creeks in the NOTL watershed are now municipal drains and a reservoir has been created on Four Mile Creek, which may have implications for fish and fish habitat.

St. David's Gorge traverses the NOTL watershed. The gorge is an abandoned channel that has been filled in with a complex sequence of glacial and periglacial deposits including gravels, sands, tills, silts, and clays at depths up to 200 metres. Irrigation for agriculture is a noted concern in the NOTL watershed. Currently, irrigation water is supplied via a network of intake channels, reservoirs, municipal drains and natural channels. However, surface water shortages during dry summers do occur despite the irrigation network.

Scope of the Study

The intent of this project is to produce a watershed plan developed in consultation with appropriate government agencies, landowners and interest groups that assists with the management of water, land/water interactions, aquatic life and aquatic resources to protect and improve the health of the watershed ecosystem. The NOTL Watershed Plan will provide a systematic strategy to guide development, identify and recommend alternative and preferred restoration programs, and strengthen stewardship and partnerships in the watershed. Once complete, the NOTL Watershed Plan will characterize the watershed; identify and prioritize key issues in the watershed and recommend strategies based on the key issues.

Specific Components of the Study

Public Consultation

The purpose of public consultation is to ensure that concerns and issues are identified early and addressed appropriately. The public consultation plan will be based on an open and participatory process and will aim to create public awareness about the project.

The project consultant shall provide a minimum of four public meetings/presentations, and allow for further public input as required at critical stages of the project. The format for public meetings will present opportunities for information exchange and feedback in the form of Open Houses and Stakeholder Workshops.

The project consultant shall assist in the establishment of a project committee (with membership yet to be determined), take appropriate minutes, and document concerns and action items as required. It should also be noted that the Four Mile Creek – Niagara Chapter of Trout Unlimited Canada has been active in trying to restore the brook trout population that once inhabited Four Mile Creek and, as such, they should be involved in the watershed planning process.

Watershed Inventory and Actions

The project consultant shall review all available information pertaining to the NOTL watershed and undertake field surveys as necessary to produce a complete characterization and inventory of the watershed and watercourse conditions (including natural channels and municipal drains). The study components will include but not be limited to the following:

Floodplain Mapping

This component of the study will undertake the necessary hydrologic and hydraulic analysis in order to generate 100 year return period floodlines for Two Mile, Four Mile, Four Mile Pond, Six Mile and Eight Mile Creeks. All components of this analysis shall be consistent with the Ministry of Natural Resources and the Flood Damage Reduction Program requirements. A digital

elevation model and digital colour air photos of the subject watersheds are available from the NPCA for use in this study.

Stream Morphology

This component of the watershed study will confirm reach boundaries and channel sensitivities through an historic assessment and synoptic level survey. During the field survey, any sites where bank erosion is taking place or could potentially occur, will also be identified for all watercourses including municipal drains in the watershed. The project consultant shall recommend both structural and non-structural rehabilitation and restoration measures to establish natural levels of erosion in the watershed.

Fish and Aquatic Habitat

This component of the study will assess existing fish communities and fish habitat conditions in the watershed. In addition, factors that limit the distribution and abundance of healthy fish communities will be identified (e.g., Virgil Dam). It is noted that Four Mile Creek had a native brook trout population in the past. However, land use change has depleted trout populations over time. The Four Mile Creek – Niagara Chapter of Trout Unlimited Canada is confident that this creek can be returned to a viable cold water resource amenable for the return of brook trout. Fish studies for this component of the watershed study will place emphasis on identifying and evaluating stream conditions suitable for brook trout in Four Mile Creek. The Watershed Plan will determine the feasibility of establishing a cold water fishery in Four Mile Creek.

Fish habitat falls into 1 of 3 categories in Niagara: Type 1, Type 2 or Type 3. Habitat type is based on the sensitivity and significance of current or potential habitats in a water body. Type 1 habitat is the most sensitive habitat of the 3 types. As a result, it requires the highest level of protection. Type 2 habitat is less sensitive and requires a moderate level of protection. Type 2 areas are considered “ideal for enhancement or restoration projects” and include feeding areas for adult fish and unspecialized spawning habitat. The project consultant shall focus on aquatic habitat restoration opportunities in these areas of the watershed, and make recommendations on priority areas and strategies to improve fish habitat.

Even though their purpose is to remove excess water from the land, municipal and agricultural drains do contain fish habitat. Therefore, drains are classed (A through C) or typed (D through F) according to flow, temperature, species, and the length of time since they were last cleaned out. For example, a Class A drain has permanent flow with cold or cool water temperature and no presence of trout or salmon. Type E drains also have a permanent flow with warm water temperatures and top predators (e.g., bass, pike, muskie and crappie) present in the drain. Therefore, the project consultant shall review environmental and habitat conditions of municipal drains in the watershed and make recommendations on priority areas and strategies to improve fish habitat.

Natural Heritage

This component of the watershed study will include the identification of existing wetlands, woodlands, wildlife travel corridors and wildlife habitat areas as well as the relationship between wildlife and natural areas. In addition, this component of the watershed planning process will identify the resource management role of existing wetlands and woodlands with respect to flood attenuation, wildlife habitat and water quality enhancement. Natural area boundaries will be confirmed and mapped as part of this study. Historic locations of wetlands and woodlands will also be reviewed. Based on this investigation, the project consultant shall propose sites for

remediation to address issues such as flood attenuation, wildlife habitat, and water quality. In addition, the project consultant shall propose suitable sites to increase forest and wetland cover in the watershed.

Lake Ontario Shoreline

Since the time the Lake Ontario Shoreline Management Plan was prepared in 1994, the Provincial Policy Statement under the Planning Act has added new policies with respect to Natural Hazards, specifically dynamic beaches. The watershed plan will update the components of the Lake Ontario Shoreline Management Plan that are outdated and to bring up to the current standards for Natural Hazards and Natural Heritage under the PPS.

Water Quantity

The Regional Municipality of Niagara has recently retained Stantec Consulting Limited to undertake a feasibility study of raw water supply for agricultural irrigation purposes in the Niagara Region. Niagara-on-the-Lake is one of this study's focus areas because irrigation is heavily used in this area. The source of irrigation water in NOTL is mainly channelled through the municipal drain system. The quantity of water in the drain irrigation system is not sufficient in some years, and Regional Niagara is currently investigating methods to ensure an adequate water supply for irrigation water that takes into account environmental systems.

The project consultant shall use any findings from the feasibility study in assessing issues pertaining to water quantity in the watershed. For example, the watershed study will include an evaluation of the ability of watercourses (including municipal drains) to sustain healthy populations and other aquatic life, as well as recreational uses (e.g., fishing) given surface water withdrawals for irrigation. In addition, the impact of excessive flows (nuisance flooding) and inadequate flows (if/when they occur) on the concentration of pollutants and increases in stream temperatures will form part of the study. The project consultant shall make recommendations to enhance surface water quality during low water conditions in the watershed.

Water Quality

This component of the watershed study will assess the existing water quality of the creeks and tributaries within the NOTL watershed. Recent water quality studies (BioMap) indicate impaired water quality for Four Mile Creek and Two Mile Creek. Thus, the project consultant shall note existing sources of pollution and recommend remedial actions as well as identify opportunities for water quality enhancement. In addition, the project consultant shall include a set of recommended water quality objectives based on stream use (e.g., aesthetics, fishery, recreation).

The project consultant will also examine issues related to public concerns raised about the impact of exiting development on watershed health including the impacts of stormwater discharge on water quality, biological diversity and productivity, downstream peak flows, and channel erosion.
The project consultant will also review the Niagara Peninsula Conservation Authority's *Groundwater Study* (2005) to determine high sensitivity groundwater sites in the study watershed, and make recommendations to protect groundwater resources.

Rural Point and Non-Point Source Pollution

The *NWQPS* (2003) identified the need to assess the impacts of agriculture on water quality through an inventory of rural best management practices (BMP). Information is lacking in the watershed in terms of the significance of rural non-point source pollution problems such as livestock access, feedlot runoff, discharge of septic system or livestock/farmstead wastes to watercourses, and municipal drains through the field tile drainage works.

To accomplish this component of the watershed plan, the project consultant shall administer a landowner survey to rural landowners to identify any rural non-point source problem areas and identify rural BMPs.

Urban Development

The *NWQPS* (2003) has identified issues associated with urban development for this watershed. Urban development can result in an increased frequency of flooding and peak flow volumes, decreased base flow, increased sediment loadings, changes in stream morphology, increased organic and inorganic loadings, increased stream temperature, and loss of aquatic/riparian habitat. The project consultant shall investigate existing and future areas designated for urban development with respect to these potential impacts, and make recommendations to protect, improve and restore water quality and quantity in these areas recognizing the recent changes to Provincial legislation (e.g. Planning Act, Provincial Policy Statement, Greenbelt Plan and proposed Greater Golden Horseshoe Plan).

Project Phases and Deliverables

Develop a Watershed Plan and Restoration Strategy

The NOTL Watershed Plan will make recommendations to protect, improve and restore water quality in quantity as required by the Provincial Policy Statement issued under the Planning Act, including opportunities for restoring and rehabilitating the creeks and their tributaries within the NOTL watershed. Consideration will be given to the input and issues brought forth through the public consultation process, the *NWQPS* (2003), and the study consultant's findings. The watershed planning process will provide a systematic strategy to guide development, identify and recommend alternative and preferred restoration programs, and strengthen stewardship and partnerships in the watershed. It will be completed in 2 Phases including, but not limited to the following:

Phase 1: Background Study and Issues Identification

- Background data collection and synthesis (e.g., watershed characterization).
- Identification of key issues in the watershed.
- Identification of any technical studies to fill in any information gaps in the watershed study area.

Phase 2: Watershed Strategy

- Recommendations on land use policies for protecting, improving and restoring water quality and quantity in Municipal Planning documents
- Recommendations on stream rehabilitation and restoration measures, both structural and non-structural, municipal and regional policies, educational and outreach programs, and long and short term objectives.
- Identification and recommendation of restoration sites based on key issues in the watershed. Where applicable, all recommendations shall be separated based on ownership, whether publicly owned (Municipality or Regional Niagara) or private.

- A priority list including estimated costs for projects, activities, policies or other recommendations that are developed through the creation of the Watershed Plan
- Recommendations regarding a monitoring program and performance indictors to assist in determining the effectiveness of Watershed Plan implementation
- Recommendations for financial and information assistance programs that could be considered to assist in the implementation of the Watershed Plan.

Timing

The project is targeted to be completed within 18 months of initiation.

Reports and Documentation

The project consultant shall deliver 10 copies of a draft report and 20 copies of a final report for Phase 1 – Background Study and Issues Identification, and for Phase 2 – Watershed Strategy to the NPCA. Interim reports shall be delivered as required through the course of the project.