

### **3. ENVIRONMENTAL BACKGROUND**

Background data was collected on existing regulatory, environmental, social and economic conditions in the study area. These existing conditions were used to characterize the study area and act as a basis for assessment and evaluation purposes. The conditions were used subsequently to evaluate various water/wastewater servicing alternatives. The conditions are described as follows:

- Current status of regulatory requirements and those anticipated in the future which were used as a basis to assess public health and safety issues and concerns, and how each water/wastewater servicing alternative could address this in the future.
- The current natural environments in those areas impacted by any or all of the water/wastewater servicing alternatives to be developed and evaluated.
- The social/cultural issues to be taken into account based on those policies and/or that information available from the various areas impacted by any proposed water/wastewater servicing alternatives.
- The economic and financial measures to be utilized for alternative assessment and evaluation purposes.
- The legal/jurisdictional issues that exist and are to be addressed by any proposed water/wastewater servicing alternatives for assessment and evaluation purposes.
- The technical considerations to be taken into account for any water/wastewater servicing alternatives for assessment and evaluation purposes.

#### **3.1. Public Health and Safety**

In May 2000, the drinking water system of the Town of Walkerton, Ontario (4,800 people) became contaminated with a virulent strain of *E. coli*. In the ensuing outbreak, 2,300 people became ill and seven died. Many of those who survived suffered permanent damage to their health.

In the aftermath, the government of Ontario appointed Mr. Justice Dennis O'Connor to head an inquiry into what happened and how to ensure it never happened again. The inquiry made 93 recommendations, all related to public health. These recommendations were respectful of the goals of conservation, environmental protection, equity and economic efficiency, but focused on the urgent question of assuring the quality of Ontario's drinking water. The Walkerton Inquiry has had a significant impact on how the public perceives water supply and will significantly impact the City's Water/Wastewater Servicing Master Plan and its future water/wastewater systems. The Province of Ontario in responding to the Inquiry recommendations developed and implemented a number of new acts, policies and regulations (i.e.

Safe Drinking Water Act, proposed Clean Water Act, Water Taking and Transfer Regulation, etc.) all of which have implications on the development of new water supplies.

### 3.1.1. Regulatory Update

While Walkerton was the catalyst for many recent changes in the water and wastewater sector in Ontario and across Canada, there is also strong evidence that the “Status Quo” was becoming untenable. The province’s water and wastewater assets are the legacy of investments made over more than a century, and many of the materials used are reaching the end of their productive lives. Ontario’s water and wastewater rates, always low by world standards, do not approach the true cost of service in most communities. Many municipalities will be hard-pressed to invest enough to bring their water and wastewater systems into good repair and meet increasingly high standards while keeping their rates affordable. The early response and long-term reform outputs of Walkerton are summarized in Table 3.1.

**Table 3.1: Post-Walkerton Actions Summary**

<u>Early Response</u>	<u>Long-term Reform</u>
<ul style="list-style-type: none"><li>▪ Ontario Regulation 459 (now 170)</li><li>▪ Safe Drinking Water Act</li><li>▪ Sustainable Water and Sewage Systems Act</li><li>▪ Nutrient Management Act</li><li>▪ Financing programs</li></ul>	<ul style="list-style-type: none"><li>▪ Quality management systems</li><li>▪ Full-cost recovery regulations</li><li>▪ Proposed Clean Water Act (Source protection)</li><li>▪ Expert water panel advice on organization and financing</li></ul>

The statutory foundation of Ontario’s water policy is the *Ontario Water Resources Act (OWRA)*. It assigns to the Minister of the Environment and his or her delegates broad oversight of Ontario’s waters, including powers to approve works and facilities, enter property and carry out inspections, make orders and enforce them. Regulations under the Act spell out drinking water quality requirements, licensing of well drillers, permits to take water, sewage treatment plant obligations, duties to collect and report information, and a range of other matters. Decisions of Directors under the Act are important and legally binding, although they may be appealed to the Environmental Review Tribunal.

A number of other important policies and pieces of legislation have also had an impact on water and/or wastewater systems and their owners and operators since the Walkerton tragedy. These include:

- The *Safe Drinking Water Act, 2002 (SDWA)* and its regulations impose a licensing/certification regime for drinking water providers. Developing the Drinking Water Quality Management Standard

regime took several years but are now in place and the Ministry of the Environment aims to start licensing.

- Advice on fine-tuning regulations for small communal systems was assigned to the Advisory Council on Drinking Water Quality and Testing Standards, set up under SDWA. The Council's report to the Minister of the Environment was released on March 22, 2005.
- On August 1, 2004, strengthened standards, requiring all water and wastewater operators to be certified, became effective under SDWA regulations. Certification of drinking water and wastewater plant operators had been initiated in 1987 and made mandatory in 1994 for all non-grandfathered operators in municipal systems.
- The *Sustainable Water and Sewage Systems Act, 2002 (SWSSA)* and its associated regulations will require municipalities to develop full-cost recovery plans and set their water and wastewater rates accordingly. The cost recovery plans are to be based on asset management plans, as required by the SDWA and must be certified by a professional engineer. The relevant ministries are working to develop the elements of full-cost recovery planning.
- The Province introduced the proposed *Places to Grow Act* and passed the *Greenbelt Act, 2005*, both of which aim to encourage more compact land use. The latter creates a "greenbelt" in the Greater Golden Horseshoe (the area extending from the Niagara River around western Lake Ontario to Peterborough and Cobourg). The policy direction of the *Places to Grow Act* is to help to prevent the further development of small, scattered low-density communities that are costly to service.

### **3.2. Natural Environment**

The following describes the natural environment within the study area in a general sense. The descriptions of the natural environment are subsequently used as criteria for the review and evaluation of the various water/wastewater servicing alternatives. It is expected that more detailed review utilizing wetland evaluations, Environmental Significant Area reports and fisheries information will be conducted further as any particular alternatives are implemented.

#### **3.2.1. Natural Heritage Systems**

Due to the vast area considered and the conceptual nature of this Master Plan Study, existing information was referenced to determine the location of natural heritage areas. The information gained was used in preparing initial assessments of potential impacts of alternatives as detailed in Appendix E. The following documents were reviewed in order to gain the information needed:

***Official Plans***

- City of Guelph Official Plan
- Wellington County Official Plan

***Other Documents***

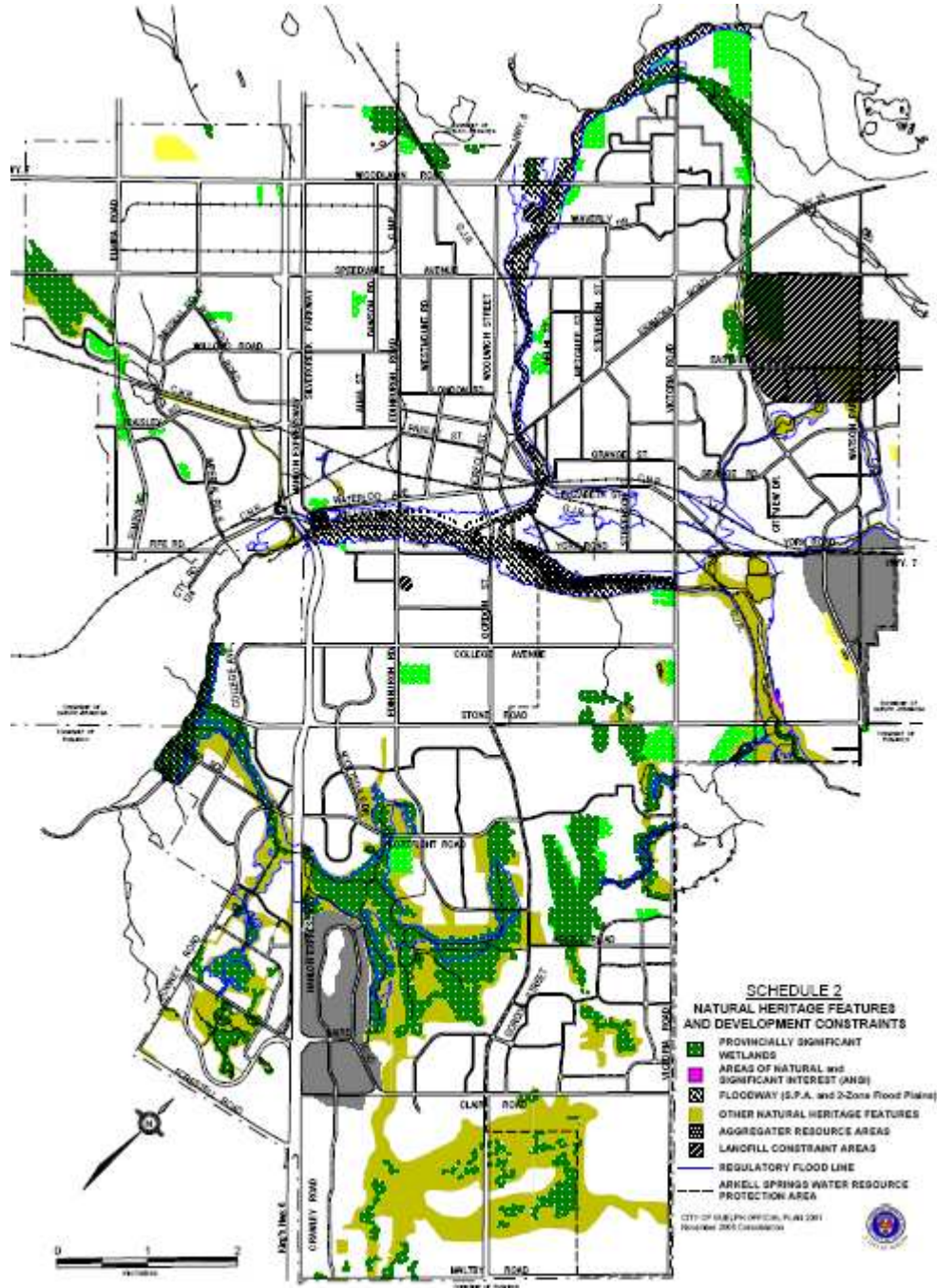
- City of Guelph Natural Heritage Strategy
- Grand River Conservation Authority website
- Soil Survey of Wellington County
- Ontario Great Lakes Coastal Wetland Atlas
- Natural Heritage Information Centre website
- Wellington County website (interactive mapping tool)

For the most part, the various water/wastewater servicing alternatives are restricted to within the City of Guelph boundaries; servicing potential to adjacent Puslinch and Guelph/Eramosa Townships and the County of Wellington were reviewed in the 195,000 population alternative.

***City of Guelph***

With a total coverage of approximately 18%, the City of Guelph contains a fairly diverse natural heritage system comprised primarily of wetland complexes, woodlands and ravines associated with the City's river systems. The City of Guelph encompasses the following significant natural heritage features as shown in the Official Plan :

- Five Subwatershed/Watershed Areas (partially or entirely – Eramosa-Speed River Watershed, Clythe Creek Subwatershed, Hanlon Creek Watershed, Torrance Creek Subwatershed, Mill Creek Subwatershed)
- Four Environmentally Sensitive Areas (ESAs),
- Two Areas of Natural and Scientific Interest (ANSIs),
- Eight Provincially Significant Wetlands (PSWs) Complexes (partially or entirely),
- Three Locally Significant Wetlands (LSWs),
- The Speed, Eramosa, Hanlon, Torrance, Clythe and Ellis River Systems,
- Approximately 30 Locally Significant Woodland Areas (i.e., of 1 ha or greater) and
- Large areas of what are currently identified as ecological corridors, buffers and linkages (i.e., 'Other Natural Heritage Features' in the Official Plan, January 2005 consolidation).



**Figure 3.1 Guelph Official Plan – Schedule 2: Natural Heritage Features**

Within and surrounding the City, more than 70 element occurrences of at risk species have been recorded. Those species which have been observed more recently (since 1990) include; least bittern (*Ixobrychus exilis*), Jefferson salamander (*Ambystoma jeffersonianum*), American chestnut (*Castanea dentata*), wavy-

rayed lampmussel (*Lampsilis fasciola*), Williamson's emerald (*Somatochlora williamsoni*) and reddsidedace (*Clinostomus elongatus*).

As stated in the City of Guelph's Official Plan, the protection and enhancement (where appropriate) of natural heritage features and their associated ecological functions is required. Natural heritage features include evaluated wetlands, habitat of endangered and threatened species, Areas of Natural and Scientific Interest, fish habitat, forestry resources, environmental corridors and ecological linkages and wildlife habitat

### ***Wellington County***

The topography and geology of Wellington County on a whole is made up of elongated hills, known as drumlins. These occupy much of the southern and northern parts of Wellington County, while the central part consists of undulating moraine. In general, the land slopes from east to west and from north to south. Some of the drainage features include the Grand, Speed and Eramosa Rivers, with the Grand being the most prominent. Guelph Lake, a result from the construction of Guelph Lake Dam in 1974, exists to the north.

Loam textured till materials predominate in the northern and southern ends of the county. The till plains in these areas contain many low broad oval hills with smooth slopes characteristic of drumlins.

Other natural heritage features within the County aside from evaluated wetlands include earth science ANSIs, life science ANSIs, conservation areas and Provincial Parks.

## **3.3. Social/Cultural**

Social/Cultural issues were considered in the evaluation of water and wastewater servicing alternatives. Each alternative was assessed using a variety of Social/Cultural considerations which, when measured with all evaluation criteria, led to the identification of preferred water/wastewater servicing solution(s). The social/cultural evaluation methodology and criteria utilized are presented as follows.

### **3.3.1. Municipal and Provincial Growth Targets**

The City of Guelph forms part of one of the fastest growing regions in the Province of Ontario, and has experienced considerable growth during the last decade. Defining growth, where it will occur and to what extent, will have a significant impact on the W/WWSMP.

The Province's Places to Grow Plan designates downtown Guelph as one of 25 Urban Growth Centres. Places to Grow prescribes population and employment projections and intensification/Greenfield density targets for Guelph/Wellington County as well as another 109 municipalities within the Greater Golden Horseshoe.

A local growth strategy was initiated to lay the foundation for growth in conformity with the Provincial Growth Plan over the next 25 years. This includes developing a detailed strategy to implement the City's vision that will encompass Growth Management Policies consistent with Provincial Places to Grow requirements which are to be incorporated into the City's Official Plan. Details are discussed further in Section 4 of this report with the latest update being included in Appendix F.

For the evaluation of alternative solutions, the ability to meet municipal and provincial growth management targets was considered in a broad sense (i.e. ability to supply and convey water and convey and treat wastewater to meet planned growth).

### **3.3.2. Short Term Construction Impacts**

Short term construction related impacts include dust, traffic, access to property, vibration and noise. For all alternatives, potential impacts were identified based on estimated degree of disturbance and land use impact information sources (described below), and where applicable visual surveys. The ability of mitigation measures to address potential impacts was also taken into consideration.

### **3.3.3. Land Use**

Land use impacts relate to potential positive and negative impacts as part of the implementation of alternative solutions. These impacts include consideration of potential effects from construction and operations on residents, businesses, agricultural, cultural/heritage (i.e. archaeological) and/or tourist and recreational resources. The evaluation in turn may also include short and long term impacts to water and/or wastewater system users along with individual residents and surrounding communities.

The Planning Act requires municipalities to prepare an Official Plan which defines local land use. An Official Plan is a document, adopted by the Council of the municipality and approved by the Ministry of Municipal Affairs and Housing (MMAH) or his delegate under Section 17 of the Planning Act. As such, an Official Plan, once approved by their Minister, is a legal document that requires compliance for municipal land use activities and initiatives. Municipalities use Official Plans to guide land use decisions based on land use designations and policies. The Planning Act also requires that each municipality

periodically (every five years) review its Official Plan to ensure that it is up to date, reflects community needs and values, and conforms to the current legislative environment and policies.

Information sources (see Appendices E and F) utilized in the land use impact assessment included analysis of aerial photography and 1:50,000 NTS mapping as they related to alternative solutions and associated construction works. Other information sources included County and City Official Plan land use schedules and, where applicable, Secondary Plans.

#### **3.3.4. Education Programs**

Various alternative solutions can provide the opportunity to be combined with water conservation and management, and Inflow/Infiltration reduction initiatives that have a positive impact on servicing approved growth and managing our natural resources. The nature of (e.g. partnerships) and the degree to which an alternative provides educational opportunities were considered.

#### **3.3.5. Social Costs and Benefits**

The implementation of various alternative solutions and resultant social costs and benefits were considered as part of the evaluation in terms of level of impact (low, medium and high) related to social cost and benefit.

#### **3.3.6. Triple Bottom Line Test**

The ability of an alternative solution to collectively meet social, economic and environmental impact considerations and achieve a balanced outcome is referred to as Triple Bottom Line. Triple Bottom Line has been captured in Guelph's Strategic Plan adopted by City Council. As such, the ability of an alternative to address these principles was considered based on level of impact.

#### **3.3.7. First Nations and Aboriginal Groups**

The impact of implementing and operating an alternative solution on First Nations and Aboriginal Groups is an important consideration that should be captured in any environmental assessment. Specific First Nations groups (e.g. Six Nations of the Grand River) have ties to the study area and have been accordingly contacted throughout the Master Plan Study for information and input with respect to Master Plan evaluations and recommendations. The evaluation of alternative solutions was based on assessing compatibility with First Nations land uses or management plans.

### **3.4. Economic/Financial**

Economic/financial impacts are also a consideration to be taken into account when evaluating various water/wastewater servicing alternatives. Estimated capital costs were determined based on 2007 tender and/or material cost information for relative comparison amongst the various water and wastewater servicing alternatives. The cost comparisons were done on a total cost and life cycle cost basis.

Operating and maintenance costs were determined on a similar basis from information provided by City of Guelph operations personnel, and relative operating and maintenance costs for similar sized systems and/or facilities contemplated as part of a water and/or wastewater servicing alternative. Estimated life cycle costs were inferred based on lifecycle cost of each proposed water and/or wastewater servicing alternative, and/or any extenuating circumstance information available, for relative comparison amongst each alternative.

Where estimated capital, operating & maintenance and/or life cycle cost information was not available, subjective assessment on a relative low, medium or high basis was undertaken for comparison amongst alternatives.

In addition, each water and/or wastewater servicing alternative was assessed with respect to its ability to avoid or minimize capital, operating/maintenance and lifecycle costs, which in turn increase water and sewer rates for system users and development charge costs for servicing new growth. City of Guelph water and sewer rates are currently in the lower range of those charged by municipalities in Ontario and across Canada. Low, medium and high impact for relative comparison amongst each alternative was identified for assessment purposes. The same was applied to the ability to minimize major infrastructure costs from an implementation, cash flow and rate impact perspective.

Cost impacts to agricultural operations were also identified where available (or assessed subjectively). They were also identified for watermain/trunk sewer routes for comparison purposes for water and wastewater servicing alternatives. This impact assessment was done on a potential or not basis for impacts, and for relative comparison amongst different water and wastewater servicing alternatives. Overall, economic/financial considerations were just one of a number of criteria that were assessed for overall preferred alternative identification purposes.

### **3.5. Legal Jurisdiction**

Legal jurisdictional issues were also considered given the potential impacts water and wastewater servicing may have on areas outside the current City boundaries. In this context each alternative was assessed in terms of location inside or outside of City boundaries, relative land and/or easement requirements, right-of-way needs, etc. and related costs, where possible. Additional impacts on agricultural operations and land uses could also occur given the potential of some alternatives to be located outside the City boundary. This was also assessed for each water and/or wastewater servicing alternative, if applicable.

Low, medium, high comparisons, “likely” and/or “not likely” type assessments were completed for each alternative based on the above. Geopolitical issues were also considered with respect to political boundaries and urban/rural interface, along with an assessment of coordination needs and the potential for successful partnerships with adjacent municipalities.

### **3.6. Technical**

Technical considerations included the capability of each alternative to meet water and/or wastewater servicing requirements from a technical feasibility perspective. These factors range from the reliability and history of a specific technology to constructability, (e.g., ease of implementation, capability of expansion, flexibility in operation, etc.). Therefore, the criteria included within this general category were:

- The ability to implement an alternative. This criterion could be impacted by ease of approvals, and the need to satisfy regulatory requirements, the need for modifications to existing facilities to accommodate the alternative, or the need for land (jurisdictional issues, agreements with neighbouring or partnering municipalities, etc.);
- Maintaining operation during construction and considering impacts to existing infrastructure (e.g. existing wells, pumping station, transportation, etc), and maintaining service to City residents and businesses;
- Minimizing disruptions/downtime by taking into consideration required changes to existing infrastructure to implement;
- Constructability to reflect ease of construction, and impacts to operations;
- Scheduling and timing to confirm whether an alternative can be brought on line in a timely manner to meet possible servicing requirements;

- Water quality in the distribution system; minimizing deadends, etc.. In addition, Inflow/Infiltration reduction potential was an important consideration for wastewater servicing;
- Flexibility and ability to meet alternative growth/population distribution scenarios;
- The ability of an alternative to respond to changes in regulatory treatment and permitting requirements/standards, at present and in the foreseeable future. Alternatives will need to have the capability to respond to changes, recognizing that these requirements could result in downgrading the capacity of a given alternative; and,
- The ability of an alternative to use existing infrastructure. This criterion reflects the opportunity to reuse existing buildings, water distribution/wastewater conveyance systems, storage and pumping facilities. It also infers how well an alternative could be integrated to complement other alternatives (e.g. changes in water distribution or sewage conveyance for future growth.)
- Compatibility with the goals and objectives of the community energy plan; i.e. move water and wastewater as efficiently as possible in the city.