Master Plans for
Urban Water Infrastructure in
The City of Vaughan

City-Wide Water & Wastewater Master Plan Class EA

Final Report

JUNE 2014

The Municipal Infrastructure Group Ltd.
8800 Dufferin Street, Suite 2000
Vaughan ON CA L4K 5X6
tel 905.738.5700 fax 905.738.0065

In association with:
Fabian Papa & Partners Inc.
216 Chrislea Road, Suite 501
Woodbridge ON CA L4L 8S5
tel 905.264.2420 fax 905.264.2441

Prepared on behalf of:

The City of Vaughan
Development/Transportation
Engineering Department
2141 Major Mackenzie Drive
Vaughan, ON L6A 1T1
tel: 905-832-8585 fax: 905-832-6145

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EXECUTIVE SUMMARY

In September 2010 Vaughan Council adopted the new City-Wide Official Plan, a component of the Vaughan Consolidated Growth Management Strategy – 2031. The City of Vaughan Official Plan has established a local framework for growth and development. As part of the planning and development process, the City has commissioned the preparation of Master Plans for Urban Water Infrastructure in Vaughan in order to establish infrastructure requirements in support of the planned build-out of the New Official Plan. These studies are being conducted in accordance with the Master Plan Class EA process set out by the Municipal Engineers Association (MEA, October 2000 as amended 2007 and 2011) and collectively cover the City's water distribution, wastewater collection, storm drainage and stormwater management systems.

This Class EA study specifically addresses water and wastewater infrastructure for the planned growth in the City for the time horizon extending to 2031. This growth is planned to occur in several designated intensification areas as well as through expansion from the current developed boundary to the urban boundary designated by the Official Plan. In terms of population numbers, Vaughan is expected to grow to 416,600 people and 266,100 jobs by 2031 from its 2011 levels of 295,000 and 185,000, respectively. The report documents the results of the process used to develop and evaluate alternatives and identifies the preferred servicing strategy to accommodate the planned growth as well as any associated mitigation measures.

During the course of this project, public engagement occurred through published notices as well as the development of a website dedicated to each of the Master Plan projects: www.vaughaninfrastructure.ca. A Technical Advisory Committee (TAC) was struck with members from York Region, the Toronto and Region Conservation Authority (TRCA), the Ontario Ministry of Environment (MOE), as well as from various departments within the City. The TAC held two formal meetings at appropriate stages in the project. As well, two evening Public Information Centre (PIC) sessions were hosted at Vaughan City Hall at appropriate stages of the project offering the public the opportunity to observe the project progress and to interact directly with the project team. Information made available at the PIC sessions was also posted to the project website. The public was also able and encouraged to contact the project team at any stage throughout the process directly or through the project website. All comments received from the public, and responses thereto, are documented in this report.

The City of Vaughan is responsible for distribution of water which is supplied in bulk by York Region through two systems: (i) the York Water System which itself derives water from the City of Toronto and Region of Peel; and (ii) a well-based groundwater supply system for the community of Kleinburg-Nashville. The Region's York Water System consists of a network of large diameter transmission mains, pumping stations, elevated tanks and reservoirs located throughout the Vaughan as well as neighbouring municipalities in the Region. Regional works are in progress to allow the introduction of lake-based supply to the community of Kleinburg-Nashville.

Responsibility for wastewater servicing in the City of Vaughan is divided between the City, which is responsible for local wastewater collection and local pumping, and York Region, which is responsible for major pumping stations, major trunk sewers and treatment facilities.

As part of this study a critical review of the water and wastewater design criteria applied by the City was undertaken to assess their currency and applicability with the aim of developing a revised set of criteria that would more appropriately reflect the realities of water consumption and wastewater generation. The result of this component of the work which drew upon relevant historical data as well as extensive work conducted by York Region was the establishment of water demand rates and wastewater generation rates that are lower than the previously applied criteria which, particularly for the existing stock of infrastructure, had an offsetting effect against the planned growth of the City through intensification of lands within the current built boundary.

Alternatives were evaluated comparatively and qualitatively against criteria for each of the following dimensions: Technical Merit; Impact on the Natural Environment; Socio-Economic Impact; and Financial Impact. The following Master Planning-level alternatives were developed and evaluated for both the City's water and wastewater infrastructure systems:

Alternative 1 – Do Nothing

Alternative 2 – Limit Community Growth

Alternative 3 – Water Conservation (water & wastewater) and Infiltration/Inflow Reduction (wastewater)

Alternative 4 – Build New Water/Wastewater Systems

Alternative 5 – Expand & Enhance Water & Wastewater Infrastructure

For both the water and wastewater systems, Alternative 5, being the expansion and enhancement of the City's existing water and wastewater infrastructure, was identified as the preferred alternative. Alternatives 1 through 3 were screened out of the analysis since Alternative 1 would result in not providing the appropriate level of service and Alternatives 1 through 3, on their own, were not able to satisfy the City's growth plan in accordance with the mandate set by the province through the Places to Grow Act. Alternative 4, being the development of new water systems (including abstraction, treatment, pumping, transmission, storage and distribution) and new wastewater systems (including collection, treatment and disposal). It is important to note that many of the positive attributes of other alternatives, particularly in relation to water conservation and infiltration/inflow (I/I) reduction, are embedded within (the preferred) Alternative 5.

Alternative 5 completely addresses the growth envisioned in the Official Plan through intensification and expansions to the developed boundary in addition to improving and increasing utilization of the City's existing stock of infrastructure. While some impacts to the natural environment will result due to construction activity, this impact is minimal given that most of the envisioned work will occur in road right-of-ways and the use of trenchless technologies will largely mitigate concerns and, due to the attention to water conservation, I/I reduction and similar matters, this alternative also offers valuable improvements to existing conditions. Of the 28 projects identified, most of the work will occur in outlying areas relative to existing development, thereby not significantly impacting the socio-economic environment of the City. Moreover, the ability to completely satisfy the City's Official Plan growth objectives serves to enhance this dimension.

This Master Plan satisfies the Class EA requirements for the projects identified as Schedule 'A' or 'A+' activities. These projects are considered pre-approved, and may proceed to design and construction. For projects identified as Schedule 'B' projects under the Municipal Class EA process, the work undertaken during the development of the Master Plan can be used in support of some of the requirements of Phase 1 and 2 of the Municipal Class EA. It may be necessary to fulfill the additional requirements of the individual projects in order to consider project specific issues that were beyond the scope of the Master Planning process.

While financial investment will be required to implement the identified projects, the scale of this investment is reasonable and can be made progressively over time in response to the need which is driven largely by market conditions for urban land. The total estimated cost of water capital projects identified in this Master Plan amount to $67.7 million which is approximately equivalent to an average of $800 per residential unit planned to be developed until 2031. Similarly, the total estimated cost of the identified wastewater capital projects is $69.6 million, being equivalent to approximately $800 per residential unit, on average.

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1 INTRODUCTION

1.1 Purpose

In September 2010 Vaughan Council adopted the new City-Wide Official Plan, a component of the Vaughan Consolidated Growth Management Strategy – 2031. The City of Vaughan Official Plan has established a local framework for growth and development. As part of the planning and development process, the City has commissioned the preparation of Master Plans for Urban Water Infrastructure in Vaughan in order to establish infrastructure requirements in support of the planned build-out of the New Official Plan. These studies are being conducted in accordance with the Master Plan Class EA process set out by the Municipal Engineers Association (MEA, October 2000 as amended 2007 and 2011) and collectively cover the City's water distribution, wastewater collection, storm drainage and stormwater management systems.

This Class EA study specifically addresses water and wastewater infrastructure for the planned growth in the City for the time horizon extending to 2031. The report documents the results of the process used to develop and evaluate alternatives and identifies the preferred servicing strategy and any associated mitigation measures.

Vaughan is undergoing development within its urban boundaries, which must proceed in accordance with Provincial policy as well as the York Region and City of Vaughan Official Plans. The Province of Ontario's Growth Plan 2005 is to develop communities with a better mix of housing, jobs, shopping, and services in close proximity, with policies to guide growth into existing urban areas. The Plan has identified growth centres with associated density targets designed to accommodate future populations of Ontario in a manner that prioritizes sustainability and quality of life.

1.2 Study Area

The study area (Figure 1) for this Water and Wastewater Master Plan Class EA includes the full limits of the entire City of Vaughan. Any servicing recommendations are to address only lands within the City's revised Urban Boundary, as defined in the Vaughan Official Plan (2010).

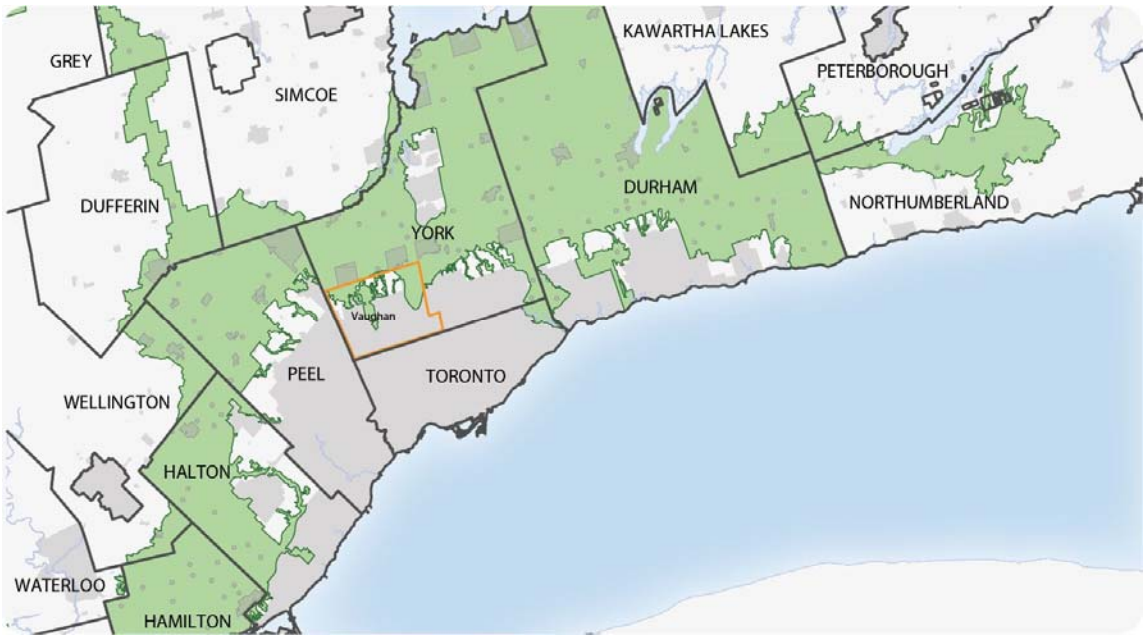


Figure 1 Study Area (Source: Vaughan Official Plan)

The City of Vaughan is a lower-tier municipality located within, and at the southwest corner of its upper-tier counterpart, York Region. It is bounded by the Township of King to the north as well as the Town of Richmond Hill and City of Markham to the east, all similarly located within York Region. To the south is the City of Toronto and to the west is Peel Region.

With respect to water and wastewater services, the City of Vaughan is responsible for water distribution and wastewater collection, while the bulk supply of water and trunk collection of wastewater, in addition to subsequent treatment thereof, is the responsibility of York Region. The City is not responsible for water abstraction, transmission or storage, nor is it responsible for water or wastewater treatment.

Figure 2 identifies the limits of the urban boundary within the City in accordance with the Official Plan and also identifies the block numbers used within the City and which are referenced throughout this document. Additional information such as designated land uses and related matters is included in Appendix A.

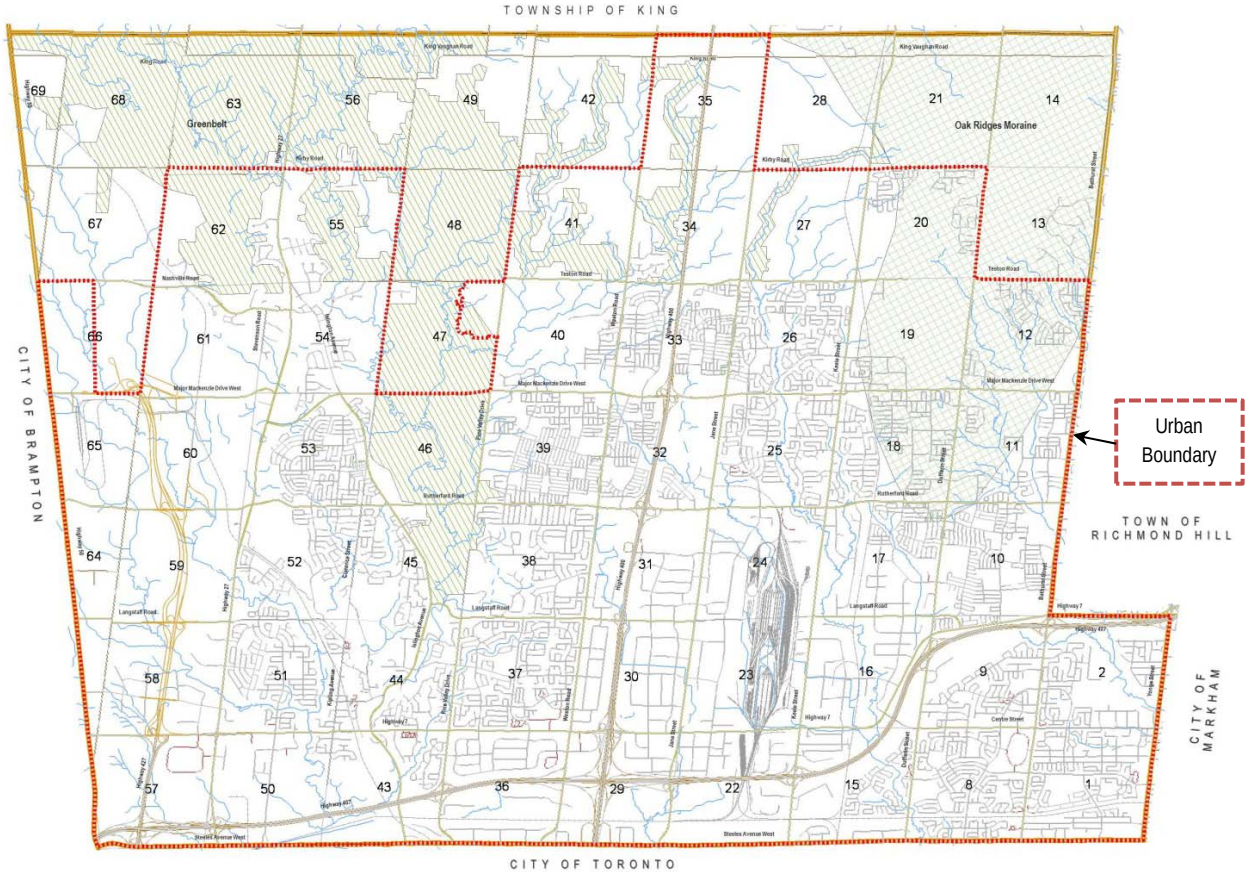


Figure 2 Limits of Urban Boundary & Block ID Numbers

1.3 Master Plan Class Environmental Assessment Process

The planning of major municipal projects or activities is subject to the Ontario Environmental Assessment (EA) Act, R.S.O. 1990, and requires the proponent to complete an Environmental Assessment, including an inventory and description of the existing environment in the area affected by the proposed activity.

The Class EA process was developed by the Municipal Engineers Association, in consultation with the Ministry of the Environment (MOE), as an alternative method to Individual Environmental Assessments for recurring municipal projects that were similar in nature, usually limited in scale and with predictable range of environmental effects which were responsive to mitigating measures.

A Class EA Master Plan is a long range plan that ties together the various needs of an overall system, and is typically comprised of a set of separate projects that are to be individually implemented over an extended period of time. A Master Plan considers the individual needs of a system within a broader context, and integrates infrastructure needs with environmental assessment planning principals. Master Plans address Phase 1 and 2 of the Municipal Class EA process and include a stakeholder consultation program. Figure 3 illustrates the Class EA planning flowchart.

A Master Plan is typically subject to the approval of the municipality for which it was prepared. Prior to being approved, a clear and concise Master Plan report is made available for review and comment by the public and review agencies. Following consideration of any public comment and subsequent approval of the Master Plan, the report is reviewed periodically to determine whether there is a need for formal updating of the Master Plan. Details on how and when a specific Master Plan will be reviewed are generally documented in that Master Plan. The public consultation of the EA process is discussed further in Section 10 with associated materials provided in Appendix J.

The Vaughan City-Wide Water & Wastewater Master Plan Class EA is classified as a Schedule ‘B’ activity in accordance with the Municipal Class EA schedules. Therefore, the following Class EA planning phases apply:

Phase 1	Identify the problem (deficiency) or opportunity.
Phase 2	Identify alternative solutions to address the problem or opportunity by taking into consideration the existing environment, and establish the preferred solution taking into account public and review agency input.

The individual projects recommended under a Master Plan may be categorized as Schedule 'A', Schedule 'B' or Schedule 'C' under the Municipal Class EA process. At the time that the individual projects included in the Master Plan are to be implemented, they are subject to the requirements of the Municipal Class EA process. For Schedule 'B' and Schedule 'C' projects identified within a Master Plan, the work undertaken during the development of the Master Plan can be used in support of the requirements of Phases 1 and 2 of the Municipal Class EA.

For example, if an individual project is to be implemented and it is a Schedule 'B' project under the Municipal Class EA process, the work undertaken during the development of the Master Plan can be used in support of some of the requirements of Phases 1 and 2 of the Municipal Class EA. It may be necessary to fulfil the additional requirements of the individual projects in order to consider project specific issues that were beyond the scope of the Master Planning process.

The Class EA provides for the three following designations of the project depending upon potential impacts:

Schedule A	Projects are limited in scale, have minimal adverse environmental effects and include a number of municipal maintenance and operational activities. These projects are pre-approved. Schedule A projects generally include normal or emergency operational and maintenance activities.
Schedule A +	Projects are within existing buildings, utility corridors, rights-of-way, and have minimal adverse environmental effects. These projects are pre-approved, however, the public is to be notified prior to project implementation.

Schedule B — Projects have the potential for some adverse environmental effects. The proponent is required to undertake a screening process, involving mandatory contact with directly affected public and relevant review agencies, to ensure they are aware of the project and that their concerns are addressed. If there are no outstanding concerns, then the proponent may proceed to implementation. Schedule B projects generally include improvements and minor expansions to existing facilities.

Schedule C — Projects have the potential for significant environmental effects and must proceed under the full planning and documentation procedures specified in the Class EA document. Schedule C projects require that an Environmental Study Report be prepared and filed for review by the public and review agencies. Schedule C projects generally include the construction of new treatment facilities and major expansions to existing treatment facilities.

The Class EA process also provides an appeal process to change the project status. Under the provisions of subsection 16 of the amended EA Act, there is an opportunity under the Class EA planning process for the Minister to review the status of a project. Members of the public, interest groups and review agencies may request the Minister to require a proponent to comply with Part II of the EA Act, before proceeding with a proposed undertaking. This is known as a "Part II Order" (formerly called "Bump-Up Request"). The Minister determines whether this is necessary with the Minister's decision being final. The procedure for dealing with concerns which may result in the Minister, by order, requiring the proponent to comply with Part II of the Act is outlined in the Municipal Class Environmental Assessment document.

Following the end of the review period, if there are no outstanding Part II Order Requests, the project may proceed to Phase 5 of the Class EA process to complete the contract drawings and tender documents, and then move on to construction. This study encompasses Phase 1 and Phase 2 of this process with Phase 5 (implementation) being the subject of future work for each of the individual projects identified at the appropriate time.

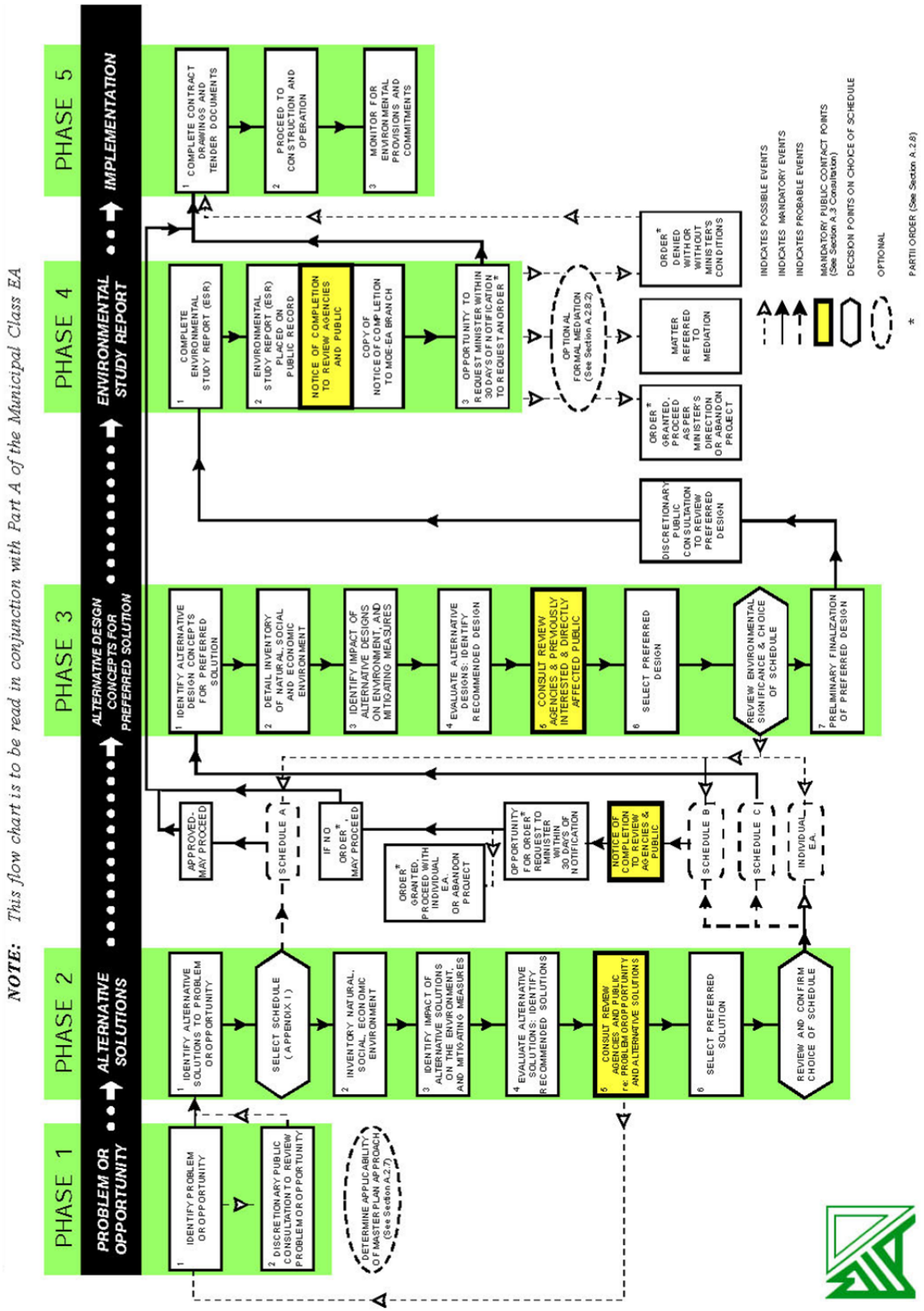


Figure 3 Class EA Planning Flow Chart (Source: Municipal Engineers Association)

2 PROBLEM STATEMENT

Like many towns and cities throughout Ontario, the City of Vaughan has recently adopted a new City-Wide Official Plan. In Vaughan, the New Official Plan is part of an overall Growth Management Strategy, initiated by Council that will "shape the future of the City and guide its continued transformation into a vibrant, beautiful and sustainable City".

The New Official Plan was completed and adopted by City Council in September 2010, and as such the City is now interested in undertaking a City-Wide Water/Wastewater Master Plan Environmental Assessment Study (MPEA) to complement the New Official Plan and to establish the water and wastewater infrastructure required to support the build-out of the New Official Plan.

The Water and Wastewater Master Plan will identify alternative infrastructure planning and implementation strategies and select the preferred alternative to meet the City's growth needs, premised upon a time horizon of 2031. Servicing scenarios beyond 2031 will also be considered to efficiently plan for municipal infrastructure requirements in anticipation of full urbanization and build-out of remaining white belt lands throughout the City.

This Water and Wastewater Master Plan is to be co-ordinated and integrated with York Region's Water/Wastewater Master Plan Update (2009) as well as the City's principles of sustainability as established in the Community Sustainability and Environmental Master Plan (CSEMP) called Green Directions Vaughan.

This project also presents the opportunity to re-assess the City's design criteria and explore opportunities to maximize the utilization of existing water and wastewater infrastructure.

3 BACKGROUND INFORMATION

Within the City of Vaughan, there are a number of completed and ongoing studies that were reviewed and referenced as part of these Master Plans. A summary of those studies is provided below.

3.1 Vaughan Official Plan

The Official Plan is a legal document approved by the City of Vaughan and York Region, which describes policies and objectives for future land use. It reflects a community vision for future change and development.

The York Region Official Plan is a broad based strategic plan adopted by York Region Council under Section 16 of the Planning Act and which provides the basis for Vaughan's new Official Plan. The Regional Official Plan provides policies, land use designations and criteria to direct economic, environmental and community-building decisions affecting the use of land. The Regional Official Plan leaves considerable latitude for an area municipality to provide detailed planning policies within the overall Regional framework.

Vaughan's new Official Plan provides guidance for the physical development of the municipality to the year 2031 while taking into consideration important social, economic and environmental issues and objectives. The Plan provides a policy framework that will guide where new development can locate, how existing and future neighbourhoods will be strengthened, how Vaughan's environment will be enhanced, what municipal services will be provided, and when and where Vaughan will grow.

Vaughan's new Official Plan was developed with an extensive program of public consultation, under the banner of Vaughan Tomorrow (www.vaughantomorrow.ca), to establish the framework through which provincial, regional, and municipal planning objectives could be achieved, with particular emphasis on sustainable growth.

The latest update of the Official Plan was completed and adopted by City Council in September 2010, and provides the basis for completion of Secondary Plans throughout the City as well as this Master Plan.

3.2 Green Directions Vaughan

Green Directions Vaughan is the City's Community Sustainability and Environmental Master Plan (CSEMP). It influences virtually all aspects of the City's operational and regulatory activities, including the growth management strategy. The plan establishes the principles of sustainability to be used in the development of other plans and master plans to achieve a healthy natural environment, vibrant communities and a strong economy.

Green Directions provides two distinct functions:

1. it creates a series of sustainability action plans to guide the City's operational and regulatory functions; and
2. it acts as the City's first Integrated Community Sustainability Plan.

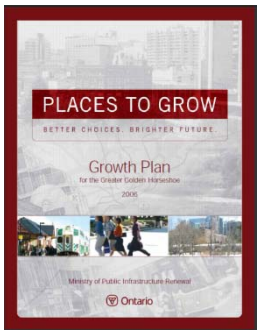
There are six key goals outlined in the plan:

1. To significantly reduce our use of natural resources and the amount of waste we generate;
2. To ensure sustainable development and redevelopment;
3. To ensure that Vaughan is a City that is easy to get around with a low environmental impact;
4. To create a vibrant community where citizens, businesses and visitors thrive;
5. To be leaders in advocacy and education on sustainability issues; and
6. To ensure a supportive system for the implementation of Green Directions.

The Water/Wastewater Master Plan and the Storm Drainage / Storm Water Management Master Plan will both strive to achieve the goals of Green Directions through:

1. Ongoing consultation with the Region, TRCA, MOE, the Development Community, and the General Public; and
2. Consideration of established and emerging technologies to achieve waste reduction and sustainability goals.

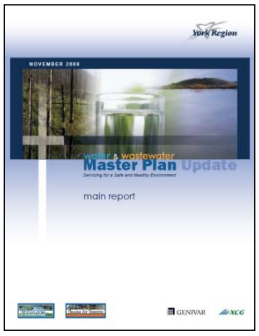
3.3 Places to Grow



The Provincial 2006 Growth Plan for the Greater Golden Horseshoe was prepared under the Province's 2005 Places to Grow Act. The Growth Plan establishes population and employment forecasts up to 2031 as well as general intensification requirements, prime agricultural policies, and identifies potential future transportation corridors and priorities.

This Growth Plan forecasts that the population within York Region will grow to 1,500,000 by 2031 and that the number of jobs will increase to 780,000. Within Vaughan specifically, this translates to a 2031 population of 416,600 (growth of 168,000 over 2006 population), and 266,100 jobs (increase of 102,000). This will be achieved through a combination of expansion to the existing urban boundary and also through intensification within existing built-up areas. The Places to Grow Act and the Growth Plan provided the basis for the updates to the Official Plan.

3.4 York Region Water and Wastewater Master Plan



In November 2009, York Region updated its Water and Wastewater Master Plan to guide the implementation of infrastructure throughout the Region to accommodate the growth and land use designations established by the provincial, regional and municipal planning processes. As the Region supplies water to the City and collects and treats the City's wastewater, the recommendations of the Water/Wastewater Master Plan need to be considerate of, and complementary to, those of the Region's Master Plan to ensure consistency.

The York Region Master Plan identified a number of water and wastewater projects intended to support growth in the City of Vaughan, as follows:

Water Projects

- PD5 Reservoir (in vicinity of Huntington Road and Kirby Road) and Feedermain
- Decommissioning of East Woodbridge Pumping Station (PD5-West)
- Decommissioning of East Woodbridge Elevated Tank (PD5-West)
- Huntington Road PD6 Watermain
- PD6 Reservoir (in Nobleton area)
- Upgrades to South Maple PD7 Pumping Station
- PD7 Reservoir (in vicinity of Jane Street and King-Vaughan Road) and Feedermain
- Upgrades to South Maple PD8 Pumping Station
- PD8 Reservoir (in vicinity of Keele Street and King-Vaughan Road) with Feedermain
- PD8 Pumping Station (in vicinity of Jane Street and Teston Road; time horizon 2031-2051)
- PD9 Pumping Station (in vicinity of Keele Street and Kirby Road) with Feedermain
- PD9 Elevated Tank (in vicinity of Keele Street and King-Vaughan Road
- Decommissioning of Kleinburg Well Nos. 2 & 3
- Kleinburg Pumping Station

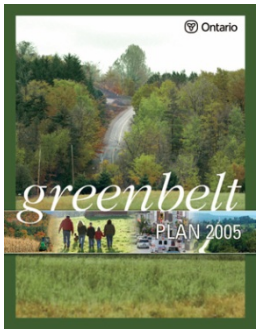
Wastewater Projects

- Kleinburg WPCP Expansion to 2.8 ML/d
- North West Vaughan Collector
- West Rainbow Creek Trunk Sewer
- North East Vaughan Collector
- Jane-Rutherford Trunk Sewer Upgrade

The Vaughan City-Wide Water and Wastewater Master Plan will consider the above projects and provide comment as to the justification and timing of the projects relative to the updated planning information being considered in this study.

The Region's proposed water and wastewater projects as developed in its 2009 Master Plan Update are provided in Appendix B. The need and timing of the proposed Regional infrastructure listed above is contingent on the outcome of the upcoming Master Plan Update (scheduled to commence in late 2013) and other planned Reqional studies.

3.5 Greenbelt Plan



The Greenbelt Plan was established in 2005 under the Greenbelt Act.

The City of Vaughan includes lands that are part of the Greenbelt Plan. The Plan's main goals are to protect against the loss and fragmentation of agricultural land, protect natural heritage and water resource systems that sustain ecological and human health and provide for a diverse range of economic and social activities associated with rural communities, agriculture, tourism, recreation and resource uses. The Greenbelt Plan acknowledges the need to maintain existing infrastructure to serve existing land uses and the need for additional infrastructure to support future growth. All new infrastructure that will be within the Greenbelt must comply with specific policies prior to implementation.

3.6 Oak Ridges Moraine Conservation Plan

The Oak Ridges Moraine Conservation Plan (released April 22, 2002) is an ecologically based plan established by the Province of Ontario (Ministry of Municipal Affairs and Housing) to provide land use and resource management direction for lands located within the Oak Ridges Moraine. This Plan, which takes precedence over regional and municipal official plans, establishes a long-term strategy for the Oak Ridges Moraine, including planning objectives for development within the Moraine.

3.7 Vaughan Transportation Master Plan

The Transportation Master Plan will define the road and public transit infrastructure, and other initiatives, which are needed to accommodate the population and employment growth that will result from the implementation of the Growth Management strategy.

This study will assess opportunities to coordinate construction of new water and wastewater infrastructure with anticipated road construction.

3.8 Where and How to Grow

Where and How to Grow (Urban Strategies Inc, 2009) documents the residential capacity analysis and land budget exercise associated with the preparation of Vaughan's new Official Plan. It establishes the framework and basis for a new discussion about Where and How to Grow in Vaughan to 2031.

This report identifies intensification potential for each of the priority intensification opportunity areas within the City.

3.9 Housing Analysis and Employment Lands Needs

Housing Analysis and Employment Land Needs (Hemson Consulting Ltd., 2010) provides a technical analysis of housing and employment land needs and to highlight the primary policies to implement Vaughan's vision for growth. This study was undertaken as an input to the City's growth management program, Vaughan Tomorrow.

This report confirms some of the projections from *Where and How to Grow,* and *also* provides employment land projections and the basis for the urban boundary expansion areas that were included in the Official Plan.

3.10 Existing Information Relating to Growth Areas

3.10.1 Vaughan Metropolitan Centre Secondary Plan

The Vaughan Metropolitan Centre (VMC) area in Vaughan is a designated urban growth centre, with a vision for redevelopment. The Secondary Plan has established a vision for the VMC that includes a distinct downtown containing a mix of uses, civic attractions, and a critical mass of people. The recently completed Municipal Servicing Class Environmental Assessment Master Plan (The Municipal Infrastructure Group Ltd., 2012) for this area contains the recommendations of the VMC Secondary Plan through evaluation of existing water, wastewater, and stormwater servicing capacities and identifies any necessary improvements.

3.10.2 North Kleinburg-Nashville Secondary Plan

The North Kleinburg-Nashville SP includes lands that are fully within built-up area, greenfield area and greenbelt area (The Planning Partnership, May 2010). The purpose is to provide a detailed land use plan, where and how much growth will be accommodated. There are seven different areas within Blocks 55 and Blocks 62 – along the east side of Block 55 and the west side of Block 62. It is anticipated that 1,900 new residential units (6,400 people), and 200 jobs will be accommodated through North Kleinburg-Nashville.

3.10.3 Highway 400 North Employment Lands Secondary Plan

This secondary plan area is bounded by Weston Road in the west, Jane Street to the east, Teston Road to the south, and Vaughan city limits just north of King Vaughan Road (Macaulay Shiomi Howsen Ltd., 2006). This area has been identified as employment lands to accommodate the projected employment growth. Sections of this area are part of the Greenbelt Lands; as such, no significant development will be permitted in those areas. At the northeast quadrant of Weston Rd and Teston Rd, there is an existing estate residential subdivision which will remain.

After accounting for the estate residential lands, Greenbelt Lands, and rivers/streams in the area, it is estimated that there is 340 hectares for employment development. A minimum development of 50 persons/hectares results in 17,000 jobs in the Highway 400 North Employment Lands.

3.10.4 West Vaughan Employment Lands Secondary Plan

In 2002, OPA 600 designated lands east of Highway 50 and west of Woodbridge and Kleinburg-Nashville communities for employment uses (Vaughan, 2002). These lands are necessary for the City to meet its 2031 employment forecasts. These lands include Blocks 59 and 60, as well as sections of Blocks 65 and 66. Blocks 64 and most of 65 have been planned/developed in a separate planning process. Most of Block 65 is the CP Intermodal Facility and is not included in the West Vaughan Employment Area (WVEA). Highway 427 is in the process of being extended to a new terminus at Major Mackenzie Drive. The gross area for WVEA comprises 975 hectares. Within this area, there are 20,120 jobs with zero residential uses.

3.10.5 Woodbridge Centre Secondary Plan

The focus of this Secondary Plan, completed in May 2010 by Office for Urbanism, is to provide an overall urban design framework for the Woodbridge Centre area. Woodbridge Core and Kipling Corridor, both covered under Woodbridge Centre Secondary Plan (SP), are considered an area of intensification. Woodbridge Commercial Core is also covered by this SP and is identified as an area for intensification. By 2031, 4,230 residential dwellings are projected.

3.10.6 Yonge Steeles Corridor Secondary Plan

The Yonge Steeles Corridor is located in the southeastern corner of the City, bordered by the City of Markham to the east. The Yonge Steeles Corridor Secondary Plan provides development framework for this intensification area (IBI Group Architects, May 2010). The area is further divided into north and south components. The north section is along Yonge Street between the northern edge of the Thornhill Golf and Country Club and Highway 407. The south section is along Yonge Street from Thornhill Public School and Steeles Avenue, and Steeles Avenue from Yonge Street to Palm Gate Boulevard. This area is identified as an intensification corridor to assist the City to reach its intensification growth targets.

3.10.7 Carrville District Centre Plan (OPA 651)

Carrville Centre located at the common corner of Blocks 10, 11, 17, and 18, at the intersection of Dufferin Street and Rutherford Road, and is planned to undergo some proposed development and intensification by 2031. Carrville Centre is governed by OPA 651, completed in 2006. This centre will include a mixed-use land use, be pedestrian friendly and transit supportive. It is the intent for Carrville Centre to become an urban centre and strike a 'live/work' relationship. High quality urban design will be the development characteristic. Carrville Centre shall be designed with a total population of 12,000 people and 4,000 jobs.

3.10.8 Steeles Corridor Servicing Strategy Master Plan Class EA (OPA 620)

This growth area is located along Steeles Avenue, between Jane Street and Keele Street in Block 22. This growth area encompasses land approved by OPA 620, located on the north side of Steeles Avenue across from York University. A land use review for this area consisting of vacant land was completed in September 2004 by Urban Strategies Inc. The plan underway to extend the TTC subway system to York University offers up many land uses under OPA 620 for this growth. The total projected growth, in accordance with OPA 620, is 11,000 residents and 5,000 jobs.

3.10.9 Kleinburg-Nashville Water and Wastewater Servicing Strategy Master Plan

The Kleinburg-Nashville community is located in the north-west quadrant of Vaughan. Currently it has a population of approximately 4,500 people; however, there are several development areas within the community limits. Vaughan required a servicing study to be completed illustrating the servicing options for the community. The Master Plan (AECOM, May 2011) identifies the most effective way to provide sanitary and water servicing. This community is surrounded by significant environmental features, including Main and East Humber River Valleys and the Greenbelt.

4 DESCRIPTION OF THE PROJECT AREA

4.1 Land Use

The existing land use of the City of Vaughan is a mix of natural areas, employment lands, residential lands and commercial lands as indicated in Figure 1with a full size version available in Appendix A.

The majority of the employment lands are located along the westerly edge of the City, west of Highway 27 (West Vaughan Employment Area), as well as between Weston Road and Dufferin Street from south of Rutherford Road to Steeles Avenue, from Pine Valley Drive to Weston Road from south of Highway 7 to Steeles Avenue, and the Highway 400 North Employment Lands (Weston Road to Jane Street north of Teston Road).

The northerly portion of the City is predominantly composed of agricultural land, natural areas and parks, with much of the area being part of the Greenbelt and Oak Ridges Moraine. The majority of commercial lands are along the Highway 7 corridor, Jane Street corridor, and Rutherford Road. The remaining areas are largely residential.

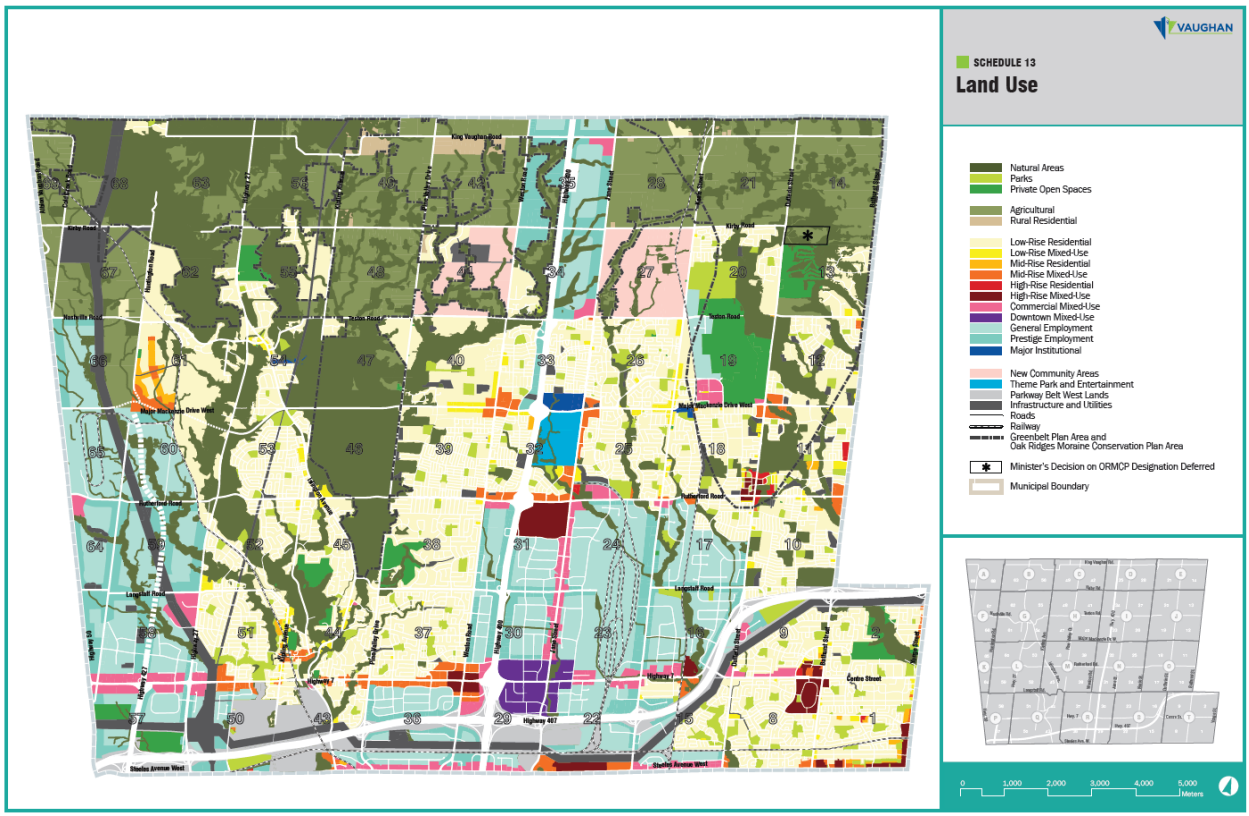


Figure 4 Land Use (Schedule 13 of Official Plan; See Appendix A for full size version)

4.2 Natural Environment

4.2.1 4.2.1 Terrestrial Resources

The City of Vaughan is located within the Deciduous Forest Region, which includes the Carolinian Zone of Canada (MNR, 2002). Ontario's Deciduous Forest lies along the northern shores of lakes Erie and Ontario and the southeastern shore of Lake Huron. It is the northern extension of the large deciduous forest of the northeastern

United States. Many of the trees found there are at the northern limit of their range. The Deciduous Forest Region contains one percent of Ontario's forests. In this region, the forest life is the most diverse in Ontario.

The Ministry of Natural Resources (MNR) has identified several Areas of Natural and Scientific Interest (ANSI) and Environmentally Significant Areas (ESAs) within the City of Vaughan. The locations of these areas are shown in Figure 5 and include the Humber River Valley – Kleinburg ANSI and ESA, the Kleinburg Woodlots ANSI, the Boyd Conservation Area and Adjacent Lands ANSI and ESA, Maple Spur Channel ANSI and ESA, Maple Uplands and Kettles ANSI and ESA and the Baker's Woods ANSI and ESA. These natural areas are considered to be significant by the Provincial Government and should be avoided.

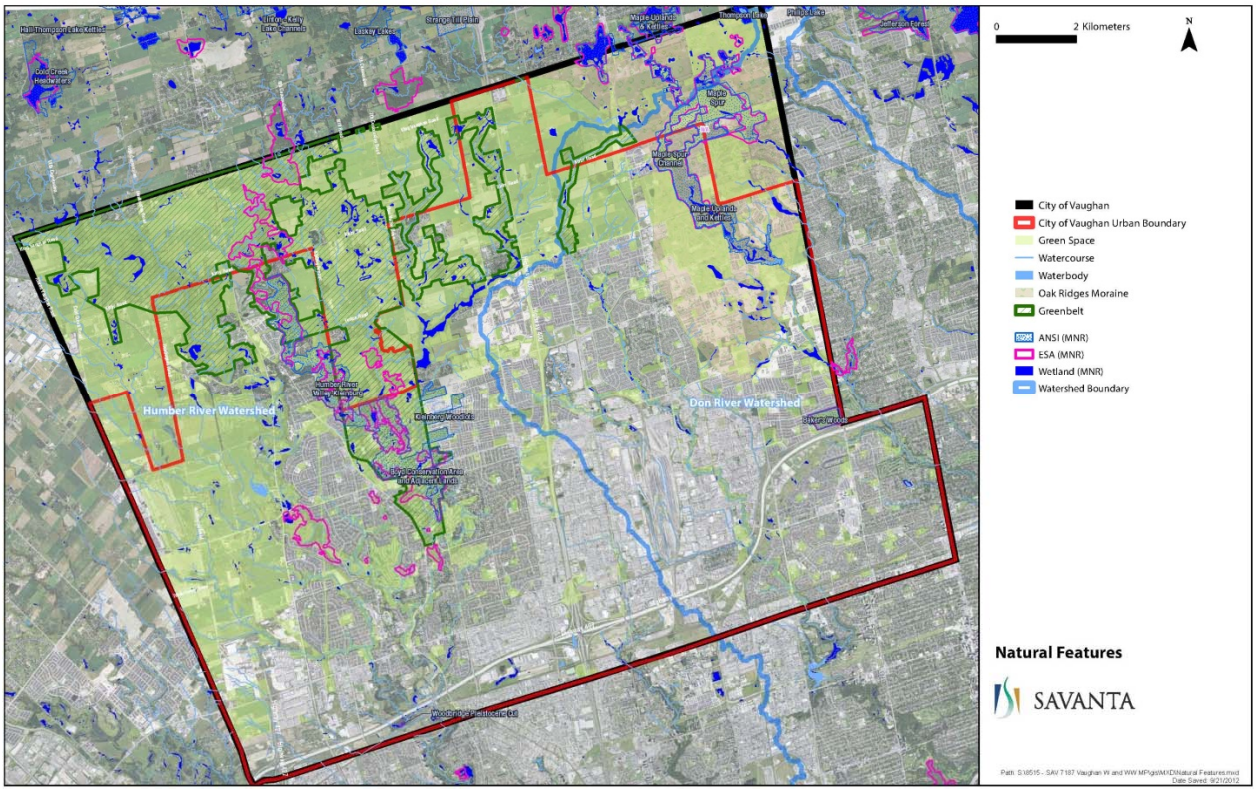


Figure 5 Natural Features in Vaughan (Source: Savanta)

4.2.2 Aquatic Resources

The City of Vaughan is located within the Humber River Watershed (western portion) and Don River Watershed (eastern portion) as shown in Figure 5.

The Humber River Watershed supports a fish community that represents generally healthy conditions. During the TRCA's 2004 fish surveys 39 native fish species were collected that span 10 phylogenic families. At virtually all of the TRCA monitoring stations a host of minnow species described as habitat generalists that are relatively tolerant of poor water quality have been observed. These species can withstand an array of thermal regimes and include: creek chub (Semotilus atromaculatus), common shiner (Luxilus cornutus), blacknose dace (Rhinichthys atratulus), fathead minnow (Pimephales promelas) and longnose dace(Rhinichthys cataractae). White sucker (Catostomus commersoni) and brook stickleback (Culaea inconstans) are two other tolerant, generalist fish species that are also observed throughout the watershed with the exception of Black Creek, which is in a highly urbanized area, where brook stickleback has not been collected since 1994 (TRCA, 2008).

The Don River Watershed supports a dominant fish community that is described as generalists, tolerant of a wide range of habitat conditions and are commonly associated with urban, degraded streams. This dominant fish community includes the following species: longnose dace (Rhinichthys cataractae), blacknose dace (Rhinichthys atratulus), white sucker (Catostomus commersoni), creek chub (Semotilus atromaculatus), fathead minnow (Pimephales promelas), and bluntnose minnow (Pimephales notatus). Although the dominant fish community are warm water tolerant species, Redside dace (Clinostomus elongatus), an endangered species, as well as mottled sculpin (Cottus bairdi) and American brook lamprey (Lampetra rostrata), both relatively sensitive species, have also been consistently collected through time at various stations across the watershed. However, their present distributions (2002-2005) are now limited to reaches in the Upper East Don River where suitable cool and cold water habitat still remain (TRCA, 2009).

4.2.3 Species at Risk

Redside dace, a Species at Risk (SAR) under provincial and federal legislation, has experienced a decline due to impacts associated with urbanization, such as increased water temperatures, higher volume flows, increased flashiness and turbidity. The middle reaches of the Main and East Humber and Purpleville Creek subwatersheds support a relatively high abundance of redside dace, whereas it is only present in the Upper East Don subwatershed (confirmed by informal TRCA sampling in 2008) and its distribution and abundance is not specifically known. Much of this catchment has recently undergone intensive urban development; the ultimate effects of land use change on stream habitat in the Upper East Don River, and subsequently redside dace populations, are not fully realized but heavy siltation has already been observed.

Terrestrial species at risk will have to be reviewed on a smaller scale as the various habitat types and ecosystems present in the City of Vaughan could support a vast number of flora and fauna species at risk. It should be noted that these species will most likely be concentrated within the ANSI and ESA area identified by the MNR.

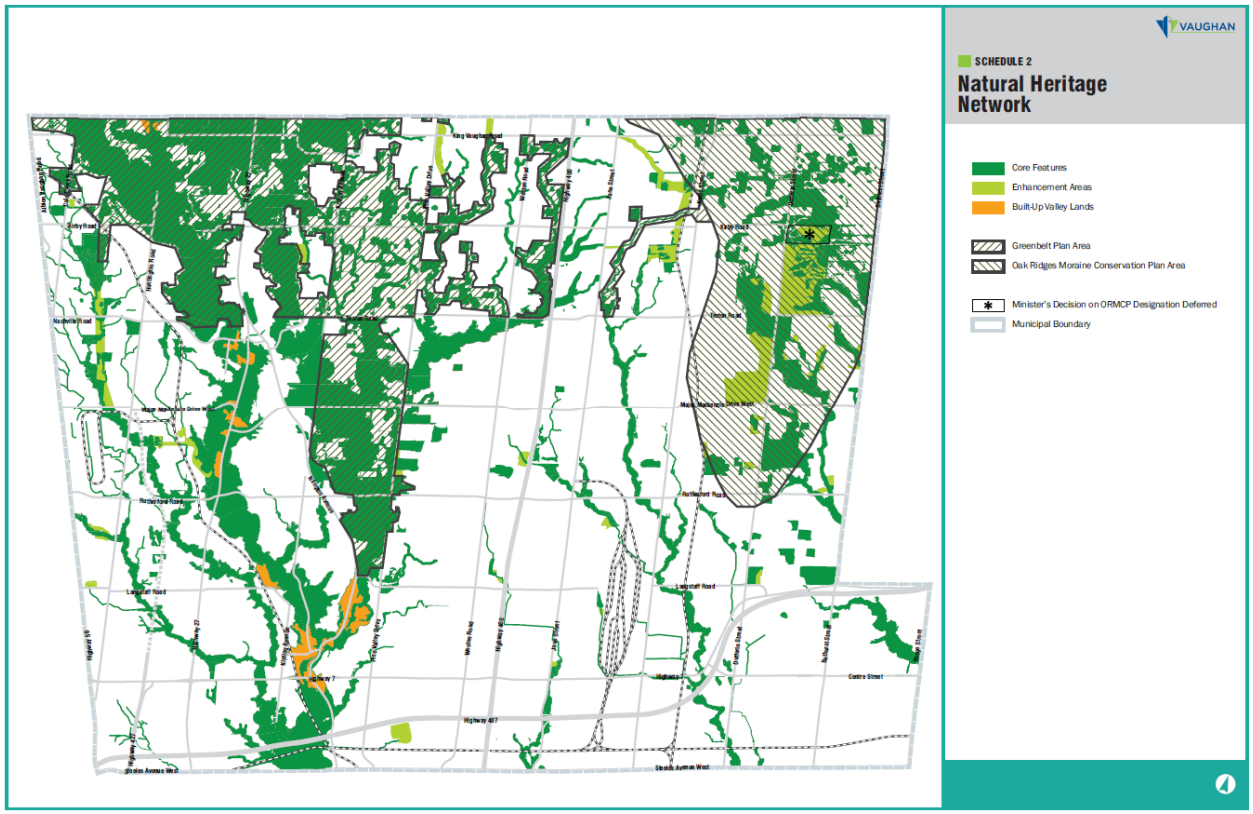


Figure 6 Natural Heritage Network (Schedule 2 of Official Plan; See Appendix A for full size version)

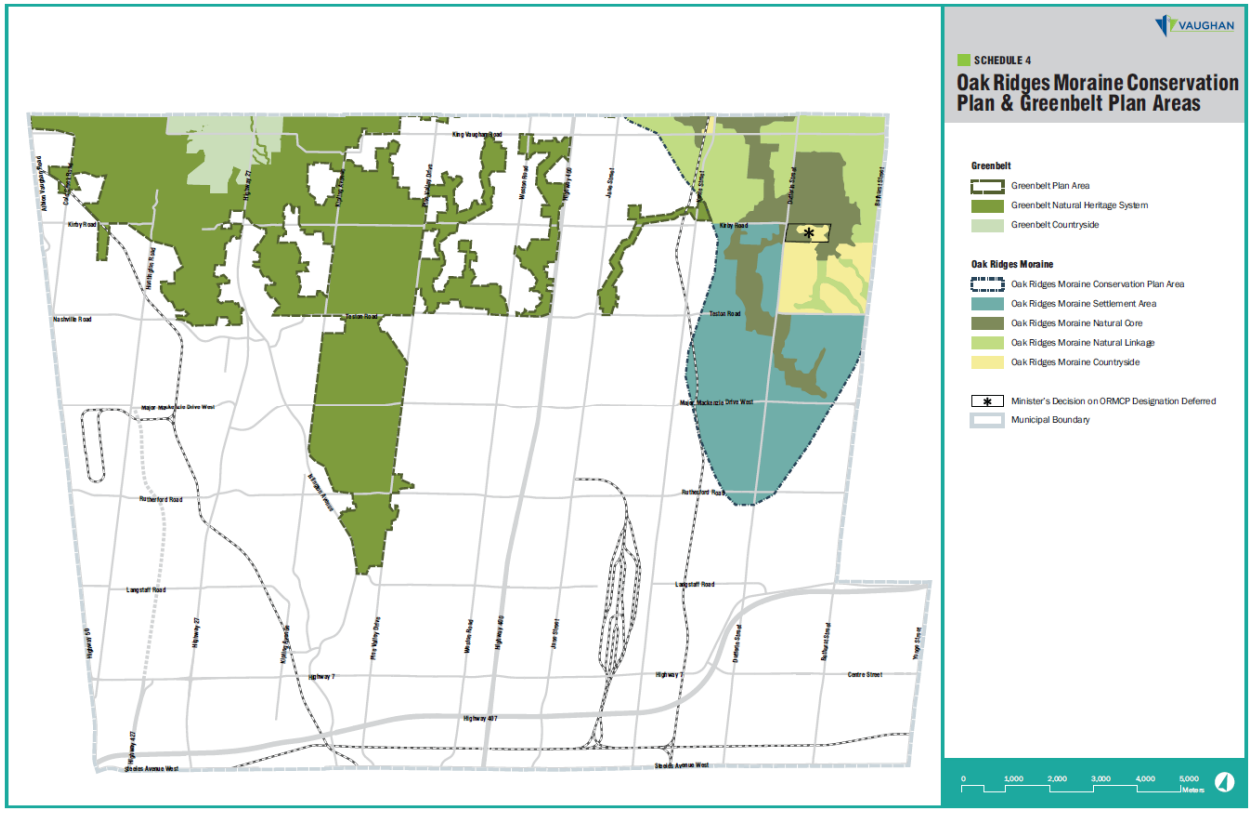


Figure 7 Oak Ridges Moraine Conservation Plan & Greenbelt Plan Areas
(Schedule 4 of Official Plan; See Appendix A for full size version)

4.3 Socio-Economic Environment

Vaughan has experienced rapid growth since the early 1970s which has transformed it from a collection of primarily rural villages and other small settlements and the surrounding countryside to a large suburban municipality and a major centre of economic activity and employment growth[1]. The City is home to approximately 295,000 residents and 185,000 jobs which include manufacturing, commercial/retail, service industry, amongst others. This is supported by road and other infrastructure systems and any future water and wastewater infrastructure planning, being the subject of this study, must be cognizant of this environment in order to mitigate impacts to it during implementation.

[1] Source: Official Plan

5 EXISTING SERVICING

5.1 Existing Water Distribution System

The City of Vaughan is responsible for distribution of water which is supplied in bulk by York Region through two systems: (i) the York Water System which itself derives water from the City of Toronto and Region of Peel; and (ii) a well-based groundwater supply system for the community of Kleinburg-Nashville. The Region's York Water System consists of a network of large diameter transmission mains, pumping stations, elevated tanks and reservoirs located throughout the City of Vaughan as well as neighbouring municipalities in the Region. York Region infrastructure, identified in the darker elements on Figure 8, is superimposed on the City's water distribution system for illustration purposes.

There are several pressure zones within Vaughan which are directly linked to the broader York Region pressure zones which are based on prevailing ground elevations, although the Kleinburg-Nashville zone is unique. A discussion of each of the pressure districts follows. Table 1 lists the ground elevations serviced by each zone and Figure 8 illustrates their spatial distribution across the City. During the course of this study, pressure monitoring was conducted at various strategic locations, the results of which are presented in a Technical Memorandum which is provided in Appendix C.

Table 1 Vaughan Pressure Districts

Pressure District	Legend for Figure 8	General Ground Elevation Limits (m)
PD4		143 – 174
PD5		163 – 195
PD6		195 – 229
PD7		227 – 256
PD8		256 – 282
PD9		282 – 315
PD-KN[2]		195 – 240

[2] This elevation range is based on conditions prior to the June 2012 re-alignment of the PD6/PD-KN zone boundary which placed the southerly portion of Kleinburg into PD6.

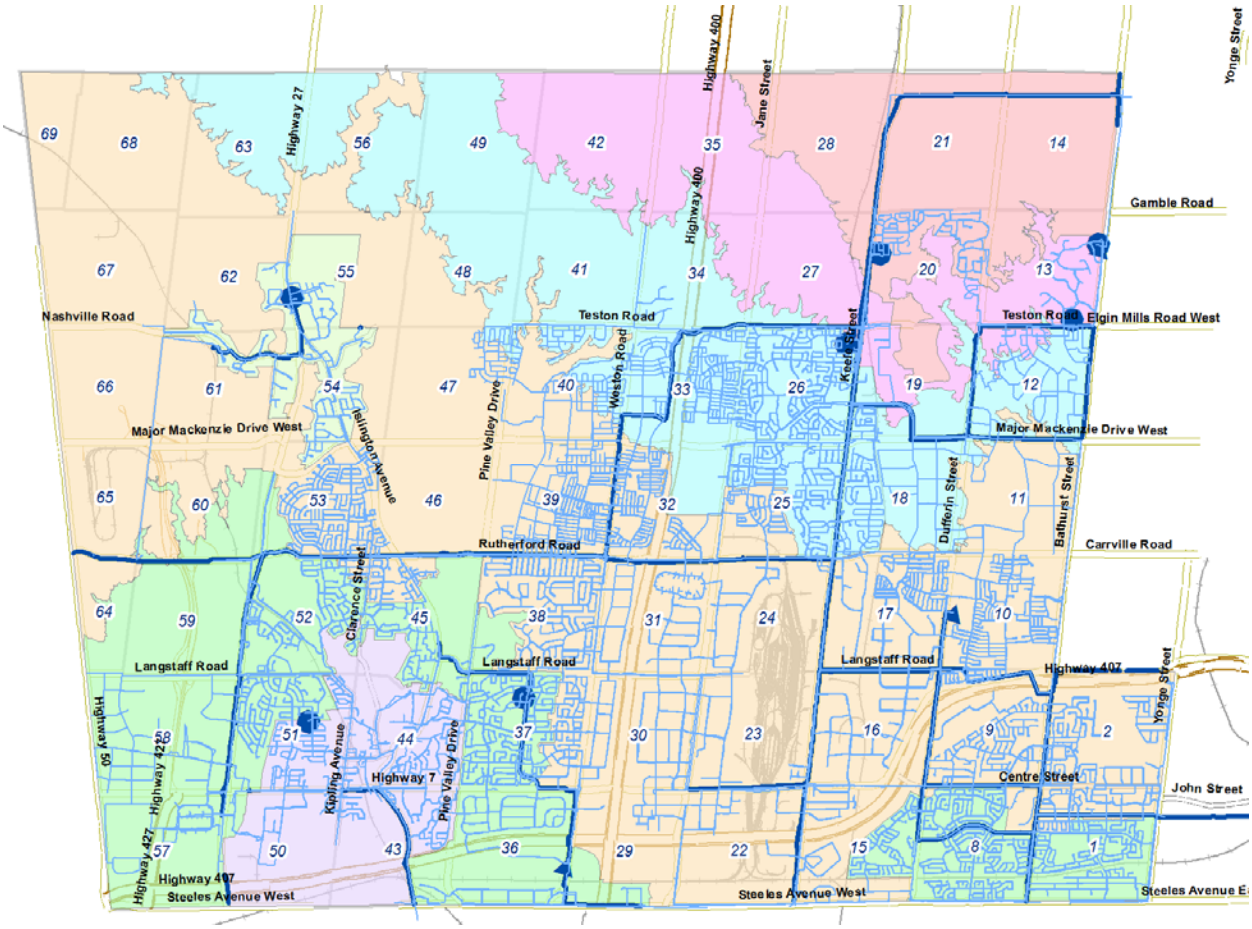


Figure 8 Existing Water Distribution System (Refer to Table 1 for Legend)

5.1.1 PD4

This pressure zone (or district) is supplied with water from a connection to York Region infrastructure located near its connection to a Toronto-based supply located at the intersection of Islington and Steeles Avenues. There are several connections between the Region's system and local distribution system within the zone. In addition, there are several pressure reducing valves which supply water from the surrounding PD5-West zone as well as the West Woodbridge Elevated Tank located near the northwesterly limit of the zone.

5.1.2 PD5

The PD5 zone is further divided into two hydraulically-independent zones, discussed further below.

PD5-West

This pressure zone, located in the southwesterly portion of the City derives water from York Region infrastructure which, in turn, derives water from a City of Toronto feed located at Keele Street and Steeles Avenue, as well as from the large feedermain located on Rutherford Road which is supplied by Peel Region. In addition to several connections between the Region's system and the local distribution system within the zone, there is also the East Woodbridge Booster Pumping Station and the East Woodbridge Elevated Tank, also owned and operated by York Region, as well as PRVs which derive water from the adjacent PD6 system. As noted earlier, this pressure zone also supports the PD4 zone by providing supply at selected locations through PRVs.

PD5-East

Located at the southeasterly corner of the City, this pressure district is connected at various locations to York Region infrastructure which itself derives water from connections to the City of Toronto system at the intersections of Dufferin and Bathurst Streets with Steeles Avenue. This system also contains the Dufferin Reservoir which is owned and operated by the City of Toronto.

5.1.3 PD6

This is the largest pressure district in the City by coverage and, in terms of York Region supply infrastructure, includes the Maple Reservoir located at the intersection of Keele Street and Teston Road, the South Richmond Hill Reservoir, and feeds from both the City of Toronto (Keele Street and Steeles Avenue) and the Region of Peel (Highway 50 and Rutherford Road). There are a number of connections between the Region's transmission network and the City's local distribution system within the zone. As noted earlier, this pressure zone also supports the PD5-West zone at selected locations through PRVs.

Construction is currently underway in the westerly portion of the City for purposes of servicing development in Block 61 in the Kleinburg-Nashville area as well as to convert the Kleinburg water system to a lake-based supply, all of which is expected to be completed in the coming years. In the short term, this portion of the infrastructure will be solely supplied by the large feedermain located on Rutherford Road which is supplied by Peel Region through a connection at Huntington Road. The final phase of the Kleinburg-Nashville conversion is expected to be completed in 2013.

5.1.4 PD7

This pressure district is supplied by York Region's Maple PD7 Pumping Station, the North Maple Reservoir and the North Richmond Hill Reservoir. There are a number of connections between the Region's transmission network and the City's local distribution system within the zone. Pressure monitoring at selected locations throughout this zone (see Appendix C) suggest that the system is very stable.

5.1.5 PD8

Similar to PD5, this zone is further divided into two hydraulically-independent zones, discussed further below.

PD8-West

This small pressure zone, servicing industrial lands generally located to the east of Keele Street on the north and south sides of Teston Road, is currently supplied with a City owned and operated booster pumping station located at the northwest corner of the intersection of these roads and deriving water from a York Region PD7 feedermain along Keele Street. A Schedule A+ EA has recently been completed to decommission this facility and replace this supply source with a connection to the large diameter PD8 feedermain which is pressurized at the Maple PD8 Pumping Station, both of which are owned and operated by York Region. As at the time of writing, detailed design for this connection is underway and it is anticipated that this, along with the decommissioning of the booster pumping station, will be completed in the coming years. This system is currently, and following the connection to the PD8 feedermain will remain, a closed zone with a single source of supply.

PD8-East

This pressure zone is principally supplied through a connection to York Region's current North Richmond Hill Pumping Station which itself is planned to be decommissioned with a new station of the same name to take its place. A secondary source of supply is through a PRV connected to the adjacent PD9 system which, under normal operating conditions, does not emit flow to PD8, however, is available in the event of a depressurization in PD8 or for temporary supply in unique circumstances. This system also operates as a closed zone.

At the northeasterly limit of this zone, the City owns and operates the small Woodland Acres Booster Pumping Station to provide adequate pressure for a small, localized area of residences who, by virtue of elevation, would otherwise experience sub-standard pressures. This locally boosted area is isolated from the remainder of the zone by means of a check valve and a combination pressure reducing and pressure sustaining valve (PRV/PSV). As a result, the remainder of the zone is fed by a relatively long (approximately 1,200 m) and small (300 mm diameter) pipe which runs along the westerly boulevard of Bathurst Street from the current location of the West Richmond Hill Pumping Station to the southerly leg of Woodland Acres. During periods of high demand and flow, significant head and pressure drops are experienced in this stretch of pipe which consequently affects the pressures throughout the remainder of the zone. York Region is currently working on detailed design of a water booster (PD8) station in the vicinity of Bathurst Street and Teston Road. Upgraded infrastructure is already in place along Bathurst Street. The City has requested additional connections to this infrastructure.

5.1.6 PD9

This closed pressure zone is supplied by a City owned and operated booster pumping station located on lands owned by York Region and which draws water from the Region's North Maple Reservoir. This station was constructed as a temporary facility and does not meet typical standards and has experienced several operating issues. As noted earlier, this pressure zone also supports the PD8 zone by providing emergency supply at a single location through a PRV.

5.1.7 PD-KN

This pressure zone is composed of York Region owned and operated wells as well as an elevated tank which are currently connected by the City's distribution system infrastructure. A recently constructed booster pumping station located at the base of the elevated tank is in place, however, has yet to be commissioned. This system has been the subject of several recent studies conducted by both the City and the Region which have resulted in a strategy to bolster supply to this system whose capacity, in recent years, has been stressed. The components of the strategy, which will convert this system from a well-based to a lake-based supply, are at various stages of progress and generally include the following:

- A watermain along Huntington Road is currently under construction from Rutherford Road to Nashville Road. This watermain, which will provide supply to the PD6 system located in Block 61 of the Kleinburg-Nashville area, provides water originating in Lake Ontario and subsequently abstracted, treated and transmitted by the Region of Peel and delivered to York Region's pipe on Rutherford Road.
- A watermain along Nashville Road from Huntington Road to a new temporary booster pumping station located at the site of Wells 3 & 4 (Whisper Lane) is at or near completion of its design and whose construction is anticipated to be completed in 2013.
- A watermain along Nashville Road and Highway 27 from the new temporary booster pumping station to the booster pumping station and elevated tank location is currently in its detailed design stage and similarly is expected to be installed and commissioned in the coming years.
- Water supply conversion from well-based to lake-based is expected to be completed in 2013.

In June 2012, a zone realignment was undertaken which moved the southerly portion of the Kleinburg area from the PD-KN zone to PD6. This realignment had the effect of reducing demands on the PD-KN system and improving its ability to meet the needs of the community in the interim prior to the completion of the lake-based supply.

5.1.8 Other Matters

A City-Wide water audit was completed in 2011 which identified that, while the City had historically maintained its fraction of Non-Revenue Water (NRW) – the difference between the quantity of water purchased from York Region and that delivered to its customers – at levels of generally less than 10%, there has been an increase in NRW in

recent years reaching as high as over 15% in 2009 and 13.7% in 2010. The City has reported that, for 2011 and 2012, this figure has been further reduced to above 12%[3]. The audit also revealed several issues with respect to metering practices which appear to have contributed to this increase and that additional work is required in order to better understand its causes. Since the audit was completed, the NRW figure has decreased, however, the underlying causes are not understood at this time and, similarly, may warrant additional investigation. Among the recommendations made in that report was the development of a feasibility and implementation plan for a water distribution network monitoring and control system.

5.2 Existing Wastewater Collection System

Responsibility for wastewater servicing in the City of Vaughan is divided between the City, which is responsible for local wastewater collection and local pumping, and York Region, which is responsible for major pumping stations, major trunk sewers and treatment facilities.

The majority of the City's wastewater collection system conveys flows to York Region's York Durham Sewage System (YDSS; see Figure 9). Currently, wastewater flows from the community of Kleinburg-Nashville are directed to the Kleinburg Water Pollution Control Plant (WPCP) whose effluent is discharged to the Humber River.

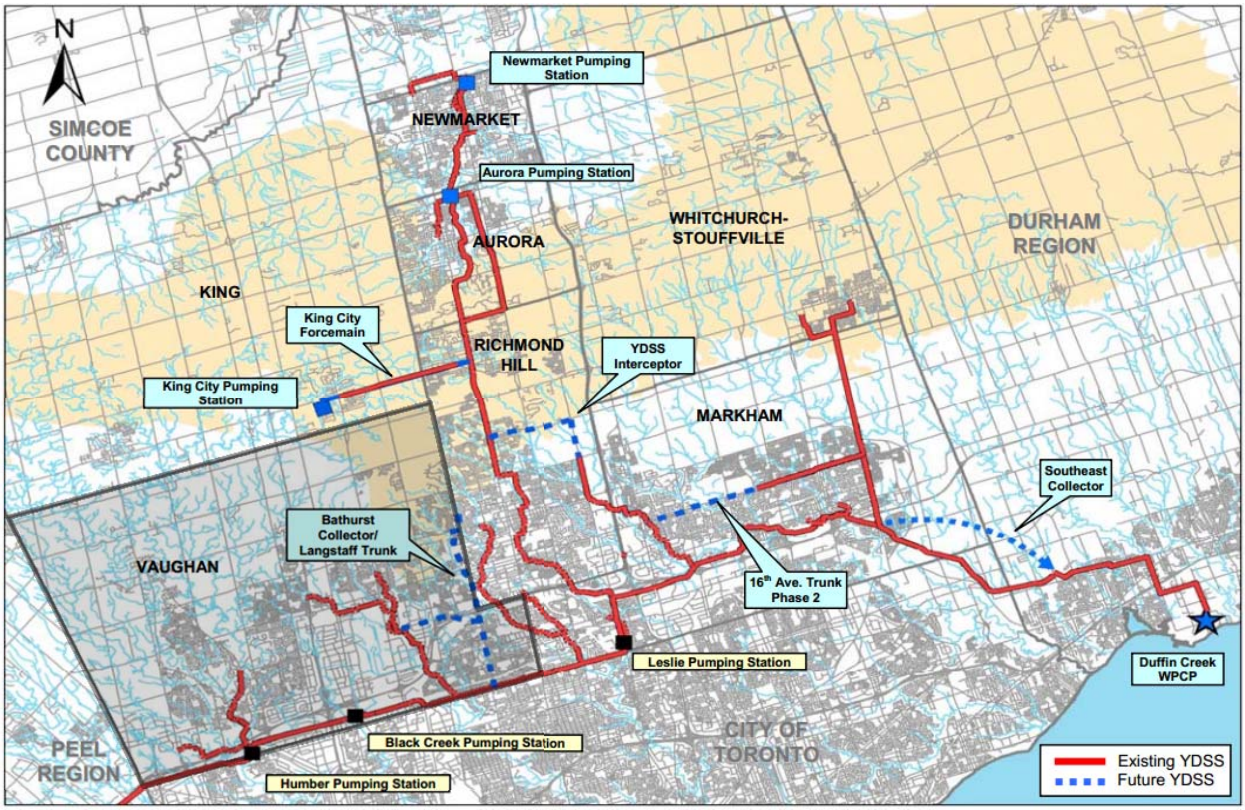


Figure 9 York Durham Sewage System, YDSS (Source: York Region)

The City has 12 existing sanitary collector systems as illustrated in Figure 10 and described further below.

[3] This figure was calculated using a different methodology than that used in the City-Wide Water Audit, but is expected to be representative.

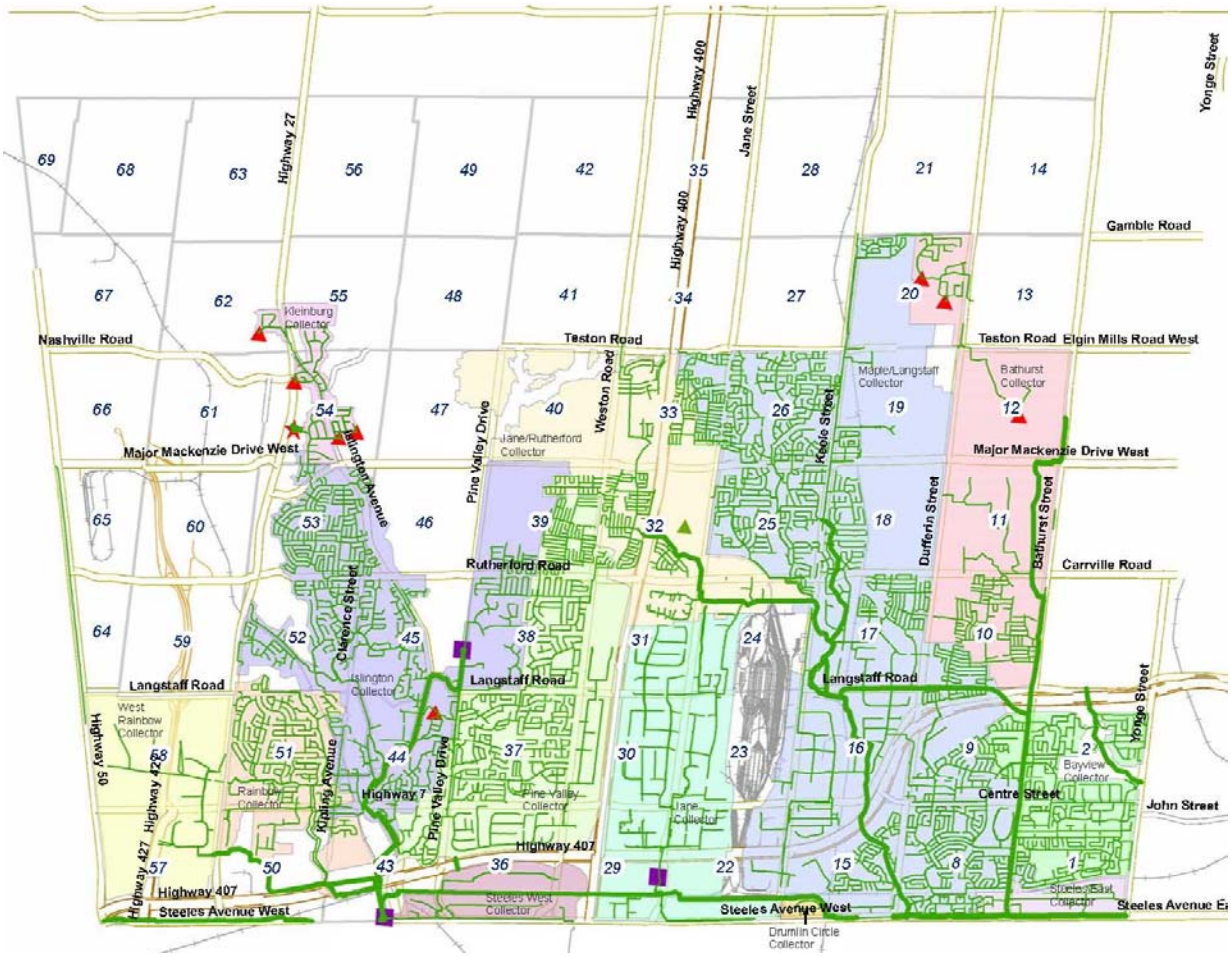


Figure 10 Existing Wastewater System

5.2.1 Bathurst Collector

The Bathurst Sanitary Collector System is located along the eastern side of Vaughan. Blocks 10, 11, 12, and the east half of Block 20 are all serviced by this system. The Maplewood Ravines Pumping Station, Northdale Pumping Station (temporary), and the Block 12 Pumping Station (temporary) are used to service this tributary area. Connections to the Regional system are along Bathurst Street.

5.2.2 Bayview Collector

The Bayview Sanitary Collector System consists of sewers discharging to the Regional trunk sewer which runs through a valley of a tributary to the Don River from Bathurst Streeet toward Bayview Avenue.

5.2.3 Drumlin Circle Collector

The Drumlin Circle Sanitary Collector System is the smallest tributary area in the Vaughan network. This system consists of local sanitary sewers throughout the collector system.

5.2.4 Islington Collector

The Islington Sanitary Collector System services the area with two pumping stations (Humber and Pine Valley) owned and operated by York Region. The flows from Pine Valley Pumping Station are discharged to the Region's

trunk along Islington Avenue which subsequently discharges at Humber Pumping Station. There are several connections between local collection sewers and the Region's trunk sewer. City's sanitary sewer along Islington Avenue (Langstaff Road to north of Highway 7) has been decommissioned and service connections transferred.

There are two City owned and operated pumping stations within this tributary area as well. The Block 39 SPS, along Pine Valley Drive just south of Major Mackenzie Drive and the small Pine Grove SPS within Block 44.

5.2.5 Jane Street Collector

The area within the Jane Street Collector is primarily employment-based. Servicing these lands includes the Region owned and operated Black Creek Sewage Pumping Station as well as the city-owned Jane Street Sanitary Collector.

5.2.6 Jane / Rutherford Collector

The Jane / Rutherford Sanitary Collector System will consist of Pine Valley North SPS (Block 40) and a private SPS in Block 34 (Maple Travel Centre). The Jane / Rutherford Collector Regional Trunk Sewer, and local sanitary sewers throughout the collector system are necessary to service this area.

5.2.7 Kleinburg Collector

The Kleinburg Sanitary Collector System is separate from the rest of the City. The collector system consists of five City-owned and operated pumping stations (Nashville SPS, Sevilla SPS, Kerrowood SPS, Camlaren SPS, and the planned Kleinburg North SPS) as well as the York Kleinburg Water Pollution Control Plant which is owned and operated by York Region. There is no collector trunk, only local sanitary sewers throughout the collector system.

5.2.8 Maple Collector / Langstaff Collector

The Maple / Langstaff Sanitary Collector System is the largest system in the City. It currently consists of the Maple / Langstaff Regional Trunk Sewers, and local sanitary sewers throughout the collector system.

5.2.9 Pine Valley Collector

The Pine Valley Sanitary Collector System is between the Islington Collector System and the Jane Street collector system. There are no pumping stations within this tributary area. There are local sanitary sewers to service this area that is tributary to the Regional Humber Pump Station.

5.2.10 Rainbow Collector

The Rainbow Sanitary Collector System covers part the western of Woodbridge. There are no pumping stations within this tributary area. This collector system includes the Regional trunk collector, and local sanitary sewers throughout the collector system and is tributary to Humber Pumping Station.

5.2.11 West Rainbow Collector

The West Rainbow Sanitary Collector System currently consists of local sanitary sewers throughout the collector system. This tributary area encompasses the West Vaughan Employment area and is tributary to Humber Pump Station.

5.2.12 Steeles East Collector

The Steeles East Sanitary Collector System currently consists of local sanitary sewers throughout the collector system. There are no trunk sewers or pumping stations. This collector system conveys the majority of Vaughan's sanitary flows ultimately to Duffin Creek WPCP.

5.2.13 Steeles West Collector

The Steeles West Sanitary Collector System currently consists of local sanitary sewers throughout the collector system. There are no trunk sewers or pumping stations. Flows from this tributary area lead directly into Humber SPS.

6 FUTURE CONDITIONS

As discussed earlier and as envisioned in the Official Plans of the City and York Region, as well as the Places to Grow legislation of the Province, Vaughan is planned to undergo significant growth over the time horizon extending to 2031. This growth will occur through intensification of existing built-up areas of the city, as well as through expansion of development into the expanded urban boundary. Beyond the current planning horizon, there are additional lands within the City but outside of the current urban boundary, referred to as "Whitebelt" lands which are not otherwise constrained and may potentially be developed by 2051 being outside of the current planning horizon (i.e., 2031).

6.1 Intensification Areas

The location of the intensification areas referred to in this section are shown in Figure 11.

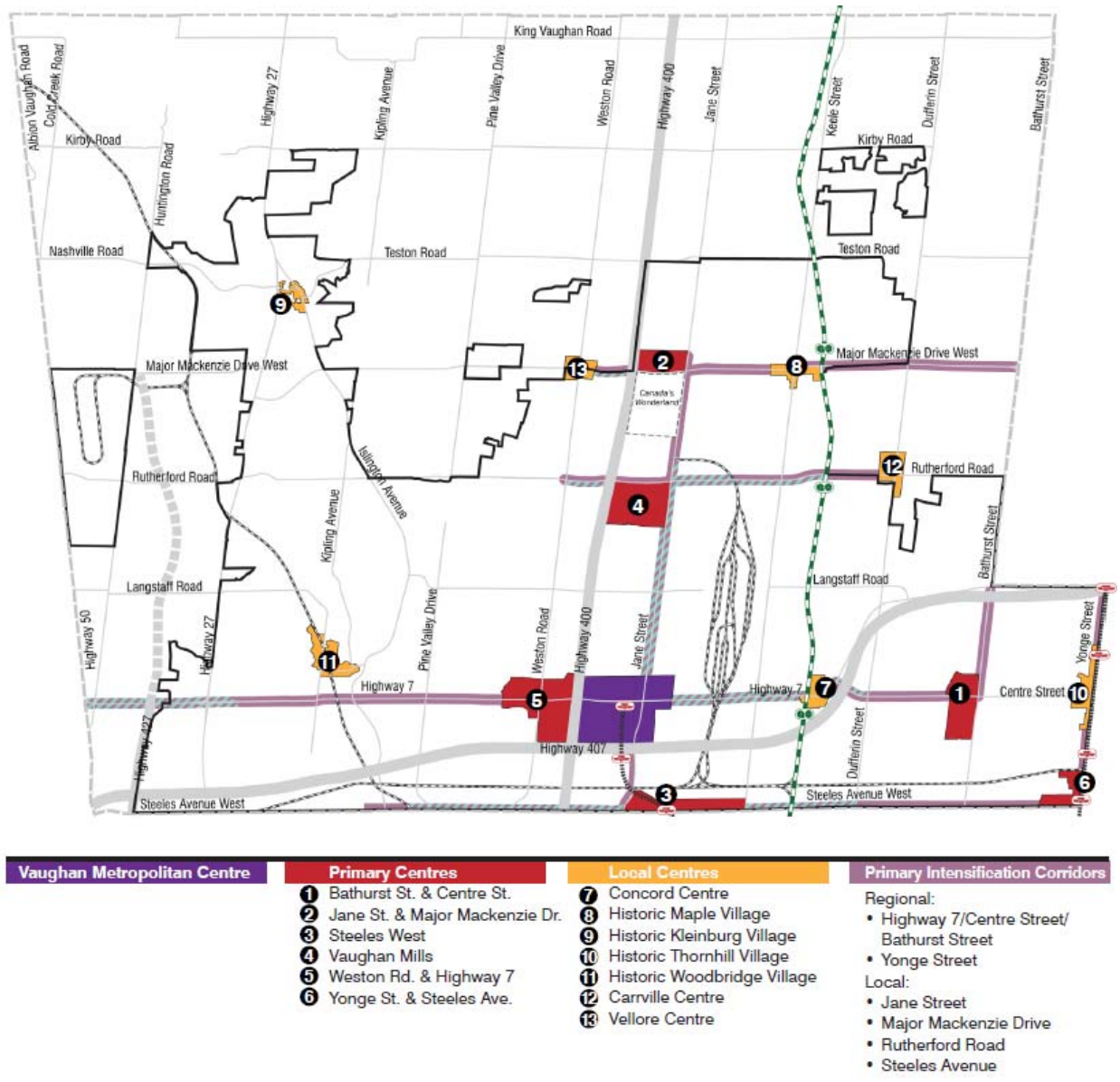


Figure 11 Intensification Areas (Source: Official Plan)

6.1.1 Vaughan Metropolitan Centre

This intensification area is centred on the Highway 7 corridor east of Highway 400. Although there are vacant lots through this land, the majority of this land is already developed. The Vaughan Metropolitan Centre area is located within the Jane Street Collector and the PD6 pressure zone.

6.1.2 Bathurst Street & Centre Street

This intensification area includes land on the north and south sides of Centre Street, west of Bathurst Street, including the Promenade Mall. This already developed area is located within the Maple/Langstaff sewershed and the PD6 pressure zone.

6.1.3 Jane Street & Major Mackenzie Drive

This area is located between Highway 400 and Jane Street, just north of Major Mackenzie in Block 33 and includes the site of a new hospital as part of the development of the Vaughan Health Campus of Care. While the lands in question are currently not populated, they are surrounded by development and related infrastructure systems. This area is located within the Jane/Rutherford Collector sewershed and the PD7 pressure zone.

6.1.4 Steeles West (OPA 620)

This growth area is located along Steeles Avenue, between Jane Street and Keele Street in Block 22 and encompasses lands approved by OPA 620, the north side of Steeles Avenue across from York University. This area is within the Steeles West Collector and Black Creek tributary areas and the PD6 pressure zone.

6.1.5 Vaughan Mills

This intensification area is located between Highway 400 and Jane Street, just south of Rutherford Road in Block 31 in the area including and surrounding the Vaughan Mills mall and has the possibility for redevelopment. The completion of Bass Pro Mills Drive also provides opportunity for additional intensification. This area is within the Jane/Rutherford Collector Sewershed and the PD6 pressure zone.

6.1.6 Weston Road & Highway 7

This opportunity area is one of two major areas located on either side of Highway 400 at Weston Road and Highway 7 being located on the west side of the highway and with Vaughan Mills Centre located on the east side. This growth area is located within the Pine Valley Collector Sewershed for wastewater collection. With respect to water servicing, the lands straddle two pressure zones: the PD5-West pressure zone on the west side of Weston Road, south of Highway 7, and the PD6 pressure zone on the east side of Weston Road and on the north side of Highway 7.

6.1.7 Yonge Street & Steeles Avenue

Along Yonge Street and Steeles Avenue, there are pockets of intensification expected in Blocks 1 and 2. The majority of this projected growth is concentrated near the future subway node at Yonge Street and Steeles Avenue while additional intensification is planned along the west side of Yonge Street around Clark Avenue (see Historic Thornhill Village below) as well as from north of the Thornhill Country Club to the Highway 407 Corridor (see Yonge Street Corridor Secondary Plan below).

The area around the intersection of Yonge Street and Steeles Avenue is tributary to the Steeles East Collector and is situated in the PD5-East pressure district.

6.1.8 Concord Centre

This area is located both north and south of Highway 7 in the vicinity of the rail line which is planned to be host to a future GO Station. These lands are tributary to the Maple/Langstaff Collector are situated in the PD6 pressure zone.

6.1.9 Historic Maple Village

Lands located near the intersection of Keele Street and Major Mackenzie Drive, located west of the Maple GO Station and Vaughan City Hall, provides the opportunity for intensification. This area is within the Maple/Langstaff Collector and PD7 pressure zone.

6.1.10 Historic Kleinburg Village

There are pockets of intensification potential in Block 54. Under current conditions, the Kleinburg area is a self-sustaining area; that is, it is not connected to the City's broader wastewater or water systems. This intensification area is tributary to the Kleinburg Collector and located within the PD-KN pressure zone.

6.1.11 Historic Thornhill Village

The historic Thornhill core has intensification available along Yonge Street to the north and south of Centre Street. This growth area is tributary to the Bayview Collector and located within the PD6 pressure zone.

6.1.12 Historic Woodbridge Village

Located along Woodbridge and Kipling Avenues, the Woodbridge core area has been identified for intensification potential. This intensification area is within the Islington Collector Sewershed and the PD4 pressure zone.

6.1.13 Carrville Centre

The Carrville Centre is located at the corner where Blocks 10, 11, 17, and 18 meet, at the intersection of Dufferin Street and Rutherford Road, and is planned to undergo development and intensification by 2031. Carrville Centre is governed by OPA 651, completed in 2006. The portion of Carrville Centre in Blocks 10 and 11 are tributary to the Bathurst Collector, with the portion in Blocks 17 and 18 tributary to Maple/Langstaff Collector. These lands straddle the PD6 and PD7 pressure districts.

6.1.14 Vellore Centre

Vellore Centre is situated at the intersection of Major Mackenzie Drive and Weston Road. This area is governed by OPA 650. These lands are tributary to the Jane/Rutherford sewershed and straddle the PD6 and PD7 pressure districts.

6.1.15 Regional Intensification Corridors

Several corridors have been identified for general intensification including sections of Highway 7, Rutherford Road, Major Mackenzie Drive, Jane Street, Bathurst Street and Yonge Street, as indicated in Figure 11.

6.2 Secondary Plans & Expansion Areas

The areas within the City which are subject to Secondary Plans, some of which include expansion areas for new employment lands or new communities, are discussed below. Not all secondary plan areas are explicitly covered as they have may have been discussed earlier in relation to identified intensification areas (Section 6.1). For all areas considered in this study, the growth component is accounted for in the population projections and distributions for assessing infrastructure capacity and needs.

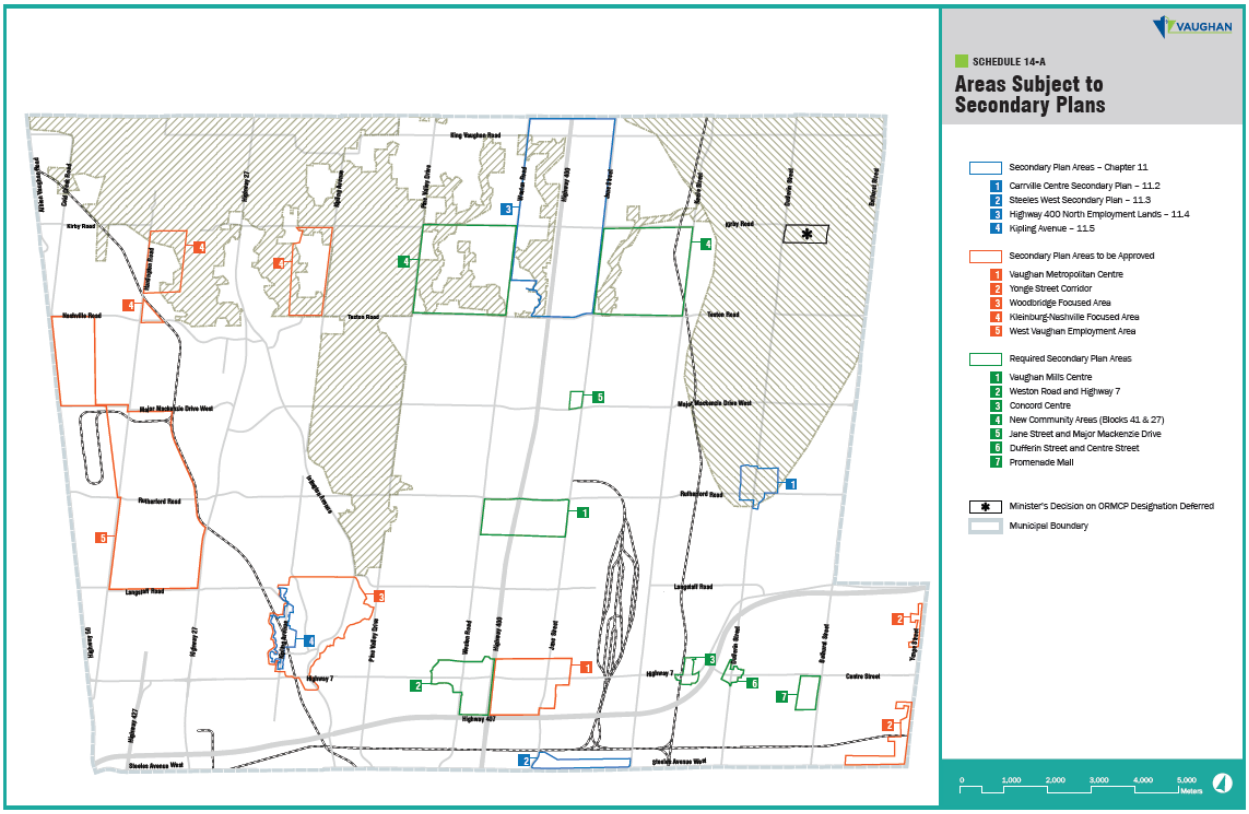


Figure 12 Areas Subject to Secondary Plans (Schedule 14-A of Official Plan; See Appendix A for full size version)

6.2.1 Highway 400 North Employment Lands

Blocks 34 and 35 are each divided into west and east halves by Highway 400. This entire area, approximately 805 hectares, is planned to be entirely used for employment purposes. It is not expected that the whole area will be developable because the west side of Highway 400 contains lands located within the Greenbelt. These currently undeveloped lands generally do not host any infrastructure systems, with the exception of along Teston Road to where such infrastructure has extended to service lands largely south thereof. This area is tributary to Maple Collector Sewershed and is situated in PD7 and PD8 pressure zones.

6.2.2 Kleinburg-Nashville Focuses Area

These lands include areas within Blocks 55 and 62 and are considered in the North Kleinburg-Nashville Secondary Plan which is planned to consist primarily of residential development.

6.2.3 West Vaughan Employment Area

OPA 600 designated lands east of Highway 50 and west of Kleinburg-Nashville communities for employment uses (Blocks 59, 60, and 66W). Currently, York Region is installing trunk water and sanitary services along Huntington Road, north of Rutherford Road, which will support development in these lands. This area is tributary to Humber Pump Station and PD6 pressure zone.

6.2.4 Vaughan Mills Centre

This area contains two major intensification/growth areas on either side of Highway 400 between Weston Road and Jane Street on the south side of Rutherford Road in Block 31. The lands on between Highway 400 and Jane Street,

largely occupied by Vaughan Mills Mall and related development, are discussed in Section 6.1.5). The lands on the west side of Highway 400 is currently undeveloped and servicing will be expanded into this area as development progresses. The west half of this area is tributary to Humber Pump Station, with the east half tributary to Maple Collector Sewershed. The entire area lies within PD6 pressure zone.

6.2.5 New Community Areas (Blocks 41 & 27)

While the northwest corner of Block 41 contains some estate residential development with the remaining area, as well as land within Block 27 are undeveloped and are planned to develop with primarily residential uses. This area is tributary to Maple Collector Sewershed, and lies within PD7 and PD8 pressure districts.

6.2.6 Dufferin Street & Centre Street

The Centre Street Opportunity Area includes lands governed by OPAs 21, 671, and 672. The intensification potential is along Centre Street as it is part of the Highway 7 transit corridor. The area is within developed land and is located within the Maple Collector Sewershed and PD6 pressure zone.

6.3 Other Growth Areas

Several areas not discussed above are within the urban boundary and are currently under development or do not have Secondary Plans initiated or in place. The anticipated growth of these areas is considered in this study for purposes of assessing the City's water and wastewater servicing infrastructure capacity and needs. Additional detail is available in the Planning Projections memorandum which is provided in Appendix E.

In addition, there are the Whitebelt lands which currently lie outside of the City's urban limits but are not otherwise constrained and protected by the Greenbelt and Oak Ridges Moraine. Development of these lands is contemplated to be completed by 2051, however, it is noted that this is outside of the planning horizon of this study (i.e., 2031) and, accordingly, population growth and distribution in these areas is not considered in this study for infrastructure capacity assessment. Nevertheless, since future expansion into the Whitebelt lands is anticipated, it is appropriate to consider these lands to the extent that they would not be unduly constrained by decisions made on the basis of the current planning horizon.

7 DESIGN CRITERIA & POPULATION PROJECTIONS

As part of this study a critical review of the water and wastewater design criteria applied by the City was undertaken to assess their currency and applicability with the aim of developing a revised set of criteria that would more appropriately the realities of water consumption and wastewater generation.

Significant technological advances have been made in recent years with respect to construction techniques and water conservation, yet the City's design criteria are still generally based on the more conservative of the Ministry of Environment guidelines from the 1980s. If there is a reasonable basis for reducing the City's design criteria, then the capacity of the existing system to service additional growth is increased, and the overall city-wide servicing costs will be reduced. In addition to the potential financial savings, there will be potential socio-economic benefit in not having to upsize or twin existing infrastructure in order to provide the required capacity.

This review is detailed in a Technical Memorandum that can be found in Appendix D and which made use of the extensive work previously prepared by York Region in its most recent Master Plan Update, a review of relevant neighbouring municipalities as well as data collected by the City. It is noted that a review and update of the City's fire flow criteria was not part of the scope of this study.

7.1 Water Distribution System

In terms of water supply, the majority of Vaughan is serviced through the lake-based York Water System while Kleinburg is currently supplied by wells. Although Kleinburg will be converted to a lake-based supply in the near future, its current unique consumption patterns coupled with its relative isolation within the City's system suggests that it is appropriate to consider demand criteria for Kleinburg separately from the remainder of the City's distribution system. These criteria can be reviewed and adjusted in future studies supported by monitoring data as the distribution system evolves and integrates the Kleinburg community. More generally, with the development and implementation of more efficient water fixtures and ongoing water conservation initiatives, it is reasonable to expect that the demands will decrease over time and, similarly, future studies supported by monitoring data may form the basis for future revisions to the design criteria.

Table 2 Water Distribution System Design Criteria

	York Water System	Kleinburg Water System
Average Day Demand, Residential	300 Lpcd	347 Lpcd
Average Day Demand, Employment	300 Lpcd	317 Lpcd
Maximum Day Peaking Factor	1.8	2.5
Maximum Hour Peaking Factor	3.0	4.0
Minimum Hour Peaking Factor	0.85	0.85

7.2 Wastewater Collection System

The majority of Vaughan's wastewater is conveyed to the York Durham Sewage System (YDSS) owned and operated by York Region, while the community of Kleinburg is serviced through a local water pollution control plant (WPCP) which discharges to the Humber River directly. Similar to water demand, the wastewater flow quantities of Kleinburg are materially different from the larger area serviced by the YDSS and, as a result, different criteria have been applied. It is noted that York Region is in the process of completing the West Vaughan Sewage Servicing Study EA and for which the preliminary preferred alternative includes construction of a large diameter sanitary sewer

along Highway 27 to the Kleinburg WPCP which, when completed, will convey flows from this community to the YDSS.

Table 3 Wastewater Collection System Design Criteria

	YDSS	Kleinburg WPCP
Generation Rate, Residential	364 Lpcd	450 Lpcd
Residential Peaking Factor	Harmon (Min. 2.0, Max. 4.0)	
Generation Rate, Employment	369 Lpcd	450 Lpcd
Infiltration Allowance	0.26 L/s/ha	0.23 L/s/ha

It is important to note that there is a 90 Lpcd dry weather infiltration allowance in the generation rates listed in Table 3 which have been adopted from the Region's work. Accordingly, these rates do not account for peak infiltration and inflow that would occur under wet weather conditions and for which the infiltration allowances are provided, similarly adopted from the Region's work in this regard.

It is expected that infiltration and inflow to the wastewater collection system within the City of Vaughan as well as throughout the broader York Region will be controlled and reduced through various initiatives that are currently underway and/or planned. In addition, new collection systems will be subject to the Region's Sanitary Sewer System Inspection, Testing and Acceptance Guideline (September 2011) which places significant emphasis on leakage as well as infiltration and inflow reduction.

7.3 General Impact of Revised Criteria

The criteria used in this study generally produce lower hydraulic design loadings on the water and wastewater systems under analysis when compared to the historically applied design criteria (i.e., 450 Lpcd) which was used in the development of the infrastructure systems servicing the City today. Accordingly, these reduced loading rates would be expected to have an offsetting effect against the planned growth of the City through intensification of lands within the current built boundary.

7.4 Population Projections

The City of Vaughan is expected to grow to 416,600 people and 266,100 jobs by 2031 from its 2011 levels of 295,000 and 185,000, respectively. A review of the relevant studies relating to the City's projected populations was conducted in conjunction with the Official Plan and available Secondary Plans in order to allocate populations to the various intensification and greenfield areas identified across the City for purposes of estimating hydraulic loading conditions and computer-based modelling of the existing and proposed infrastructure systems which will serve the City for its build-out to 2031. This work is detailed in a Technical Memorandum which is provided in Appendix E.

8 DEVELOPMENT & EVALUATION OF ALTERNATIVES

This section discusses the development of Master Plan-level alternatives considered as well as the evaluation methodology applied to identify the preferred alternatives for each of the water and wastewater systems.

8.1 Evaluation Methodology

Each of the alternatives was evaluated comparatively and qualitatively against the criteria (identified in **bold** typeface) for each of the dimensions discussed below and scored using a graphical symbol, a diamond in this case, for which an empty diamond represented the lowest possible score, with various degrees of shading (i.e., ¼, ½ or ¾) representing incrementally higher scores with a completed (i.e., full) diamond representing the highest possible score. That is,

In addition, for each alternative considered, an initial screening was conducted to identify and subsequently remove infeasible alternatives from further evaluation. For this particular project, any alternatives which would not support the City's growth mandate as identified in its Official Plan – which itself is a reflection of Provincially-mandated growth targets – were accordingly removed from further evaluation and tagged as "NOT RATED".

Based on the evaluation criteria, a qualitative "net effects analysis" has been applied to identify the potential effects on the environment and apply reasonable mitigative measures, identify the relative advantages and disadvantages, and propose the recommended solutions.

8.1.1 Technical Merit

The technical merit of each alternative was assessed based on its **Functionality** which is its ability to meet the demands and integrate with existing infrastructure systems, as well as its **Constructability** which considers factors such as ease of construction, length of routes, required construction methods and the number and nature of crossings.

8.1.2 Natural Environment

This dimension relates to potential impacts to the natural and physical components of the environment (i.e., air, land, water and biota) including natural and/or environmentally sensitive areas. The **Impact on the Natural Environment** was reviewed for each alternative and which looked at the need for crossings or other forms of construction in areas of the Greenbelt or Oak Ridges Moraine, as well as the impact of the alternatives on terrestrial and aquatic environments.

8.1.3 Socio-Economic Environment

This dimension considered matters such as the **Cultural Environmental Impact** looking at cultural heritage and potential disruptions to surrounding areas, the **Transportation Impact** which looked at the impact on traffic patterns, road closures/detours and public transit disruptions, as well as the **Residential and Business Impact** which looked at the proximity of the proposed work to residences, businesses, and institutions in addition to matters such as public safety and perception, also including odour and air quality issues.

8.1.4 Financial

In terms of the financial dimension, alternatives were reviewed with respect to their expected **Life Cycle Costs** considering capital, operations and maintenance costs over a typical time period on the order of 25 years.

8.2 Water & Wastewater System Alternatives

The following discusses the various Master Planning-level alternatives that were developed in response to the problem statement (see Section 0) and evaluated for both the City's water and wastewater infrastructure systems.

8.2.1 Alternative 1 – Do Nothing

This alternative does not consider any material changes to the existing water distribution and wastewater collection infrastructure systems while the City implements the recommendations and direction provided in its Official Plan. While this alternative does not address the problem statement, it does provide a benchmark for evaluating the other alternatives as required by the Class EA process.

8.2.2 Alternative 2 – Limit Community Growth

This is an adaptation of Alternative 1 in that, while it does not consider any material changes to the existing infrastructure, it seeks to limit the growth envisioned in the Official Plan to the extent necessary based on the capacity that can be supported by the existing water and wastewater systems.

8.2.3 Alternative 3 – Water Conservation (Water & Wastewater) and I/I Reduction (Wastewater)

This alternative seeks to expand on Alternative 2 by attempting to provide for the growth mandated by the Official Plan without building new infrastructure through the reduction of water consumption and wastewater generation, as well as the reduction of infiltration/inflow to the existing sanitary sewer system. Water conservation would include a reduction in water demand through mandatory/voluntary conservation initiatives. Reduction of Infiltration/Inflow (I/I) would involve the identification and prioritization of areas and initiatives to reduce current I/I levels as well ensuring new infrastructure construction is considerate of this matter.

8.2.4 Alternative 4 – Build New Water/Wastewater Systems

This alternative considers the provision of water and wastewater services to accommodate urban growth in the City through the implementation of new water source, treatment and supply (including pumping, transmission, storage and distribution) systems as well as wastewater collection, treatment and disposal systems. That is, new systems that would work independently from the existing infrastructure systems.

8.2.5 Alternative 5 – Expand & Enhance Water & Wastewater Infrastructure

This alternative considers a combination of enhancements to, and extension of, the existing infrastructure systems to provide for mandated growth within the developed portion of the City as well as the new growth areas encompassed in the urban boundary as envisioned in the Official Plan. This alternative provides the opportunity to optimize available and planned capacity within the existing municipal infrastructure while expanding into currently unserviced areas inside the urban boundary.

8.3 Evaluation of Water & Wastewater System Alternatives

The following tables present the results of the evaluation process for each of the alternatives considered for both of the City's water and wastewater systems. In both cases, Alternative 5, being the expansion and enhancement of the City's existing water and wastewater infrastructure, was identified as the preferred alternative as a result of Alternatives 1 through 3 not being able to satisfy the City's (and Province's) growth mandate and Alternative 4 being inferior across all evaluation criteria in relation to Alternative 5.

Further details regarding the individual projects included in each of these preferred alternatives is provided in subsequent sections of this report as well as in Appendices H and I.

Evaluation Criteria	Alternative 1 Do Nothing	Alternative 2 Limit Community Growth	Alternative 3 Water Conservation	Alternative 4 Build New Water Systems	Alternative 5 Expand & Enhance Existing Water Distribution System
Technical Merit	This option does not address the needs of the growth envisioned for Vaughan via intensification or expansions to urban boundaries, nor does it address any current concerns or the reality of an ageing infrastructure system. 	Falls short of providing infrastructure necessary to satisfy objectives of City's Official Plan. 	Helpful at improving utilization of existing infrastructure but does not allow for expansion of the urban boundary as identified in Official Plan. 	Significant works required which will not benefit from economies of scale or leverage available from Regional-level infrastructure currently in place and planned. 	Completely addresses the growth envisioned in the Official Plan through intensification and expansions to urban boundaries in addition to improving and increasing utilization of the City's existing stock of infrastructure. 
Natural	Impacts from private water wells. 	No impact, but does not offer improvements to existing conditions. 	No impact and offers improvements to existing conditions. 	Will result in development of local water supplies and abstraction thereof from the natural environment in addition to related energy requirements.	Some impact as a result of construction works including creek crossings. Most construction will occur in road right-of-ways and the use of trenchless technologies will largely mitigate concerns. Offers valuable improvements to existing conditions.
Socio-Economic	This option severely limits economic development through population or business growth. 	This option does not meet the growth and density objectives of the City's Official Plan. 	Although this option does offer value to the existing developed areas, it does not meet the urban expansion objectives of the Official Plan. 	Significant construction works will be required for this with resultant disruptions. Inconsistency with municipal service delivery model used in City and Region. 	Modest impacts during construction, most of which will occur in outlying areas vis-à-vis existing development. Completely satisfies City's Official Plan growth objectives.
Financial	No impact. 	Modest financial investment required. 	Modest financial investment required. 	Very large financial investment required.	Reasonable financial investments required. 
Overall	Cannot satisfy City's servicing policies as documented in Official Plan. Cannot satisfy Provincially-mandated growth targets. **NOT RATED**	Cannot satisfy Provincially-mandated growth targets. **NOT RATED**	Cannot satisfy Provincially-mandated growth targets. **NOT RATED**	This option is inferior to other viable alternatives for all evaluation criteria. 	Optimal balance of benefits and impacts across all evaluation criteria while fully satisfying City's Official Plan growth objectives.  **PREFERRED ALTERNATIVE**

Table 4 Evaluation of Water System Alternatives

Evaluation Criteria	Alternative 1 Do Nothing	Alternative 2 Limit Community Growth	Alternative 3 Water Conservation	Alternative 4 Build New Wastewater Systems	Alternative 5 Expand & Enhance Existing Wastewater Collection System
Technical Merit	This option does not address the needs of the growth envisioned for Vaughan via intensification or expansions to urban boundaries, nor does it address any current concerns or the reality of an ageing infrastructure system.	Falls short of providing infrastructure necessary to satisfy objectives of City's Official Plan.	Helpful at improving utilization of existing infrastructure but does not allow for expansion of the urban boundary as identified in Official Plan.	Significant works required which will not benefit from economies of scale or leverage available from Regional-level infrastructure currently in place and planned.	Completely addresses the growth envisioned in the Official Plan through intensification and expansions to urban boundaries in addition to improving and increasing utilization of the City's existing stock of infrastructure.
Natural	Impacts from private septic systems.	No impact, but does not offer improvements to existing conditions.	No impact and offers improvements to existing conditions.	Will result in development of local sanitary collection system and treatment plants, increasing pollutant loadings to natural watercourses and increased energy use.	Some impact as a result of construction works including creek crossings. Most construction will occur in road right-of-ways and the use of trenchless technologies will largely mitigate concerns. Offers valuable improvements to existing conditions.
Socio-Economic	This option severely limits economic development through population or business growth.	This option does not meet the growth and density objectives of the City's Official Plan.	Although this option does offer value to the existing developed areas, it does not meet the urban expansion objectives of the Official Plan.	Significant construction works will be required for this with resultant disruptions. Inconsistency with municipal service delivery model used in City and Region.	Modest impacts during construction, most of which will occur in outlying areas vis-à-vis existing development. Completely satisfies City's Official Plan growth objectives.
Financial	No impact.	Modest financial investment required.	Modest financial investment required.	Very large financial investment required.	Reasonable financial investments required.
Overall	Cannot satisfy City's servicing policies as documented in Official Plan. Cannot satisfy Provincially-mandated growth targets. **NOT RATED**	Cannot satisfy Provincially-mandated growth targets. **NOT RATED**	Cannot satisfy Provincially-mandated growth targets. **NOT RATED**	This option is inferior to other viable alternatives for all evaluation criteria.	Optimal balance of benefits and impacts across all evaluation criteria while fully satisfying City's Official Plan growth objectives. **PREFERRED ALTERNATIVE**

Table 5 Evaluation of Wastewater System Alternatives

9 PREFERRED ALTERNATIVES

As discussed in the preceding section of this report, the preferred alternative for both the water and wastewater components of this study is Alternative 5 – Expand and Enhance Existing Water and Wastewater Infrastructure. This alternative meets all the planned growth projections and directions provided in the City's Official Plan which, in turn, is shaped in accordance with the Province of Ontario's strategy for growth.

9.1 Preferred Water Servicing Alternative

The preferred water servicing alternative (Alternative 5) consists of a set of projects and/or initiatives aimed at supporting the ongoing use of the existing water distribution system infrastructure as well as its expansion into areas that are currently undeveloped but within the urban boundary as identified in the City's Official Plan. This list of projects is provided in Table 6 with a discussion on each below. A plan showing the projects is provided in Figure 13 and Appendix H, with individual project information sheets including preliminary cost estimates provided in Appendix I. A construction contingency has been included in the cost estimates in Table 6.

The preferred water servicing alternative also includes a water conservation component. Water Conservation was identified as Alternative 3 (see Section 8.2), but was not selected as the preferred alternative as it does not present a complete solution.

9.1.1 W1 – PD8 East

This set of project options is aimed at strengthening the PD8 zone of the City's distribution network, particularly those lands located in the northerly portion of Block 12, Block 13 and the southeasterly portion of Block 20. At present, this portion of PD8 (identified as PD8-East) operates as a closed zone and is supplied by the Region's North Richmond Hill Pumping Station located on the west side of Bathurst Street, south of Kirby Road. The only redundancy of supply is through a pressure reducing valve (PRV) in Block 20 on Hunterwood Chase, connected to the PD9 system which, itself operates as a closed zone and is supplied by a sub-standard pumping station owned and operated by the City. Anticipated future demands suggest that, in its current state, the system may not be sufficient to satisfy all demand conditions.

It is noted that York Region intends to decommission the North Richmond Hill Pumping Station and which will be replaced by the new West Richmond Hill Pumping Station to be located near the intersection of Bathurst Street and Teston Road.

W1(A) – Teston Road PD8 Watermain

This option for project W1 contemplates the installation of a watermain along Teston Road from the small PD8 system (PD8-West) servicing the industrial lands on the east side of Keele Street, both north and south of Teston Road, through to the available PD8 watermain infrastructure available at Dufferin Street and Teston Road. This project would link the currently small and isolated PD8 zones within Vaughan and, further, would allow for the supply to the unified zone by two York Region sources: (i) the new West Richmond Hill Pumping Station located near the intersection of Bathurst Street and Teston Road; and (ii) the PD8 feedermain which originates at the Maple Reservoir (southwest corner of Keele Street and Teston Road) and travels north along Keele Street to the Town of Aurora. It is noted that this latter connection has not been made as at the time of writing, but the City is currently proceeding to make the connection (currently at detailed design stage) and, for the purposes of this work, is assumed to be in place.

While this is a hydraulically desirable alternative, and following the consultations forming part of this EA study, it may prove somewhat challenging to implement as a result of the required crossing of a natural feature as well as matters related to the former landfill site which straddles Teston Road in this area. York Region is looking into connecting the

currently discontinuous Teston Road from Rodinea Road to Dufferin Street and, if this project were to proceed, it may be appropriate to consider including this proposed watermain for concurrent installation.

For these reasons, the implementation of this project is subject to the ongoing monitoring of pressures in the PD8 area serviced by the West Richmond Hill Pumping Station (PD8 East) and the progress of construction of the Teston Road connection for transportation purposes.

W1(B) – PD8 East Improvements

An alternative to the Teston Road PD8 watermain discussed above would be selective improvements to the existing PD8 system which currently has a single point of connection to the Region's supply infrastructure and effectively operates with a long, single feed in the City's system. As noted above, the Region is advancing improvements to its PD8 infrastructure along Bathurst Street and this alternative contemplates the inclusion of a 2nd connection to the Region's infrastructure.

These connections, however, may not be sufficient and additional study is recommended with respect to fire flow needs and capacity of the existing and improved system.

9.1.2 W3 – Teston Road PD7 Watermain Twinning

There is currently a 750 mm diameter watermain reduced to a 600 mm diameter watermain along Teston Road from a point east of Highway 400, where it is connected to a 900 mm diameter main, to Weston Road. Under 2031 demand conditions in Blocks 40 and 47, and with the addition of Block 55 to the urban boundary, it is possible that operating pressures may become unacceptably low. This project contemplates the potential increasing of this watermain capacity through its twinning, although it is noted that additional study, supported by regular field testing and monitoring as development progresses, should be conducted to verify the need and exact size of this watermain as well as to identify details relating to its installation.

9.1.3 W4 – Block 35 PD8 Watermain

The majority of lands in Block 35 lie at elevations which makes them suitable for servicing from the PD8 system. There is York Region PD8 infrastructure currently available along Keele Street and for which stub connection have previously been installed along King-Vaughan Road and Kirby Road. This project contemplates the extension of a looped watermain system from Keele Street to Weston Road, along both King-Vaughan Road and Kirby Road.

It is noted that a small portion of land located toward the northeasterly corner of Block 35 may be elevations which are generally higher than would be normally serviced by the PD8 system. While the details are more appropriately the subject of a more focused study (e.g., Secondary Plan, Block Plan, etc.), it is noted that residual pressures for fire suppression are expected to be achieved with the proposed PD8 system and any low operating pressure concerns which might arise may be mitigated through the use of individual booster pumps within each property and on an as-needed basis.

9.1.4 W5 – Weston Road PD7 Watermain

This project contemplates the implementation of a trunk PD7 watermain along Weston Road to provide service to Blocks 34 West and 41 as they develop. There is PD7 infrastructure currently available at the intersection of Weston and Teston Roads.

9.1.5 W6 – Woodbridge Expansion Area PD6 Watermain Connection

Block 53 (Woodbridge Expansion Area, WEA) and, recently, the southern part of Kleinburg are largely supplied by a relatively long 500 mm diameter watermain located on Rutherford Road between the area east of Pine Valley Drive and Islington Avenue. Under significant demand conditions, this stretch of pipe is anticipated to suffer from significant

head losses resulting in sub-standard pressures in the northerly part of the WEA and southern Kleinburg. Recent pressure monitoring illustrates the magnitude of current pressure fluctuations experienced in the area in question (see Appendix C).

This project contemplates the connection of one of the existing Woodbridge Expansion Area watermains to the 1800 mm diameter York Region pipe (Peel Feedermain) in order to help mitigate this situation. This connection would be made with a pressure reducing valve (PRV) with a check valve feature such that flow could not pass from the distribution system to the feedermain in the event of lower pressures in the latter (e.g., when the Peel pumps are not operating).

9.1.6 W7 – Block 55 PD-KN Watermain Servicing

This project contemplates the installation of watermains along Kipling Avenue, Kirby Road and Highway 27 which will derive water from the existing PD-KN system located along Islington Avenue as well as the PD7 watermain which is planned to be in place to service lands currently under development in Blocks 40 and 47. This latter connection will include a PRV to reduce pressures to PD-KN levels.

9.1.7 W8 – Major Mackenzie Drive PD6 Watermain

This project will provide a necessary redundancy between the PD6 systems in this area of the City which, in turn, also supports the supply for the PD-KN system servicing the Kleinburg-Nashville area. Furthermore, this project is expected to significantly improve system hydraulics in PD6.

9.1.8 W9 – Huntington Road PD6/PD-KN Watermain

This project contemplates the installation of a watermain extending north along Huntington Road from its intersection with Nashville Road in order to service the lands on the east side within Block 62, as well as the interconnection of this piping with the existing watermain at the end of Mizuno Crescent. Depending on how development of land and support infrastructure progresses, this watermain may be pressurized to either of the PD6 or PD-KN levels, to be determined at the appropriate time.

9.1.9 W10 – PD5-East

This pressure district is known to experience low pressures under existing conditions and matters are expected to be exacerbated as demands increase into the future. At this time, there is no clear indication of major infrastructure works which can bolster service this already urbanized area and any solutions will likely take the form of local optimizations such as zone realignments, connections from the PD6 network and pipe upgrades. For purposes of this work, a contingency figure is carried, noting that it will be subject to change based on further detailed study.

9.1.10 W11 – Water Loss Monitoring & Control System

Further to the recommendations of a City-Wide Water Audit conducted for 2010 and completed in 2011, this project considers the implementation of a water loss monitoring and control system which will support growth by minimizing the amount of water lost through leakage as infrastructure ages as well as to serve in assisting the City to manage the flows of water within its system. Similarly, the details of the requirements for such a system will be the subject of further study and, for purposes of this work, a contingency figure is carried.

9.1.11 W12 – Realignment of PD4/PD5 Zone Boundary on Kipling Avenue

This project contemplates the realignment of the PD4/PD5 zone boundary in the area of Kipling Avenue from Gordon Avenue to Vaughan Mills Road. These houses are currently situated in PD4 and, as a result of their relatively high elevations, may be susceptible to sub-standard pressures under peak loading conditions. Recent pressure monitoring suggests that the currently experienced pressure range is acceptable (see Appendix C). Additional

pressure monitoring over time would help clarify the need and timing of such an adjustment.

9.1.12 W13 – Block 66W PD6 Watermain

This project contemplates the construction of a looped watermain deriving its supply from York Region PD6 infrastructure currently under construction along Huntington Road in order to supply the industrial lands identified in the City's Official Plan. Given the anticipated land use, a looped supply is important from the perspective of reliability in addition to performance.

9.1.13 W14 – PD9 Pumping Station

Further to discussions with York Region as part of the consultation process of this EA, it appears that the Region may not be proceeding with previously envisioned improvements to its PD9 system along Keele Street which would result in the City being responsible for the provision of service to the relatively small PD9 area located predominantly in the northerly part of Block 20. This area is currently serviced by a City-owned pumping station which was constructed as a temporary facility. The reliance of the City on this facility for ongoing provision of service to these lands requires examination through a condition assessment which is contemplated in this project and, for purposes of preliminary budgeting, it is further assumed that a new facility will need to be constructed by the City on lands owned by the Region (as is currently the case).

9.1.14 W15 – City-Wide Water Conservation

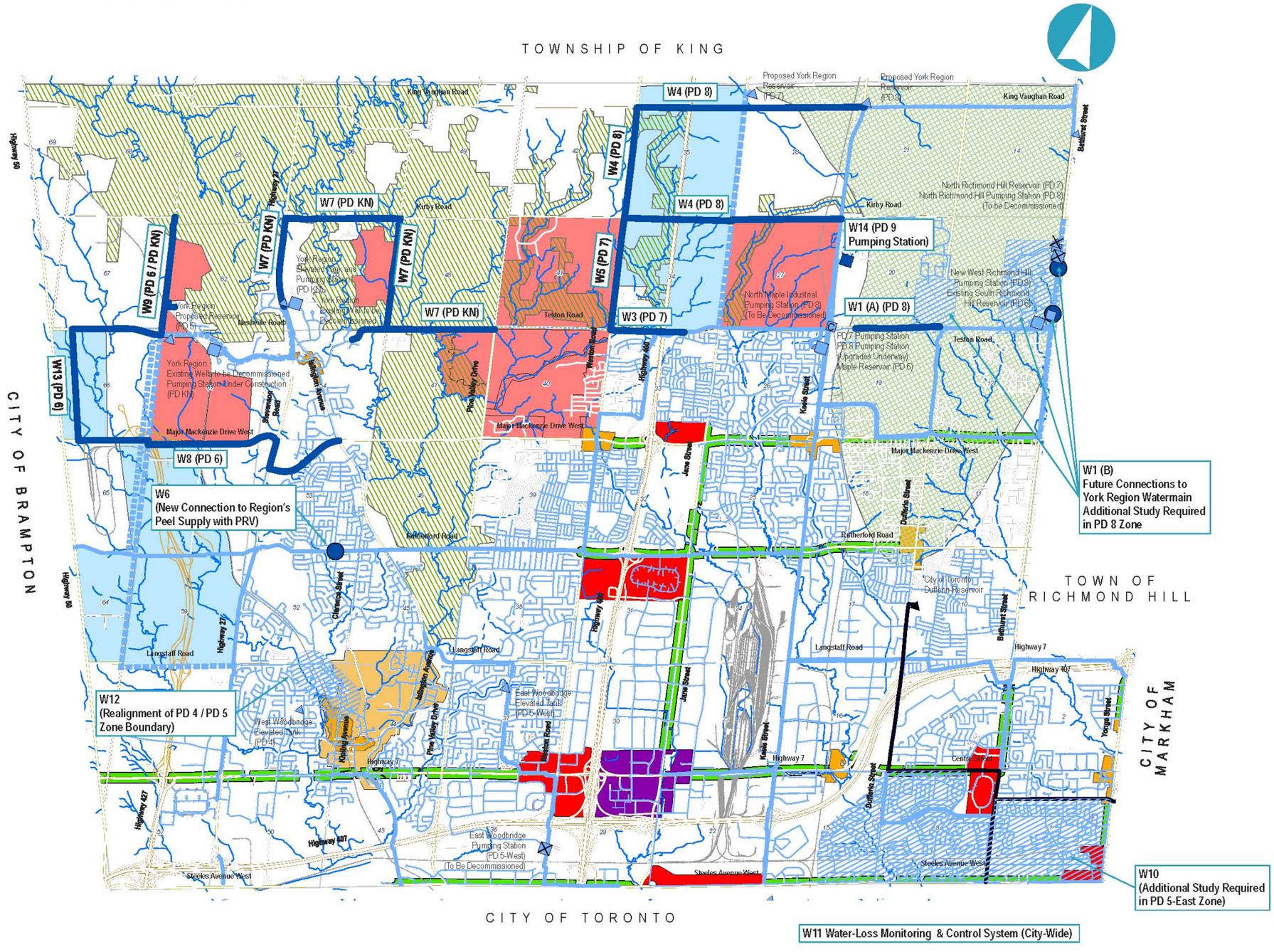
The continuous implementation of water conservation measures are important practices being led by York Region that should continue to be supported by the City to maximize use of existing system capacity.

Table 6 Preferred Water Alternative Projects

ID	Description	Trigger/Timing	Anticipated Class EA Schedule	Estimated Cost (2013 dollars)
W1(A)	Option A: Teston Road PD8 Watermain	Subject to ongoing monitoring of pressures and construction of Teston Road connection	B	$2.8 M
W1(B)	Option B: PD8 East Improvements	Connections to Region infrastructure. Subject to further study.	A+	$1.4 M (not carried in total)
W3	Teston Road PD7 Watermain Twinning	Block 40/47/55 Development. Subject to further study.	B	$5.6 M
W4	Block 35 PD8 Watermain	Block 34E/35 Development	A+	$23.9 M
W5	Weston Road PD7 Watermain	Block 34W/41 Development	A+	$2.8 M
W6	Forest Fountain Drive PD66 Watermain Connection	Subject to ongoing monitoring of pressures	A+	$0.4 M
W7	Block 55 PD-KN Watermains	Block 55 Development	B	$10.1 M
W8	Major Mackenzie Drive PD6 Watermain	Block 60/61 Development	B	$7.2 M
W9	Huntington Road Watermain	Block 62W Development	A+	$3.2 M
W10	PD5-East Improvements	Subject to further study and ongoing monitoring of pressures	TBD	$1.7 M
W12	Realignment of PD4/PD5 Zone Boundary on Kipling Avenue	Subject to ongoing monitoring of pressures	A	$0.1 M
W13	Block 66W PD6 Watermain	Development of the industrial lands	A+	$6.5 M
W14	PD9 Pumping Station	Subject to condition assessment of existing City pumping station	B	$3.4 M
	SUBTOTAL WATER CAPITAL PROJECTS			$67.7 M[4]
W11	*Water Conservation Program – Water Loss Monitoring & Control System*	*Progressive development 2013-2017*	TBD	$2.5 M
	SUBTOTAL WATER OPERATING & MAINTENANCE PROJECTS			$2.5 M
	GRAND TOTAL			$70.2 M

Note: For the projects identified as a Schedule 'B' project under the Municipal Class EA process, the work undertaken during the development of the Master Plan can be used in support of some of the requirements of Phases 1 and 2 of the Municipal Class EA. It may be necessary to fulfil the additional requirements of the individual projects in order to consider project specific issues that were beyond the scope of the Master Planning process.

[4] This value is equivalent to approximately $800 per residential unit to be developed until 2031.



Legend

- Proposed Master Plan Pumping Station
- Proposed Master Plan Watermain
- City of Vaughan Pumping Station
- City of Vaughan Existing Watermain
- City of Vaughan Proposed Watermain
- York Region Pumping Station
- York Region Storage Facility
- York Region Pumping Station to be Decommissioned
- York Region Storage Facility to be Decommissioned
- York Region Existing Watermain
- York Region Watermain Under Construction
- York Region Watermain to be Constructed by 2031
- City of Toronto Reservoir
- City of Toronto Watermain
- Freeway
- Interchange
- Regional Road
- Arterial Road
- Rural Road
- Railway
- Rivers
- Oak Ridges Moraine
- Green Belt
- Urban Boundary
- Primary Intensification Corridors
- Primary Centres
- Vaughan Metropolitan Centre
- Local Corridors
- Employment Growth Areas
- Residential Growth Areas
- Woodbridge Core

Note: Pipe alignments are for reference only and may be refined during detailed design phase.

Figure 13 Water Servicing Preferred Alternative (See Appendix H for full size drawing)

9.2 Preferred Wastewater Servicing Alternative

The preferred wastewater servicing alternative (Alternative 5) consists of a set of projects and/or initiatives aimed at supporting the ongoing use of the existing wastewater collection infrastructure as well as its expansion into areas that are currently undeveloped but within the urban boundary as identified in the City's Official Plan. This list of projects is provided in Table 7 with a discussion on each below. A plan showing the projects is provided in Figure 14 and Appendix H, with individual project information sheets including preliminary cost estimates provided in Appendix I. A construction contingency has been included in the cost estimates provided in Table 7.

The preferred wastewater servicing alternative also includes an Infiltration/Inflow (I/I) reduction component. I/I reduction was identified as Alternative 3 (see Section 8.2), but was not selected as the preferred alternative as it does not present a complete solution.

9.2.1 WW1 – Jane Street Sub-Trunk Sanitary Sewer

This project contemplates the construction of the sub-trunk gravity sewer necessary to collect new growth areas on the east and west sides of Jane Street and which is expected to discharge to the future York Region North East Vaughan Collector, which will be the subject of a forthcoming EA project by the Region (expected to be undertaken in 2013). The exact extents of this project may be subject to change, depending on the ultimate location of the Region's future Collector.

9.2.2 WW-2 – Block 27 Sub-Trunk Sanitary Sewer

This project contemplates the construction of the sub-trunk gravity sewers necessary to service Block 27 and drain it to the future York Region North East Vaughan Collector, which will be the subject of a forthcoming EA project by the Region (expected to be undertaken in 2013). The exact extents of this project may be subject to change, depending on the ultimate location of the Region's future Collector.

9.2.3 WW3 – Teston Road Sub-Trunk Sanitary Sewer & Pumping Station

This project contemplates the construction of the sub-trunk gravity sewers and sanitary pumping station necessary to service growth areas on the west side of Highway 400 and drain them to the future York Region North East Vaughan Collector, which will be the subject of a forthcoming EA project by the Region (expected to be undertaken in 2013). The exact extents of this project may be subject to change, depending on the ultimate location of the Region's future Collector.

9.2.4 WW4 – Weston Road Sub-Trunk Sanitary Sewer

This project contemplates the construction of a sub-trunk gravity sewer to service the growth areas along the east and west sides of Weston Road and drain them to the Teston Road Sub-Trunk Sanitary Sewer and Sewage Pumping Station (WW3).

9.2.5 WW5 – Block 55 SPS & Forcemain

This project contemplates the construction of the pumping station and forcemain necessary to service this development block. This infrastructure is also expected to provide service to currently developed but unserviced lands in the vicinity. The forcemain will discharge to currently proposed sewers within Blocks 40/47, and then to the Pine Valley North SPS. The planned Pine Valley North SPS expansion will accommodate the Block 55 flows.

9.2.6 WW6 – Huntington Road Sub-Trunk Sanitary Sewer

This project contemplates the construction of the sub-trunk gravity sewer on Huntington Road to service development to the north of Nashville Road and to drain to existing infrastructure. This project is further broken down into the

following options, depending on how land and supporting infrastructure develops.

WW6(A) – Connection to Block 61 West Infrastructure

The infrastructure planned and partially under construction in Block 61 West has been designed to accommodate the additional development lands within the urban boundary (as defined in the Official Plan) and this option contemplates connection to a completed infrastructure system in Block 61 West.

WW6(B) – Connection to Region Infrastructure on Huntington Road, South of Major Mackenzie Drive

This option contemplates the scenario where the infrastructure in Block 61 West is not completed or otherwise not accessible at the time that the lands relying on this sub-trunk sanitary sewer are needed. Under such a scenario, the sub-trunk sewer is expected to be extended southerly where it will connect to York Region infrastructure located on Huntington Road, immediately south of Major Mackenzie Drive.

9.2.7 WW7 – Major Mackenzie Drive Sub-Trunk Sanitary Sewer

It is noted that this project previously contemplated the replacement of the Kleinburg Sewage Treatment Plant with a pumping station and forcemain. Further to ongoing discussions with, and developments at, York Region, this project has been redefined to this smaller scoped project which considers servicing of lands largely within Block 61 in conjunction with the identification of a new project (WW12) discussed below. This Major Mackenzie Drive sub-trunk sanitary sewer is intended to collect flows from new growth areas and direct them to York Region infrastructure along Huntington Road.

9.2.8 WW8 – Carrville Centre Sanitary Sewer

This project will support the ongoing development and future intensification of Carrville Centre, located at the intersection of Dufferin Street and Rutherford Road.

9.2.9 WW9 – Vellore Centre Sanitary Sewer

As development continues in the new growth areas triggering the expansion of the Pine Valley North SPS, this sewer will divert some flows from the Vellore Centre to existing sewers with anticipated residual capacity along Vellore Woods Boulevard.

9.2.10 WW10 – South Jane Street Sanitary Sewer Upgrades

This project is intended to convey flows from the OPA 620 lands (Steeles West) to available York Region infrastructure on the west side of Jane Street.

9.2.11 WW11 – Pine Valley North SPS & Forcemain

This project will service a significant amount of development in new growth areas of the City, including Blocks 40, 41 West, 47 and 55. The station will be built in two phases, with the second phase triggered by the development within Block 55. The Pine Valley North SPS will discharge to existing sewers along Forest Hill Road.

9.2.12 WW12 – Highway 27 Sanitary Sewer

This project contemplates construction of a new sanitary sewer in the northerly part of Kleinburg which will drain to a York Region trunk sewer which has been identified as the preferred alternative of an ongoing EA (West Vaughan Sanitary Sewer).

9.2.13 WW13 – Block 41 SPS, Forcemain and Sanitary Sewer

This project contemplates the construction of the pumping station, forcemain, and gravity sewer necessary to service this development block. The gravity sewer will connect to the future sub-trunk sewer along Weston Road (Project WW4).

9.2.14 WW14 – Flow Monitoring and Sewer Capacity Analysis Studies

The sewer modelling exercise identified some areas that could be subject to *existing* sewer surcharging, based on the data that was used to build the model. As the City has not received flooding complaints in these areas, it is suspected that there might be some errors in the base data (infrastructure information, population data, etc), or that the modelled design flows are in excess of the actual sewer flows. The specific locations requiring further study prior to making specific recommendations are:

- Clarence Street Sewer, upstream to Block 53:

  A review of the existing flows and sewer capacities is recommended to confirm the wastewater system connectivity and modelling results through this area.

- Block 37 sewers, along Misty Meadow Drive:

  A review of the existing flows and sewer capacities is recommended to confirm the wastewater system connectivity and modelling results through this area.

- Blocks 43 and 50 Trunk Sewers:

  A review of the connectivity between the City's and Region's sewers is recommended through this area, relating to recent improvements undertaken by the Region (West Rainbow Creek Trunk Sewer, 2010).

For costing purposes, it has been assumed that 10 temporary flow meters will be installed for each of these studies and maintained for a 12-month period.

9.2.15 WW15 – City-Wide Infiltration/Inflow (I/I) Reduction

The continuous implementation of I/I reduction measures are important practices being led by York Region that re recommended be supported by the City to maximize use of existing system capacity. This program will help to identify existing sewers where high I/I flows could result in surcharging not identified through the sewer modelling process.

For costing purposes, it has been assumed that 50 permanent flow meters will be installed and maintained for a 5-year period, and that 10 individual I/I studies will be required.

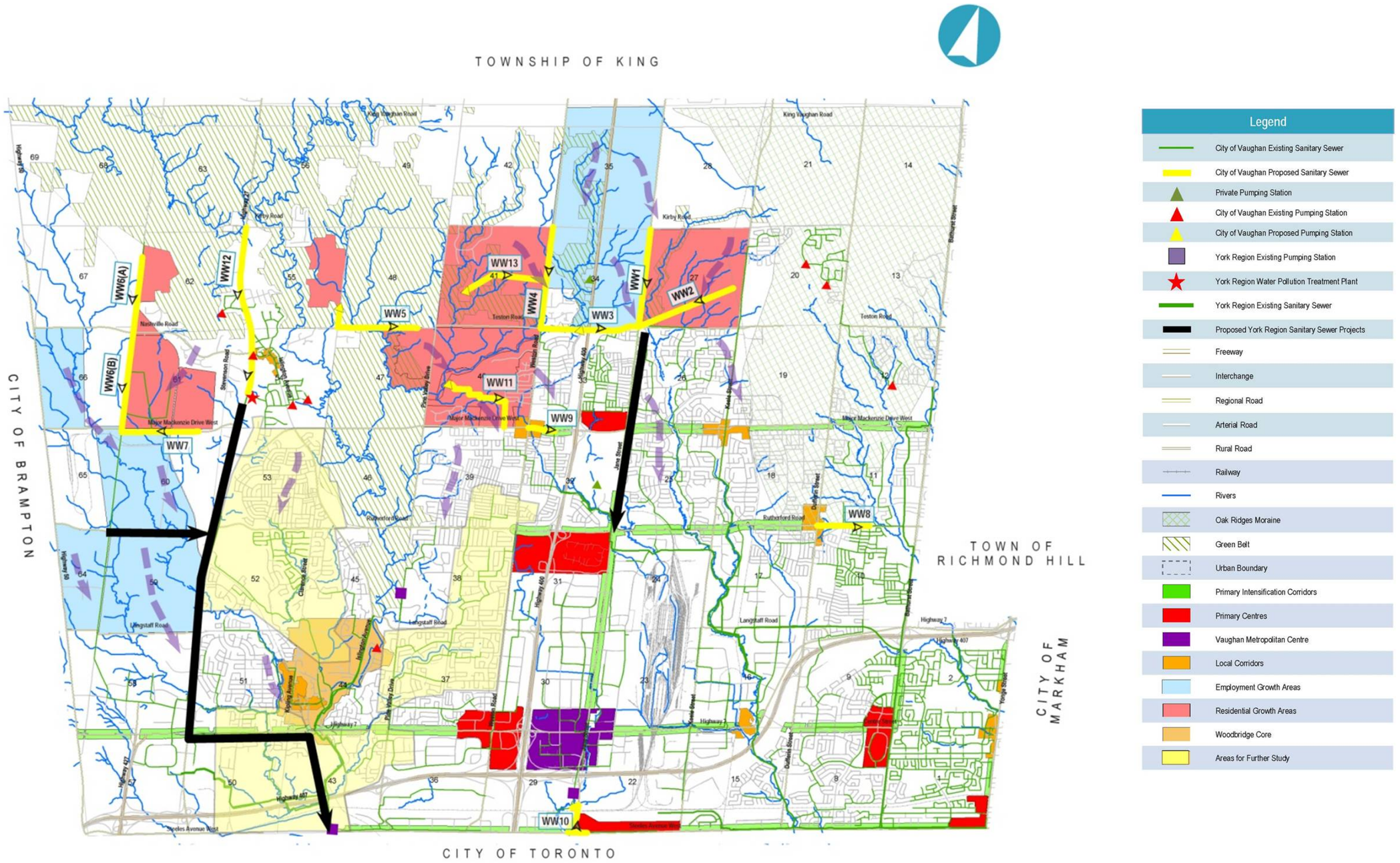
Table 7 Preferred Wastewater Alternative Projects

ID	Description	Trigger/Timing	Anticipated Class EA Schedule	Estimated Cost (2013 dollars)
WW1	Jane Street Sub-Trunk Sanitary Sewer	Block 35E Development. Subject to completion of York Region EA	A+	$3.3 M
WW2	Block 27 Sub-Trunk Sanitary Sewer	Block 27 Development	A+	$1.7 M
WW3	Teston Road Sub-Trunk Sanitary Sewer and SPS	Block 34/35W/41 Development	B	$10.0 M
WW4	Weston Sub-Trunk Sanitary Sewer	Block 34W/35W/41 Development	A+	$2.6 M
WW5	Block 55 SPS/Forcemain	Block 55 Development	B	$5.4 M
WW6	Huntington Road Sub-Trunk Sanitary Sewer	Block 62W Development	A+	$2.1 M
WW7	Major Mackenzie Drive Sub-Trunk Sanitary Sewer	Block 61 Development	B	$2.6 M
WW8	Carrville Centre Sewer (Rutherford Road)	Carrville Centre Development	A+	$1.5 M
WW9	Vellore Centre Sewer (Major Mackenzie Drive)	Vellore Centre Development	A+	$0.7 M
WW10	South Jane Street Sanitary Sewer Upgrades	Steeles West Development	A+	$2.2 M
WW11	Pine Valley North SPS/Forcemain	Block 40/47/55 Development	exempt[5]	$28.6 M
WW12	Highway 27 (Kleinburg) Sanitary Sewer	Further Development in North Kleinburg	A+	$3.6 M
WW13	Block 41 SPS, Forcemain and Sanitary Sewer	Block 41 Development	B	$5.3 M
	SUBTOTAL WASTEWATER CAPITAL PROJECTS			$69.5 M[6]
WW14	*Flow Monitoring and Sewer Capacity Analysis Studies*	*2014*	TBD	$2.5 M
WW15	*City-Wide Infiltration/Inflow (I/I) Monitoring and Reduction (50 flow monitors)*	*Progressive development 2013-2017*	TBD	$2.5 M
	SUBTOTAL WASTEWATER OPERATION & MAINTENANCE PROJECTS			$5.0 M
	GRAND TOTAL			$74.6 M

Note: For the projects identified as a Schedule 'B' project under the Municipal Class EA process, the work undertaken during the development of the Master Plan can be used in support of some of the requirements of Phases 1 and 2 of the Municipal Class EA. It may be necessary to fulfil the additional requirements of the individual projects in order to consider project specific issues that were beyond the scope of the Master Planning process.

[5] This project is to be undertaken by private sector developers and considered exempt from the EA Act. Approval for this project will be sought via the provisions of the Planning Act (per Section 2 of O.Reg. 345/93).

[6] This value is equivalent to approximately $800 per residential unit to be developed until 2031.



Note: Pipe alignments are for reference only and may be refined during detailed design phase.

Figure 14 Wastewater Servicing Preferred Alternative (See Appendix H for full size drawing)

10 PUBLIC & AGENCY COMMUNICATIONS

10.1 Notice of Study Commencement

A Notice of Study Commencement, dated September 14, 2011, was prepared to describe the purpose of the Environmental Assessment, to notify the public of the study and invite comment, and provide contact information for the project. The notice was issued by the following means:

- Letter mailed directly to Stakeholder Contact List (see Appendix J);
- Newspaper advertisement in both the Vaughan Citizen and the Vaughan Liberal on September 15, 2011 and September 22, 2011, and;
- Posting on the Vaughan Infrastructure website (www.vaughaninfrastructure.ca).

Interested parties were invited to provide comments. The Notice of Study Commencement and a summary of the comments received during Phase One Public Consultation are provided in Appendix J.

10.2 Stakeholder Consultation

10.2.1 Technical Advisory Committee (TAC)

A Technical Advisory Committee (TAC) was formed and which held two meetings throughout the course of the study. This committee consisted of representatives from the following key stakeholder groups:

- City of Vaughan;
- York Region;
- Toronto and Region Conservation Authority (TRCA); and
- The Ontario Ministry of Environment (MOE).

The first TAC meeting was held on September 27, 2011. The TAC membership list, materials presented and resulting minutes from the September 27, 2011 meeting are included in Appendix J. A second TAC meeting was held on June 6, 2012 and, similarly, the materials presented at the meeting are provided in Appendix J.

10.2.2 Public Information Centre No. 1 (PIC 1)

In accordance with the Municipal Class EA planning and design process, a discretionary Public Information Centre (PIC) was held on October 13, 2011 to present an overview of the Class EA Process, background information for the study, study objectives and Problem /Opportunity Statements.

Stakeholders were notified as follows:

- letter mailed directly to Mandatory Contact List, and;
- the PIC Notice was published in both the Vaughan Citizen and the Vaughan Liberal on Thursday September 29, 2011 and Thursday October 6, 2011.
- the PIC Notice was posted on the project website.

The October 13, 2011 PIC was held at Vaughan City Hall (located at 2141 Major Mackenzie Drive, Vaughan, Ontario, L6A 1T1) from 7:00 p.m. to 9:00 p.m. The PIC followed an informal open house format with display boards presenting the project information. The PIC provided participants with an opportunity to review and comment on the project information and to discuss the project directly with the project team.

Sixteen individuals attended the PIC. Attendees were encouraged to provide written comments on comment sheets provided. No comment sheets were completed and submitted. The PIC display boards were posted to the project website. Copies of the Notice, Display Boards and Attendance Sheets for the PIC are included in Appendix J. It is

noted that the PIC for this study was held jointly with the PIC for the City-Wide Storm Drainage/Storm Water Management (SWM) Master Plan and, accordingly, some of the notice and display materials may not be directly relevant to this study.

10.2.3 Public Information Centre No. 2 (PIC 2)

A second PIC was held at Vaughan City Hall on June 27, 2012 from 7:00 p.m. to 9:00 p.m. and presented the findings of the study including the evaluation of alternatives and the identification of the preliminary preferred alternative for each of the water and wastewater infrastructure systems. Similarly, stakeholders were notified of this event as follows:

- letter mailed directly to Mandatory Contact List, and;
- the PIC Notice was published in both the Vaughan Citizen and the Vaughan Liberal on Thursday June 7, 2012 and Thursday June 14, 2012.
- the PIC Notice was posted on the project website.

The PIC followed an informal open house format with display boards presenting the project information and providing participants the opportunity to review and comment on the project information in addition to corresponding directly with the project team. The display boards were also posted to the project website.

Fifteen individuals attended the PIC and were encouraged to provide written comments on the comment sheets provided or otherwise prior to July 27th, 2012. Comments were received from the public during and following the PIC session and, where required or otherwise appropriate, responses were issued. Copies of the Notice, Display Boards, Attendance Sheets, comments received and responses issued are included in Appendix J. Similar to PIC 1, this study was held jointly with the PIC for the City-Wide Storm Drainage/Storm Water Management (SWM) Master Plan and, accordingly, some of the notice and display materials may not be directly relevant to this study.

Amongst the comments received included a submission from landowners with interests in the City's Block 41 and which related to previous investments in oversizing local sewers in Blocks 32 West and 33 West in order to support future growth in Block 41. It is noted that the projects identified in the preferred alternative are required to support the complete build-out of the City through to the end of the current planning horizon, being 2031. Accordingly, there may be opportunities for interim development phasing and the timing and use of existing and new infrastructure in addition to the consideration of historical arrangements and related investments made to develop the existing stock of infrastructure. Subsequent to the receipt of these comments, the landowners in question have been engaged by the City and the noted concerns have been satisfactorily addressed.

The Ministry of Tourism and Culture provided comments regarding the assessment of cultural heritage impacts for any projects identified in this Master Plan. Given that many of the projects identified are expected to be within public road allowances, it is expected that the number of projects where cultural heritage impacts are possible will be minimal. These assessments are not included due the nature and scope of the City-wide Master Plan study, however, such assessments will be conducted for each the projects identified in this Master Plan where required during the detailed design phase for each of the projects.

10.3 Notice of Study Completion and Report Review

The Notice of Study Completion, dated May 8, 2014, was prepared to notify the public of the completion of this study, and to advise of opportunities to review this report. The notice was issued by the following means:

- Letter mailed directly to Stakeholder Contact List (see Appendix J);
- Newspaper advertisement in both the Vaughan Citizen and the Vaughan Liberal on May 29, 2014 and June 5, 2014, and;
- Posting on the Vaughan Infrastructure website (www.vaughaninfrastructure.ca).

The Notice of Study Completion is provided in Appendix J.

This Report has been made available for public review and comment at the following locations during normal business hours (8:30AM to 4:30PM) from June 2nd through July 2nd, 2014:

1. Vaughan City Hall: 2141 Major Mackenzie Drive, Level 2.
2. Pierre Berton Library: 4921 Rutherford Road
3. Bathurst Clark Resource Library: 900 Clark Avenue West

10.4 Summary of EA Schedule

Table 8 EA Schedule

Task	Date
Notice of Study Commencement	September 15, 2011
TAC Meeting 1	September 27, 2011
PIC 1	October 13, 2011
TAC Meeting 2	June 6, 2012
PIC 2	June 27, 2012
Notice of Study Completion	May 29, 2014

11 RESOURCES

Places to Grow: Growth Plan for the Greater Golden Horseshoe, Province of Ontario, 2006

Greenbelt Plan, Province of Ontario, 2005

York Region Official Plan, 2009

City of Vaughan Official Plan, 2010

Housing Analysis and Employment Needs. Hemson Consulting, 2010

Where & How to Grow; Direction on Future Growth in the City of Vaughan to 2031. Urban Strategies Inc., 2009

Green Directions Vaughan: Community Sustainability and Environmental Master Plan, DPRA, 2009

Carrville District Centre Plan, The Planning Partnership, 2006

Steeles Avenue Corridor Land Use Review, Urban Strategies, 2004

Highway 400 North Employment Lands Secondary Plan, Macaulay Shiomi Howson, 2006

Kipling Avenue Corridor Study¸ Office for Urbanism, 2009

Vaughan Metropolitan Centre Secondary Plan, Urban Strategies Inc., 2010

Yonge Steeles Corridor Secondary Plan, Young + Wright/IBI Group Architects, 2010

Woodbridge Centre Secondary Plan, Office for Urbanism, 2010

North Kleinburg-Nashville Secondary Plan, The Planning Partnership, 2010

West Vaughan Employment Area Secondary Plan, Urban Strategies Inc., 2010

York Region Unit Rates Report, Water & Wastewater Master Plan Update, Genivar & XCG, 2008

York Region Water & Wastewater Master Plan Update, Genivar & XCG, 2009

Kleinburg-Nashville Water and Wastewater Servicing Strategy Master Plan, AECOM, 2012

City-Wide Water Audit, Fabian Papa & Partners, 2011

City of Vaughan Transportation Master Plan, AECOM, 2012