

Sustainable Halton



Water and Waste Water Infrastructure

May 2007



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EXECUTIVE SUMMARY

1.0 INTRODUCTION

The purpose of this background study is to provide an overview of current, planned and potential water and wastewater (W/WW) infrastructure for Halton Region.

The Regional Official Plan defines the objectives of urban W/WW servicing as follows:

- a) Provide satisfactory levels of urban servicing in the Urban Area to meet existing and future requirements;
- b) Provide a staged approach for improvement and extension of urban services that is:
 - within financial capabilities of Region,
 - meeting or exceeding provincial standards, and
 - based on infrastructure plan.

W/WW infrastructure master plans and projects require approval through the Class Environmental Assessment (Class EA) process, which is a phased planning approach including public consultation.

2.0 EXISTING WATER AND WASTEWATER INFRASTRUCTURE

W/WW servicing is currently provided through a lake-based system for Oakville, Burlington, new urban areas of Milton and the Halton Hills 401 Corridor, and through groundwater/stream-based systems for Acton, Georgetown and the old urban area of Milton.

Lake-Based System

Lake-based water is currently treated at two facilities: the Burlington Water Purification Plant (WPP) and the Oakville WPP, with a third facility, the Burloak WPP currently under construction. The water is distributed through the South Halton Water Distribution system through separate water pressures zones each spanning an elevation difference of approximately 30 metres. The Burlington and Oakville WPP's are at the limit of their site capacity, but the Burloak WPP site has potential for future expansion.

There are four lake-based wastewater treatment plants each with their own wastewater collection system: the Burlington Skyway WWTP, Oakville South

West WWTP, Oakville South East WWTP and the Mid-Halton WWTP. Of these only the Mid-Halton plant has significant potential for future expansion. The Skyway plant also has site capacity for expansion but requirements of the Hamilton Harbour Remedial Action Plan would have to be met, possibly including a new outfall to Lake Ontario.

Groundwater and Stream-Based System

The Milton well water supply system consists of the Kelso and Walker's Line well fields. The two aquifers are at the maximum safe aquifer yield, and therefore, an expansion of this supply is not considered feasible for servicing new growth. The Milton WWTP is a tertiary treatment facility discharges treated effluent to Sixteen Mile Creek which is limited receiving water and therefore, offers only minimal opportunity for expansion of the plant. Therefore, new growth in Milton will be serviced by the lake-based system.

The Acton well water supply system comprises five wells which are currently operating at capacity: the two Davidson wells and the Fourth Line well are located within the Amabel aquifer, and the two Prospect Park (Fairy Lake) wells are located within the Prospect Park aquifer. The Acton WWTP is also at capacity and discharges to Black Creek, which is designated a sensitive stream and cold-water fishery. Halton Region is currently undertaking water and wastewater master plan projects to address servicing of the existing urban area of Acton, however the outcome is dependent on agency approval.

The Georgetown groundwater supply system consists of 7 municipal wells which are currently operating at capacity: four wells are located at the Cedarvale Well Site, two at the Princess Anne well site, and one at Lindsay Court. Halton Region is currently undertaking several Class EA projects required to meet the water supply requirements of the existing urban area of Georgetown, but the outcome of these projects is dependent on agency approval. The Georgetown WWTP has sufficient capacity to service the existing urban area; it also discharges to a sensitive receiver Silver Creek.

3.0 PLANNED WATER AND WASTEWATER INFRASTRUCTURE

South Halton Water and Wastewater Master Plan Update

The South Halton Master Plan Update (MP Update) was initiated in October of 2006 to prepare an update to the 2002 Master Plan for the Lake based Water and Wastewater Infrastructure in the Region of Halton. The purpose of the MP Update is to re-examine the timing and costs for water and wastewater infrastructure projects to the year 2021 for the existing urban areas of Oakville, Burlington, Milton and the Halton Hills Highway 401 Corridor. It is the intention of this plan to provide direction for expansion of the Region's Water and Wastewater Infrastructure until such time as the new Durable Halton Master Plan

can be completed in 2009. Scheduled for completion in May of 2007, the MP Update will also provide input for a new water and wastewater development charges bylaw in 2007.

The MP Update will examine three development scenarios for analysis. The Best Planning Estimates Version 4 based on Places to Grow will be the primary information utilized for updating land use data for the study for the period 2006 to 2021.

The plan will also address 2031 oversizing requirements for projects that are required to be sized with greater capacity than will be necessary for 2021 due to long term needs or logical capacity requirements.

A rudimentary mature state analysis will be completed to ensure all short term projects are recommended in a way to ensure that they will not be redundant in the future. Examples of this include the need to ensure sufficient property requirements are recommended for the mature state and linear pipe sizes are consistent with a longer term plan.

Incorporated as part of the plan will be the requirements for biosolids handling at each of the major Wastewater Treatment Plants. A separate Biosolids Master Plan will identify offsite biosolids management options (see below).

Milton & Halton Hills 401 Corridor Alternate Water Supply Class EA

Halton Region is currently undertaking a Class EA Study for an alternate water supply to the Town of Milton and the Halton Hills Highway 401 Corridor. The alternate water supply will be required to provide capacity for projected and approved growth to the year 2021 and security of supply. The alternate water supply will also function as a long-term supply for the future Zone 4 reservoir.

Zone 5 Reservoir and Feedermain Class EA

The purpose of this Class EA is to identify a preferred location for the Zone 5 water reservoir to accommodate growth in the lake-based serviced areas of Milton and Halton Hills 401 Corridor. The purpose of the Zone 5 reservoir is to supply water during peak hour demands, fire, or emergency.

Georgetown Water Supply and Assimilative Capacity Study

Halton Region is currently in the process of hiring a consultant to undertake a third party peer review of the work completed to date to find an additional water supply source for expansion of the Georgetown urban area. A separate consultant is being retained to address the issue of potential assimilative capacity in Silver Creek for expansion of the Georgetown WWTP. These studies are to be completed by the end of March 2007 for including in this background study.

Biosolids Master Plan

The Region's current strategy for biosolids management is very similar that of other municipalities across the GTA. That is to maximize the amount of land application in partnership with the agricultural community of Halton, utilize landfill disposal as necessary, and implement technologies at our wastewater treatment plants such as digestion and dewatering to allow access to as many diverse biosolids management options as possible.

The long-term strategy includes continuing to support and sustain our land application program to the greatest degree possible, as it provides a viable service to the agricultural community, continuing to utilize technologies such as digestion and dewatering that allow diversification, and then to explore options for diversification such as alkaline stabilisation, energy from waste and pelletization.

4.0 AQUIFER MANAGEMENT AND SOURCE PROTECTION

The new Clean Water Act which became law in 2006 requires the development and implementation of Source Protection Plans of lake based and aquifer based water supplies on a watershed basis. These plans and the implementation of the Region's Aquifer Management Plan will provide a long term strategy to protect water resources in Halton. This new legislative environment will impact on the ability to expand Halton's well and stream based systems, particularly in Georgetown which is a sensitive setting from a hydrogeologic perspective.

5.0 SUMMARY OF KEY HIGH-LEVEL ISSUES

Key high-level issues for the Durable Halton Plan related to water and wastewater infrastructure will include:

- The well and stream based systems will probably not be able to support intensification in current serviced areas or expansion of the current urban boundaries.
- Intensification in existing lake-based urban areas will be challenging and costly because of the effect on existing infrastructure. It will be necessary to upsize much of the existing in-ground infrastructure and expand existing water and wastewater treatment facilities. However, the site capacity of existing water and wastewater treatment plants is limited and it will be difficult to obtain suitable new sites.
- A second major trunk watermain feed from Lake Ontario to north of Highway 407 will probably be required.
- A second major trunk gravity sewer from north of Highway 407 to the Mid-Halton Wastewater Treatment Plant (or other site) will probably be required.

- Increasingly stringent regulatory limits for discharge of wastewater to Lake Ontario will likely result in a significant increase in the cost of wastewater treatment capacity.

5.1 Options

Options that will be reviewed as part of the Durable Halton Plan include:

- Location of infrastructure to support growth and minimize cost
- Lake based versus well and stream based servicing
- Modification of distribution and drainage boundaries to accommodate intensification
- Treatment options to maximize site capacity
- Service connections to neighbouring municipalities

5.2 Georgetown Water Supply and Assimilative Capacity Study

Halton Region is currently in the process of hiring a consultant to undertake a third party peer review of the work completed to date to find an additional water supply source for expansion of the Georgetown urban area. This study is expected to be completed in the summer of 2007, for inclusion in the development and evaluation of alternatives for the Durable Halton Plan.

A separate consultant is being retained to address the issue of potential assimilative capacity in Silver Creek or Credit River for expansion of the Georgetown WWTP. This study is expected to be completed by the end of March 2007 for inclusion in the final version of this background study.

5.3 Peel Connection

Halton Regional staff have approach Peel Regional staff regarding the possibility of connection to the Peel water and wastewater system, either as a temporary or permanent solution. Staff at Peel Region are currently completing an analysis of their system and results are expected in February 2007. This option will be discussed further in the final version of this background study once we have received Peel's response.

1.0 INTRODUCTION

The purpose of this background study is to provide an overview of current, planned and potential water and wastewater (W/WW) infrastructure for Halton Region.

1.1 Background

It is a Regional responsibility to provide W/WW servicing as legislated under the Halton Act 1973.

The Regional Official Plan defines the objectives of urban W/WW servicing as follows:

- c) Provide satisfactory levels of urban servicing in the Urban Area to meet existing and future requirements;
- d) Provide a staged approach for improvement and extension of urban services that is:
 - within financial capabilities of Region,
 - meeting or exceeding provincial standards, and
 - based on infrastructure plan.

Planning for infrastructure is required to develop capital works budget, provide framework for phased development, and to ensure that servicing is developed in systematic way for proper sizing of facilities.

Following steps are undertaken when planning for infrastructure:

- Complete an inventory of existing system to define deficiencies and excess capacity,
- Develop W/WW system for full urban build out development strategy, and
- Develop phasing of treatment facilities and system components as a function of phased development.

1.2 Master Planning and the Class EA Process

The Class Environmental Assessment (Class EA) process was approved by the Minister of the Environment in 1987 under the Ontario Environmental Assessment Act for municipal infrastructure projects, including roads, water and wastewater projects.

The Ontario Environmental Assessment Act requires proponent to examine and document the environmental effects which might result from major projects or activities and their alternatives. Municipal undertaking became subject to the Act in 1981.

Class EA projects fall into one of the three following Schedules depending on the potential environmental impact of the project:

- **Schedule A** – Schedule A projects generally include normal or emergency operational and maintenance activities. The environmental effects of these activities are usually minimal; therefore, these projects are pre-approved and can proceed immediately to implementation.
- **Schedule B** – Schedule B projects generally include improvements and minor expansions to existing facilities. There is potential for some adverse environmental impacts and therefore the proponent is required to proceed through a screening process including consultation with those who may be affected.
- **Schedule C** – Schedule C projects generally includes the construction of new facilities and major expansions to existing facilities. These projects proceed through the complete environmental assessment planning process outlined in the Class EA before proceeding with construction.

The Class EA is a phased planning approach that includes five main study phases and public consultation. The complexity and extent of the environmental impact of a specific project determines the number of phases to be completed to comply with the Class EA process. The five phases are described below and presented on Figure 1.1:

- **Phase 1 – Problem or Opportunity:** The completion of this phase requires the proponent to document the factors that lead to the conclusion that an improvement or change is warranted.
- **Phase 2 – Alternative Solutions:** In this phase, alternative solutions to the problem or opportunity are identified and evaluated, taking into account the existing environment. A recommended preferred solution can be developed with input from the public and review agencies. The nature of the solution will determine if the proponent is required to complete additional phases of the Class EA process.

- **Phase 3 – Alternative Design Concepts for Preferred Solution:** If required, this phase will examine alternative methods of implementing the preferred solution, again considering environmental impacts and public and review agency input.
- **Phase 4 – Environmental Study Report:** This phase includes the preparation of an Environmental Study Report that documents the rationale and planning and consultative process undertaken for the project and the publication of the report for public review.
- **Phase 5 – Implementation:** This is the implementation phase of the Class EA process. This phase allows for design and construction of the items as planned in earlier phases, and monitoring for compliance with those planning principles.

Schedule A projects involve generally minor operational and upgrade activities and may proceed to implementation once Phase 1 of the Class EA process is complete. Schedule B projects must complete the first two phases of the Class EA process. Proponents must identify and assess alternative solution to the problem, inventory impacts and select a preferred solution. Relevant technical agencies and affected members of the public must be contacted. Provided that no significant impacts are found and no requests are received to elevate the project to a Schedule C or undertake the project as an individual EA (Part II Order), the project may proceed to detailed design. Schedule C projects will proceed through all five phases of the Class EA process and will require more detailed study, public consultation and documentation as they may have for significant impacts.

Master Plans are long range plans which integrate infrastructure requirements for existing and future land use with environmental assessment planning principles. These plans examine an infrastructure system(s) or group of related projects in order to outline a framework for planning for subsequent projects and/or developments. At a minimum, Master Plans address Phase 1 and 2 of the Municipal Class EA process.

2.0 EXISTING WATER AND WASTEWATER INFRASTRUCTURE

Water and wastewater servicing is currently provided through a lake based system for Oakville, Burlington, new urban areas of Milton and the Halton Hills 401 Corridor, and through groundwater and stream based systems for Acton, Georgetown and the older urban area of Milton. This section provides a brief description of existing water supply and distribution systems as well as wastewater collection and treatment systems.

2.1 Lake Based Water Purification Plants

Lake based water in the Halton is currently treated at two facilities, Burlington Water Purification Plant (WPP) and Oakville WPP. The third water treatment facility, Burloak WPP, is currently under construction. Once the Burloak WPP is on-line, all three plants will discharge treated drinking water into the South Halton Water Distribution System, which services Burlington, Oakville and the new urban areas of Milton.

Burlington WPP

The Burlington WPP is located at 3249 Lakeshore Road in Burlington. This facility was built in several stages after first commissioning in 1935. An upgrade and expansion project was initiated in 2000, to expand the capacity of the Burlington WPP. The plant upgrade was completed in 2005 and the capacity was expanded to 263,000 m³/d. Upgrades to the facility included an addition of a high rate sedimentation system (Actiflo) and an ozone system for primary disinfection and taste and odour control. There is minimal additional site capacity available to further increase the plant capacity.

Oakville WPP

The Oakville WPP is located on the shore of Lake Ontario, off of Kerr Street and south of Lakeshore Road. The Oakville WPP was built in several stages with its first components constructed in 1947. The current rated capacity of the plant is 109,000 m³/d. A preliminary design was completed in 2001 to upgrade the Oakville WPP with an Actiflo™ sedimentation process and provision of ozone to provide taste and odour control and a higher level of disinfection. Construction is currently underway with anticipated completion by the summer of 2007. The rated capacity of the plant will remain at 109,000 m³/d. This site also has capacity issues.

Burloak WPP

The first phase of the new Burloak WPP is currently under construction. The plant is located on the south side of Rebecca Street just east of Great Lakes Boulevard in the Town of Oakville (between the Burlington WPP and the Oakville WPP). The current planned capacity of this facility is 220,000 m³/d with the first phase currently under construction equal to 55,000 m³/d. The facility will use state-of-the-art membrane filtration, ultraviolet disinfection and ozone treatment technologies. Construction is currently underway with anticipated completion in early 2008.

2.2 Groundwater Supply

Milton Well Water Supply System

The Milton well water supply system consists of the Kelso and Walker's Line well fields. Four wells are located within the Kelso aquifer and two wells are located within the Walker's Line aquifer and they provide water to the central part of the Town of Milton. The remainder of the Town of Milton is supplied by transmission main from the Oakville WPP, which draws surface water from Lake Ontario. The groundwater and surface water sections of the Milton distribution system are separate.

The two aquifers providing groundwater supply to the central Milton system are at the maximum safe aquifer yield, and therefore, an expansion of this supply is not considered feasible for servicing new growth. The combined Permit to Take Water (PTTW) capacity from the Milton wells is 28,000 m³/d maximum day capacity. The new growth in Milton will be serviced by Lake Ontario based water system.

Acton Well Water Supply System

The Acton well water supply system comprises five wells. The two Davidson wells and the Fourth Line well are located within the Amabel aquifer, and the two Prospect Park (Fairy Lake) wells are located within the Prospect Park aquifer. The combined PTTW capacity from the Acton municipal wells specifies that the approved available maximum day capacity is 6,082 m³/d.

Halton plans to make water supply improvements to the Acton Water Supply System, which supplies water to residential and commercial users in the community of Acton within the Town of Halton Hills. The improvements will expand existing facilities to increase the amount of available treated water in response to the projected population increases.

Georgetown Well Water Supply System

The Georgetown groundwater supply system consists of 7 municipal wells. Four wells are located at the Cedarvale Well Site, two at the Princess Anne well site, and one at Lindsay Court. The combined Permit to Take Water stipulates that the annual average daily withdrawal shall not exceed 4,500 m³/d for the Cedarvale well field and 6,800 m³/d for the Princess Anne well field.

The Georgetown water treatment plant located at 241 Maple Avenue receives groundwater from the Cedarvale well fields and is rated to treat 8,640 m³/d.

Treatment at this facility consists of filtration, uv disinfection, fluoridation, and chlorination for residual management.

Both the Princess Anne and Lindsay Court well fields have their own on-site treatment facilities equipped with chlorination and fluoridation systems.

2.3 Water Distribution System

Due to the gradual rise in ground elevation northerly from the shore of Lake Ontario to the service area boundary in Milton and Halton Hills, separate pressure zones, each spanning an elevation difference of approximately 30 metres, have been established.

The South Halton Water Distribution System is serviced by the Burlington WPP and the Oakville WPP, both located on the shores of Lake Ontario, and will be also serviced by the Burloak WPP in 2008. At present, the distribution system has been divided into five major Burlington pressure zones west of Bronte Creek, while four major zones have been developed east of Bronte Creek in Oakville.

The central part of the Town of Milton water supply system is from municipal groundwater wells. Due to minimal changes in elevation within the service area, the distribution system comprises one pressure zone. The Lake Ontario based water supply system has been expanded to supply water to new growth areas in Milton, and a new lake water zone has been established to maintain separate lake water and well water distribution systems.

Figure 6.4 (from Halton W/WW Master Plan Review, October 2002) located in Appendix A presents a general layout of the South Halton's existing water system showing geographic location of the system components including Burlington WPP, Oakville WPP, and Milton Well Water Supply System as well as Pressure Zones. Existing Acton and Georgetown water infrastructure is shown on Figure 1 and 2 respectively which are located in Appendix A.

2.4 Lake Based Wastewater Treatment Plants

Skyway WWTP

The Skyway Wastewater Treatment Plant (WWTP) is located on Lakeshore Road in Burlington, adjacent to the Burlington Skyway Bridge. The Skyway WWTP provides wastewater treatment for the urban area in the City of Burlington in a conventional activated sludge facility. Treated effluent is discharged to Hamilton Harbour, which has been identified as an Area of Concern in the Great Lakes. The Hamilton Harbour Remedial Action Plan (RAP) has called for more stringent effluent quality requirements in order to reduce nutrient loadings to the

Harbour. The RAP has set initial and final loading targets for contaminant loadings from the Skyway WWTP. The RAP initial and final loading targets will govern the level of treatment that will be required at the Skyway WWTP in future expansion of this plant, as long as the plant continues to discharge to the Hamilton Harbour. Based on the targets, a high level of tertiary treatment that includes enhanced removal of total suspended solids and phosphorus, as well as complete nitrification, would be required to achieve the initial and final loading targets for any expansion beyond the 118,000 m³/d.

The Skyway WWTP has site capacity to expand from its current capacity of 118,000 m³/d to an estimated 243,000 m³/d. Expansion beyond the 118,000 m³/d would require a higher level of treatment to meet the loading limits, and existing conventional technology does not exist to meet the RAP loading targets at a flow higher than about 143,000 m³/d. Beyond 143,000 m³/d, the outfall capacity would not be adequate. The restrictions posed by the RAP could be avoided by construction of a new outfall to Lake Ontario, which would reduce the level of treatment required and likely minimize any significant restrictions on future expansion of the Skyway WWTP. For the Lake Ontario based outfall, an effluent pumping station would be required to overcome the additional headloss associated with the longer pipe and the effluent diffusers.

Oakville South East WWTP

The Oakville South East WWTP is located on Lakeshore Road, just west of Winston Churchill Boulevard and has a rated capacity of 31,800 m³/d. The conventional activated sludge facility services an urban area of Oakville bounded by Upper Middle Road to the north, Lake Ontario to the South, Winston Churchill Boulevard to the east and Reynolds Street to the west and includes a small area north of Upper Middle Road at Joshua Creek. The service area includes residential as well as industrial, commercial, and institutional land uses. This facility receives a large industrial contribution from the Ford Motor Company. There is some limited opportunity to increase the plant capacity by 15 to 25% based on the continued use of conventional activated sludge treatment.

Oakville South West WWTP

The Oakville South West WWTP is located on Lakeshore Road, west of Fourth Line. The plant services an area bounded by QEW to the north, Lake Ontario to the south, Reynolds Street to the east and Burloak Drive to the west. The conventional activated sludge plant discharges treated effluent through a common diffused outfall with the Mid Halton WWTP to Lake Ontario.

The South West WWTP has an on-line capacity of 35,000 m³/d, with two of the original trains out of service. The site has capacity to restore the original rated

capacity of 45,460 m³/d as well as provide capacity for the high peak flows in the service area. The site is surrounded by residences, and therefore there is no opportunity to expand the plant beyond the current rated capacity.

Mid Halton WWTP

The Mid Halton wastewater treatment plant (WWTP) is located in Oakville on the North Service Road between Third Line and Bronte Road. The plant services an urban area in Oakville bounded by QEW to the south, Bronte Road to the West, and Morrison Creek to the east. The plant will also service growth in North Oakville and Milton. The conventional activated sludge facility discharges treated effluent to Lake Ontario through a common outfall shared with the Oakville South West WWTP.

The plant was originally constructed in 1991 with a rated capacity of 20,000 m³/d. After, undergoing an optimization study, the plant was re-rated to 25,000 m³/d, conditional on demonstrating performance. The plant was then expanded to provide a total capacity of 50,000 m³/d, which is required to serve committed and anticipated growth in North Oakville, Milton, and Halton Hills 401 Corridor. An additional expansion to 75,000 m³/d is currently being tendered for completion in mid 2008.

The ultimate site capacity of the Mid Halton WWTP is 400,000 m³/d based on providing conventional activated sludge treatment. A new outfall will be required at flows greater than 150,000 m³/d. With Lake Ontario as the receiving water, the assimilative capacity does not pose a significant restriction on future expansions to this site.

2.5 Stream Based Wastewater Treatment Plants

Milton WWTP

The tertiary treatment facility discharges treated effluent to Sixteen Mile Creek which is limited receiving water and therefore, offers only minimal opportunity for expansion of the plant.

The Milton WWTP a conventional activated sludge facility which provides servicing to the urban area of Milton. The plant was originally commissioned in 1949 and expanded in four subsequent stages to its current rated capacity of 13,910 m³/d.

In 2004 The Region received approval via a new C of A re-rating the facility at 18,500 m³/d after the commencement of regular operation of the UV disinfection system. Subsequently, a plant upgrade project including the installation of UV

was initialized in 2004 with full commissioning occurring in the summer of 2006. Even with the rerating, adequate capacity is not available on the plant site or within the receiving water to treat most of the flow from anticipated growth within Milton.

Acton WWTP

The Acton WWTP is a conventional activated sludge facility with a design capacity rated to treat daily sewage flow of 4,545 m³/d (on average) and 13,410 m³/d (under peak flow conditions) and discharges to the Black River, designated a sensitive stream and cold-water fishery. The original plant was commissioned in 1951 with additional capacity added in two stages in 1969 and 1978. A recent expansion consisted of the construction of a new filter building, UV system and digester system upgrades.

Georgetown WWTP

Georgetown WWTP is a conventional nitrifying activated sludge plant. Commissioned in 1959 the Georgetown Plant has since expanded from the original (Plant A) to meet the growing needs of the surrounding community. (Plant B) represents the main expansions at the Georgetown WWTP occurring in 1977/8 and 1987-1990, and currently treats 76% of the overall sewage flow to the plant.

Today the plant's average flow capacity is 22,727 m³/d, with a peak capacity of 57,300 m³/d. The Georgetown WWTP discharges into a sensitive receiver, the Silver Creek, and therefore it is necessary for the plant to adhere to strict effluent limits set by the MOE. Based on 2005 flows to Georgetown, the plant is receiving approximately 16,170 m³/d representing 70 per cent of the rated capacity of 22,727 m³/d.

2.6 Wastewater Collection System

The wastewater collection systems in the Region of Halton may be categorized by the wastewater treatment plants that receive and treat wastewater flows. Specifically, these are the Burlington Skyway WWTP, the Mid Halton WWTP, the Oakville South West WWTP, the Oakville South East WWTP and the Milton WWTP.

The ground elevations sloping from north to south starting in the Milton and northern Burlington and Oakville areas have led to the planning and construction of gravity collection systems which ultimately outlet to Lake Ontario. In areas along the shoreline and at locations which are topographically difficult to service by gravity, wastewater pumping stations and forcemains have been constructed

to connect sub-drainage areas to the gravity collection system. The Milton WWTP and collection system is separate from the Burlington and Oakville systems and currently discharges to Sixteen Mile Creek.

The wastewater collection systems generally consist of relatively small (i.e. 200 mm and 250 mm diameter) local gravity sewers connected to larger sub trunk and trunk sewers. The pumping stations vary in size, with some servicing very local areas, to other more major stations, and have firm pumping capacities ranging from 2.69 L/s to 1,100 L/s.

Figure 7.7 (from Halton W/WW Master Plan Review, October 2002) located in Appendix A presents a general layout of the South Halton's existing wastewater system showing the location of trunks, sub-trunk sewers, pumping stations, forcemains, and the wastewater treatment plants as well as Drainage Areas. Existing Acton and Georgetown wastewater infrastructure is shown on Figure 1 and 2 respectively which are located in Appendix A.

3.0 WATER AND WASTEWATER MASTER PLANNING

3.1 Acton Water and Wastewater Master Plan

Currently Class Environmental Assessments equivalent to Master Plan Updates are underway for both the water and wastewater systems in Acton. These Class EAs are addressing the water and wastewater needs for two build out scenarios within the existing urban area. These build out scenarios include and exclude the Special Study Area commonly known as the Maple Leaf Lands or the Beardmore Tannery lands. Currently all of the water production capabilities have been allocated and almost all but a small portion of the wastewater capacity has been allocated.

Acton Water

A Schedule B Class Environmental Assessment study is underway to address the potential water production needs to service the existing urban area of Acton. Improvements proposed include a revision to the PTTW for the Prospect Park Well Field, additional pre-treatment and filtration works at Prospect Park and an addition to the existing ground storage reservoir on Churchill Road.

In order to attain a new PTTW for the Prospect Park Well field an Impact Assessment Study was completed and submitted to the review agencies for comment. The Agencies expressed concern regarding water balance within the aquifer system and the potential affect additional water takings might have on Fairy Lake Water levels.

It is anticipated that the Class EA will be completed in 2007, however the outcome is dependent on agency approval.

In order to service the special study area, it will be necessary to identify an additional water source equivalent to approximately 2500 m³/d. In order to accomplish this, a test drilling programme will be undertaken to identify potential new sources of supply.

Acton Wastewater

The existing Acton WWTP is operating very close to its rated capacity and does not have adequate capacity for full development of the existing urban area. A Schedule C Class EA is underway to identify a long term solutions for the expansion of the Acton WWTP to service the existing urban area or Acton.

The Acton WWTP discharges to a sensitive receiving stream commonly known as the Black Creek. Bench scale work is currently underway to determine those parameters that can potentially impact this stream. The bench scale work will be followed by stream monitoring in the summer of 2007.

It should be noted that the MOE believes that the Black Creek Watershed is stressed due to the significant water taking and subsequent discharge through the Acton WWTP. In addition to traditional waste water plant expansion techniques, unique solutions such as spray irrigation, ground water recharge, and restricted water use will be considered. Extensive work will also be completed to identify water conservation and infiltration and inflow reduction opportunities.

It is anticipated that the Class EA will be completed in 2008, however the outcome is dependent on agency approval.

3.2 Georgetown Water Master Plan

In 1995, the Regional Municipality of Halton (the Region) completed a Master Plan and Class Environmental Assessment (EA) to determine how to provide additional water supply to serve planned growth in the Georgetown area of the Town of Halton Hills, including Stewarttown, Norval and Glen Williams (Halton Region 1995). At that time, the strategy was to utilize the Lindsay Court Well (Test Well 22), Test Well 15, Huttonville Well and Sixth Line Well to meet the water supply requirements for the Georgetown urban area and hamlets.

Subsequent testing and investigations indicated that of the four proposed projects, only the Lindsay Court well could be implemented, as the other three could not be developed without significant environmental impacts.

In June of 2003, Halton Region completed the “Town of Halton Hills Georgetown Water Supply Master Plan Review” in accordance with the Municipal Environmental Assessment process (Municipal Engineers Association 2000). A preferred alternative identified in the Master Plan Review was to upgrade the existing water system; however, additional technical studies and individual Class EAs were required.

The three well fields utilized to distribute groundwater in Georgetown are the Princess Anne, Lindsay Court, and Cedarvale well fields. Lindsay Court and Cedarvale were both identified in the Master Plan Review as preferred options to service planned growth in the Georgetown urban area. Technical studies were conducted for the Lindsay Court well and the Schedule B Class Environmental Assessment to rate the annual average and maximum day water taking of 6,545 m³/d was completed in November 2004. Halton Region has undertaken additional technical studies to increase the maximum day water taking from Lindsay Court and increase the average annual water taking at the Cedarvale Well Field.

Three Class EAs are currently underway to address water supply for the existing urban area of Georgetown.

Lindsay Court Well Field Maximum Day Re-Rating

In 2006, Halton Region completed an aquifer testing and monitoring program to investigate the technical feasibility of re-rating the Lindsay Court maximum day water taking from 6,545 m³/d to approximately 7,500 m³/d. If the aquifer testing data indicates that the increase in water taking is sustainable and any potential impacts can be mitigated, then the Region will proceed with the Class EA process for this project.

Cedarvale Well Field Expansion

The Cedarvale Well Field Expansion Class EA is required to amend the Permit To Take Water (PTTW) to increase the Cedarvale well field annual average water taking from 4,500 m³/day to 6,972 m³/day and increase the maximum day water taking at Cedarvale Well 1A from 2,618 m³/day to 3,827 m³/day. The Region is also conducting testing at the Lindsay Court well and Georgetown Water Treatment Plant to address maximum day pumping capacity issues for the proposed future increase in annual average pumping at the Cedarvale well field.

In September 2006, the Ministry of the Environment (MOE) informed the Region that a new condition will be added to the Georgetown drinking water supply system PTTW that requires the Region to undertake an investigative program to assess the potential groundwater quality impacts related to the water taking at the Cedarvale well field. The MOE condition on the PTTW requires an assessment to define the geometry of and groundwater flow conditions within the bedrock valley aquifer system to re-assess the Cedarvale well field capture zone and zone of influence. It also requires that an assessment of potential contaminant sources and defined groundwater contaminant plumes, and their travel times be completed to identify sources of contaminants that may impact the well field. And finally, the MOE requests that the Region complete the installation of the sentry well network and establish a groundwater monitoring program. The MOE indicated that this work must be completed and approved by the MOE prior to MOE approval of the Cedarvale Impact Assessment report and subsequent PTTW amendment application to increase the annual average water taking from the Cedarvale well field.

The field work and groundwater modelling program are expected to be completed by mid 2007. Staff will report the findings of the investigation to Regional Council at that time.

Georgetown Water Treatment Plant

The Regional Municipality of Halton has initiated a Class Environmental Assessment (EA) Study to carry out operational upgrades to the Georgetown Water Treatment Plant. The Georgetown Water Treatment Plant is located at 241 Maple Avenue West (Corner of Main Street South and Maple Avenue) in the Town of Halton Hills, and treats water from the Cedarvale Well Field.

The purpose of this Class EA is to assess the environmental impacts of a plant expansion and various operational upgrades to the existing purification plant. A Schedule C Class Environmental Assessment is currently underway to re-rate the maximum day treatment capacity of the Georgetown Water Treatment Plant from 8,640 m³/d to approximately 12,500 m³/d.

3.3 South Halton Water and Wastewater Master Plan Update

The South Halton Master Plan Update (MP Update) was initiated in October of 2006 to prepare an update to the 2002 South Halton Water and Wastewater Master Plan. The purpose of the MP Update is to re-examine the timing and costs for water and wastewater infrastructure projects to the year 2021 for the existing urban areas of Oakville, Burlington, Milton and the Halton Hills Highway 401 Corridor. It is the intention of this plan to provide direction for expansion of the Region's Water and Wastewater Infrastructure until the new Sustainable

Halton Master Plan is completed in 2009. The MP Update will also provide input for a new water and wastewater development charges bylaw in 2007.

The MP Update will examine three development scenarios for analysis. The Best Planning Estimates Version 4 based on Places to Grow will be the primary information utilized for updating land use data for the study for the period 2006 to 2021. The plan will also address 2031 oversizing requirements for projects that are required to be sized with greater capacity than will be necessary for 2021 due to long term needs or logical capacity requirements. A rudimentary mature state analysis will be completed to ensure all short term projects are recommended in a way to ensure that they will not be redundant in the future. Examples of this include the need to ensure sufficient property requirements are recommended for the mature state and linear pipe sizes are consistent with a longer term plan.

The MP Update will review major projects to ensure that their proposed timing and sizing are in accordance with sound engineering and economic principles. This analysis will focus on updating the project schedule and costing to 2021. Each project will address the rationale of project sizing as it relates to the growth rates and expansion frequency.

The MP Update will also address the potential for connections to bordering municipalities. In particular Halton will investigate the possibility of connection(s) to Peel Region on an interim or long term basis. The potential for deferral of projects or the release of excess capacity as a result of water conservation and/or infiltration/inflow (I/I) correction will also be considered as part of this plan.

The report will consider changes in the regulatory environment for both water and wastewater, including but not limited to the new Clean Water Act requirements related to Source Water Protection, increasingly stringent wastewater treatment requirements and limitations on bypassing from the wastewater system during storm events.

Also incorporated as part of the plan will be the requirements for biosolids handling at each of the major Wastewater Treatment Plants. A separate Biosolids Master Plan will identify offsite biosolids management options (see below).

In summary the MP Update will provide the Region with an interim plan that will bridge the gap between the current master plan and the new Sustainable Plan. A significant amount of the work completed in this project can be used as a basis for the Sustainable Plan and will provide a short term roadmap for servicing for water and wastewater for the Region.

3.4 South Halton Environmental Assessments

There are currently two South Halton Class EAs underway.

Milton & Halton Hills 401 Corridor Alternate Water Supply Class EA

The Region of Halton has initiated a Class Environmental Assessment (Class EA) Study for an alternate water supply to the Town of Milton and the Halton Hills Highway 401 Corridor. The Town of Milton and Halton Hills 401 Corridor water supply consists of a groundwater-based well system and a lake-based water supply from Oakville by way of a transmission main on Regional Road 25. The Halton Water and Wastewater Master Plan Review (2002) identified the need for improvements to the Town of Milton's lake-based water supply system that will address security of supply and service projected and approved growth.

The alternate water supply will be required to provide capacity for projected and approved growth to the year 2021 and security of supply. The alternate water supply will also function as a long-term supply for the future Zone 4 reservoir. The Alternatives to be considered include, but are not limited to, the following:

1. Supply at Dundas Street and Bronte Road to the Moore Reservoir (located in Oakville) and north to Milton via Trafalgar Road;
2. Supply at Dundas Street and Bronte Road and north to Milton via Tremaine Road; and
3. Supply from the Region of Peel along Steeles Avenue.

A Public Information Centre is planned for June 2007.

Zone 5 Reservoir and Feedermain Class EA

The purpose of this Class EA is to identify a preferred location for the Zone 5 water reservoir. The reservoir will accommodate growth in the lake based servicing areas of Milton and Halton Hills 401 Corridor. The purpose of the Zone 5 reservoir is to supply water during peak hour demands, fire, or emergency.

At this point in the process, the project team has evaluated seven alternative reservoir and feedermain locations. A Public Information Centre was held in March 2007. The project team is currently reviewing comments received from the public and expect to report to Regional Council in June 2007.

3.5 Biosolids Master Plan

Biosolids are the nutrient-rich organic byproduct of the wastewater treatment process. Sustainable biosolids handling and management are integral to

wastewater infrastructure master planning. The Region recognizes the need to plan for and provide both short and long term biosolids management options to service Halton's growing population.

The biosolids management environment in Ontario has been very dynamic in the wake of the Walkerton tragedy and is strongly affected by changing regulations and public perceptions surrounding the various biosolids management options. Therefore, Halton recognizes that a sustainable biosolids program must be diversified.

In the short term, the Region's strategy for biosolids management is very similar that of other municipalities across the GTA. That is to maximize the amount of land application in partnership with the agricultural community of Halton, utilize landfill disposal as necessary, and implement technologies at our wastewater treatment plants such as digestion and dewatering to allow access to as many diverse biosolids management options as possible.

The long-term strategy includes continuing to support and sustain our land application program to the greatest degree possible, as it provides a viable service to the agricultural community, continuing to utilize technologies such as digestion and dewatering that allow diversification, and then to explore options for diversification. Major issues which are common to municipalities across the GTA include the changing regulatory environment and the decrease in land available for land application of biosolids.

Halton Region has secured access to the Niagara Enviro IMS Alkaline Stabilization Project, which is currently under construction and will be commissioned shortly. Halton will begin to utilize this facility in 2007 and will be confirming whether this is a sustainable technology and identifying what part this technology will play in our long term approach to a diversified biosolids management strategy.

The Region also intends to investigate other potential viable technologies for biosolids management that are currently being explored by municipalities across the GTA such as energy from waste and pelletization. Halton's Biosolids Management Advisory Committee along with the public will play an integral role in the overall review of these technologies. Long term options may also include cooperation and partnership opportunities with other GTA municipalities.

3.6 2007 Budget 10 Year Plan

Appendix B contains two maps and two tables that show development water and wastewater capital projects that will be undertaken within the next 10 years.

Major water development projects for the 10 year period (2007-2016) include:

- 20 ML Zone 5 Reservoir - The reservoir will accommodate growth in the lake based servicing areas of Milton and Halton Hills 401 Corridor. The purpose of this reservoir is to supply water during peak hour demands, fire, or emergency.
- Acton Well Field Development, Reservoir Expansion, Water Filtration, and Upgraded piping - The major upgrades to the water supply system including additional water treatment capacity at Prospect Park and additional water storage to provide sufficient water supply to meet the needs of the urban envelope for Acton. The Prospect Park water treatment works include pretreatment upgrades and an additional filter. The additional water storage capacity consists of a 2,600 m³ reservoir expansion to be constructed beside the existing reservoir. In order to accommodate the Maple Leaf lands a new well field will need to be developed.
- Georgetown WTP Expansion - In order to meet peak water demands to service the urban area of Georgetown, it will be necessary to expand the treatment capacity of the Georgetown Water Treatment Plant from approximately 8,000 m³/d to 12,000 m³/d. A Schedule C Class Environmental Assessment is currently under way.
- 1200mm WM on Dundas from Proudfoot Trail to Neyagawa - The proposed watermain is required to accommodate demand resulting from growth in the North Oakville HUSP area. Timing of this watermain is in advance of the development in North Oakville in order to coincide with the Dundas Street widening and the replacement of the Dundas Street bridge across the Sixteen Mile Creek.
- 600mm WM on Appleby Line from 130m North of Harrison Court to Proposed Street A - This watermain is required to service new subdivisions located at Millcroft Park Drive and Dundas Street (Regional Road 5), and extending north to Highway 407. The watermain is currently being constructed by the developer requiring servicing for his subdivision.
- Secondary Feedermain – Milton/Halton Hills 401 Corridor Lake Based Water Servicing The secondary feedermain is required to provide security of supply and water capacity for approved and projected growth in the Town of Milton urban area and Halton Hills 401 Corridor employment lands.

- Burloak Water Plant Expansion Phase 2 - The proposed Phase 2 Expansion to 110 ML/D is currently budgeted in 2012 and 2013. This Phase 2 expansion will also include a number of deferrals from the Phase 1 works (components of the residual disposal facility, electrical supply facility, clear well, and high lift pumping station).

Major wastewater development projects for the 10 year period (2007-2016) include:

- 2400mm WWM on Upper Middle Road from Bronte Road to west of Third Line – This main will provide sewage collection for growth areas in North Oakville HUSP area and will supplement existing collection systems to accommodate flows from growth in Milton and the Halton Hills 401 Corridor. The construction of this sewer will be done to coincide with Upper Middle Road reconstruction.
- Acton WWTP / Acton Inlet Building - The Region is currently undertaking a Schedule C Class Environmental Assessment in order to increase the existing capacity of the Acton Wastewater Treatment Plant to provide service to the designated urban envelope of Acton.
- Georgetown Digester Upgrade - The addition of a third anaerobic digester and upgrades to the existing digesters 1 and 2 including all ancillary mechanical and electrical systems are required in order for the Georgetown WWTP to stabilize biosolids production on site up to its rated capacity of 22,727 m3/d.
- Mid-Halton Wastewater Treatment Plant Phase 4 - The proposed Phase 4 expansion to 100,000 m3/d at Mid-Halton is currently budgeted in 2011.
- 900mm Forcemain on Dundas from Proudfoot Trail to west of 16 Mile Creek - The proposed sanitary forcemain are required to accommodate demand resulting from growth in the North Oakville HUSP area. Timing of this forcemain is in advance of the development in North Oakville in order to coincide with the Dundas Street widening and the replacement of the Dundas Street bridge across the Sixteen Mile Creek.

4.0 AQUIFER MANAGEMENT AND SOURCE PROTECTION

The new Clean Water Act which became law in 2006 requires the development and implementation of Source Protection Plans of lake based and aquifer based water supplies on a watershed basis. These plans and the implementation of the Region's Aquifer Management Plan will provide a long term strategy to protect

water resources in Halton. This new legislative environment will impact on the ability to expand Halton's groundwater and stream based systems, particularly in Georgetown which is a sensitive setting from a hydrogeologic perspective.

Components of the Halton Region Aquifer Management Plan include:

- Groundwater modelling
- Groundwater monitoring and the Halton Water Database
- Groundwater and surface water investigations
- Management of the Hazardous Land Use and Chemical Occurrence Inventory Database related to known and potentially contaminated sites
- Responding to well interference complaints
- Public education
- Development of land use best management practices for wellhead protection and protection of hydrogeologically sensitive areas
- Establishment of sentry wells for the protection of municipal drinking water supplies
- Monitoring well decommissioning and repair

Watershed-based source protection planning was a key recommendation of Justice O'Connor's report on the Walkerton tragedy as part of the multi-barrier approach to protect drinking water. Keeping contaminants out of the source areas greatly improves our chances of keeping them out of our taps. The key to source protection is managing the human activities that affect drinking water sources.

Source Protection includes:

- **Assessment:** Assessing the current conditions of sources of drinking water and threats to their condition
- **Planning:** Undertaking planning to ensure appropriate land use decisions are made so existing and future activities do not threaten drinking water sources
- **Management:** Undertaking management efforts to minimize and prevent threats to drinking water sources

Source Protection Plans will be updated every 5 years and will incorporate the following:

- Consist of a risk management plan and an implementation plan

- Designate land use zones in which particular source protection measures are (or are not) needed and determine acceptable ranges of water allocations among competing uses
- Provide operational limits concerning acceptable levels of water withdrawals and total contaminant loadings
- Policies to ensure every existing significant drinking water threat ceases to be a significant drinking water threat;
- Policies intended to ensure that no future drinking water threats become significant threats;
- Define a standard that will assess whether these policies have been achieved;
- Define a list of future activities that may be prohibited and a list of the areas inside a surface water intake protection zone or wellhead protection area where the activities would be prohibited
- Define a list of existing or future activities and land uses that may require a permit and a list of the areas inside a surface water intake protection zone and wellhead protection area where these permits would be required;
- Define a list of future land uses that may require a notice under this Act before a prescribed application under the Planning Act may be made to use the land for that use or before a building may be constructed in relation to that land use
- Define a list of the areas inside a surface water intake protection zone and wellhead protection area where these notices would be required;

Municipalities will be required to bring official plans and zoning by-laws into conformity by a prescribed date and will be required to complete a watershed characterization and water budget.

The Aquifer Management Plan and Source Protection Plan are also discussed in Sustainable Halton Study #1 in the context of defining a natural heritage system. The issues related to these plans that impact water and wastewater infrastructure include:

- Limited land use options in well-head protection areas
- Limited capacity in Halton's groundwater systems

5.0 SUSTAINABLE HALTON PLAN STUDIES

5.1 Schedule

As part of the Sustainable Halton Plan process, the following studies will be undertaken by the Infrastructure Planning Section:

- Background Study (October 2006 – May 2007)
- Servicing Option Studies for Development and Evaluation of Land Use Alternatives (June – Dec 2007)
- New Halton Region Water and Wastewater Master Plan for Preferred Land Use Alternative integrating all four municipalities (2008 – 2009)
- Provide input to a new Water and Wastewater Development Charges Bylaw (2009 - 2010)

5.2 Georgetown Water Supply and Assimilative Capacity Studies

Halton Region staff have retained a consultant to undertake a third party peer review of the work completed to date to find an additional water supply source for expansion of the Georgetown urban area. This study is expected to be completed in the summer of 2007, for inclusion in the final version of this background study.

A separate consultant has been retained to address the issue of potential assimilative capacity in Silver Creek or Credit River for expansion of the Georgetown WWTP. This study is expected to be completed in May 2007 for inclusion in the final version of this background study.

5.3 Peel Connection

Halton Regional staff have approached Peel Regional staff regarding the possibility of connection to the Peel water and wastewater system, either as a temporary or permanent solution. Staff at Peel Region are currently completing an analysis of their system and results are expected in April 2007. This option will be discussed further in the final version of this background study once we have received Peel's response.

5.4 Long-Term Servicing Strategy

In order to ensure that the short-term water and wastewater servicing strategies have given due consideration to potential long-term servicing requirements, Halton Region staff have retained a consultant to complete a high-level analysis of potential long-term servicing strategies for both water and wastewater. The review will consider both linear and facility requirements in terms of capacity,

property and intake/outfall locations. The results of this study will form an input to the Water/Wastewater Servicing Alternatives Study described below.

5.5 Water/Wastewater Servicing Alternatives Study

The next step for the Water and Wastewater component of the Sustainable Halton process is to retain a consultant to develop and evaluate water and wastewater servicing options for various land use alternatives. This study will provide an in-depth review and costing of the implications of growth and related issues raised in this background study. This study will also review the Region's policies related to water and wastewater servicing and provide recommendations for policy update. Staff are currently working on a Terms of Reference for this study.

6.0 SUMMARY

6.1 Summary of Key High-Level Issues

Key high-level issues for the Sustainable Halton Plan related to water and wastewater infrastructure will include:

- The groundwater and stream based systems have limited capacity and it will likely not be possible to expand these systems to support intensification or urban area expansion. In addition, the new Clean Water Act and Source Protection legislation will impact the ability to expand Halton's groundwater and stream based systems, particularly in Georgetown which is a sensitive setting from a hydrogeologic perspective. Therefore, it will likely be necessary to extend lake-based servicing to these areas.
- There are limited land use options in well-head protection areas.
- The existing lake-based water and wastewater systems has been designed to accommodated planned growth to 2021. Therefore, intensification in existing serviced areas will require costly upsizing of existing in-ground infrastructure and expansion of existing water and wastewater treatment facilities. The site capacity of existing water and wastewater treatment plants is limited so it may be necessary to obtain new sites.
- A second major trunk watermain feed from Lake Ontario to north of Highway 407 will be required
- A second major trunk gravity sewer from north of Highway 407 to the Mid Halton Wastewater Treatment Plant (or other site) will be required
- An increasingly stringent regulatory environment may limit pollutant loadings to Lake Ontario resulting in a significant increase in the cost of wastewater treatment as the population increases.

- Increasing growth will put pressure on the Region's biosolids management program, which already faces a major challenges due to the decrease in land available for the application of biosolids.

6.2 Options

Options that will be reviewed as part of the Water and Wastewater Infrastructure component of the Sustainable Halton Plan include:

- Location of infrastructure to support growth and minimize cost
- Lake based versus well and stream based servicing
- Modification of distribution and drainage boundaries to accommodate intensification
- Treatment options to maximize site capacity
- Service connections to neighbouring municipalities

Appendix A – Existing Water and Wastewater Infrastructure Figures

Appendix B – Development Water and Wastewater Capital Projects (2007-2016)