



Town of Whitchurch-Stouffville 2024 Water and Wastewater Master Plan

Master Plan Report

Post-Filing (March 2024)

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LIST OF ABBREVIATIONS

Term / Acronym	Description
ADD	Average Day Demand
ADWF	Average Dry Weather Flow
ANSI	Areas of Natural and Scientific Interest
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COSSARO	Committee on the Status of Species at Risk in Ontario
DC	Development Charges
EA(A)	Environmental Assessment (Act)
ESA	Environmentally Significant Areas
ET	Elevated Tank
FF	Fire Flow
GGH	Greater Golden Horseshoe
GM BluePlan	GM BluePlan Engineering Ltd.
HGL	Hydraulic Grade Line
HVA	Highly Vulnerable Aquifers
IPZ	Intake Protection Zone
LOS	Level of Service
LSRCA	Lake Simcoe Region Conservation Authority
MBCA	Migratory Birds Convention Act
MCEA	Municipal Class Environmental Assessment
MCM	Ministry of Citizenship and Multiculturalism
MDD	Maximum Day Demand
MEA	Municipal Engineers Association
MECP	Ministry of the Environment, Conservation, and Parks
MNDMNR	Ministry of Northern Development, Mines, Natural Resources and Forestry
MTO	Ministry of Transportation
MTSA	Major Transit Station Area
MZO	Minister's Zoning Order
NEP	Niagara Escarpment Plan
OP	Official Plan
ORMCP	Oak Ridges Moraine Conservation Plan
PHD	Peak Hour Demand
PIC	Public Information Centre
PRV	Pressure Reducing Valve
PSW	Provincially Significant Wetland
PTTW	Permit To Take Water
PWWF	Peak Wet Weather Flow
SAR	Species at Risk
SARA	Species at Risk Act
SCC	Species of Conservation Concern
SGRA	Significant Groundwater Recharge Areas

Term / Acronym	Description
SOGR	State of Good Repair
SPR	Source Protection Regions
SWP	Source Water Protection
Town	Town of Whitchurch-Stouffville
TRCA	Toronto and Region Conservation Authority
VSA	Vulnerable Scoring Areas for Groundwater and Surface Water
WBPS	Water Booster Pumping Station
WHPA	Wellhead Protection Areas
WPCP	Water Pollution Control Plant
WWPS	Wastewater Pumping Station
YWS	York Water System

1.0 Introduction

The Town of Whitchurch-Stouffville is located in Southern Ontario within York Region bordering the City of Markham, Town of Newmarket, Town of Aurora, Town of Richmond Hill, the Town of East Gwillimbury and Durham Region. The Town of Whitchurch-Stouffville is comprised of several communities including Stouffville, Ballantrae-Musselman's Lake, Bloomington, Vandorf-Preston Lake and Gormley.

The Town of Whitchurch-Stouffville is part of the Greater Golden Horseshoe (GGH) area situated around the southern end of Lake Ontario that continues to be one of the fastest growing regions in North America. The Growth Plan for the GGH, prepared under the Government of Ontario's legislative Places to Grow Act 2005, identifies substantial population and employment growth for the GGH to the year 2051.

The Town of Whitchurch-Stouffville municipal water and wastewater services are operated under a two-tiered system. York Region is responsible for water treatment and supply, transmission mains, storage facilities and booster pumping stations, as well as wastewater treatment and trunk collection system. The Town is responsible for the operation and maintenance of the local water distribution system and local sewer collection systems.

Readily available and accessible public infrastructure is essential to the viability of existing and growing communities. Infrastructure planning, land use planning and infrastructure investment require close integration to ensure efficient, safe, and economically achievable solutions to provide the required water and wastewater infrastructure. To balance the needs of growth with the protection and preservation of natural and socio-cultural resources, the Town of Whitchurch-Stouffville initiated an integrated process to complete an update to the Water and Wastewater Master Plan that will consider growth to 2051.

The Town of Whitchurch-Stouffville retained GM BluePlan Engineering Limited (GM BluePlan) to complete the updates to the Water and Wastewater Master Plan which developed, evaluated, and selected water and wastewater servicing strategies for the Town. The 2024 Water and Wastewater Master Plan used population and employment growth forecasts based on a 2051 planning horizon.

The Study Area for the Master Plan focused on the existing servicing areas within the Communities of Stouffville (water and wastewater servicing) and Ballantrae-Musselman's Lake (water servicing only, wastewater servicing was not considered as part of this Master Plan). Other areas currently without municipal services were reviewed to explore opportunities to bring servicing to these areas.

The 2024 Water and Wastewater Master Plan built on the previous work undertaken as part of the Town's 2018 Water and Wastewater Master Plan and the 2018 Development Charges Background Study Report – Water and Wastewater Servicing. The 2024 Water and Wastewater Master Plan is a critical component in the Town's planning for growth, providing the framework and vision for the water and wastewater servicing needs to the year 2051.

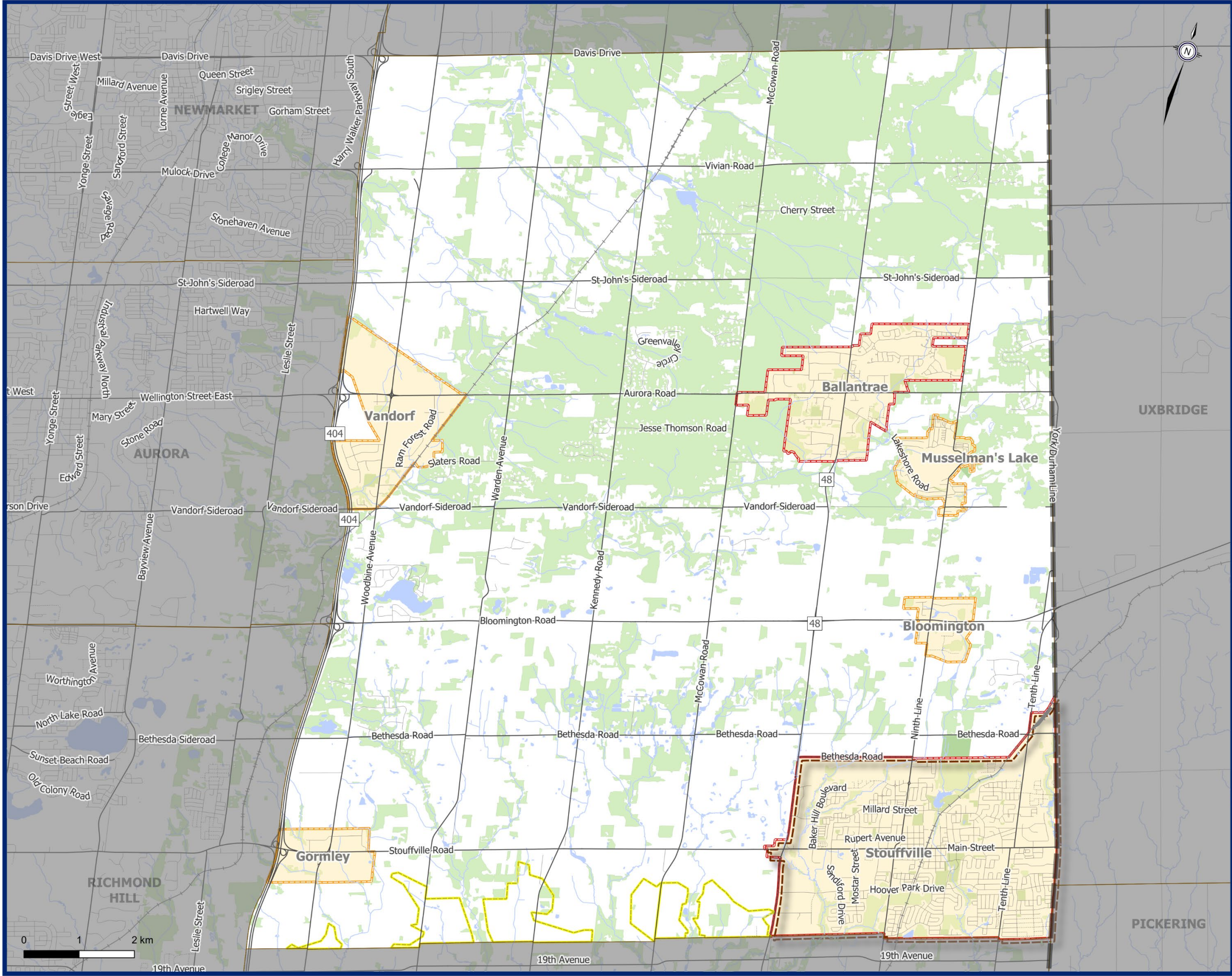
2.0 Study Area

The Town of Whitchurch-Stouffville is located in the Regional Municipality of York, in the southern region of Ontario. The Town is situated in the eastern portion of the Greater Golden Horseshoe (GGH) and has a total area of approximately 220 km².

The study area, provided in **Figure 2-1**, covers the entire municipality of the Town of Whitchurch-Stouffville. The servicing study primarily focused on the urban water and wastewater service areas within the Community of Stouffville and the water service area of Ballantrae-Musselman's Lake. The Master Plan explored, within the context of the existing Provincial Planning Policy, future municipal serving opportunities to settlements that are currently without servicing.

The majority of the Town's land is agricultural. Approximately 80% of the Town is located within the Oak Ridges Moraine Conservation Plan (ORMCP) jurisdiction. Development within the ORMCP jurisdiction is controlled to ensure the conservation and protection of significant ecological and hydrological features. The Town's southern area is located within the Rouge River watershed.

The Town resides in two (2) conservation authority jurisdictions; Ballantrae-Musselman's Lake, and Vandonk are located within the Lake Simcoe Region Conservation Authority (LSRCA) jurisdiction. The Community of Stouffville, Gormley, Bloomington and Preston Lake are located within the Toronto and Region Conservation Authority (TRCA) jurisdiction. The Conservation Authorities Act provides for regulations that restrict development in areas adjacent to wetlands, watercourses, and hazard lands. More information on conservation authority's regulation and policy can be found in **Section 3.4.3.11**.



-  Towns and Villages
-  Hamlets
-  New Urban Area
-  Urban Area
-  Railway
-  Wooded Areas and Parks
-  Waterbodies
-  Municipal Boundary
-  Regional Municipal Boundary

Figure 2-1

Study Area

Town of Whitchurch-Stouffville

3.0 Planning Framework and Master Plan Approach

3.1 Master Plan Objectives

This Master Plan was completed as an Approach 1 of the Master Planning process as set out in the MEA Class EA (October 2000, as amended in 2007, 2011 and 2015) as outlined in *Section A.2.7* (Approach 1 in Appendix 4) of the MEA Class EA based on the strategic level study input. This approach involves the preparation of a Master Plan document at the conclusion of Phase 1 and 2 of the Class EA process. The Master Plan was prepared at a broad level assessment and recognizes that further detailed assessments will be required through separate studies or through an Integrated Planning Approach to satisfy project specific fulfillment of the MEA Class EA requirements for the specific schedule B and C projects and for linear infrastructure located within future roads identified within the Master Plan.

The Master Plan evaluated the ability of existing and planned water and wastewater infrastructure within the Town of Whitchurch-Stouffville to efficiently and effectively service the Town's existing population and forecasted growth to 2051. This Master Plan study incorporated the latest planning information, modelling tools, historical flow and demand data, and servicing studies to complete a full review and update of the servicing strategies.

The key objectives of the Master Plan are as follows:

- Review planning forecasts to 2051 and determine the impacts on servicing needs for the Town's water and wastewater infrastructure;
- Evaluate the ability and constraints of existing and planned water and wastewater infrastructure to efficiently and effectively service the Town's existing users and anticipated growth;
- Undertake a comprehensive review and analysis for both water and wastewater servicing requirements;
- Address key servicing considerations as part of the development and evaluation of water and wastewater servicing strategies including:
 - Level of service to existing users and anticipated future growth to 2051.
 - Review servicing alternatives and explore opportunities to bring servicing to other areas currently without municipal services within the Town.
 - Operational flexibility and system security and reliability.
 - Mitigation of impacts to natural, socio-cultural, and economic environments.
 - Opportunity to meet policy, policy statements, regulations, and technical criteria.
 - Opportunity to optimize existing infrastructure and servicing strategies.
 - Ensure the strategies are cost effective.
- Utilize calibrated water and wastewater hydraulic models for the analysis of servicing alternatives;
- Provide the need, timing and cost of servicing and infrastructure, and establish a complete and implementable water and wastewater capital program;
- Provide consultation and engagement with Indigenous Communities, local residents/businesses and review agencies; and
- Complete the Master Plan in accordance with the Municipal Engineers Association (MEA) Class Environmental Assessment (EA) process for Master Plans (Approach 1).

3.2 Municipal Class Environmental Assessment (EA) Process

The Town of Whitchurch-Stouffville Water and Wastewater Master Plan was undertaken as an Approach 1 Master Plan as defined by the MEA. The requirements to satisfy the selected approach are outlined below.

3.2.1 Class Environmental Assessment Process

Ontario's *Environmental Assessment Act* (EAA) defines a planning and design process that proponents must follow to examine and document the environmental effects that could result from major projects or activities.

The EAA's comprehensive definition of the environment is:

- Air, land, or water,
- Plant and animal life, including human life,
- The social, economic, and cultural conditions that influence the life of humans or a community,
- Any building, structure, machine or other device or thing made by humans,
- Any solid, liquid, gas, odour, heat, sound, vibration, or radiation resulting directly or indirectly from human activities; and,
- Any part of a combination of the foregoing and the interrelationships between any two or more of them, in or of Ontario.

The purpose of the EAA is the betterment of the people of the whole or any part of Ontario by providing for the protection, conservation, and wise management of the environment in Ontario (*RSO1990, c.18, s.2*). An EAA must also ensure that decisions result from a rational, objective, transparent, replicable, and impartial planning process.

As set out in *Section 5(3)* of the EAA, an EA document must include the following:

- A description of the purpose of the undertaking.
- The undertaking.
- The alternative methods of carrying out the undertaking.
- Alternatives to the undertaking.

The EA document must also include a description of:

- The environment that will be affected or that might reasonably be expected to be affected, directly or indirectly, by the undertaking or alternatives to the undertaking.
- The effects that will be caused or that might reasonably be expected to be caused to the environment by the undertaking or alternatives to the undertaking.
- The actions necessary or that may reasonable be expected to be necessary to prevent, change, mitigate or remedy the effects upon or the effects that might reasonably be expected upon the environment by the undertaking or alternatives to the undertaking.
- An evaluation of the advantages and disadvantages to the environment of the undertaking, the alternative methods of carrying out the undertaking and the alternatives to the undertaking (*RSO1990, c.18, s.2*).

3.2.1.1 Bill 108, More Homes, More Choice Act, 2019

The Government of Ontario enacted Bill 108 to increase the housing development to create more affordable housing. This Bill led to amendments within several existing provincial planning legislation, including the *Planning Act*, *Ontario Heritage Act*, *Development Charges Act*, *Conservation Authorities Act*, *Endangered Species Act* and the *Environmental Assessment Act*. Key changes include¹:

- Repeal of strict limitation on appeal grounds introduced by Bill 139, *Building Better Communities and Conserving Watersheds Act*, 2017.
- Changes to applications to alter, demolish or remove heritage properties.
- Changes to payment timings for development charges.
- Community Benefit Charge (CBC) funding excludes costs that would otherwise be recoverable under the *Development Charge Act*.
- Streamline the Class EA process through the development of screening criteria to be used to exempt certain projects within the class from the application of the *Act*.

3.2.1.2 Bill 109, More Homes for Everyone Act, 2022

The Government of Ontario enacted Bill 109 in 2022 which provides municipalities within Ontario to an expedited approval process to build homes faster. This Bill amends sections of the *Planning Act* and *Development Charges Act* among others. The most significant change is that Bill 109 requires municipalities to refund application fees (zoning by-law amendments, site plan application) if a decision was not made within the legislative timeline².

3.2.1.3 Bill 23, More Homes Built Faster Act, 2022

The Government of Ontario enacted Bill 23 in 2022 to support the construction of 1.5 million homes by 2032. The Bill made changes to key land use planning and development policies, including changes to the *Planning Act*, *Development Charges Act* and the *Ontario Heritage Act*, *Conservation Authorities Act*. In addition, Bill 23 also enacted new legislation “*Supporting Growth and Housing in York and Durham Regions Act*, 2022”. The key changes are summarized below³:

- New exemptions on community benefits and development charges for affordable units.
- Removal of municipal cultural heritage properties from the register under certain circumstances.
- Providing the Province, the ability to override provincial heritage standards and guidelines in cases where there is a provincial priority conflict (e.g., transit, housing, health and long-term care and infrastructure).
- Revisions to *O.Reg. 9/06* Criteria for Determining Cultural Heritage Value or Interest.
- Changes to conservation authority jurisdiction if activities are part of development authorized under the *Planning Act*.
- Expedition and collaboration of the York Region and Durham Region projects; York Region Sewage Works” and the “Lake Simcoe Phosphorus Reduction”

¹ Dentons (2019). Bill 108, More Homes, More Choice Act – Unpacked. Retrieved from [Dentons - Bill 108, More Homes, More Choice Act – unpacked](https://www.dentons.com/en/insights/publications/articles/2019/04/10/bill-108-more-homes-more-choice-act-unpacked)

² Legislative Assembly (2022). Bill 109, More Homes for Everyone Act. Retrieved from <https://www.ola.org/en/legislative-business/bills/parliament-42/session-2/bill-109>.

³ BLG (2022). Bill 23 in Ontario: The More Homes Built Faster Act, 2022 receives Royal Assent. Retrieved from <https://www.blg.com/en/insights/2022/12/bill-23-in-ontario-the-more-homes-built-faster-act-2022-receives-royal-assent>

3.2.2 The Principles of Environmental Planning

The EAA sets a framework for a rational, objective, transparent, replicable and impartial planning process based on the following five key principles:

Consultation with affected parties. Consultation with the public and government review agencies is an integral part of the planning process. Consultation allows the proponent to identify and address concerns cooperatively before final decisions are made. Consultation should begin as early as possible in the planning process.

Consideration of a reasonable range of alternatives. Alternatives include functionally different solutions, “alternatives to” the proposed undertaking and “alternative methods” of implementing the preferred solution. The “Do Nothing” alternative must also be considered.

Identification and consideration of the effects of each alternative on all aspects of the environment. This includes the natural, social, cultural, technical, and economic environments.

Systematic evaluation of alternatives in terms of their advantages and disadvantages, to determine their net environmental effects. The evaluation shall increase in the level of detail as the study moves from the evaluation of “alternatives to” to the evaluation of “alternative methods”.

Provision of clean and complete documentation of the planning process followed, to allow “traceability” of decision-making with respect to the project. The planning process must be documented in such a way that it may be repeated with similar results.

3.2.3 Class Environmental Assessment

“Class” Environmental Assessments (Class EAs) were approved by the Minister of the Environment in 1987 for municipal projects having predictable and mitigable impacts. The Municipal Class EA process was revised and updated in 2000, 2007, 2011 and 2015. The Class EA approach streamlines the planning and approvals process for municipal projects that are:

- Recurring,
- Similar in nature,
- Usually limited in scale,
- Predictable in the range of environmental impacts, and
- Responsive to mitigation.

The Municipal Class EA outlines the procedures to be followed to satisfy Class EA requirements for water, wastewater, stormwater management and road projects. **Figure 3-1** illustrates the Municipal Class EA planning and design process.

3.2.4 Selection of Master Plan Approach

The Town completed this project as an Approach 1 Master Plan Study. This approach allows for Schedule A, A+ identified in the master plan to move forward to implementation and become the basis for future investigations for specific Schedule B and C projects. The Water and Wastewater Master Plan satisfies Phases 1 and 2 of the Class EA process, at the end of which this Master Plan document was prepared for the Town.

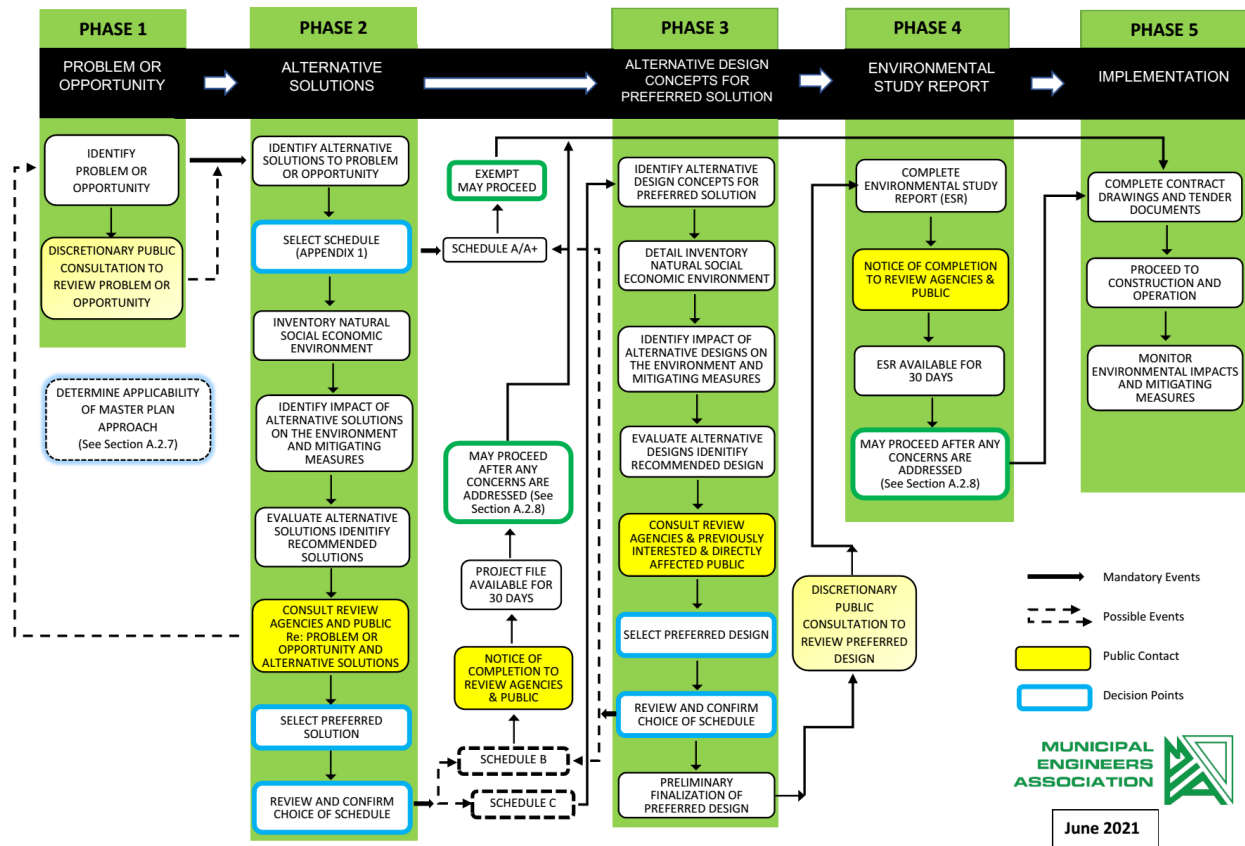


Figure 3-1: Municipal Class EA Planning and Design Process⁴

⁴ Municipal Engineers Association (MEA). 'Municipal Class EA Planning and Design Process', Municipal Class EA, MEA, [https://municipalclassea.ca/files/high%20resolution%20exhibit%20A.2%20\(FLOWCHART\)%20NEW%20JUNE%202021.pdf](https://municipalclassea.ca/files/high%20resolution%20exhibit%20A.2%20(FLOWCHART)%20NEW%20JUNE%202021.pdf) (accessed April 19, 2022)

3.3 Phase 1 – Problem and Opportunity Statement

As part of Phase 1 of the Municipal Class EA process, a problem/opportunity statement provides a clear statement that identifies the opportunities and challenges that are being addressed through the study. The problem / opportunity statement for the Town of Whitchurch-Stouffville Water and Wastewater Master Plan is summarized as follows:

“The Water and Wastewater Master Plan has been initiated to update the Town’s long-term servicing strategy and capital implementation plan to ensure level of service for existing residents and businesses, to support future growth to 2051, and to consider potential impacts post-2051.”

The Regional Municipality of York is responsible for the planning of the Regional system for water supply, storage and pumping, and wastewater collection and treatment. The Town of Whitchurch-Stouffville is reliant on the Region to provide adequate water supply and wastewater collection for the Community of Stouffville (water supply and wastewater collection) and Ballantrae-Musselman’s Lake (water supply).

The Town of Whitchurch-Stouffville Water and Wastewater Master Plan problem and opportunity statement considers the following strategic goals:

- Consider environmental (natural and socio-economic) impacts and minimize where possible
- Provide system capacity to meet existing and projected growth needs to 2051 and beyond;
- Provide operational flexibility for infrastructure maintenance, inspection and emergency operations;
- Provide infrastructure capacity and flexibility to adapt to climate change (e.g., extreme wet weather events); and,
- Minimize total capital, operation and maintenance, and lifecycle costs.

3.4 Planning and Policy Overview

3.4.1 Planning and Growth Projections

The 2019 Provincial Growth Plan provides population and employment growth forecasts to 2041. Amendment 1 was released in 2020 and updated the planning horizon to 2051. Based on the need to conform to Amendment 1, the Region updated their Official Plan which provided updated residential and employment growth forecasts to the year 2051.

Table 3-1: Projected Residential and Employment Planning Estimates⁵

Municipality / Year	Res 2021	Res 2051	Emp 2021	Emp 2051
Town of Whitchurch-Stouffville	51,400	103,500	17,000	28,400
Region of York	1,209,500	2,087,900	641,500	990,600

⁵ York Region. 2022 York Region Official Plan’. <https://www.york.ca/york-region/regional-official-plan> (updated June 2022; approved November 2022; file accessed October 2023)

Planning estimates for the Town of Whitchurch-Stouffville, distributed throughout the hamlets of the Community of Stouffville, Ballantrae, Musselman's Lake, Gormley, Vandorf-Preston Lake and Bloomington, is the basis for the water and wastewater demand and flow projections for the 2024 Master Plan. **Table 3-2** and **Table 3-3** and provide an overview of the projected residential and employment estimates to 2051.

For the purpose of this study, 2021 was used as the base year. The total 2051 planning estimates (residential and employment) is 133,473.

Table 3-2: Projected Residential Planning Estimates to 2051

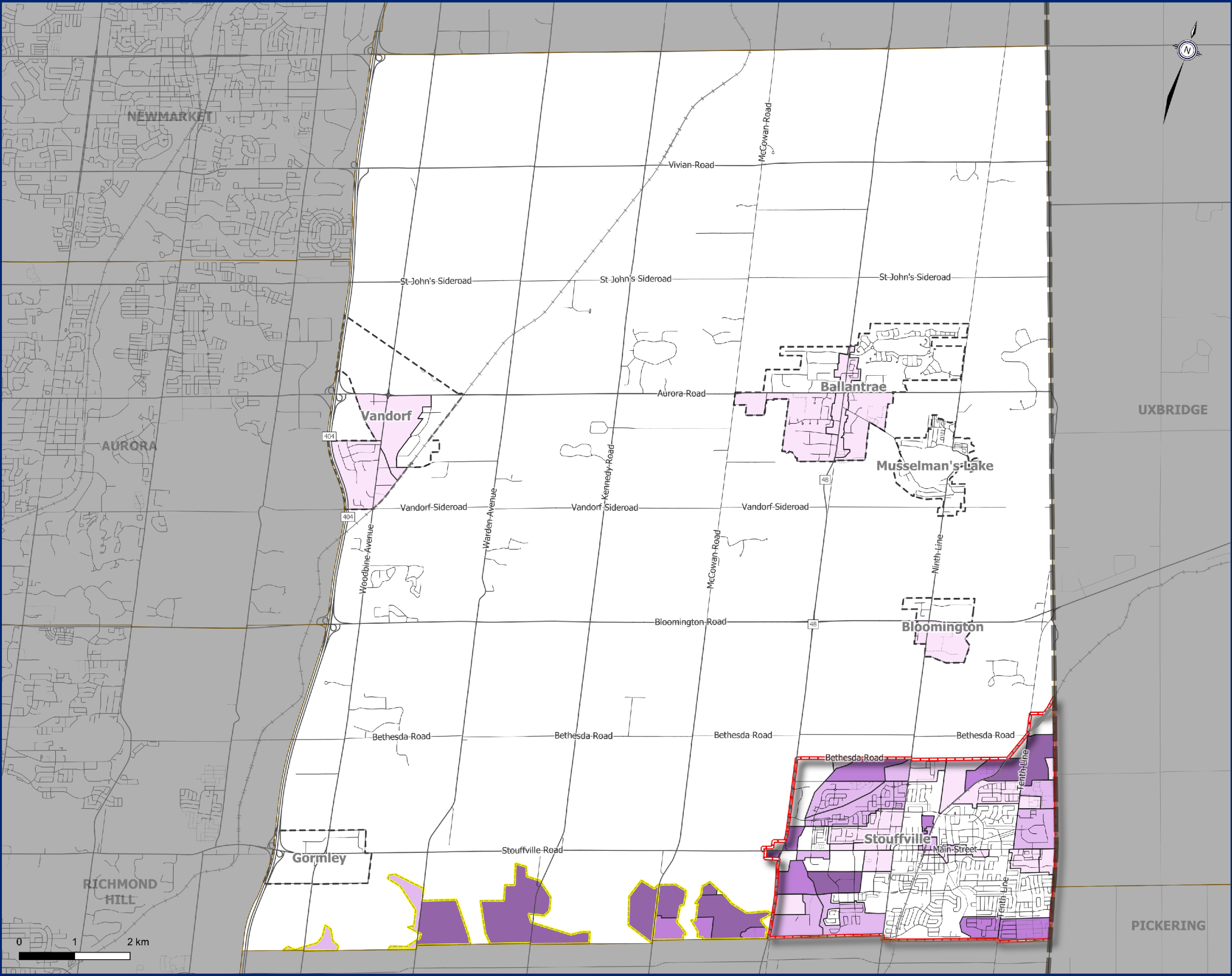
	2021	2026	2031	2036	2041	2046	2051
Ballantrae	3,637	3,927	4,398	4,536	4,536	4,408	4,567
Bloomington	313	419	423	431	435	440	443
Gormley	124	124	120	116	115	114	112
Musselman's Lake	1,679	1,679	1,679	1,679	1,679	1,679	1,679
Other	6,995	7,032	7,056	7,080	7,089	7,097	7,104
MZO – Phase 1	0	0	1,460	1,460	1,460	1,460	1,460
MZO – Phase 2	15	3	4,671	5,539	6,407	6,407	6,407
Whitebelt Lands	1,480	1,480	2,827	5,642	7,800	12,116	12,116
Stouffville	34,248	45,388	55,843	61,050	63,366	65,136	68,397
Vandorf-Preston Lake	669	669	668	967	1,026	1,126	1,226
Total	49,160	60,721	79,145	88,500	93,913	99,983	103,511

Source: Projected population estimates were provided by the Town of Whitchurch-Stouffville's Planning Department (June 2023 Adjusted).

Table 3-3: Projected Employment Planning Estimates to 2051

	2021	2026	2031	2036	2041	2046	2051
Ballantrae	287	323	331	331	331	331	331
Bloomington	183	200	206	211	211	213	216
Gormley	1,631	1,931	2,209	2,209	2,209	2,209	2,209
Musselman's Lake	27	27	27	27	27	27	27
Other	1,522	1,526	1,526	1,742	1,787	1,890	1,989
MZO – Phase 1	18	18	18	18	18	18	18
MZO – Phase 2	474	474	574	574	574	574	574
Whitebelt Lands	2,516	2,516	2,816	3,016	3,916	4,616	5,899
Stouffville	9,692	12,025	13,436	14,018	14,188	14,367	14,874
Vandorf-Preston Lake	1,536	1,859	2,579	3,065	3,357	3,732	3,825
Total	17,886	20,899	23,722	25,211	26,618	27,977	29,962

Source: Projected employment estimates were provided by the Town of Whitchurch-Stouffville's Planning Department (June 2023 Adjusted).



Population Growth (2021-2051)

-  <=100
-  101 - 500
-  501 - 1,000
-  1,001 - 2,000
-  >=2,001

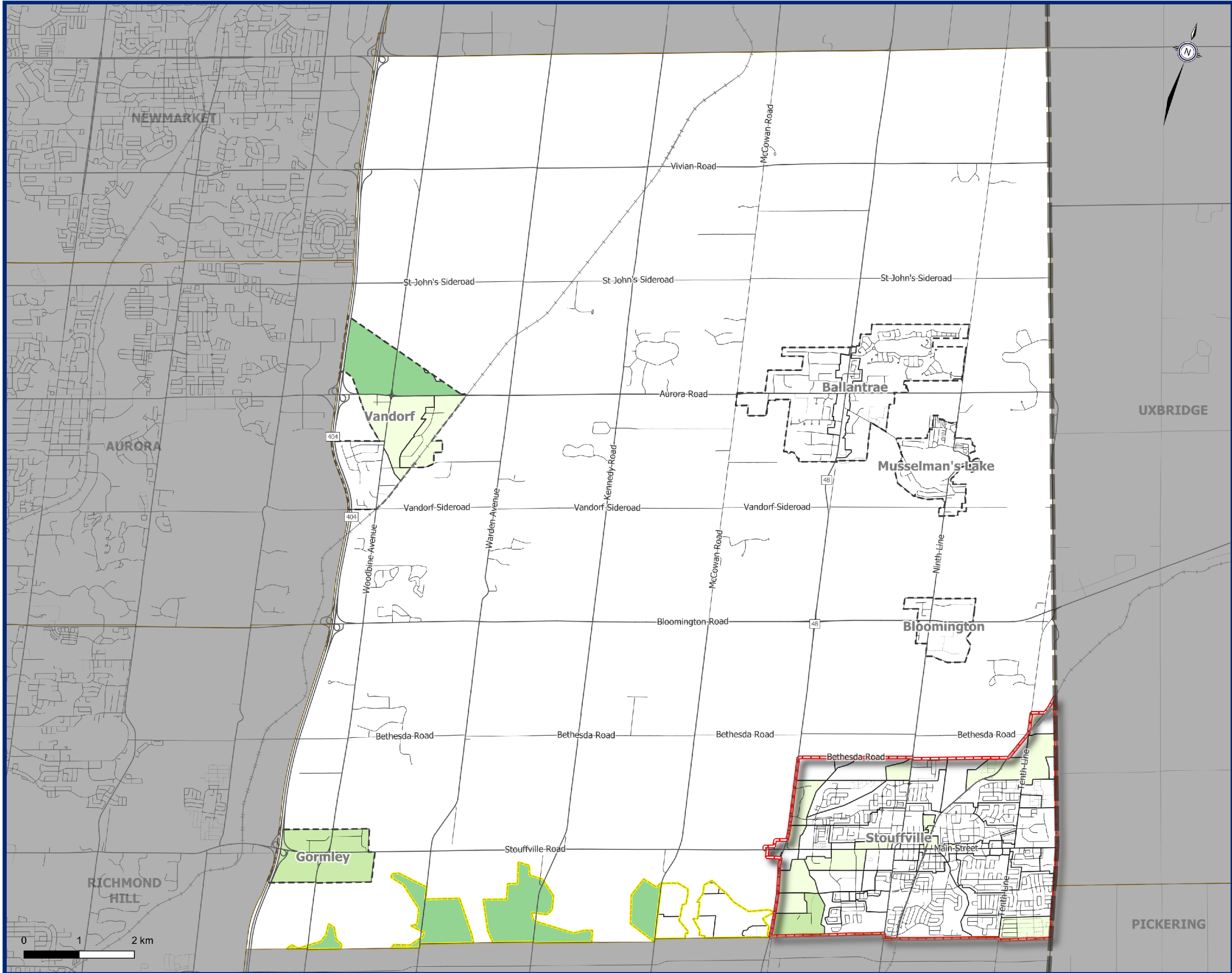
Other Features

-  Railway
-  New Urban Area
-  Urban Area
-  Settlement Areas Boundary
-  Regional Municipal Boundary

Figure 3-2

Population Growth (2021-2051)

Town of Whitchurch-Stouffville



Employment Growth (2021-2051)

-  <=100
-  101 - 500
-  501 - 1,000
-  1,001 - 2,000
-  >=2,001

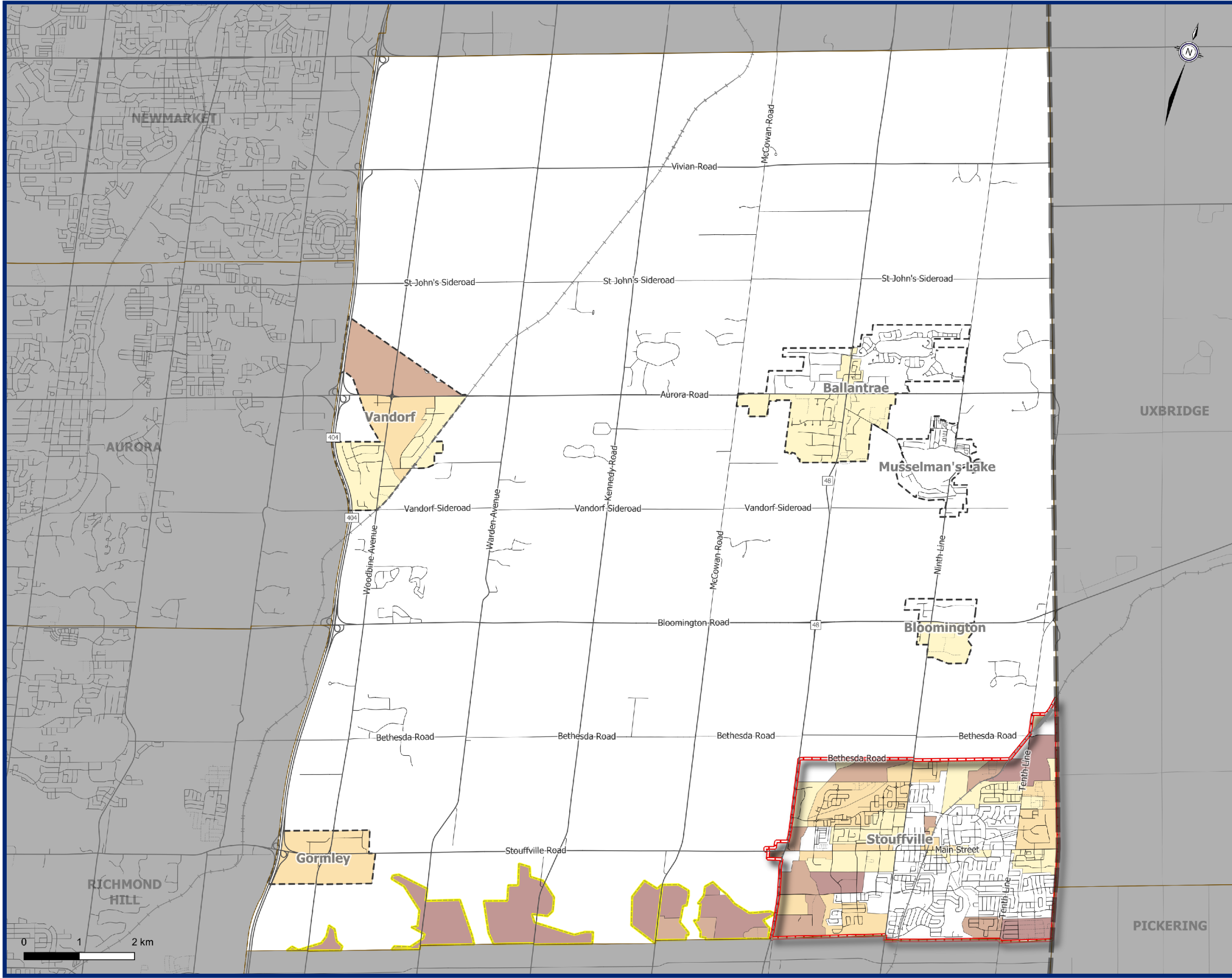
Other Features

-  Railway
-  New Urban Area
-  Urban Area
-  Settlement Areas Boundary
-  Regional Municipal Boundary

Figure 3-3

Employment Growth (2021-2051)

Town of Whitchurch-Stouffville



Total Growth (2021-2051)

- <=100
- 101 - 500
- 501 - 1,000
- 1,001 - 2,000
- >=2,001

Other Features

- Railway
- New Urban Area
- Urban Area
- Settlement Areas Boundary
- Regional Municipal Boundary

Figure 3-4

Total Growth (2021-2051)

Town of Whitchurch-Stouffville

3.4.2 Federal Legislation Policy

3.4.2.1 Department of Fisheries and Oceans – Fisheries Act

The Fisheries Act is a federal legislation for the protection of fish habitat from biological, physical, or chemical alterations that are harmful and/or destructive. Fisheries and Oceans Canada, in conjunction with various other agencies (Environment Canada, Ministry of Northern Development, Mines, Natural Resources and Forestry, Ontario Ministry of the Environment, Conservation and Parks) are responsible for the enforcement and management of fisheries resources. Under the Fisheries Act, no undertaking or activity, including in-water works, shoreline works, and Creek crossings should result in serious harm to fish or fish habitats. Impacts must be avoided or mitigated.

Relevance to this study: There are several watercourses within the study area with fish and fish habitat and as such the Fisheries Act applies.

3.4.2.2 Environment Canada – Migratory Birds Convention Act

The Migratory Birds Convention Act (MBCA) was established in 1917 and amended in 1994 and 2005, to protect migratory birds, their eggs, and their nests. The MBCA was created to implement the Migratory Birds Convention between Canada and the United States. The Act lists protected families and subfamilies of migratory birds and lays out legislation surrounding activities that may impact migratory birds or nests, including when and where activities may occur. The study area contains deciduous and mixed forested land, that may support migratory or nesting birds; Measures to avoid or mitigate impacts to migratory birds will be included as part of the preferred strategies.

Relevance to this study: There are several woodlots in the study area with potential to support migratory and nesting birds.

3.4.2.3 Environment Canada – Species at Risk Act

The Species at Risk Act (SARA) focuses on restoring and maintaining populations of species that are at risk of extinction or extirpation due to human activity such as habitat destruction, hunting, introduction of competing species, or other anthropogenic causes.

Species are designated at risk by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) by using biological information on a species deemed to be in danger. The COSEWIC reviews research information on population and habitat status, trends and threats and applies assessment criteria based on international standards. Once a species is added to Schedule 1 – List of Wildlife Species at Risk, it benefits from legal protection afforded and the mandatory recovery planning required under the Act.

Relevance to this study: While SARA applies to species on federal land, it also applies to species at risk migratory birds under the MBCA and fish anywhere they occur. Therefore, SARA applies to any fish species that are deemed a federal species at risk in the Study Area.

3.4.3 Provincial Legislation and Policy

3.4.3.1 Provincial Policy Statement (PPS)

The PPS sets the policy foundation for land use planning and development in Ontario, providing guidance and support for appropriate land use planning and development while protecting resources of provincial interest, public health and safety, and the quality of the natural and built environment. The PPS contains policies relevant to water and wastewater infrastructure planning including, but not limited to:

- Requirement that infrastructure be provided in a coordinated, efficient and cost-effective manner with considerations to climate change.
- Planning for infrastructure should be financially viable over their lifecycle and available to meet current and projected needs.
- Optimization of the use of existing infrastructure and public service facilities before developing new infrastructure.

More specifically, the PPS recommends that water and wastewater services should:

- Direct and accommodate expected growth in a manner that promotes the efficient use and optimization of existing municipal water and wastewater services.
- Ensure that these systems are provided in a manner that:
 - can be sustained by the water resources upon which such services rely,
 - is feasible, financially viable and complies with all regulatory requirements; and
 - protects human health and the natural environment.
- Promote water conservation and water use efficiency.
- Integrate servicing and land use considerations at all stages of the planning process.

The Greenbelt Plan, the Niagara Escarpment Plan (NEP), and the Oak Ridges Moraine Conservation Plan (ORMCP) work within the framework set out by the Growth Plan for the GGH for where and how future population and employment growth should be accommodated.

Together, all four provincial plans build on PPS to establish a land use planning framework for the GGH and the Greenbelt Plan Area that supports a thriving economy, a clean and healthy environment and social equity.

Relevance to this study: The PPS defines the parameters under which it should be implemented (i.e., the preferred water and wastewater strategies must comply with the overall goals of the PPS, including protect human health and the environment, be financially viable and comply with all regulatory requirements).

3.4.3.2 A Place to Grow – Growth Plan for the Greater Golden Horseshoe

A Place to Grow is the provincial initiative to plan for growth in Ontario. The most recent growth plan, A Place to Grow - The Growth Plan for the Greater Golden Horseshoe (the Growth Plan), was first introduced in July 2017 replacing the 2006 Growth Plan, and later amended in August 2020.

The Growth Plan is a long-term plan that works together with the Greenbelt Plan, the ORMCP and the NEP to manage growth and development in a way that supports economic prosperity, protects the natural environment, and helps build complete communities that achieve a high quality of life.

To support these goals, the Growth Plan for the Greater Golden Horseshoe (GGH) works to:

- Support the achievement of complete communities that offer more options for living, working, learning, shopping, and playing.
- Reduce traffic gridlock by improving access to a greater range of transportation options.
- Provide housing options to meet the needs of people at any age.
- Revitalize downtowns to become more vibrant and to provide convenient access to an appropriate mix of jobs, local services, public service facilities and a full range of housing.
- Curb sprawl and protect farmland and green spaces.
- Promote long-term economic growth.

Like other provincial plans, the Growth Plan builds upon the policy foundation provided by the Provincial Policy Statement and provides additional and more specific land use planning policies to address issues facing specific geographic areas in Ontario. While the PPS provides for a time horizon of up to 25 years to make enough land available to meet projected needs, the PPS also suggests that a provincial plan may provide an alternate time horizon for specific areas of the province. The 2020 Growth Plan provides that the applicable time horizon for land use planning is 2051.

Relevance to this study: Like the PPS, the Growth Plan for the GGH supports the need for this project, as well as defines the parameters under which it should be implemented in a sustainable manner. The preferred water and wastewater strategies must comply with the overall goals of the Growth Plan.

3.4.3.3 Greenbelt Plan

The Greenbelt Plan (2017) builds upon the existing policy framework established in the Provincial Policy Statement. The purpose of the plan is to inform the decision-making process to protect agricultural lands, natural heritage and water resource systems, and to provide for a diverse range of economic and social activities related to rural communities, agriculture, tourism, recreation and resource uses.

The Greenbelt Plan includes lands within the Niagara Escarpment and the Oak Ridges Moraine and builds upon the ecological protections provided by the NEP and the ORMCP. The Protected Countryside lands identified in the Greenbelt Plan are intended to enhance the spatial extent of agriculturally and environmentally protected lands covered by the NEP and the ORMCP while improving linkages between these areas and the surrounding major lake systems and watersheds.

Whitebelt lands are undeveloped lands, typically used for agricultural or rural purposes, that are not protected from any future urban development and not subject to any Greenbelt Plan or Growth Plan policies. They lie of the outer boundary of the urban areas in Greenbelt Plan area. There are approximately 46,000 hectares of whitebelt lands within the GGH, with which 400 hectares is located within the Town of Whitchurch-Stouffville⁶.

Relevance to this study: Like the Provincial Policy Statement, the Greenbelt Plan supports the need for this project, as well as defines the parameters under which it should be implemented including the protection of the natural heritage, water resources and agricultural lands. The preferred water and wastewater strategies must comply with the overall goals of the Greenbelt Plan.

⁶ Neptis Foundation (2021). Whitebelt. <https://neptis.org/geoweb/data-catalogue/whitebelt>

3.4.3.4 Oak Ridges Moraine Conservation Plan

The Oak Ridges Moraine Conservation Plan (ORMCP) (2017) is a regulation to the Oak Ridges Moraine Conservation Plan Area. The plan provides land use and resource management direction to provincial ministers, ministries, agencies, municipalities, landowners and other stakeholders on how to protect the ecological and hydrological features and functions of the land and water resources within the Moraine.

Some of the objectives of the ORMCP include:

- Protect the ecological and hydrological integrity of the ORM Area.
- Ensure that only land and resource uses that maintain, improve or restore the ecological and hydrological functions of the ORM Area are permitted.
- Maintain, improve or restore all the elements that contribute to the ecological and hydrological functions of the ORM Area, including the quality and quantity of its water and its other resources.
- Provide for land and resource uses and development that are compatible with the other objectives of the Plan.

Relevance to this study: Like the PPS, the ORMCP supports the need for this project, as well as defines the parameters under which it should be implemented including the protection of ecological and hydrological features and functions within the study area. The preferred water and wastewater strategies must comply with the overall goals of the ORMCP.

3.4.3.5 Endangered Species Act

The *Endangered Species Act* was originally written in 1971 and amended in 2008. Similar to the *Federal Species at Risk Act (SARA)*, the *Act* aims to provide protection to plant and animal species that are at risk of extinction or extirpation from Ontario.

Species thought to be at risk in Ontario are initially determined by the Committee on the Status of Species at Risk in Ontario (COSSARO), and if approved by the provincial Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNR), species will be added to the provincial list of endangered and threatened species in compliance with the *Act*. The *Act* immediately provides habitat protection to all species listed as threatened, endangered or extirpated.

The *Act* provides guidance on determining whether anthropogenic activities, such as construction, could impact regulated species and considers biology and behaviour of the species, details of the activity, and how the activity may affect the species' ability to carry out its life processes.

Relevance to this study: Given the characteristics of the area, there is potential for terrestrial and aquatic provincial SAR species. The preferred water and wastewater strategies will aim to minimize potential impacts to Species at Risk habitat.

3.4.3.6 Sustainable Water and Sewage System Act

The *Sustainable Water and Sewage Systems Act* (2002) legislates financial planning and sustainability of municipal water and wastewater systems and specifies reporting requirements.

In 2010, *Bill 13, Sustainable Water and Wastewater Systems Improvement and Maintenance Act* was tabled to repeal the *Sustainable Water and Sewage Systems Act*.

Key points of the Bill are as follows:

- Sets out the purposes of the *Act*, which include ensuring that public ownership of water services and wastewater services is maintained.
- Establishes the Ontario Water Board as an agent of the Crown and sets out the Board's objectives, powers and duties which relate to the regulation of water services and wastewater services.
- Sets out the responsibilities of municipalities or groups of municipalities that are designated as regulated entities by regulation.

Regulated entities must prepare business plans for the provision of water services or wastewater services. The plan must contain, among other things, an assessment of the full cost of providing water services or wastewater services to the public and a description of how the regulated entity intends to pay this full cost.

Relevance to this study: The Master Plan provides the capital program for proposed water and wastewater servicing strategies which supports the Town's water and wastewater financial planning.

3.4.3.7 Water Opportunities and Conservation Act

The Water Opportunities and Conservation Act aims to encourage water conservation, strengthen sustainable municipal water planning, and make Ontario a leader in developing and selling water technologies and services. The purposes of the Act are as follows:

- Foster innovative water, wastewater and storm water technologies, services and practices.
- Create opportunities for economic development and clean-technology jobs in Ontario.
- Conserve and sustain water resources for present and future generations.

To further the purposes of the Act, the Minister of the Environment, Conservation and Parks (MECP) may establish aspirational targets in respect of the conservation of water and other matters.

The Act requires certain municipalities, persons and entities to prepare, approve and submit to the Minister of the Environment, Conservation and Parks municipal water sustainability plans for municipal water services, municipal wastewater services and municipal storm water services under their jurisdiction. The Minister may establish performance indicators and targets for these services. The Act also authorizes the making of regulations requiring public agencies to prepare water conservation plans, achieve water conservation targets, and consider technologies, services and practices that promote the efficient use of water and reduce negative impacts on Ontario's water resources.

Relevance to this study: The *Act* supports the evaluation of the water and wastewater strategies.

3.4.3.8 Safe Drinking Water Act

The *Safe Drinking Water Act* was adopted in 2002. The *Act* provides for the protection of human health and the prevention of drinking water hazards through the control and regulation of drinking water systems and drinking water testing. Key features of the *Act* include the following:

- Legally binding standards for contaminants in drinking water,
- Requirement to use licensed laboratories for drinking water testing,

- Requirement to report any results that do not meet the standards to the Ministry of the Environment, Conservation and Parks and the local Medical Officer of Health and to undertake corrective action,
- All operators of municipal drinking water systems must be trained and certified,
- Establishment of a licensing regime for drinking water systems; and
- Inspections and enforcement to determine compliance with the *Act*.

Relevance to this study: The *Safe Drinking Water Act* supports the need for this project by ensuring both the water and wastewater systems have sufficient capacity to meet existing and future growth.

3.4.3.9 Clean Water Act and Source Water Protection

The *Clean Water Act* was adopted in 2006 with the objective to protect existing and future sources of drinking water including rivers, lakes, and underground aquifers. The *Act* requires the following:

- That local communities assess existing and potential threats to their water, and that they set out and implement the actions needed to reduce or eliminate these threats,
- Empowers communities to take action to prevent threats from becoming significant,
- Public participation on every local source protection plan – the planning process for source protection is open to anyone in the community, and,
- That all plans and actions be based on sound science.

Relevance to this study: The *Clean Water Act* supports the need for this project by providing system capacity and security, and once constructed must be operated in accordance with the *Act*.

3.4.3.10 Source Water Protection

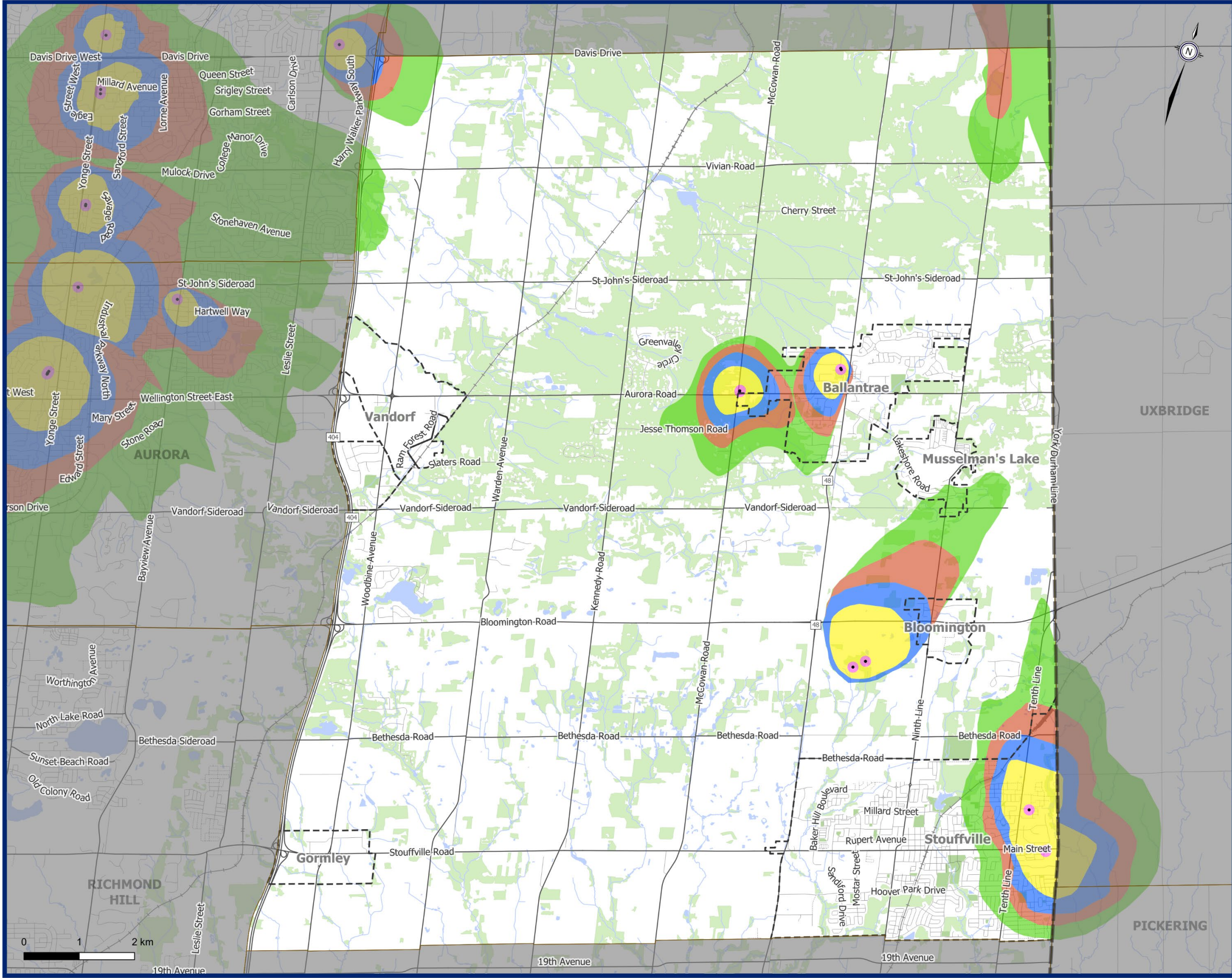
Source Water Protection (SWP) Plans were prepared for the 19 watershed-based Source Protection Regions (SPR) across Ontario to protect existing and future sources and to identify areas of significant drinking water threats. The study area falls within two Source Water Protection Regions: CTC Source Protection Region and South Georgian Bay Lake Simcoe Region. Within these regions are two areas including Toronto Source Protection Plan and Lake Simcoe and Couchiching/Black River Source Water Protection Plan.

The Source Water Protection Plans identify vulnerable areas that have been delineated under the Clean Water Act including Wellhead Protection Areas (WHPA), Intake Protection Zones (IPZ), Highly Vulnerable Aquifers (HVA), Significant Groundwater Recharge Areas (SGRA), and Vulnerable Scoring Areas for Groundwater and Surface Water (VSA) as well as water quantity vulnerable areas. According to the Source Protection Plan⁷.

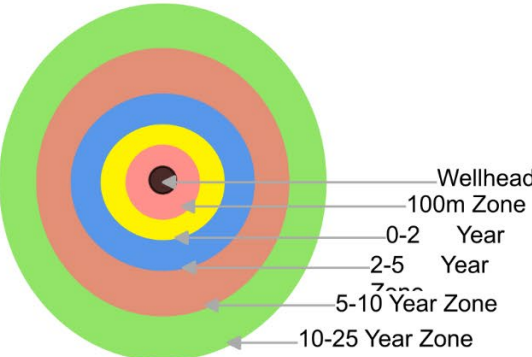
- **WHPA** is surface and underground area around a municipal water well or well field. Wells draw water from underground areas, called aquifers, where water fills cracks in bedrock or spaces between grains of sand, gravel or soil.
- **IPZ** is the area of land and water immediately surrounding a surface water intake. It indicates the areas where dangerous materials may get to an intake so quickly that operators of the municipal water treatment plant may not have enough time to shut down the intake before the pollutant reaches it.
- **SGRA** is the area where an aquifer is replenished when rain and snow fall and seep into the ground.
- **HVAs** is an underground layer of water-bearing permeable rock, rock fractures or unconsolidated materials (gravel, sand, or silt) from which groundwater can be extracted using a water well. Underground aquifers are sources of our drinking water.

Relevance to this study: The study area contains HVAs, SGRA, and WHPAs scattered throughout the study area. Impacts to these resources must be considered in the selection and development of the preferred water and wastewater strategies, and the establishment of mitigation measures.

⁷ CTC Source Protection Committee. 'Approved Source Protection Plan: CTC Source Protection Region', The CTC Source Protection Plan, Toronto and Region Source Protection Authority, [The CTC Source Protection Plan - CTC Source Protection Region \(ctcswp.ca\)](https://ctcswp.ca) (accessed May 5, 2022)



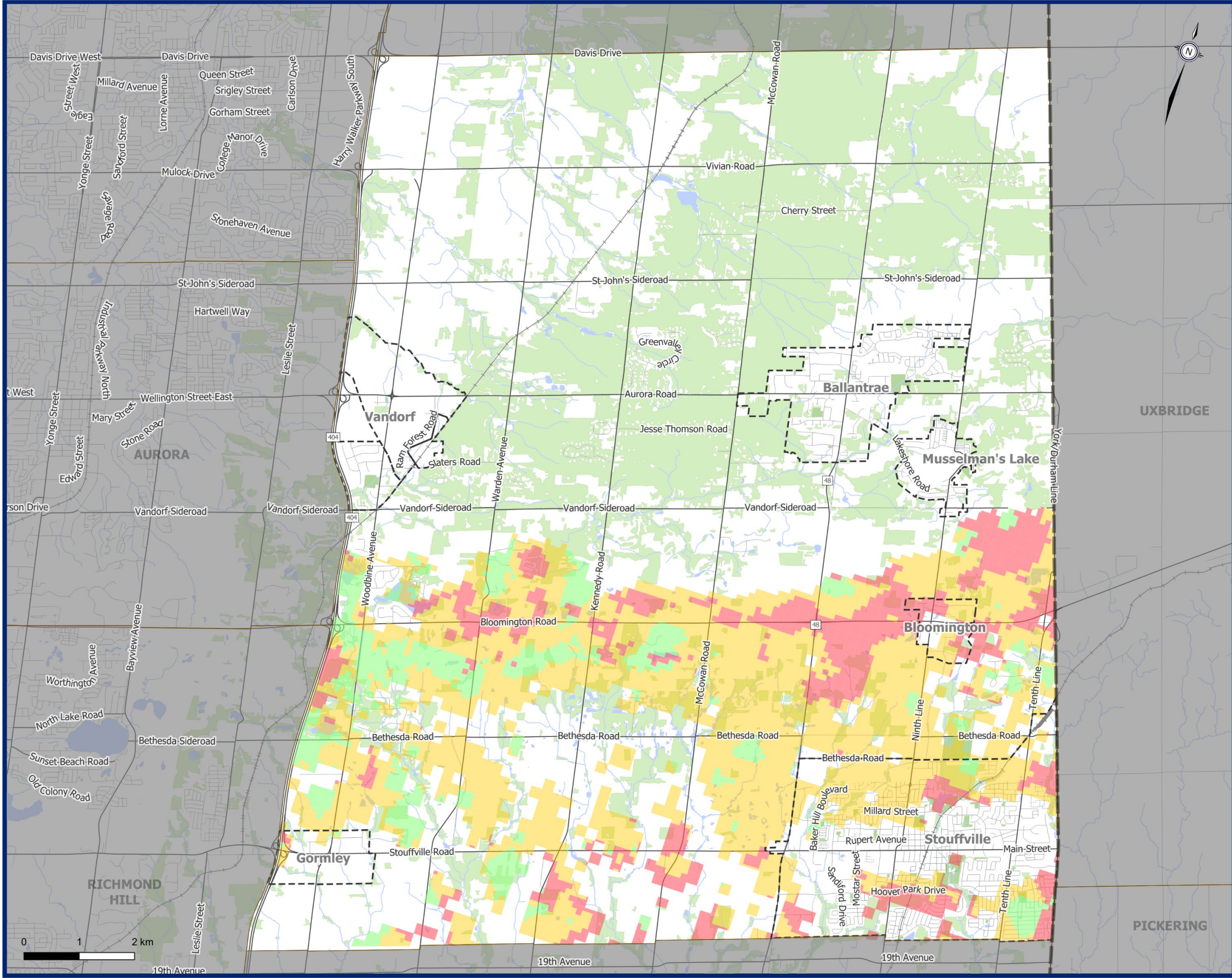
Wellhead Protection Area



Other Features

-  Railway
-  Wooded Areas and Parks
-  Waterbodies
-  Settlement Area Boundary
-  Municipal Boundary
-  Regional Municipal Boundary

Figure 3-5
**MECP Source water Protection
Wellhead Protection Areas**



**Significant Recharge Area
Vulnerability Level**

- High
- Medium
- Low

Other Features

- Railway
- Wooded Areas and Parks
- Waterbodies
- Settlement Area Boundary
- Municipal Boundary
- Regional Municipal Boundary

Figure 3-6
**MECP Source Water Protection
Information Significant
Groundwater Recharge Area**

Highly Vulnerable Aquifers

-  Lake Simcoe Region Conservation Authority (LSRCA)
-  Toronto and Region Conservation Authority (TRCA)

Other Features

-  Railway
-  Wooded Areas and Parks
-  Waterbodies
-  Settlement Area Boundary
-  Municipal Boundary
-  Regional Municipal Boundary

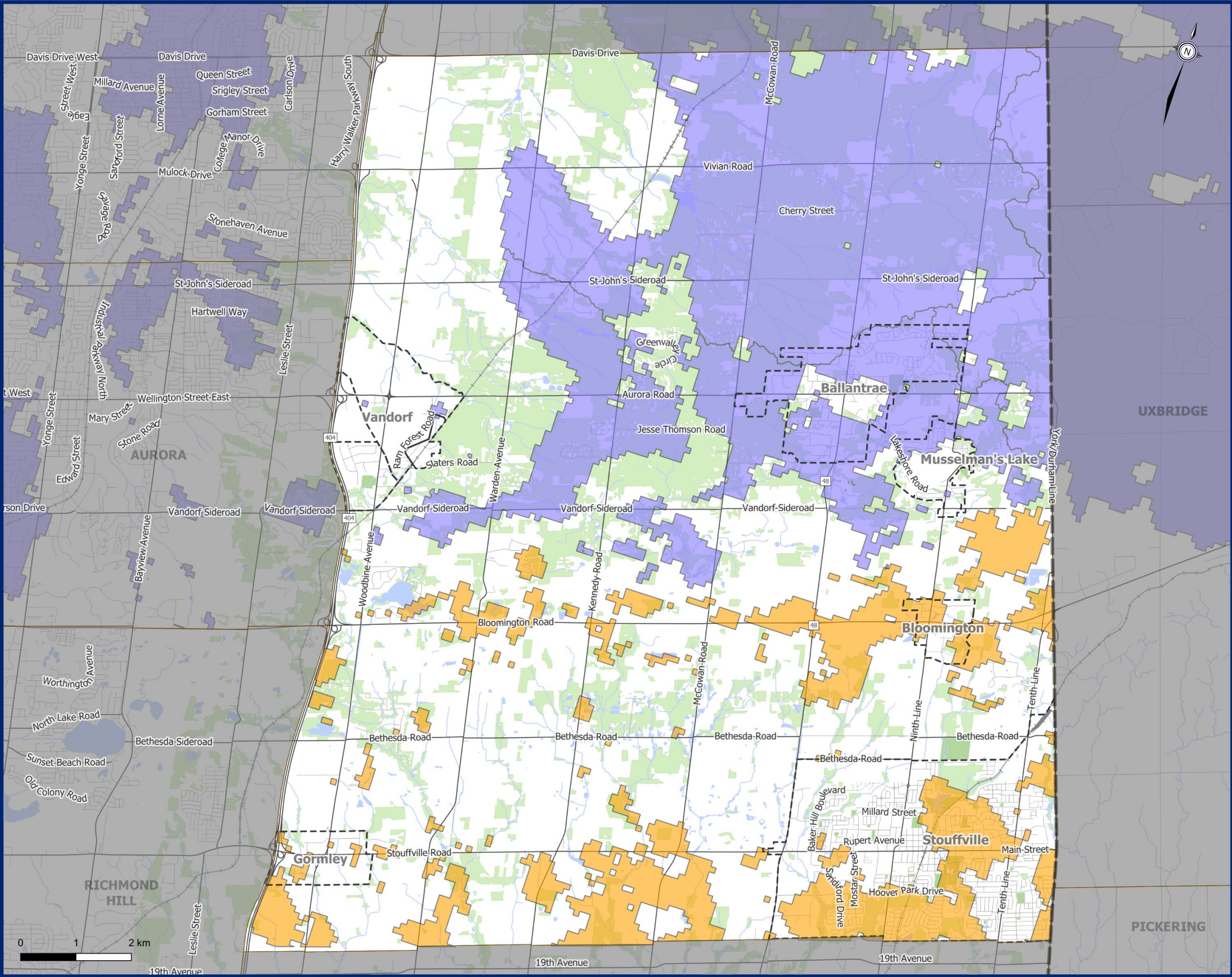


Figure 3-7

**MECP Source Water Protection
Information
Highly Vulnerable Aquifers**

3.4.3.11 Conservation Authority Regulation and Policy

The legislative mandate of the Conservation Authority, as set out in *Conservation Authorities Act (s.20)*, is to establish and undertake programs designed to further the conservation, restoration, development, and management of natural resources. Conservation Authorities are local agencies that protect and manage water and other natural resources at the watershed level. These agencies have several responsibilities and functions in the land use planning and development process.

Conservation Authorities act as commenting agencies on development applications under the Planning Act based on regulations approved by their Board of Directors and the province. These Conservation Authorities have agreements with partnering municipalities to provide technical services regarding matters associated with natural heritage protection, hazardous land management, and water resources.

The Town of Whitchurch-Stouffville contains portions of five watersheds, under the jurisdiction of:

- Toronto and Region Conservation Authority (TRCA)
- Lake Simcoe Region Conservation Authority (LSRCA)

Figure 3-8 presents an overview of the Conservation Authorities within the Town of Whitchurch-Stouffville.

In November 2022, the Province of Ontario passed the *More Homes Built Faster Act, 2022 (Bill 23)*. The Bill introduced a series of legislative changes affecting conservation authorities. The Province has stated that the purpose of these changes is to:

“accelerate housing development approvals while continuing to protect Ontario families, communities, and critical resources. The proposed changes would further focus conservation authorities on their core mandate, support faster and less costly approvals, streamline conservation authority processes and help make land suitable for housing available for development.”

The legislative changes to the *Conservation Authorities Act* and *Planning Act* include:

1. Proposed updates to the regulation of development for the protection of people and property from natural hazards in Ontario (legislative changes).

Focusing conservation authorities' role in review of development related proposals and applications (comments, appeals).

Freezing conservation authority fees.

Identifying conservation authority lands suitable for housing and streamlining conservation authority severance and disposition processes that facilitate faster development.

Bill 23 received royal assent on November 28, 2022. However, many of the Bill's changes to the *Conservation Authorities Act* will not come into effect until a later date.

3.4.4 Municipal Legislation and Policy

3.4.4.1 York Region Official Plan

York Region maintains a commitment to ensuring that its communities have long-term water and wastewater services. Additionally, the Region looks to ensure that the environment is protected and enhanced, all while being sustainable and financially responsible in their water and wastewater pledge.

The Region of York recently updated their Official Plan (OP), which was adopted by York Regional Council in June 2022 and approved by the Minister of Municipal Affairs and Housing in November 2022. The population forecast for York Region and the Town of Whitchurch-Stouffville for the basis of planning development are as follows:

Table 3-4: 2022 York Region Official Plan – Planning Estimates⁸

	2041	2051
York – Population	1,731,800	2,087,900
York – Employment	859,800	990,600
Stouffville – Population	73,900	103,500
Stouffville – Employment	24,000	28,400

The 2022 York Region OP looks to increase sustainability and reduce climate impacts through future developments, some of their desires that are relevant to this study include:

- Protecting the natural and agricultural system,
- Climate change mitigation and adaptation,
- Energy and water conservation level beyond the Ontario Building Code,
- Low impact development and green infrastructure,
- Reduction of construction waste,
- Recycling and adaptive reuse of construction materials, and,
- Other sustainability measures.

This study looked to propose projects and initiatives to the Town that will increase sustainability and reduce climate change in their efforts to ensure that water and wastewater planning for the Town maintains or improves on current levels of service. To this point – the Region looks for local municipalities to work toward reducing the amount of inflow and infiltration in both the local and regional wastewater systems.

⁸ York Region. 2022 York Region Official Plan'. <https://www.york.ca/york-region/regional-official-plan> (accessed October 2023)

3.4.4.2 York Region 2022 Water and Wastewater Master Plan

The Regional Municipality of York's 2022 Water and Wastewater Master Plan sets out an approach to meet the needs of the Region's growth to 2051. The Master Plan is updated approximately every 5 years, to conform to updated planning horizons and changes in existing and future conditions. The most recent update reflects the revised growth forecasts identified in the Growth Plan and incorporated in the Regional OP. The 2024 Master Plan focuses on the development of an integrated, long-term strategy for sustainable water and wastewater services while aiming to achieve environmental, social, and financial sustainability beyond the five-year time horizon. Regional Council endorsed the 2024 Master Plan in May 2022.

The Town's Master Plan process will aim to align its proposed water and wastewater strategies to the recommended strategies presented in the Region's Master Plan. The water and wastewater strategies recommended as part of the Region of York Water and Wastewater Master Plan are detailed in **Section 4.4** and **Section 5.4**, respectively.

3.4.4.3 Town of Whitchurch-Stouffville Official Plan

The Town of Whitchurch-Stouffville OP provides direction and a policy framework for guiding future development, managing growth, land use, infrastructure decisions, and the effects on the social, economic, and natural environment within the Town. Policies on land use include appropriate location of residential, industrial, commercial, and institutional properties, location of services (i.e., roads, watermains, sewers, parks and schools), and the order of the Town's growth plan. Most of the Town is located on the Oak Ridges Moraine (ORM), therefore all applicable ORM policies apply in addition to the policies set out in the OP.

The OP was approved by the Town in September 2000 and reviewed and amended over time. Recent changes in Regional and Provincial planning policies and legislation created the need for a new OP to ensure a strategic and coordinate long-term vision for the Town. The latest version of the Town OP was approved in January 2023.

3.4.4.4 Town of Whitchurch-Stouffville Leisure and Community Master Plan

The Town's 2022 Leisure and Community Master Plan was completed in September 2022. The Master Plan recommended increased indoor recreational facilities and to acquire future parklands. These new space requirements will provide enhanced public enjoyment and will be owned, maintained, and operated by the Town. With an increase in leisure and community features within the Town, there is an expectation that there will be increased population and thereby put demands on the current water and wastewater infrastructure system. Further, the 2022 Leisure and Community Master Plan suggested increases to active transportation through the integration of their trail systems. When determining lands to be acquired for greenspace or leisure and community facilities, the Town may consider allotting some of the lands toward water and wastewater services.

3.4.4.5 Town of Whitchurch-Stouffville Transportation Master Plan

The Town's Transportation Master Plan proposes network improvements through the Town of Whitchurch-Stouffville. Timing for roadway improvements is considered in the timing for water and wastewater network improvements and construction to ensure minimal disruption to the public and residents with roadway closures. The Town is currently updating their 2022 Transportation Master Plan and will be considered through this Master Plan.

3.4.4.6 Town of Whitchurch-Stouffville Master Fire Plan

The Town completed the 2022 Master Fire Plan in April 2022. Key recommendations include:

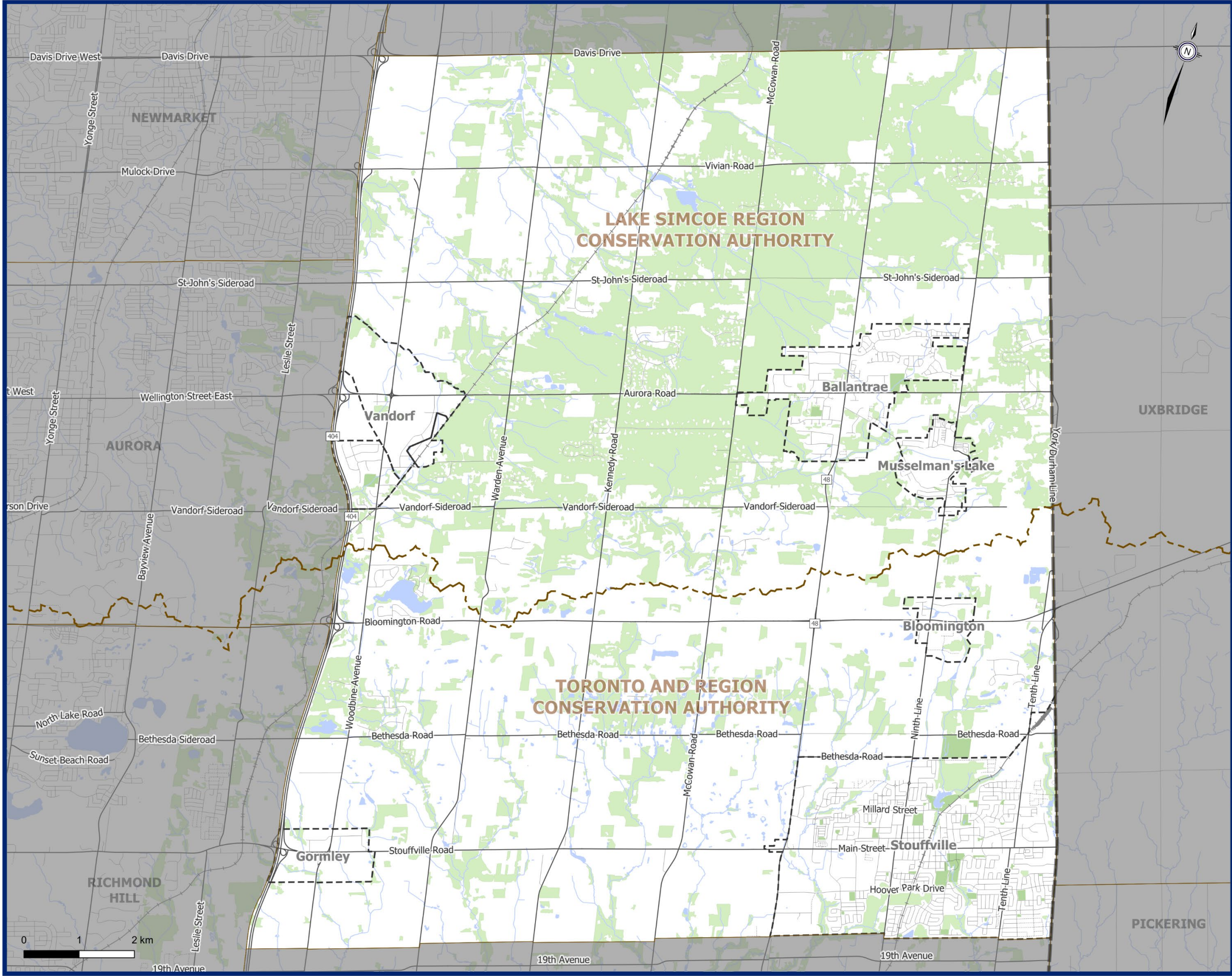
- Enhancement of the training division resources;
- Relocation of the Ballantrae Fire Station (52); and,
- Addition of two new fire stations; one near Tenth Line / Walter Atkinson area in Lincolnville. The other near Woodbine / Warden area in Bloomington. These facilities are planned within the next 5 to 10 year horizon based on growth.

These recommendations will require coordination with the Water Master Plan to ensure the Town's services can meet the additional demand required.

3.4.4.7 Town of Whitchurch-Stouffville Development Charges Background Study

The Town's Development Charges (DC) Background Study informs the Town what costs in the development of the community can be pushed back onto the developer and at what monetary rate. Where there is existing infrastructure, a reduction can be incorporated to the development charges if the current facilities can be utilized without decreasing the level of service (LOS) to the existing community.

The Town will be updating their DC in coordination with the Town's Master Plan.



-  Conservation Authority Jurisdiction
-  Railway
-  Wooded Areas and Parks
-  Waterbodies
-  Settlement Area Boundary
-  Municipal Boundary
-  Regional Municipal Boundary

Figure 3-8
**Conservation Authority within
Study Area**

3.4.5 Designated Natural Areas

3.4.5.1 Hydrological Features

The study area contains the following subwatersheds:

- Little Rouge
- Main Rouge
- East Holland River
- Black River
- Pefferlaw River
- West Duffins Creek

Any development proposed within these features or their regulated limits will require authorization or a permit from TRCA or LSRCA. More details on hydrological features can be found in **Appendix A**.

3.4.5.2 Significant Woodlands

There are two types of woodlands:

- **Major Woodland Area:** these are continuous blocks of forest that cover several hundreds of hectares and consist of relatively mature mixed and deciduous forests integrated with conifer plantations.
- **Tableland Woodlot Area:** these are woodlot features that are generally greater than 4 ha in size and vary in composition from conifer plantation to mature mixed and deciduous stands of trees. It is recognized that they may include a lower level of diversity compared to Major Woodland Areas and woodland blocks within the ORM.

The study area contains approximately 6,414 hectares of woodlands as identified in the Town's Official Plan, ORM Conservation Plan and/or the MNDMNRF. More details on significant woodlands can be found in **Appendix A**.

3.4.5.3 Environmentally Significant Areas

Environmentally Significant Areas (ESA) are mapped within the Town's Official Plan (Schedule A). Each feature is located within the ORM and are considered key natural heritage features subject to the same levels of protection as defined in the ORMN Conservation Plan and Greenbelt Plan for like science ANSIs.

There are five ESAs within the study area. More details on ESAs can be found in **Appendix A**.

3.4.5.4 Significant Wetlands

The Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNRF) designates Provincially Significant Wetlands (PSWs). PSWs are designated based on a scientific point-based ranking system known as the Ontario Wetland Evaluation System. Wetlands are assessed based on a range of criteria, including biology, hydrology, societal value and special features.

The study area contains 11 PSWs and one locally significant wetland. Provincially significant wetlands are protected under the *Planning Act* and the *Provincial Policy Statement, 2020*. More details on significant wetlands can be found in **Appendix A**.

3.4.5.5 Areas of Natural and Scientific Interest

ANSIs are designated by the province according to standardized evaluation procedures. ANSIs are ranked by the MNRF as being either provincially or regionally significant.

The study area contains five different ANSIs. Development may be permitted within or adjacent (i.e., within 50 metres) to a provincially significant ANSI where an assessment demonstrates that development will not adversely affect the feature of its ecological function. More details on ANSIs can be found in **Appendix A**.

3.4.5.6 Species at Risk

For this desktop review, species identified as endangered or threatened Species at Risk (SAR) under the Endangered Species Act are considered SAR. Species listed as special concern under the *Act* and those listed as endangered, threatened, and special concern under the Species at Risk Act (SARA) are considered Species of Conservation Concern (SCC) unless the ESA ranking provides additional protections.

The review identified 22 SAR and 12 SCC to potentially occur within the study area. This included one amphibian, 18 birds, one fish, three insects, five mammals, two plants, and four reptiles. The study area may also contain species which are regionally or locally rare. More details on Species at Risk can be found in **Appendix A**.

3.5 Master Plan Key Principles and Policies

3.5.1 Source Water Protection Policies

The master planning process took into consideration the source water protection policies from the Credit Valley, Toronto and Region, Central Lake Ontario and South Georgian Bay – Lake Simcoe Source Water Protection Plans when selecting the preferred servicing strategies. The applicable source protection plan policies⁹, provided in **Table 3-5**, were considered during this study.

Table 3-5: Applicable Drinking Water Source Protection Policies related to Sanitary Sewers

Policy No.	Policy Statement
SWG-13	Where sanitary sewers and related pipes are in an area where the activity is, or would be, a significant drinking water threat, the Environmental Compliance Approval that governs the activity shall be reviewed or established to ensure appropriate terms and conditions so that the activity ceases to be, or does not become, a significant drinking water threat in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS = 10) (existing, future); or The remainder of an Issue Contributing Area for Nitrates or Pathogens (existing, future). Not limiting any other conditions to be included in the Environmental Compliance Approval, the Issuing Director should include the following conditions, where possible: • Requiring higher construction standard • Inspections by the owner for leaks
SWG-14	New development dependent on sanitary sewers and related pipes, in an area where the activity would be a significant drinking water threat, shall only be permitted where it has been demonstrated by the proponent through an approved Environmental Assessment or similar planning process that the location for the sanitary sewer and related pipes is the preferred alternative and the safety of the drinking water system has been assured in any of the following areas: • WHPA-A (future); or • WHPA-B (VS = 10) (future); or • WHPA-E (VS = 10) (future); or • The remainder of an Issue Contributing Area for Nitrates or Pathogens (future).
SWG-15	The storage of sewage shall be prohibited where the activity would be a significant drinking water threat in any of the following areas: • WHPA-A (future); • WHPA-E (VS ≥ 9) (future); or • WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (future)

⁹ CTC Source Protection Committee. 'Approved Source Protection Plan: CTC Source Protection Region', The CTC Source Protection Plan, Toronto and Region Source Protection Authority, [The CTC Source Protection Plan - CTC Source Protection Region \(ctcswp.ca\)](https://ctcswp.ca) (accessed May 5, 2022)

Policy No. Policy Statement

	Where facilities for the storage of sewage are in an area where the activity is, or would be, a significant drinking water threat, the Environmental Compliance Approval that governs the activity shall be reviewed or established to ensure appropriate terms and conditions are included so that the activity ceases to be, or does not become, a significant drinking water threat in any of the following areas: • WHPA-A (existing); or • WHPA-B (VS $\geq$ 8) (existing, future); or • WHPA-C (VS = 8) (existing, future); or • WHPA-E (VS $\geq$ 9) (existing); or • WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (existing); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (existing, future)
SWG-16	The use of land for the establishment of facilities for the storage of sewage shall be prohibited where the activity would be a significant drinking water threat in any of the following areas: • WHPA-A (future); or • WHPA-E (VS $\geq$ 9) (future); or • WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (future) The use of land for the establishment of facilities for the storage of sewage, in an area SWG-15 MON-1 where the activity would be a significant drinking water threat, shall only be permitted where it has been demonstrated by the proponent through an approved Environmental Assessment or similar planning process that the location for the storage of sewage is the preferred alternative and the safety of the drinking water system has been assured in any of the following areas: • WHPA-B (VS $\geq$ 8) (future); or • WHPA-C (VS = 8) (future); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (future)

3.5.2 Climate Change

Through the Class EA process, the Town considered climate change, both impacts from and impacts to the water and wastewater systems, in the selection of the preferred solutions. This section provides an overview of the potential impacts of climate change to the water and wastewater system and the potential implications of the water and wastewater systems on climate change. This information was considered in support of the development and evaluation of servicing strategies.

Climate conditions can have an impact on the water and wastewater systems. The following provides a list of weather events and their potential impacts on the water and wastewater system.

- High Temperatures: an increase in temperatures can lead to water quantity and quality issues.
- Drought: a decrease in rainfall can lead to water quality issues (higher concentration of wastewater entering the wastewater treatment plants).
- Freeze-Thaw Cycle: an increase in freeze-thaw cycles can lead to damaged buried infrastructure.
- Precipitation: increased precipitation can lead to capacity issues (increased inflow and infiltration entering the wastewater system) and more frequent overflows at wastewater treatment plants and sewage pumping stations. Increased precipitation can also lead to increased bank erosion affecting the stability of buried infrastructure.

- Storms and Wind: high winds and increase in the frequency of storms can lead to an increase in power outages, impacting the operation of water and wastewater facilities.
- Water Level: increased water levels can lead to flooding of infrastructure.

The following proposed strategy concepts aim to minimize a project's impact on climate change.

- The use of wastewater gravity sewers to reduce greenhouse gas emissions compared to the development of pumping stations.
- Connections to existing infrastructure to enhance capacity, thereby reducing the need to build new infrastructure to increase capacity in the system.
- Adding redundancy to the water and wastewater systems by connecting to existing infrastructure to allow aging infrastructure to be properly rehabilitated and maintained.
- Design of infrastructure to existing and future peak wet weather conditions to ensure future capacity and avoid potential overflows.
- Restoring natural/grassed areas back to original or enhanced natural conditions.
- Carrying out construction activities outside of key ecological periods to minimize damage to the natural environment and wildlife habitat (e.g., construction outside breeding bird season and high runoff periods in spring).
- Decreasing the project's carbon footprint by reducing shipment distances of construction resources and materials where possible.
- Using energy efficient technologies during construction where possible.

The proposed servicing solutions provide flexibility and redundancy for adapting to the potential climate change impacts described above.

3.6 Water and Wastewater Servicing Strategy Evaluation Process

The identification and evaluation of water and wastewater servicing alternatives is a fundamental component of the master planning process. The servicing strategies development process allows for a comprehensive review of various servicing solutions and is completed through a transparent process to demonstrate decision-making and to provide recommended strategies.

The 2024 Master Plan revisited concepts and strategies outlined in the 2018 Master Plan from a new perspective to take into consideration key changes that are critical for the Town's long-term infrastructure plan. The purpose of this process was to validate current water and wastewater servicing strategies, and to ensure that all alternatives were considered while highlighting why the recommended water and wastewater servicing solutions were selected.

The following provides a list of key changes from the previous 2018 Master Plan:

- New planning horizon to 2051 with updated planning projections,
- New approved growth areas including the MZO lands,
- Updated to the master plan evaluation criteria, and,
- Increased focus on climate change adaptation.

3.6.1 Development of Servicing Strategy Alternatives

The 2024 Master Plan is an update to the 2018 Master Plan. As such, the servicing strategies in the 2018 Master Plan were reviewed to validate their continued need to service growth as well as new/updated strategies were developed to meet growth to the new 2051 planning horizon. The water and wastewater servicing strategy alternatives were developed to address the problem/opportunity statement identified in Phase 1 of the Class EA process.

In keeping with the principles of environmental planning, the servicing strategy alternatives did consider the “Do Nothing” and “Limit Growth” alternatives, however these alternatives were not feasible as the “Limit Growth” option would contradict provincial direction for planned growth and the “Do Nothing” option would lead to capacity issues with the Town’s anticipated growth to 2051.

Servicing strategies to address the problem/opportunity statement were identified based on a high-level technical analysis that considered a baseline and planned infrastructure review, growth forecasts to 2051 and consideration for post 2051 as well as recommendations from the 2018 Master Plan. The development of the strategies consisted of:

- System wide review to address existing and future needs, and,
- Service area focused review to confirm specific existing and future needs in new growth and intensification areas.

Opportunities and constraints for the water and wastewater systems were identified at the outset of the study and were used as the foundation for the servicing strategy alternatives. The evaluation process progresses from high-level concepts to more detailed servicing strategies and, where applicable, to further evaluation of specific servicing solutions in certain service areas. The progression from high-level to more detailed servicing strategies allows for a more efficient process as it screens out non-feasible and unfavourable servicing concepts before they are carried forward for evaluation.

The strategy development approach described herein was designed to ensure a logical and transparent process that documents the evaluation and decision-making used to develop the long term implementation plan and capital program. Sustainability policies and principles were also considered in the development of the 2024 Master Plan and were integrated within the strategy development, such as:

- Ensure compliance with provincial, regional and local planning and land use policies.
- Provide system capacity to meet existing and projected growth needs to 2051 and beyond including new urban growth areas approved by the Province of Ontario .
- Making best use of existing infrastructure.
- Minimizing the cost of new infrastructure.
- Considering operation and maintenance costs to ensure financial sustainability.
- Ensuring the long-term reliability and security of the water and wastewater systems.
- Increasing system resiliency to climate change.
- Avoiding disruptions to natural and cultural heritage resources.
- Minimizing environmental crossings and other disruptions to the environment.
- Planning for future infrastructure within the existing and future road right-of-way, where possible.
- Avoiding / reducing production of greenhouse gas (GHG) emissions.
- Preventing impact to areas that could represent a significant drinking water threat.

3.6.2 Evaluation Criteria

The water and wastewater servicing strategies were evaluated using five broad-level criteria: environmental and socio/cultural impacts, technical feasibility, financial viability (costs) and legal/jurisdictional requirements (coordination and compliance). Each criterion is comprised of specific factors to identify the best overall strategy.

Environmental Impacts

- Minimize major environmental crossings and address any applicable mitigation actions.
- Minimize proximity to and impacts to environmentally sensitive features (e.g., wetlands, ESAs, ANSIs, woodlots, other designated natural areas and TRCA / LSRCA regulated areas, etc.).
- Minimize impacts to source water protection areas (e.g., WHPA, IPZ, etc.).
- Minimize impacts to climate change and consider climate change adaptation measures.

Socio / Cultural Impacts

- Minimize resident / business impacts.
- Minimize impact to indigenous rightsholders and interest holders.
- Avoid areas of archaeological potential.
- Minimize impacts to cultural heritage resources.
- Minimize potential noise, odour, dust, vibration and traffic disruptions to residents and businesses during construction and operation.
- Minimize traffic impacts.
- Minimize potential impacts on nearby agricultural lands.

Technical Feasibility

- Maximize use of existing infrastructure.
- Optimize operational flexibility and maintenance requirements.
- Considers ability to maintain existing services during implementation and construction.
- Coordinate with nearby/relevant planned projects.
- Maximize routes along existing and future road rights of way and/or easements.
- Preference for service via gravity (for wastewater servicing).
- Minimize construction in areas with limited access.
- Minimize crossings including watercourse, highway, and railway.

Financial Viability

- Supports a cost effective and financially sustainable solution.
- Consider impact of lifecycle cost and reduce where possible.
- Endeavour to integrate with State of Good Repair Program where feasible.
- Align with Town's long-term financial sustainability including DCs and Municipal Rates.

Legal / Jurisdictional Requirements

- Maximize the use of Town owned lands and road right of ways.
- Minimize land requirement issues and agency concerns that may arise related to project routes, siting, and land acquisition.
- Minimize land requirement issues and agency concerns that may arise related to planning permits and crossings.

3.7 Costing Methodology

The cost estimation methodology for capital projects at a master planning level are typically based on an overall unit cost approach. The unit cost rates used for this Master Plan are representative in 2023 dollars. A summary of the unit costs is provided in **Appendix B**.

A capital cost is provided for all projects proposed as part of this Master Plan. For the majority of the water system projects, a base construction cost was obtained using either a unit rate construction cost, based on pipe diameter, or unique project analysis. The base construction cost considers several factors specific to each project such as depth, creek crossings, railway and highway crossings, tunneling requirements, and location of construction (greenfield, urban, suburban). Design, administration, contingency, and non-recoverable HST costs were added to arrive at a final project cost. The final project costs are provided in the Water and Wastewater Capital Programs, **Section 4.7** and **Section 5.7**, respectively.

4.0 Water Master Plan

The *Water Master Plan* provides an overall review of the water policies and criteria, existing water distribution system, technical analysis, and development of the preferred water servicing strategy for the Town of Whitchurch-Stouffville. This section has been organized as follows:

- 4.1 Water System Policy and Criteria
- 4.2 Existing Water Infrastructure
- 4.2 Water Hydraulic Model
- 4.3 York Region Water Master Plan Linkage
- 4.4 Assessment of Existing and Future Water Infrastructure
- 4.5 Water Servicing Strategy
- 4.6 Water Capital Program
- 4.7 Water Implementation Plan

The following sections should be read in conjunction with the other sections within the 2024 Master Plan.

4.1 Water System Policy and Criteria

Water policies, design criteria, and level of service requirements were updated as part of this Master Plan to provide guidelines and direction to the master planning process, in addition to ensuring that water demands are adequately representative to support the decision making for sizing and timing of future infrastructure. Refer to **Appendix C** and **Appendix D** for the complete water servicing policies and design criteria review.

4.1.1 Water Servicing Principles and Policies

Specific servicing principles and policies have been developed to guide the development of water servicing strategies. In general, the Town of Whitchurch-Stouffville is looking to build and maintain efficient, reliable, sustainable, and well-managed water systems that provide high level of service to the public. In order to capture these goals, the servicing principles and policies have been structured as outlined in **Appendix C**.

4.1.2 Water Design Criteria

A guiding principle of design criteria is to ensure that the demand projections are adequately predicted with an appropriate factor of safety and risk management. This overall principle also ensures that infrastructure has sufficient capacity to meet the growing needs of the Town and does not impede the approved / planned growth.

The water demand criteria updated as part of the Town of Whitchurch-Stouffville Master Plan are summarized in

Table 4-1.

Table 4-1: Water Demand Criteria

Water Demands Projection Methodology		
• Use existing demands for baseline. • Existing demands based on water billing data / flow balance. • Growth demands applied to the baseline using design criteria.		
Water Demand Criteria for Growth		
Average Day Demand (ADD)	Design Criteria	
Stouffville	250 L/cap/d	
Ballantrae-Musselman's Lake	300 L/cap/d	
Max Day Peaking Factor		
Stouffville	2.0	
Ballantrae-Musselman's Lake	2.8	
Peak Hour Peaking Factor		
Stouffville	3.0 (1.5 x MDD Peaking Factor)	
Ballantrae-Musselman's Lake	4.2 (1.5 x MDD Peaking Factor)	
Existing Land Use	Minimum Fire Flow Target for New Growth Areas	Minimum Target for Existing Service Areas
Single / Semi Detached Family	117 L/s	75 L/s
Townhouse	125 L/s	90 L/s
Apartment	150 L/s	150 L/s
Institutional	175 L/s	175 L/s
Commercial	200 L/s	200 L/s
Industrial	250 L/s	250 L/s
Water System Criteria		

- Sizing water supply, transmission, and storage facilities for Maximum Day Demand (MDD)
- Sizing of the water distribution system to accommodate Peak Hour Demands (PHD) and Maximum Day Demands plus Fire Flow (MDD + FF)

The Water Design Criteria Tech Memo is provided in **Appendix D**.

4.1.3 Water Level of Service

Industry standards for Level of Service (LOS) objectives are always changing to meet the demands of growth and reflect more efficient water consumption. The distribution system should be sized for Peak Hour Demand (PHD) and Maximum Day Demand (MDD) + Fire Flow (FF) with considerations for water quality during low demand periods.

The following summarizes the performance indicators that were used to assess the Town's distribution network and ability to meet the LOS objectives:

- Pressure Criteria – Peak / Minimum Hour
 - Existing System Areas: 40 - 100 psi
 - New Growth Areas and Pressure Zone Change Areas: 50 – 90 psi
 - Fire Flow Conditions: 20 psi
- Watermains - Velocities (excluding fire flow simulations)
 - Existing < 2 m/s
 - New < 1m/s
- Fire Flow
 - Existing System Areas: Fire flow targets based on land use as per the 2018 MP targets.
 - New Growth Areas: Fire flow targets based on land use as per Design Guidelines.
 - Single fire flow demand by land use (fire flow can be provided by multiple nearby hydrants).

The Water Level of Service Tech Memo is provided in **Appendix D**.

4.1.4 Water Demand Projections

The population and employment projections outlined in **Section 3.4.1** and the design criteria within **Section 4.1.2** were utilized to calculate the average day demand (ADD) and the maximum day demand (MDD). The total projected average day demand (ADD) and maximum day demand (MDD) are shown in **Table 4-2**.

Table 4-2: Water Demand Projections

Pressure Zone	ADD (L/s)		MDD (L/S)		PHD (L/s)	
	2021	2051	2021	2051	2021	2051
Stouffville (Zone 1-3 & Hwy 48)	97	276	175	534	253	791
Ballantrae-Musselman's Lake	13	16	37	44	54	64

4.2 Existing Water Infrastructure

The Regional Municipality of York uses the York Water System (YWS) to supply water to its nine (9) municipalities, which includes the Town of Whitchurch-Stouffville. The YWS is a lake-based system receiving its water from Lake Simcoe (exclusively for the Town of Georgina) and from Lake Ontario through the City of Toronto and Region of Peel. The YWS is supplemented from groundwater wells located within the Yonge Street Aquifer and the Stouffville well system.

The Regional Municipality of York is a two-tiered system. The Region operates and maintains water facilities and major transmission mains, while the municipalities operate and maintain the distribution system. The Town of Whitchurch-Stouffville is responsible for the operation and maintenance of watermains, valves, hydrants, service connections, and water meters for the following two water distribution systems:

- Stouffville Water Distribution System (Community of Stouffville and Highway 48)
- Ballantrae-Musselman's Lake Water Distribution System.

Currently, Gormley, Bloomington and Vandorf-Preston Lake communities do not have municipal potable water service, however Gormley does have a fire protection system which includes a non-potable water supply. **Figure 4-1** presents an overview of the Town's existing water infrastructure.

4.2.1 Community of Stouffville Water Distribution System

The Community of Stouffville water distribution system is comprised of approximately 198 kilometres of various sized watermains, 613 watermain valves, and 1,441 hydrants. The Community of Stouffville water distribution system is divided into three (3) primary water pressure zones:

- Zone 1 (upper) – located in the northeast region of Stouffville.
- Zone 2 (middle) – located in the central region of Stouffville.
- Zone 3 (lower) – located in the southwest region of Stouffville.

In addition to the three primary pressure zones, there is a small, boosted zone that distributes potable water to households and businesses located along Highway 48, at Bloomington Road. **Figure 4-2** presents an overview of the Community of Stouffville's existing water infrastructure.

The distribution system facilities are operated and maintained by the Region and are summarized in **Table 4-3**. In addition to the facilities, the Region operates and maintains four (4) large transmission watermains along Tenth Line, Main Street, Ninth Line, and Stouffville Road.

Table 4-3: Existing Facilities within the Community of Stouffville Water System

Name	General Location	Zones Supplied
Stouffville Wells (#1, #2)	Main Street west of York/Durham Line	Zone 2
Stouffville Well (#3)	Tenth Line south of Walter Atkinson Avenue	Zone 1
Stouffville Wells (#5, #6)	Between Highway 48 and Ninth Line	Zone 2, Hwy 48
Stouffville Zone 1 Booster Station	Tenth Line south of Walter Atkinson Avenue	Zone 1
Stouffville High Lift Pumping Station	Between Highway 48 and Ninth Line	Zone 2
Stouffville Zone 2 Pumping Station and Re-chlorination Facility	McCowan Road south of Stouffville Road	Zone 2
Stouffville Hwy 48 Booster Station	Between Highway 48 and Ninth Line	Hwy 48
Stouffville Zone 1 Elevated Tank	Bethesda Road east of Tenth Line	Zone 1
Stouffville Zone 2 Elevated Tank	Tenth Line south of Walter Atkinson Avenue	Zone 2
Stouffville Reservoir East / West Cells	Between Highway 48 and Ninth Line	Zone 2, Hwy 48

4.2.2 Ballantrae-Musselman's Lake Water Distribution System

The Ballantrae-Musselman's Lake community is located in the northeastern part of the Town of Whitchurch-Stouffville and is comprised of approximately 47 kilometres of various sized watermains, 330 watermain valves, and 344 hydrants. The Ballantrae-Musselman's Lake water distribution system is a single water pressure zone. **Figure 4-3** presents the Ballantrae-Musselman's Lake existing water infrastructure.

The facilities that support the distribution system, operated, and maintained by the Region, are summarized in **Table 4-4**.

Table 4-4: Existing Facilities within the Ballantrae- Musselman's Lake Water System

Name	General Location	Zones Supplied
Ballantrae Wells (#1, #2)	Aurora Road and McCowan Road	Ballantrae – Musselman's Lake
Ballantrae Wells (#3, #4)	West of Highway 48 and north of Greenan Road	Ballantrae – Musselman's Lake
Musselman's Lake Elevated Tank	Ninth Line south of Hillsdale Drive	Ballantrae – Musselman's Lake

4.2.3 Gormley

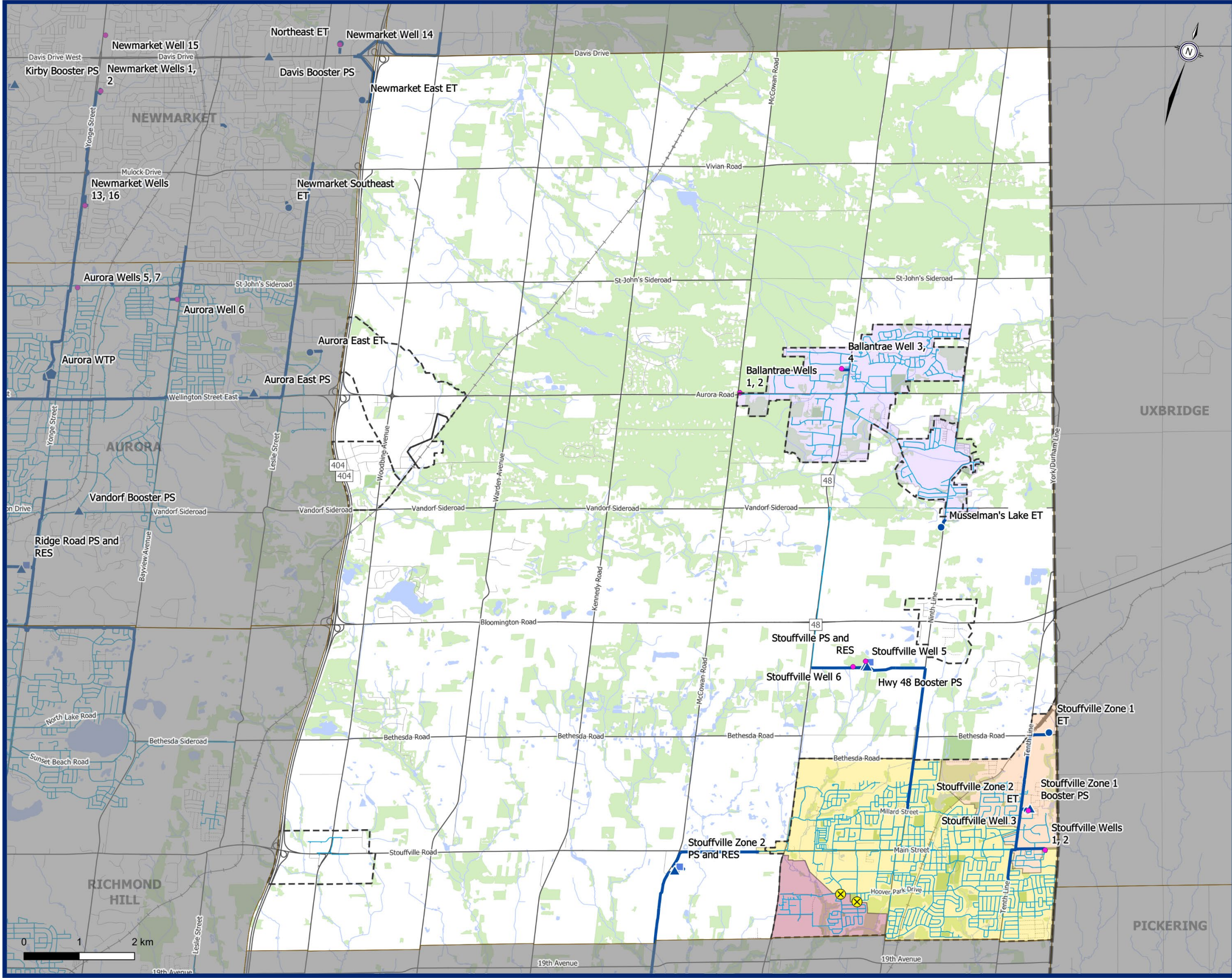
Gormley is located in the southwestern quadrant of the Town of Whitchurch-Stouffville. Currently, the Gormley community does not have municipal potable water service but does have a fire protection system which includes a non-potable water supply that is pumped into a network of watermains. The two reservoirs from which the water is pumped have a capacity of 750 m³ each.

4.2.4 Bloomington

Bloomington is located in the eastern part of the Town of Whitchurch-Stouffville, north of the Community of Stouffville. Currently, the Bloomington community does not have municipal potable water service.

4.2.5 Vandorf-Preston Lake

Vandorf-Preston Lake is located in the western part of the Town of Whitchurch-Stouffville, east of the Community of Stouffville. Currently, the Vandorf-Preston Lake community does not have municipal potable water service.



Water Facilities

- Water Treatment Plant (WTP)
- Pumping Station (PS)
- Reservoir (RES)
- Elevated Tank (ET)
- Well
- Pressure Reducing Valve
- Regional Watermain
- Municipal Watermain

Pressure District

- B1
- S1
- S2
- S3

Other Features

- Railway
- Wooded Areas and Parks
- Waterbodies
- Settlement Area Boundary
- Municipal Boundary
- Regional Municipal Boundary

Figure 4-1

**Town of Whitchurch-Stouffville
Water Infrastructure Overview**

Water Facilities

- Water Treatment Plant (WTP)
- Pumping Station (PS)
- Reservoir (RES)
- Elevated Tank (ET)
- Well
- Pressure Reducing Valve
- Regional Watermain
- Municipal Watermain

Pressure District

- S1
- S2
- S3

Other Features

- Railway
- Wooded Areas and Parks
- Waterbodies
- Settlement Area Boundary
- Municipal Boundary
- Regional Municipal Boundary

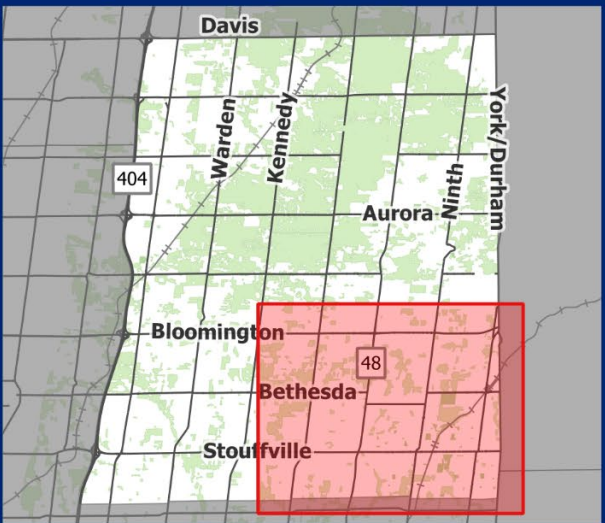
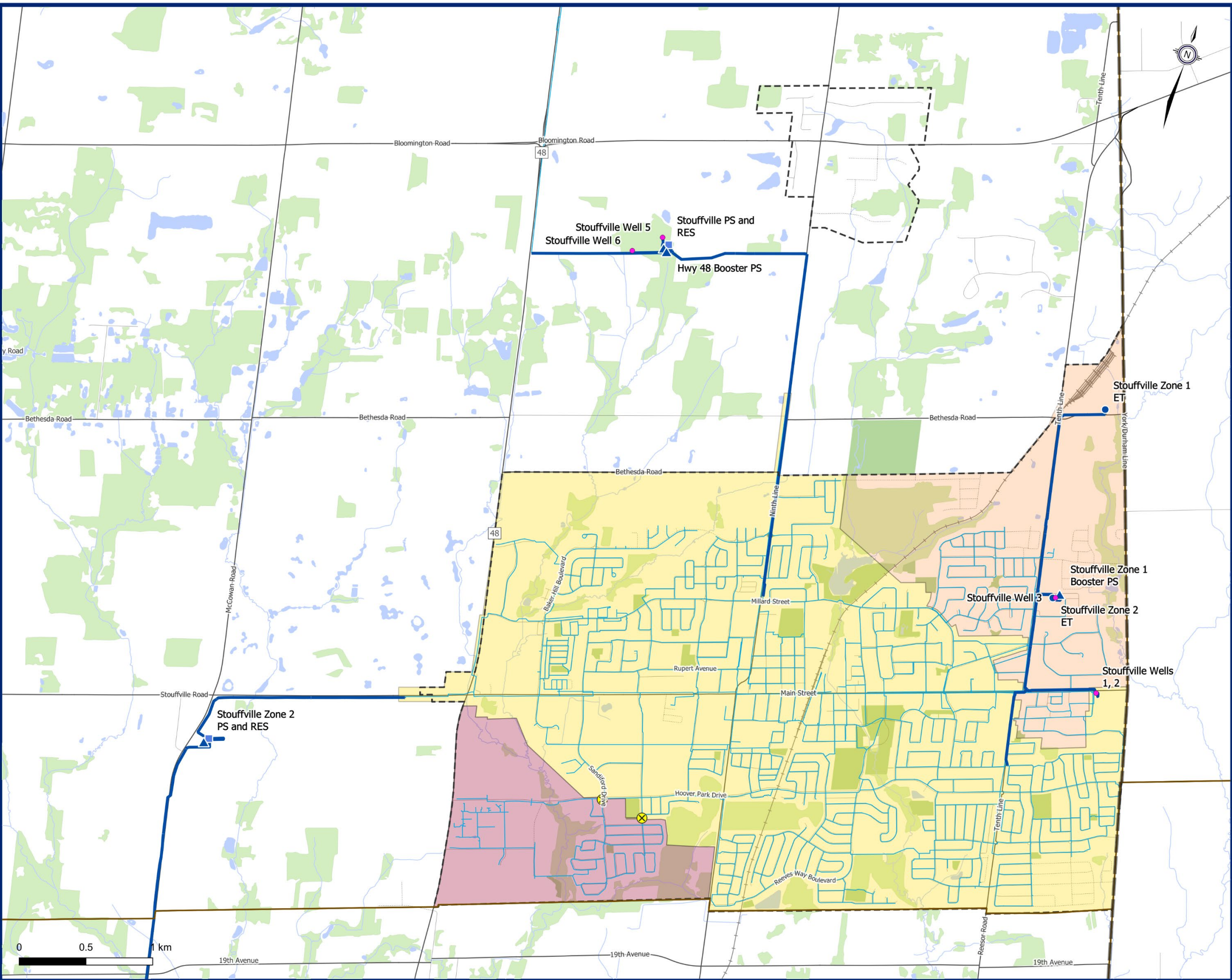


Figure 4-2

**Town of Whitchurch-Stouffville –
Stouffville Water Infrastructure**

Water Facilities

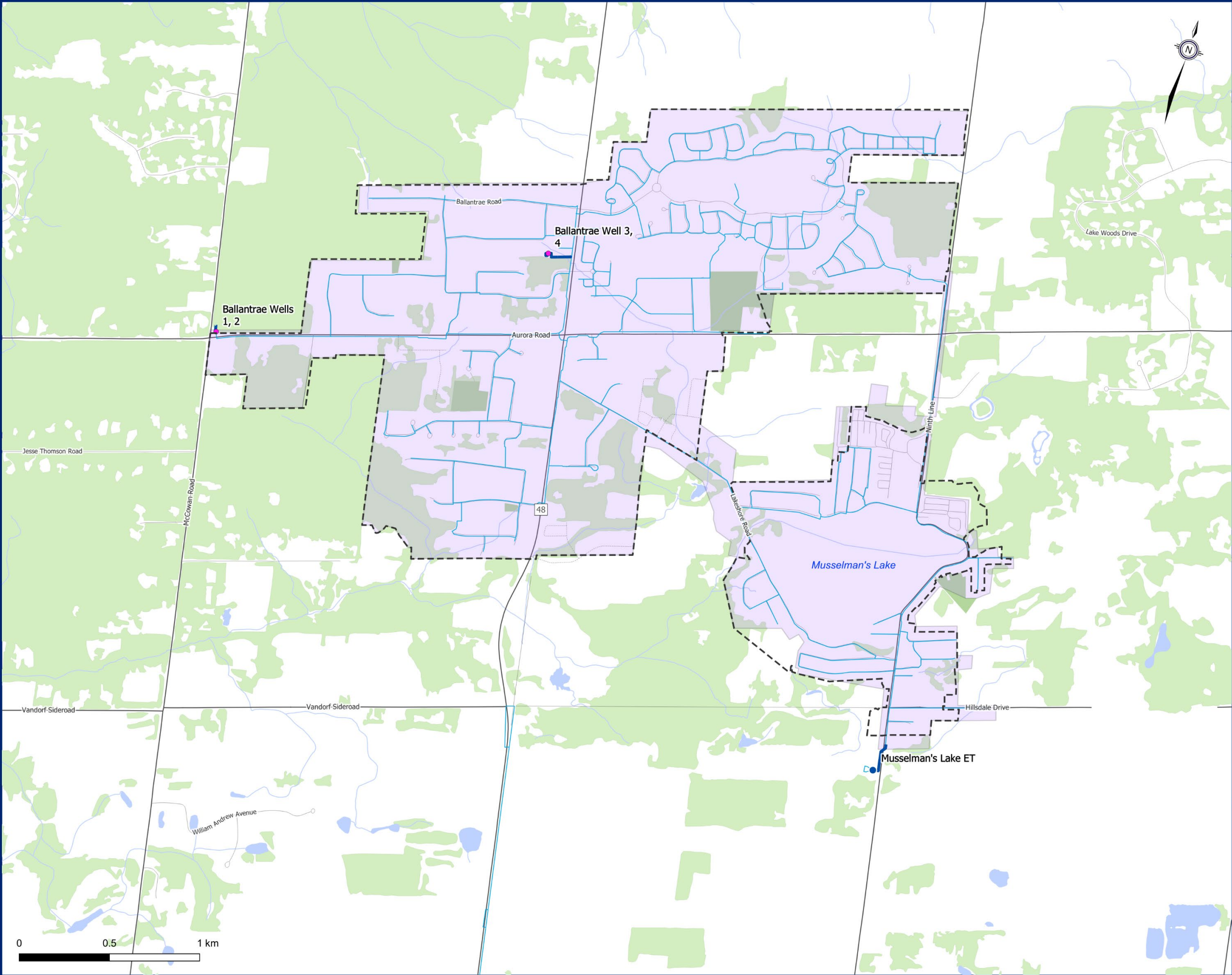
-  Water Treatment Plant (WTP)
-  Pumping Station (PS)
-  Reservoir (RES)
-  Elevated Tank (ET)
-  Well
-  Pressure Reducing Valve
-  Regional Watermain
-  Municipal Watermain

Pressure District

-  B1

Other Features

-  Railway
-  Wooded Areas and Parks
-  Waterbodies
-  Settlement Area Boundary
-  Municipal Boundary
-  Regional Municipal Boundary



0 0.5 1 km

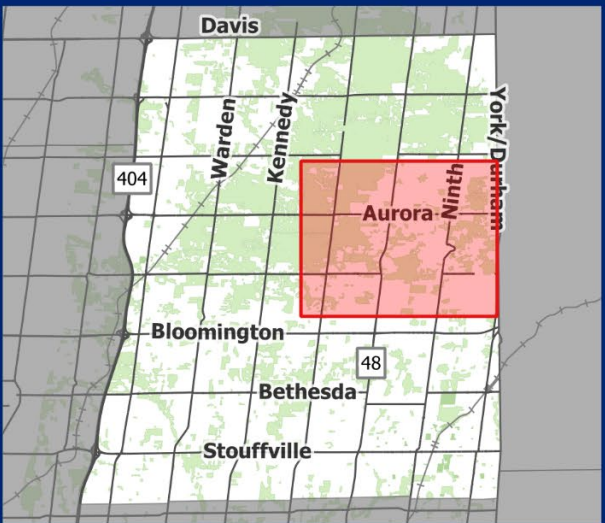
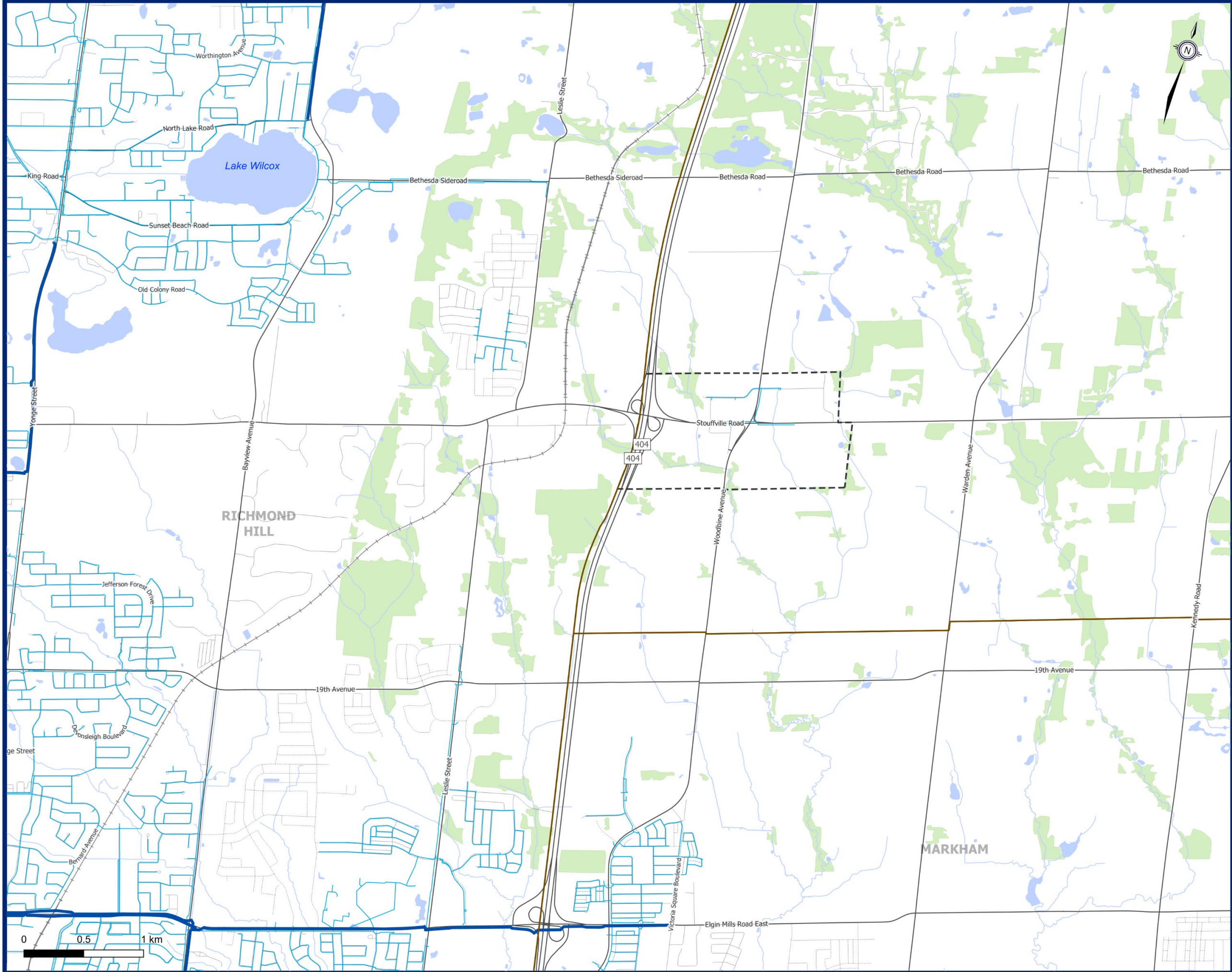


Figure 4-3
**Town of Whitchurch-Stouffville -
Ballantrae-Musselman's Lake Water
Infrastructure**



Water Facilities

-  Water Treatment Plant (WTP)
-  Pumping Station (PS)
-  Reservoir (RES)
-  Elevated Tank (ET)
-  Well
-  Pressure Reducing Valve
-  Regional Watermain
-  Municipal Watermain

Other Features

-  Railway
-  Wooded Areas and Parks
-  Waterbodies
-  Settlement Area Boundary
-  Municipal Boundary
-  Regional Municipal Boundary

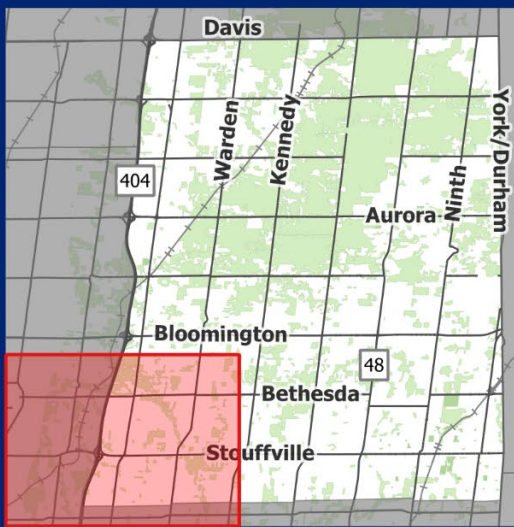


Figure 4-4

**Town of Whitchurch-Stouffville –
Gormley Water Infrastructure**

4.3 Water Hydraulic Model

Analysis of the Stouffville and Ballantrae-Musselman's Lake water distribution systems was undertaken using the Town's latest water hydraulic model in WaterCAD. The existing conditions water hydraulic model was updated and calibrated in advance of the Master Plan, using field testing data from the Fall of 2021. The model was calibrated based on the available SCADA information from the Regional Municipality of York and a substantial field-testing program that included 62 hydrant flow (spread across Stouffville Zones 1/2/3, Ballantrae and Gormley), continuous pressure monitoring at 23 locations during the hydrant flow tests. The model calibration included both a macro-calibration of the systems using the available SCADA over a multi-day period and a micro-calibration comparison of each of the hydrant flow tests.

The model calibration was able to achieve 98% of static pressures from the hydrant flow tests being within 5 psi and 84% of residual pressures from the hydrant flow tests being within 5psi. Overall, the results of the model calibration indicated a strong correlation between field and simulated results, so the model is considered suitably accurate for the purposes of Master Planning.

Population and employment projections were incorporated with the baseline existing model to create future growth scenarios. The growth projections were loaded as a separate demand so that it is simple to identify the growth portion of the system demands.

4.4 York Region Water Master Plan Linkage

Through the Regional Water and Wastewater Master Plan, the Region recommended a number of water strategies within the Town. **Table 4-5** provides the water strategies recommended for the Town.

Table 4-5: Regional Water Strategy Recommendations for the Town

Name	Project Description	Implementation Timeline
W1	Toronto Water Supply – Cost-Shared Works Continue implementation of cost-shared capital projects within the City of Toronto to permit gradual increase of water supply to York Region in accordance with current Servicing Agreement.	Ongoing
W12	Stouffville Water Servicing Expand Stouffville storage capacity to service new development. Project is expected to be implemented in phases to maximize utilization of existing infrastructure. Phase 1 – increase capacity of Stouffville Zone 2 WBPS before new storage facility is introduced. Phase 2 – Construct a new elevated take and connecting watermain to provide long-term storage capacity need in the service area.	2032 – 2051

Name	Project Description	Implementation Timeline
W11	North Markham Water Servicing Construct new facilities and associated watermain in Pressure District 7 and connect to the existing system. This project supports Markham urban expansion north of Elgin Mills Road and allows implementation of the York East Water Servicing project (W13). <i>(Note: W11 is identified as there are Whitebelt portions of future growth in the Town of Whitchurch-Stouffville, that are ultimately intended to be serviced by the Region's future Pressure District 7 system (rather than via the Stouffville or Ballantrae Pressure Districts). This project is required prior to extending servicing within Stouffville.</i>	2032 – 2041

Figure 4-5 provides an overview of the Region's preferred water strategy recommended in the York Region 2022 Water and Wastewater Master Plan¹⁰.

¹⁰ Region of York. 2022 Water and Wastewater Master Plan. <https://www.york.ca/environment/water-and-wastewater/water-and-wastewater-master-plan>.

Figure 6.1 Long-term Water Infrastructure Plan

W1	Toronto Water Supply - Cost-Shared Works
W2	Peel Water Supply - Cost-Shared Works
W3	East Woodbridge Pumping Station Decommissioning
W4	West Vaughan Water Servicing
W5	York Peel Feedermain Upgrade
W6	Northeast Vaughan Water Servicing
W7	Vaughan Storage Expansion
W8	Nobleton Water Servicing
W9	North Richmond Hill Pumping Station Decommissioning
W10	Richmond Hill Langstaff Gateway Provincial Urban Growth Centre Water Servicing
W11	North Markham Water Servicing
W12	Stouffville Water Servicing
W13	York East Water Servicing
W14	Bloomington - Bayview Watermain
W15	Aurora East Booster Pumping Station Upgrades
W16	Orchard Heights Reservoir Inlet Upgrade
W17	Eagle to Kirby Pumping Station Watermain
W18	Newmarket West Water Servicing
W19	Yonge Street Watermain
W20	Green Lane Leslie Street Watermain
W21	East Gwillimbury Water Servicing
W22	Queensville Elevated Tank No. 2
W23	Holland Landing Storage Expansion
W24	West Park Heights Pumping Station and Watermain
W25	Georgina Water System Upgrades

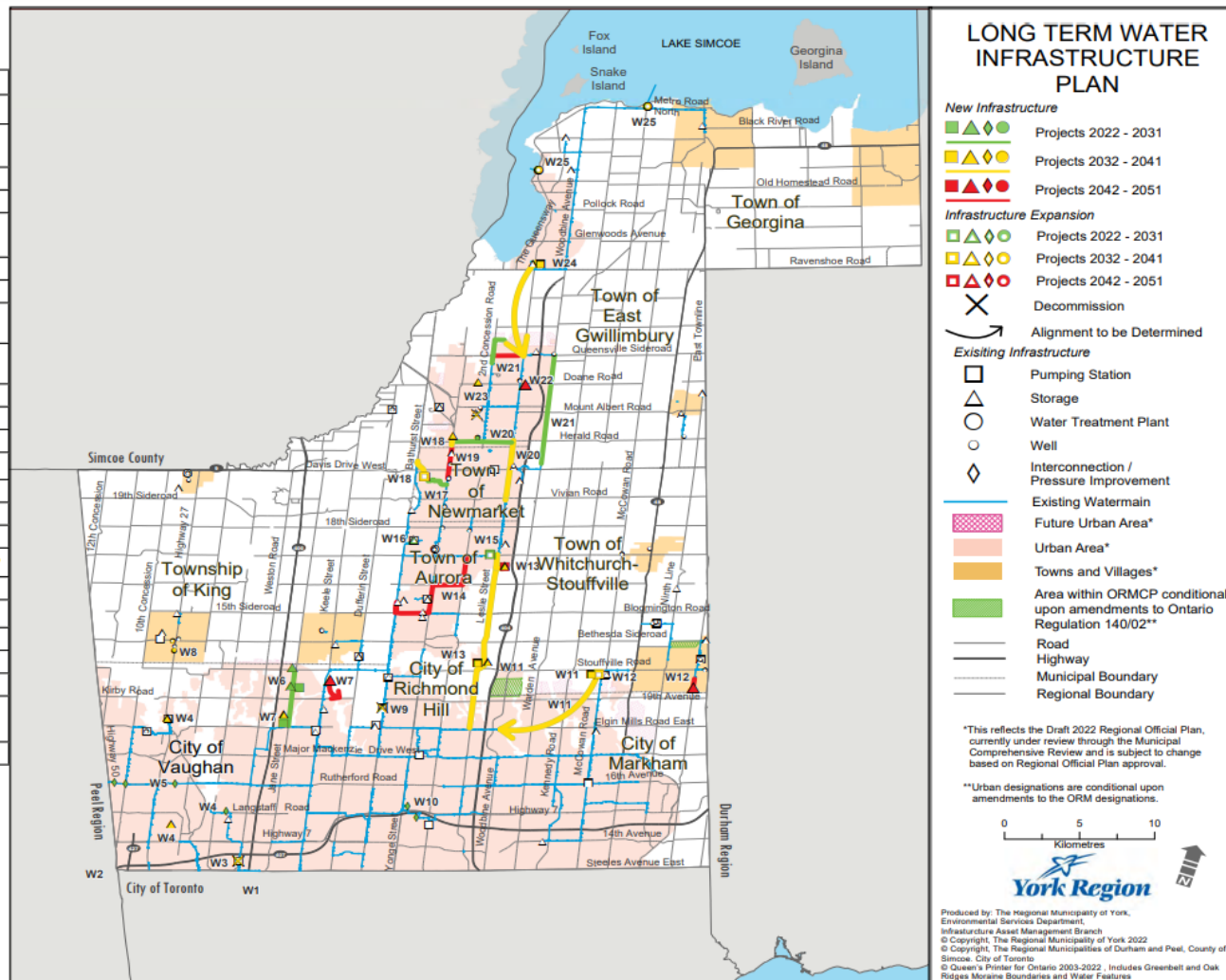


Figure 4-5: Regional Preferred Water Strategy

4.5 Assessment of Existing and Future Water Infrastructure

Following the established approach in the 2018 Water and Wastewater Master Plan, a critical initial step in the Master Planning process was the assessment of the existing infrastructure to determine the updated water system baseline conditions. These updated baseline conditions became the basis of the future recommendations of the Master Plan and therefore it was important to ensure that they were determined through a comprehensive detailed analysis of the system. Once the existing system conditions were established, the potential impact(s) of the future growth demands on the water distribution system were analyzed to develop and recommend future servicing strategies.

The following sections describe current opportunities and constraints in the existing water system and assess the system's ability to accommodate growth within the 2051 planning horizon.

4.5.1 Assumptions

The objective of the Town's Water Master Plan is to assess the performance of the distribution system and its ability to convey potable water from the Regional infrastructure to the consumers. It is assumed that the Regional infrastructure can provide sufficient supply and storage. Although the Regional infrastructure is not part of the Town's Master Plan, the servicing strategy will be developed with system flexibility in mind should any Regional infrastructure fail to meet the needs of the distribution system under extraordinary conditions. The Region's Master Plan projects (**Table 4-5**) were considered and incorporated as future projects in the model to support the need for more supply and storage in Stouffville.

Since the focus of the Town's Water Master Plan is to assess the performance of the distribution system, the Town of Whitchurch-Stouffville's design criteria were utilized for loading of demands in the model. However, understanding that these criteria are slightly more conservative (higher per capita consumption and peaking factors) than the Region of York's criteria, there are differences in the total volume of supply needed depending on the criteria used. York Region is currently undertaking a study for Reconciliation of Water & Wastewater Design Standards between York Region and Local Municipalities, which will offer another opportunity to further review Stouffville's water and wastewater design criteria and the impacts that it may have on the timing/needs of the Region's pumping and storage upgrades.

It was assumed that under a fire scenario, the Stouffville Zone 2 Pumping Station from Markham and Ballantrae wells are turned on, which is required to provide fire flow protection in the Stouffville and Ballantrae-Musselman's Lake systems respectively. This assumption was confirmed by the Town.

The following sections document the development of the servicing strategy.

4.5.2 Opportunities and Constraints

The assessment of opportunities and constraints primarily focused on the urban wastewater service areas within the Community of Stouffville and Ballantrae-Musselman's Lake. However, the Master Plan also explored future municipal serving opportunities to the rural settlement areas of Gormley and Vondorf-Preston Lake.

Existing and future water opportunities and constraints were identified through discussions with Town staff, as well as through hydraulic analyses and review of infrastructure data (e.g., GIS, design reports, as-built information, etc.). The recently re-calibrated WaterCAD hydraulic model for the Community of Stouffville and Ballantrae-Musselman's Lake was used to analyze the performance of the existing and future system under different demand conditions such as ADD, MDD, PHD, and MDD+FF.

4.5.2.1 Stouffville

In combination with the Region of York's planned upgrades to pumping and storage, the water distribution system for the Community of Stouffville has sufficient capacity to provide adequate pressures under ADD and PHD conditions. The main limitations relate to the system's ability to provide adequate fire flow protection to key areas, such as the downtown core.

Figure 4-6 highlights some of the key opportunities and constraints within the Community of Stouffville's water distribution system.

The key issues and constraints identified by the Town and/or through the modelling exercise include:

- Low chlorine residuals at dead ends, primarily in Zone 1.
- Inability to provide adequate fire flow protection, primarily along Main Street in the downtown core. This is an existing issue that is made worse by growth. There is significant intensification proposed in the downtown area where there are aging and small cast iron watermains.
- Opportunity/constraint to locate new infrastructure along Highway 48. Requires coordination and buy in from Ministry of Transportation (MTO).
- Low pressures arise in the northeast corner of Zone 2, east of Ninth Line and north of Main Street, as a result of growth, high elevations in the area and its lack of proximity to floating storage.
- There is an overall conveyance issue from the Zone 2 elevated tank to west side of the system, when pumping facilities are off. In that case, there are significant headlosses along Tenth Line and Main Street, since all flow is backfeeding from the Zone 2 tank, during PHD or a fire in Zone 2.

The following lists key opportunities identified by the Town and/or through the modelling exercise:

- The Town has an ongoing State of Good Repair (SOGR) program that focuses on replacing aging watermains. These aging watermains lead to frequent watermain breaks and higher leakage due to structural defects. As intensification occurs along Main Street, and new development is underway, there is opportunity to align any upsizing or replacing of aging watermains to provide the additional capacity that is required to accommodate growth. The focus should be on small diameter cast iron and ductile iron watermains.
- The Town has recently installed a new 300 mm diameter watermain along Main Street from Tenth Line to Park Drive. Continuing along Main Street to Ninth Line would improve the conveyance from the Zone 2 elevated tank to the west side of the Zone 2 pressure zone.

- There is a surplus of Regional water storage in Zone 1, and a deficit in Zone 2. Installing new PRVs between Zone 1 and Zone 2 would provide additional ability to transfer water from Zone 1 to Zone 2 under emergency conditions, increasing the pressures under PHD and fire conditions.
- New infrastructure will be required as new development occurs, especially in the southwest, northwest, and northeast corners of the serviced area. There are opportunities to provide additional system looping to help with dead ends and provide greater system flexibility.
- When the Region of York undertakes their Class EA to identify an additional storage site for Stouffville Zone 2, the Town should work closely with the Region to help identify a suitable site that aligns reasonably with the Town's distribution system network.

4.5.2.2 Ballantrae-Musselman's Lake

In general, the water distribution system for the Ballantrae-Musselman's Lake community has sufficient capacity to provide adequate pressures under ADD and PHD conditions. The primary issues relate to the system's ability to provide adequate fire flow protection.

Figure 4-7 highlights some of the key opportunities and constraints within the Ballantrae-Musselman's Lake water distribution system.

The key issues and constraints identified by the Town and / or through the modelling exercise include:

- There is limited transmission system capacity between Musselman's Lake elevated tank to the remainder of the system. Therefore, there is significant headloss during a fire scenario when the wells are not in operation.
- There are various dead ends servicing key customers, such as the local school and community centre, making it difficult to provide adequate fire flow protection.

The following lists key opportunities identified by the Town and/or through the modelling exercise include:

- Additional capacity between the elevated tank to the centre of the network would increase the overall fire flow protection throughout the systems. Opportunities should be considered to align watermain upsizings in parallel with state-of-good-repair upgrades along the routes between the elevated tank and the Ballantrae areas.
- Looping of dead ends would improve available fire flow and should be considered, where viable.

4.5.2.3 Highway 48 Water Booster Pumping Station

Potable water servicing was extended from the Community of Stouffville to Highway 48. The boosted system services a few homes, small businesses, and the golf course; however, it does not provide any fire flow protection.

The key issues and constraints identified by the Town and/or through the modelling exercise include:

- The Highway 48 WBPS is nearing the end of its servicing life. There are many operational issues with this station and ongoing maintenance.
- The system is a single watermain with a dead end.
- There have been many customer complaints over the past few years of interrupted service as there are many watermain breaks downstream of the pumping station.
- Based on the topography, the servicing along Highway 48 ranges from 40 psi to 100 psi.

The following lists key opportunities identified by the Town and/or through the modelling exercise include:

- There is opportunity to improve the performance of the Highway 48 system by connecting the north end to the Ballantrae-Musselman's Lake system.
- There is opportunity to align watermain works with state-of-good repair program.

4.5.2.4 Gormley, Bloomington, Vandorf-Preston Lake

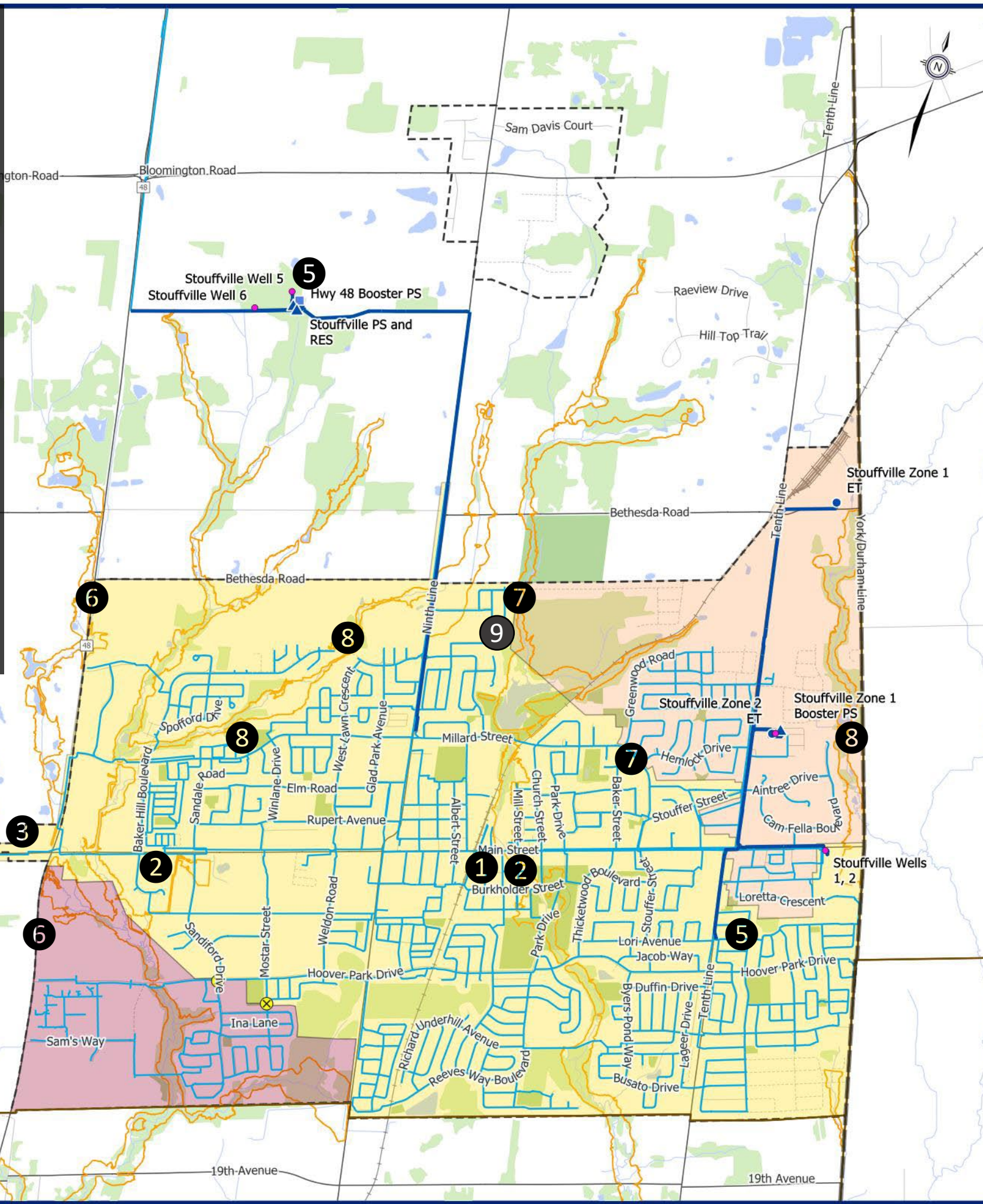
Currently the communities of Gormley and Vandorf-Preston Lake do not have municipal water services. Through the master planning process and consultation with the public, interest was identified for potential extension of municipal water services to these communities.

The following key issues and constraints were identified:

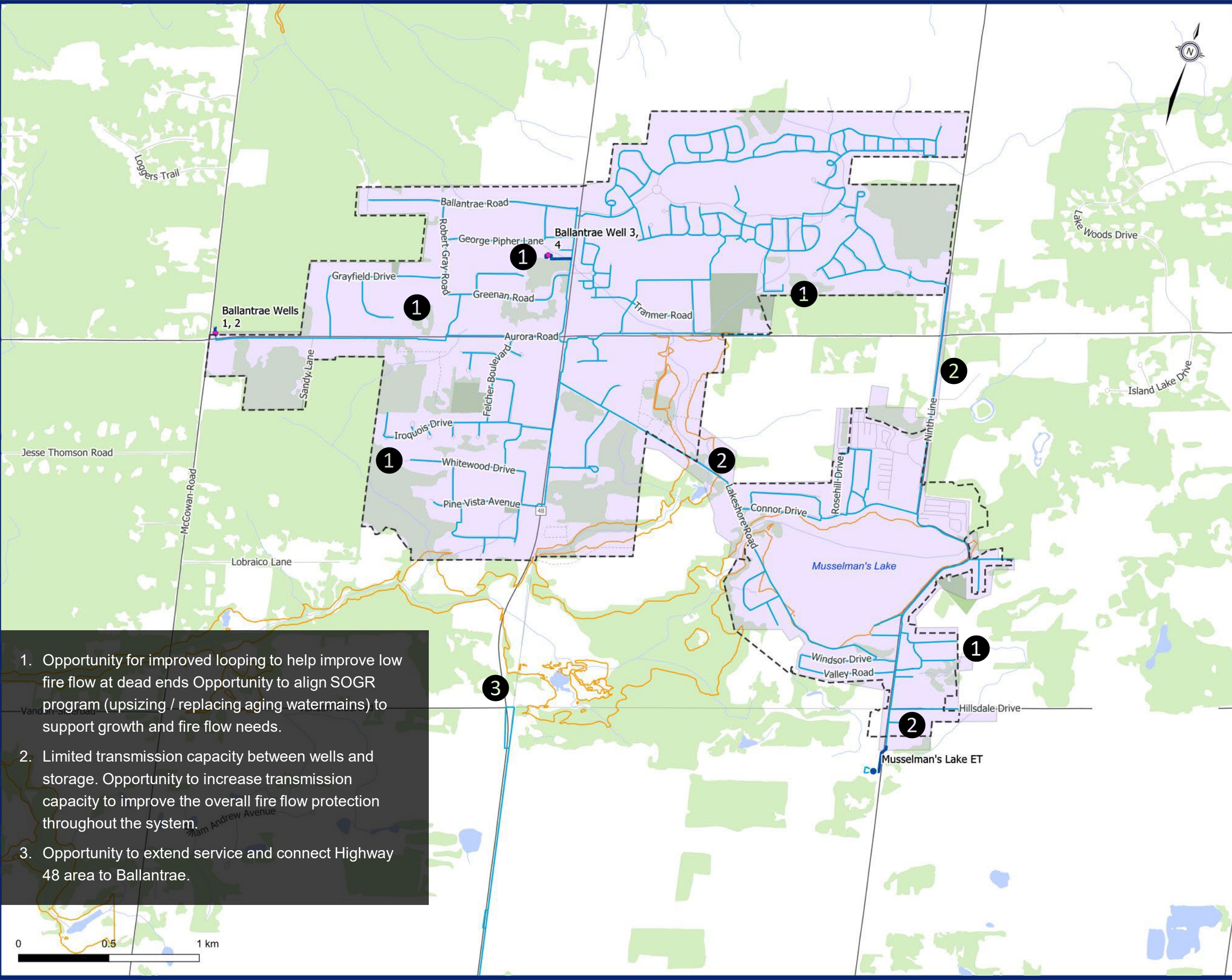
- Currently there is no existing municipal water infrastructure within these communities.
- The communities are located within the Oak Ridges Moraine and Greenbelt Plan Protected Countryside.
- The Oak Ridges Moraine Conservation Plan restrict "partial servicing" of water or wastewater services.
- The Greenbelt Plan restricts the extension of lake-based water and wastewater services.
- Opportunity to explore extension of water servicing to these communities via Stouffville or neighbouring municipalities (e.g., Markham, Richmond Hills, Aurora).

Note: Future Class EA studies will explore the strategy and feasibility in further detail of how to provide municipal water services to these communities.

1. Fire flow deficiencies in downtown core, due to aging infrastructure and increased density.
2. Opportunity to align SOGR program (upsizing / replacing aging watermain) to support growth and fire flow needs.
3. Watermain capacity constraint driven by growth.
4. Regional supply limitation. Opportunity to align Town's plans with increases in supply from Zone 2 BPS and/or to supply new growth areas by Region's PD7.
5. Regional storage limitation in Zone 2. Opportunity to align Town's plans with Region's second Zone 2 Storage.
6. Opportunity to utilize Highway 48 for system resiliency and looping, but with MTO Coordination & Agreement needed.
7. Opportunity to improve Zone 2 resiliency and utilize surplus Z1 storage with Zone 1 to Zone 2 PRVs.
8. Opportunity for improved looping to help improve low fire flow and system resiliency across growth areas.
9. Low pressure areas with growth.



- Water Facilities**
- Elevated Tank (ET)
 - Well
 - Regional Watermain
 - Municipal Watermain
- Pressure District**
- B1
- Other Features**
- ▭ Regulated Floodplain
 - Wooded Areas and Parks
 - Waterbodies
 - - - Settlement Area Boundary



- 1. Opportunity for improved looping to help improve low fire flow at dead ends Opportunity to align SOGR program (upsizing / replacing aging watermain) to support growth and fire flow needs.
- 2. Limited transmission capacity between wells and storage. Opportunity to increase transmission capacity to improve the overall fire flow protection throughout the system.
- 3. Opportunity to extend service and connect Highway 48 area to Ballantrae.

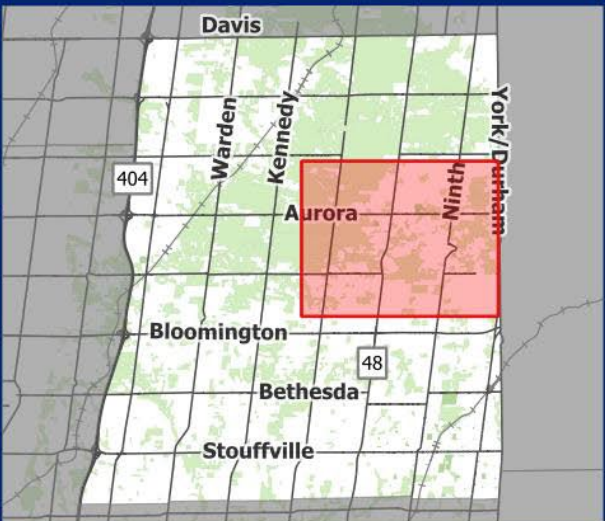


Figure 4-7
Opportunities and Constraints
Ballantrae - Musselman's Lake

4.6 Water Servicing Strategy

The identification and assessment of servicing alternatives is a critical component of the master planning process. It enables a comprehensive review of various servicing solutions and should be documented to ensure the process has been carried out in a transparent and defensible manner.

4.6.1 Servicing Strategy Development

The 2024 Master Plan is an update to the 2018 Master Plan. As such, the servicing strategies in the 2018 Master Plan were reviewed to validate their continued need to service growth as well as new/updated strategies were developed to meet growth to the new 2051 planning horizon. The master plan servicing strategies were developed to address the problem/opportunity statement identified in Phase 1 of the Class EA process as described in more detail in **Section 3.6.1**.

Water alternative servicing strategies were identified and reviewed in detail for existing and future growth areas within the Community of Stouffville and Ballantrae-Musselman's Lake, and at a high-level for Gormley, Vandorf-Preston-Lake and Whitebelt Lands. Collectively, all these area specific servicing solutions will form the overall water servicing strategy for the Town of Whitchurch-Stouffville. The following section summarizes the water alternative servicing strategies development for key growth areas within the Community of Stouffville and Ballantrae-Musselman's Lake, as well as the high-level servicing review for Gormley, Vandorf-Preston-Lake and Whitebelt Lands.

4.6.1.1 Stouffville North-East / Zone 1 and Zone 2 Boundary

This area encompasses designated Greenfield Area that are part of the Phase 3 developable areas in the North-east corner of Stouffville. This area is generally projected to be mainly residential with some allocation for employment growth. Currently there is no water service in this area and new infrastructure will be required to provide service for future growth.

This Master Plan Update explored opportunities to bring municipal water services to this area, while also improving resiliency in Zone 2 in the future with Z1 to Z2 connectivity via a PRV. The following alternatives were considered:

- **Alternative 1** – Connect Zone 1 and Zone 2 via future developments.
- **Alternative 2** – Connect Zone 1 and Zone 2 via Bethesda Road.
- **Alternative 3** – Connect Zone 1 and Zone 2 via a new PRV at Greenwood Road and Millard Street

Figure 4-8 presents a water servicing strategy for the Stouffville North-East / Zone 1 and Zone 2 Boundary Area. **Table 4-6** lists the pros and cons for each alternative.

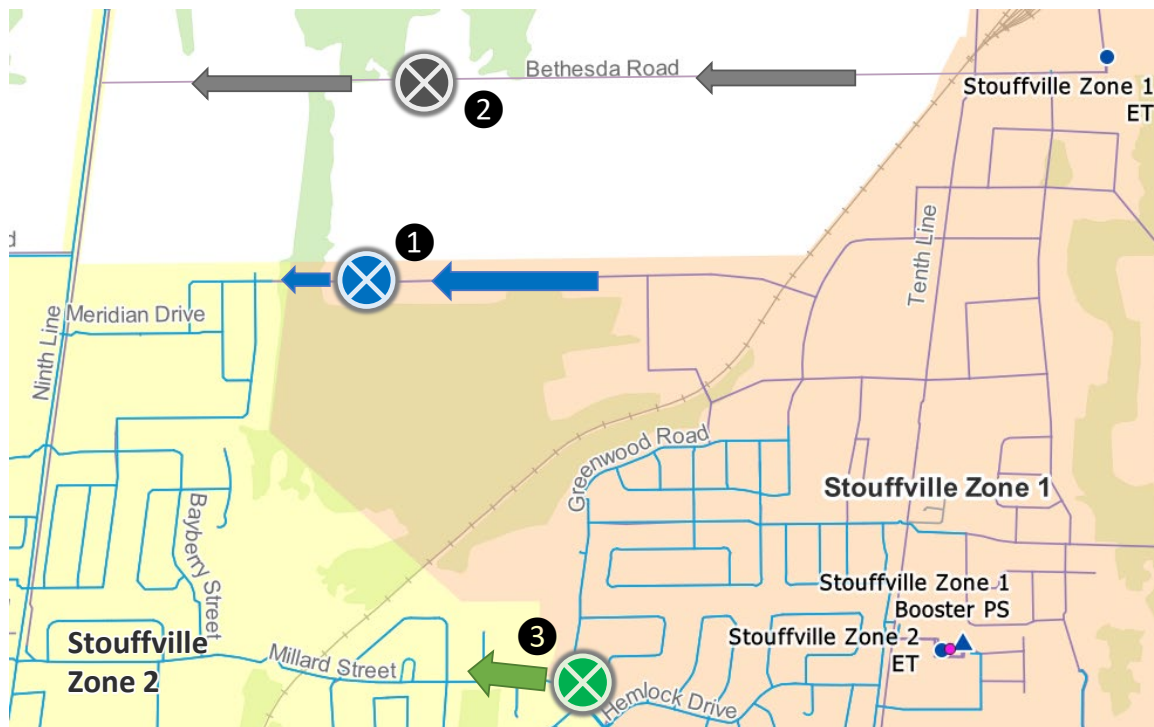


Figure 4-8: Stouffville North-East Water Servicing Strategy

Table 4-6: Stouffville North-East Water Servicing Strategy

Alternative #	Pros	Cons
1	- Effective for Zone 2 to Zone 1 transfer - Makes use of planned development watermain along the route	Requiring crossing of environmental feature (dependent on road/bridge for ROW)
2	Effective for Zone 2 to Zone 1 transfer	- Requiring railway crossing - Only suitable if Bethesda Road lands are serviced - Longer length of watermain construction
3	- Not requiring railway crossing - No new watermain needed	Less effective for Zone 2 to Zone 1 transfer, due to smaller watermain sizes and indirect route to high elevation area

Alternative 1 provides a feasible solution that brings municipal water service to planned developments and improves system resiliency in Zone 2 with shorter length of watermain construction. Therefore, Alternative 1 was carried forward as the preferred alternative. Alternative 2 would only be viable if servicing was intended to reach up to Bethesda Road along this stretch of the system. Alternative 3 is less effective at improving the Zone 1 to Zone 2 transfer.

4.6.1.2 Stouffville East / Cam Fella Boulevard and York-Durham Line

This area encompasses the designated Built-Up Area between Tenth Line and York-Durham Line around Cam Fella Boulevard. This area is at present mainly comprised of residential uses and is projected for future residential redevelopment with some allocation for employment growth. Currently, there is municipal water service for this area and new infrastructure will be required to provide service for future growth in the north. However, this southern portion of Zone 1 is solely relying on the 300 mm Ductile Iron watermain (built in 1992) on Tenth Line between Walter Atkinson Avenue and Aintree Drive, so improved looping to mitigate risk is recommended.

This Master Plan Update explored opportunities to improve resiliency in this area in the future. The following alternatives were considered:

- **Alternative 1** – Connect proposed developments to the existing watermain on Cam Fella Boulevard via an easement and upsizing along Cam Fella Boulevard.
- **Alternative 2** – Create a larger Zone 1 loop via York-Durham Line and Main Street.

Figure 4-9 presents a water servicing strategy for the Stouffville East / Cam Fella Boulevard and York-Durham Line Area. **Table 4-7** lists the pros and cons for each alternative.

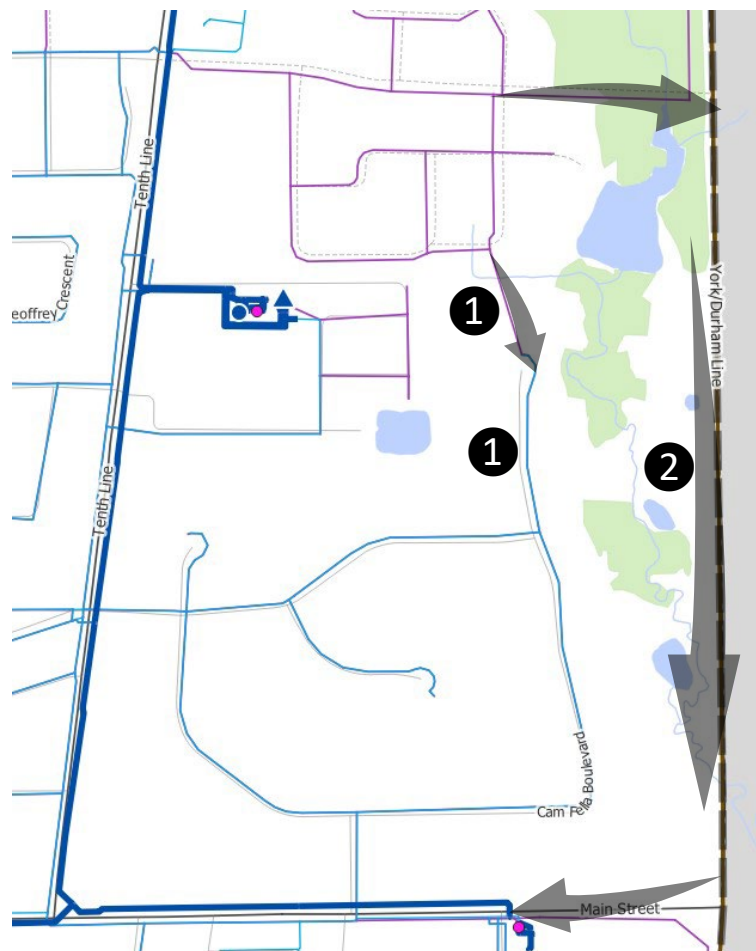


Figure 4-9: Stouffville East Water Servicing Strategy

Table 4-7: Stouffville East Water Servicing Strategy

Alternative #	Pros	Cons
1	- Significantly shorter (350 m) length of watermain construction and upgrade - Takes advantage of existing watermains	Requiring an easement and more disruption to nearby residents
2	Not requiring an easement and can largely be built along existing ROW	- Significantly longer (> 1200 m) length of watermain construction on York-Durham Line - Disruption on regional road - Less development to service along route

Both alternatives can provide the resiliency needed. However, Alternative 1 improves system resiliency in Zone 1, while avoiding significantly longer watermain construction on York-Durham Line. Therefore, Alternative 1 was carried forward.

4.6.1.3 Stouffville North-West / Bethesda Road and Highway 48

This area encompasses designated Greenfield Area in the North-west Community of Stouffville. It is mainly comprised of vacant lands and employment uses near Highway 48, and it is projected for future residential development with some allocation for employment growth near Highway 48. Currently, there is limited municipal water service for individual properties near Highway 48 and new infrastructure will be required to provide service for future growth.

This Master Plan Update explored opportunities to bring municipal water services to all properties in this area and improve resiliency by completing the looping in the future. The following alternatives to service the area were considered:

- **Alternative 1** – Complete the loop via Highway 48 or easement off Highway 48.
- **Alternative 2** – Provide looping / service by converting the private watermain to municipal.

Figure 4-10 presents a water servicing strategy for the Stouffville Central-East / Cam Fella Boulevard and York-Durham Line Area. **Table 4-8** lists the pros and cons for each alternative.

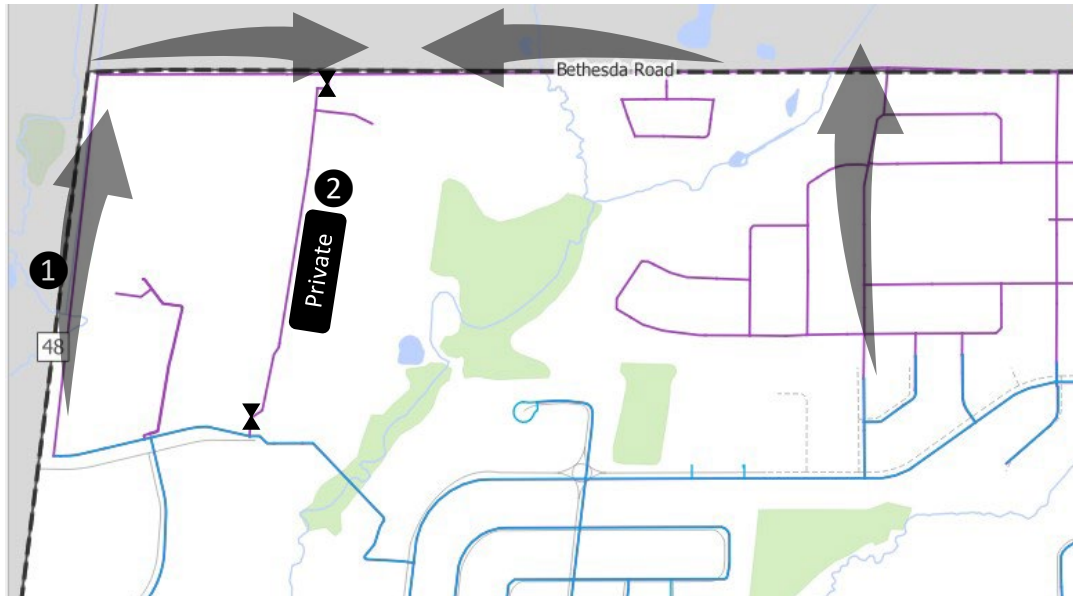


Figure 4-10: Stouffville North-West Water Servicing Strategy

Table 4-8: Stouffville North-West Water Servicing Strategy

Alternative #	Pros	Cons
1	- Provides full looping and servicing to all future customers along Highway 48 and Bethesda Road - Does not need to involve changes or taking ownership of the private watermain	Easement could be needed to avoid work directly on Hwy 48, which requires coordination and agreement with MTO
2	Avoids Highway 48	- Requiring private watermain transfer to municipal (removal of check valves; and change to metering) - Will still need a dead-end watermain to service properties at top of Highway 48

Overall, Alternative 1 is considered to provide a more complete looping solution for the area and avoids transferring private watermain into municipal watermain. Therefore, Alternative 1 was carried forward.

4.6.1.4 Stouffville South-West / MZO Lands (west of Highway 48)

This area encompasses designated Greenfield Areas in southwest Stouffville. This area is generally projected to be mainly residential with some allocation for employment growth. Currently there is no water service in this area and new infrastructure will be required to provide service for future growth.

This Master Plan Update explored opportunities to bring municipal water services to this area in the future. The following alternatives to service the area were considered:

- **Alternative 1** – Mainly supply via Region of York's Zone 7 (chloraminated system) with the use of an interim BPS, prior to the ultimate completion of the Region's Zone 7 Pumping Station, transmission main and storage solutions as per Master Plan Project W11. A small portion of the development ("Phase 1") near Highway 48 would continue to be serviced via Stouffville Zone 3 (chlorinated) with two connections for looping. No connections between the two systems are planned.
- **Alternative 2** – Supply the entire area via Stouffville Zone 3 system, which gets supply from the existing Stouffville Zone 2 system.

Figure 4-11 presents a water servicing strategy for the Stouffville South-West (MZO Lands). **Table 4-9** lists the pros and cons for each alternative.

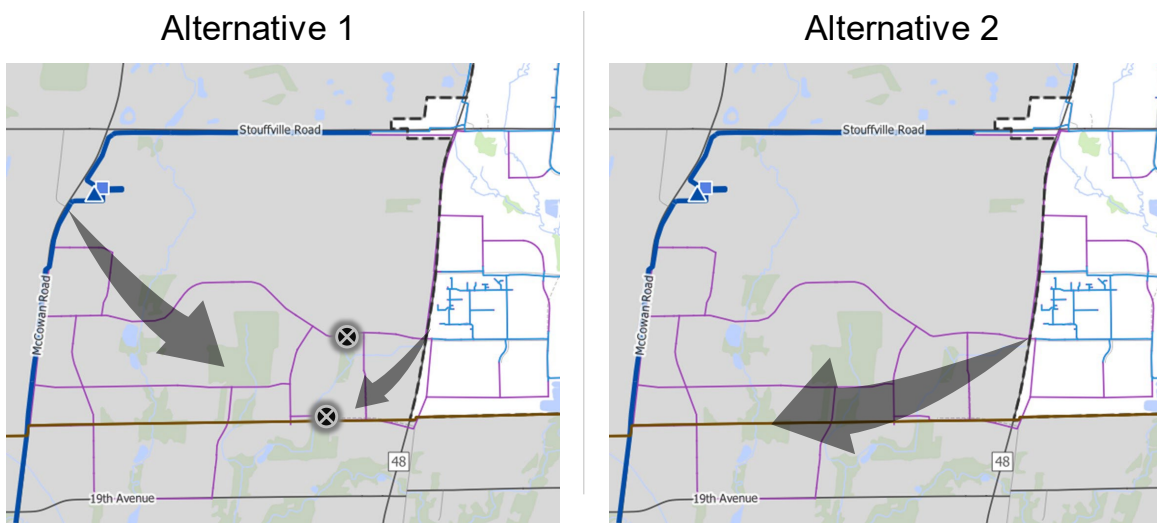


Figure 4-11: Stouffville South-West (MZO Lands) Water Servicing Strategy

Table 4-9: Stouffville South-West (MZO Lands) Water Servicing Strategy

Alternative #	Pros	Cons
1	- Largely, in line with the York Region Master Plan, which intended to service these lands via Pressure Zone 7 in future. - Greater availability of water supply from the North Markham Reservoir (and a Zone 7 pump station) than via Stouffville Zone 2	- Differences in timing between development interest and the availability of the Regional solution will require an interim solution (pump station, etc.). - Town of W-S will need to operate part of their system as “chloraminated” which brings different needs for operations staff.
2	Entire Stouffville service area could remain chlorinated	- Would require significant upgrades to Stouffville Zone 2 Pump Station & Rechlorination Facility. Increases in flow will also necessitate twinning the Stouffville Road transmission main to ensure contact time; further increases in size to Zone 2 Storage and upsizing other Zone 2 / Zone 3 internal network. - Higher energy cost and greater Greenhouse Gas Emissions (wasted energy) by pumping water to higher HGL and then reducing it down to a lower HGL.

Alternative 1 provides a feasible solution that avoids the significant upgrades needs across the Stouffville water system and instead focuses on the use of the Region’s Pressure Zone 7 system. The Stouffville Zone 2 / 3 system was never intended/designed to handle this large growth area west of Highway 48 and as such, the magnitude of upgrades needed to service it from this route are significant. Therefore, Alternative 1 was carried forward.

It is also noted that a separate MESP (Master Environmental Servicing Plan) is being undertaken specifically in relation to these lands.

4.6.2 High-Level Water Servicing Review

The following section summarizes the high-level servicing review for Gormley, Vandorf-Preston-Lake and Whitebelt Lands. Please note that future Class EA studies will explore the strategy and feasibility in further detail of how to provide municipal water services to these communities.

4.6.2.1 Gormley

Currently this area is not serviced by municipal water system; only fire flow protection is provided. This Master Plan Update explores opportunities to bring servicing to these areas in the future. The following water servicing strategies were identified for Gormley:

1. Opportunity to be serviced by an extension of the Markham Zone 7 system via a local WBPS.
2. Opportunity to be serviced from Richmond Hill Zone 9.
3. Opportunity to be serviced from Stouffville Zone 2.
4. Potential to provide municipal wells, treatment and treated water storage to provide a full stand-alone drinking water system (rather than just a fire protection system).

Figure 4-12 presents a high-level graphic overview of the water servicing strategy for Gormley.

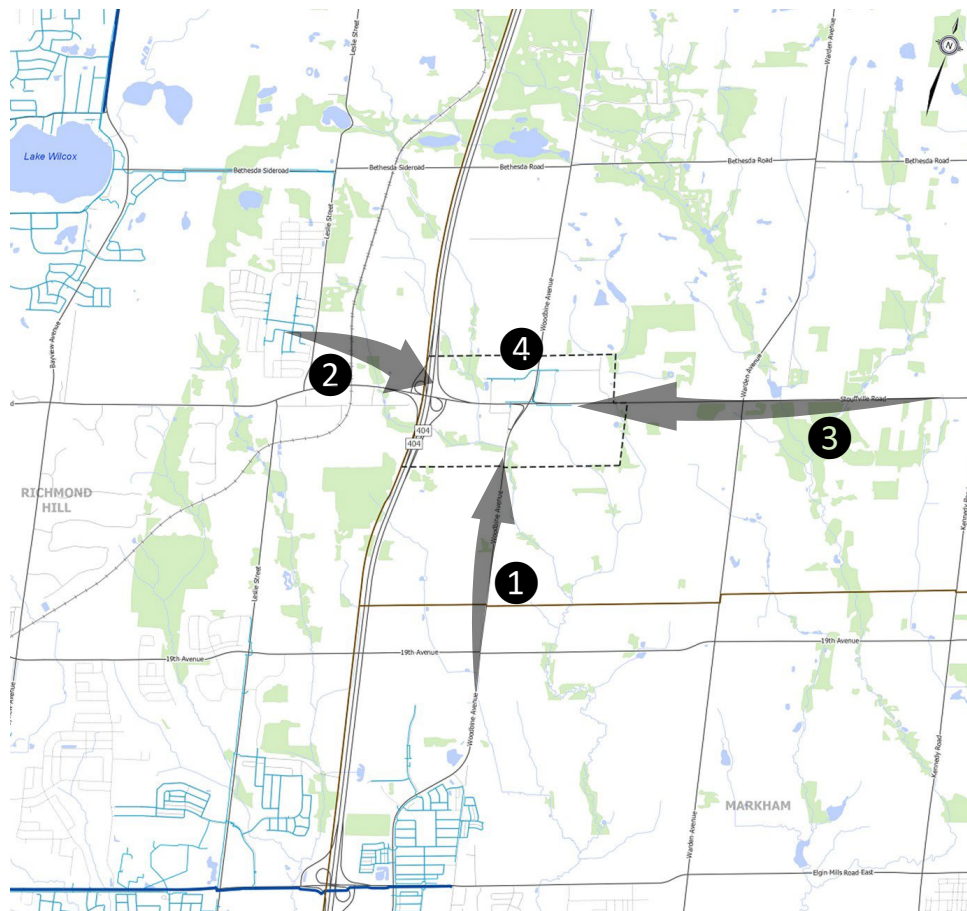


Figure 4-12: Gormley Water Servicing Strategy

4.6.2.2 Vandorf

Currently this area is not serviced by municipal water system. This Master Plan Update explores opportunities to bring servicing to these areas in the future. The following water servicing strategies were identified for Vandorf:

1. Opportunity to be serviced from Aurora East via local WBPS.
2. Opportunity to be serviced from Gormley.
3. Opportunity to be serviced from Ballantrae.
4. Potential to provide municipal wells, treatment and treated water storage to provide a full stand-alone drinking water system.

Figure 4-13 presents a high-level graphic overview of the water servicing strategy options for Vandorf.

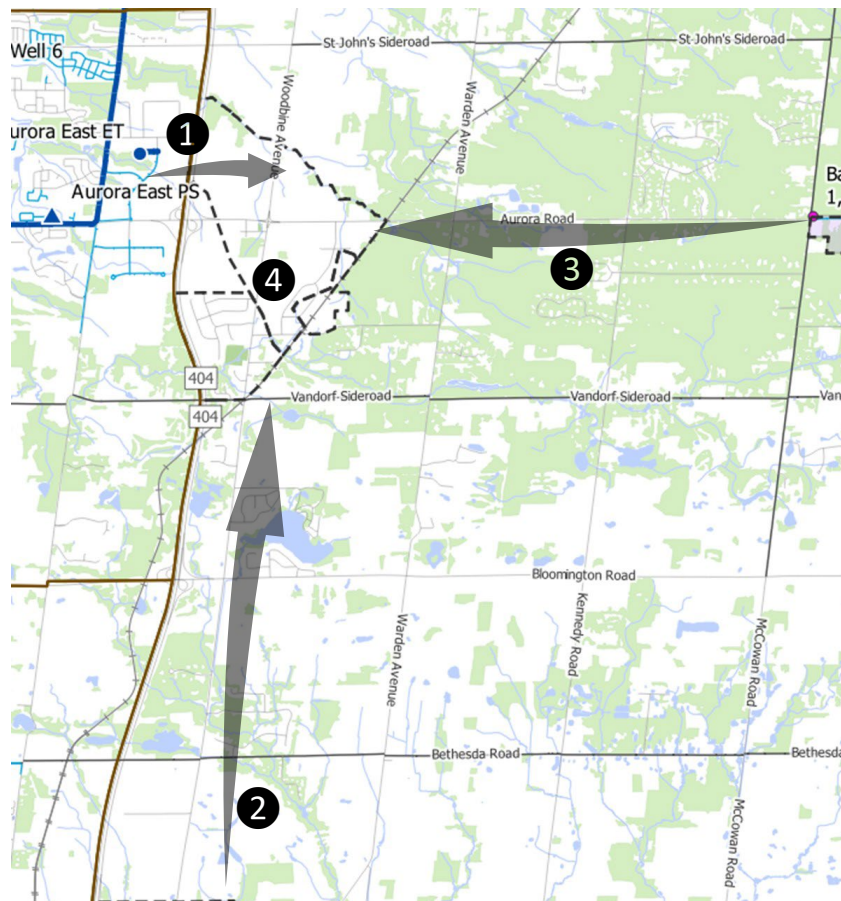


Figure 4-13: Vandorf Water Servicing Strategy Options

4.6.2.3 Whitebelt Lands

Currently this area is not provided with municipal water services. This Master Plan Update explores opportunities to bring servicing to these areas in the future. The following water servicing strategies were identified for Whitebelt Lands:

- **Areas 1 to 6:** Extension of servicing via the Region of York's future PD7 (either directly off of a future Regional Nineteenth Avenue. transmission main) or via local Markham PD7 watermain.
- **Area 7:** Located adjacent to MZO lands. Potential extension of servicing via the Region of York's future PD7 (either directly off of a future Regional Nineteenth Avenue. transmission main or from a future McCowan PD7 transmission main).
- **Area 8 & 9:** Both are part of the MZO lands described as part of **Section 4.6.1.4**.

Figure 4-14 presents a high-level graphic overview of the water servicing strategy for the Whitebelt Lands. As previously documented in **Section 4.6.1.4**, it is planned to service the Whitebelt Lands via Markham PD7 as recommended in the Regional Master Plan.

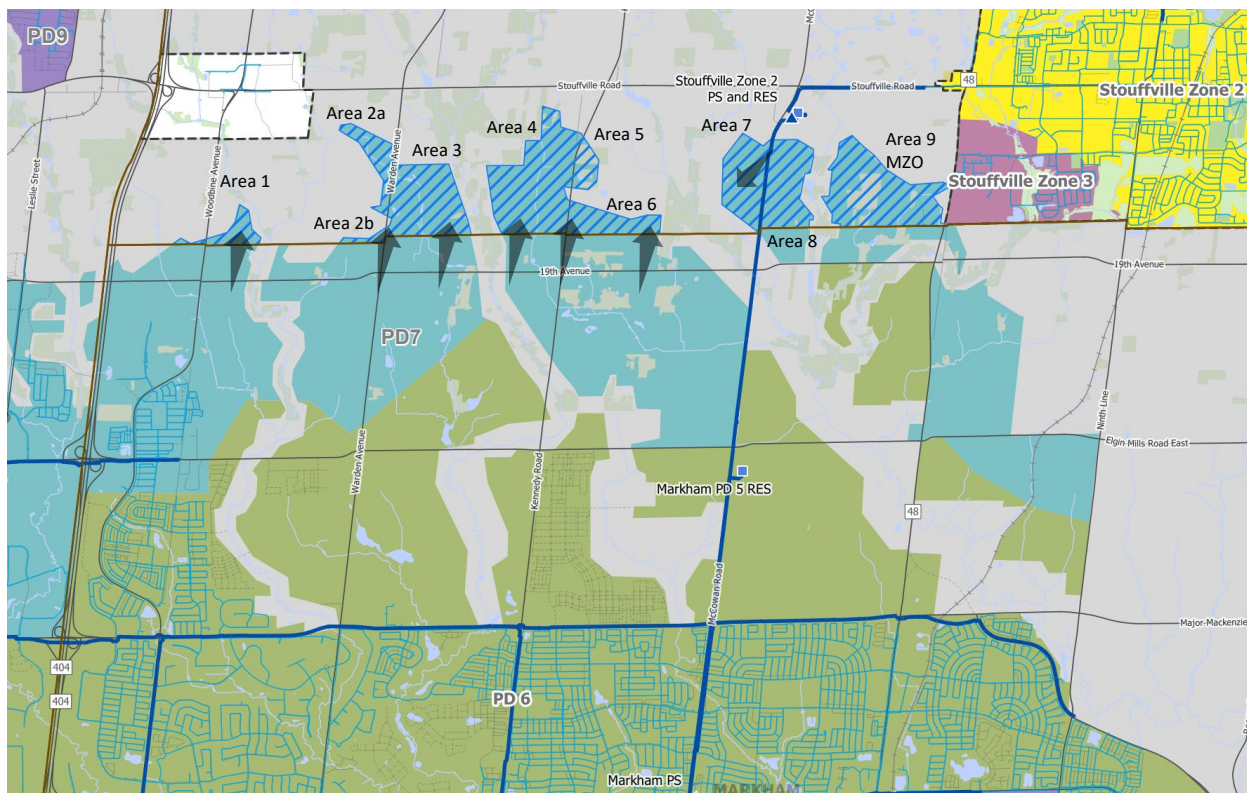


Figure 4-14: Whitebelt Lands Water Servicing Strategy

4.6.3 Preferred Water Servicing Strategy

Several separate water servicing strategies are recommended that collectively form the overall preferred water strategy to service the projected growth to 2051. The preferred servicing strategy was developed to ensure that the extension of the existing water distribution system is aligned with existing planning policies, designates residential and employment growth areas, can support intensification, and that the Master Plan follows an integrated approach with the Town's SOGR program.

The primary objective of the water servicing strategy is to build off the configuration of the existing system within the Town of Whitchurch-Stouffville. Since only the Community of Stouffville and Ballantrae-Musselman's Lake has municipal water services, the water strategy focuses on these key areas.

4.6.3.1 Community of Stouffville

The preferred servicing strategy was developed to ensure that extension of the water distribution system follows the existing sub-trunk looping strategy, that existing infrastructure can support intensification within the downtown core and follows an integrated approach with the Town's state of good repair program.

In general, the water servicing strategy for the Community of Stouffville consists of:

- Aligning the intensification strategy with the ongoing SOGR projects in the downtown core.
- Continuation of the Main Street upgrades. This will significantly improve the available fire flows along the Main Street corridor.
- Build off the existing system configuration of sub-trunk looping. Applying this approach to the proposed Greenfield growth areas will allow for critical looping within each quadrant of the system, along the servicing boundaries. This strengthens the overall system and provides greater operational flexibility.
- Build off the regional storage strategy of supplementing Zone 2 from Zone 1.
- Build off the regional supply strategy of continuing to use the existing Stouffville wells, and supporting increased supply needs by increases in capacity from the Region's Stouffville Zone 2 Pumping Station.
- Continuing to support Zone 1 via the Region's Stouffville Zone 1 WBPS and Z1 elevated tank.
- Providing supply to Stouffville South-West (MZO Lands) mainly via Region's Zone 7 (chloraminated system). Phase 1 of the development near Highway 48 would continue to be serviced via Stouffville Zone 3 (chlorinated system). This is in line with an ongoing MESP (Master Environmental Servicing Plan) that is being undertaken specifically in relation to Stouffville South-West (MZO Lands).

Key capital projects required to achieve this strategy includes:

- 4 km of watermain upgrades along Main Street corridor. Primarily replacing of old cast iron and ductile iron watermain.
- New watermain along Highway 48 to connect Main Street to Zone 3. New PRV required.
- New 300 mm diameter watermain along Bethesda Road, at the northern limits of the servicing boundary, to connect Tenth Line to Highway 48.
- Two new Zone 1 to Zone 2 PRVs.

- Regional increases in supply from the Stouffville Zone 2 Pumping Station and Stouffville Zone 1 WBPS. (Regional)
- Use of the Region's proposed second Zone 2 elevated tank to help support peak hour demands in Stouffville Zone 2&3. (Regional)
- New watermain to service Stouffville South-West (MZO Lands) from the Region's PD7 system. (note interim supply is also being assessed as part of a separate MESP)

4.6.3.2 Community of Ballantrae-Musselman's Lake

The water servicing strategy for the Community of Ballantrae-Musselman's Lake consists of strengthening the trunk network from the Musselman's Lake Elevated Tank to the centre of the distribution system.

Key capital projects required to achieve this strategy includes 2 kilometres of new 300 mm diameter watermain winning along Ninth Line.

4.6.3.3 Servicing of Highway 48

It is recommended that the Region and Town complete a joint study to investigate the opportunity to decommission the Highway 48 WBPS and service highway 48 customers from the Ballantrae-Musselman's Lake system.

The water servicing strategy for servicing of Highway 48 customers:

- Improve pressures along Highway 48 and eliminate the operational and maintenance challenges associated with the Highway 48 WBPS by connecting the existing dead end to the Ballantrae-Musselman's Lake system.

Key capital projects required to achieve this strategy includes:

- 1 kilometre of new 250 mm diameter watermain along Highway 48,
- New PRV along Highway 48, in proximity of Bloomington Road, and,
- Decommissioning of Highway 48 WBPS.

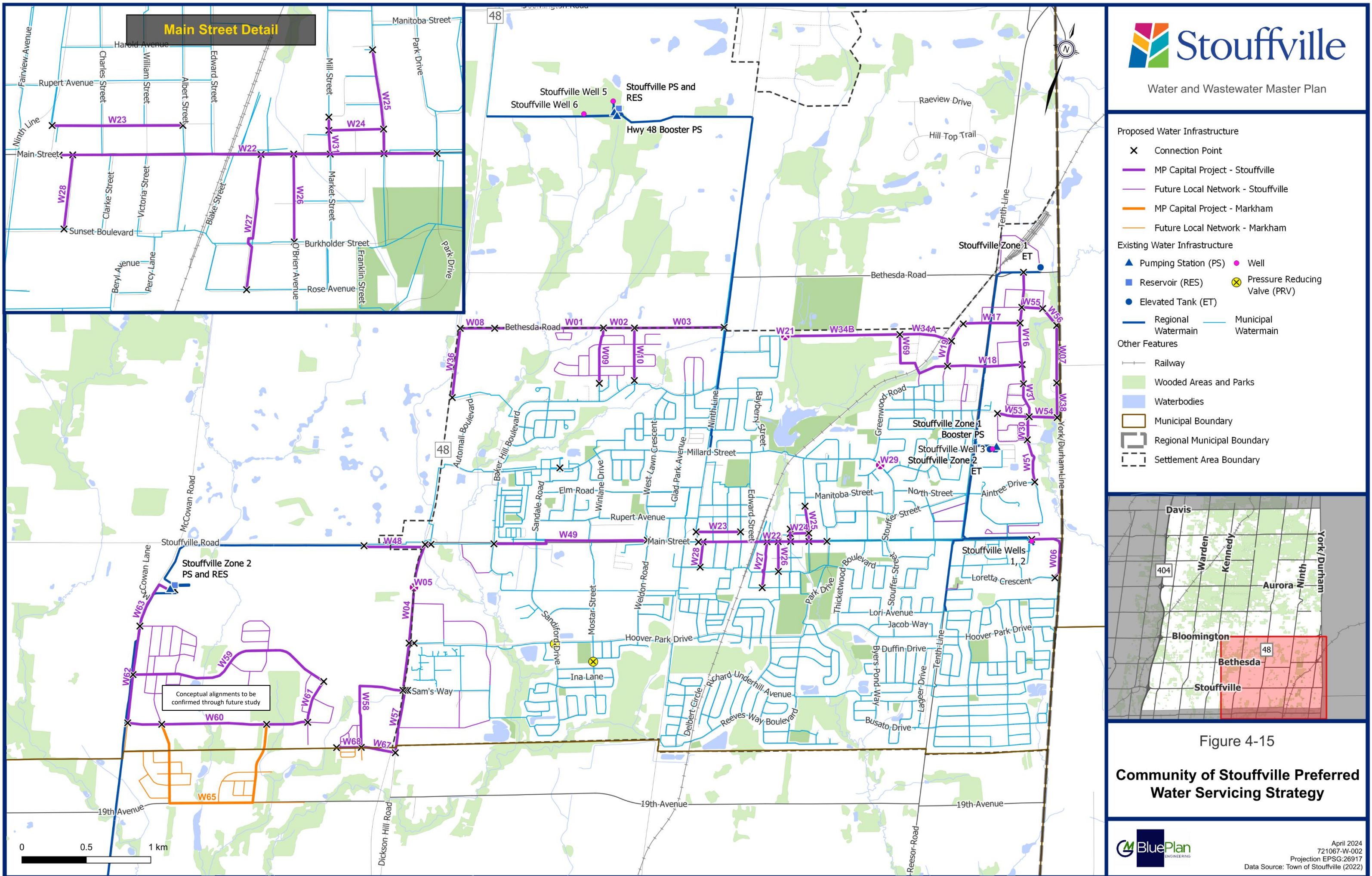
4.6.3.4 Gormley and Vandorf-Preston

The Master Plan Update recommends that separate studies be carried out to evaluate the viability and selection of the preferred solution for municipal water services for the communities of Gormley and Vandorf-Preston.

4.6.3.5 Whitebelt Lands

It is planned to service the Whitebelt Lands via Markham PD7 as recommended in the Regional Master Plan.

In addition to the key capital projects, several other projects and upgrades are included within the water servicing strategy to address existing and future capacity needs within the collection system. The complete Preferred Water Strategy for the Town of Whitchurch-Stouffville is presented in **Figure 4-15** and **Figure 4-16**. Each capital project is listed along with its respective estimated capital cost in **Section 4.7**.



Proposed Water Infrastructure

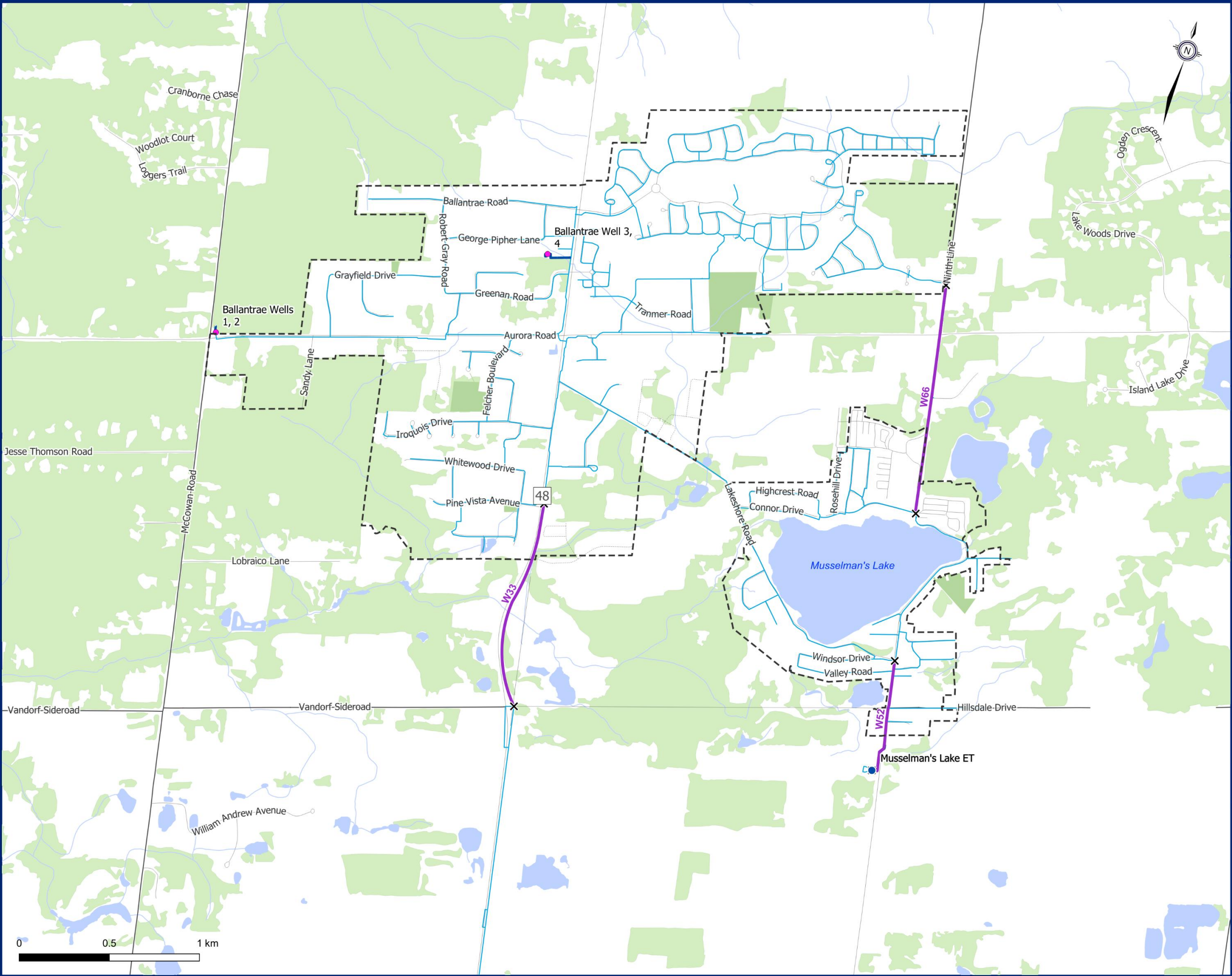
- ✕ Connection Point
- MP Capital Project - Watermain
- Future Local Network

Existing Water Infrastructure

- Elevated Tank (ET)
- Well
- Regional Watermain
- Municipal Watermain

Other Features

- Railway
- Wooded Areas and Parks
- Waterbodies
- Settlement Area Boundary
- Municipal Boundary
- Regional Municipal Boundary



0 0.5 1 km

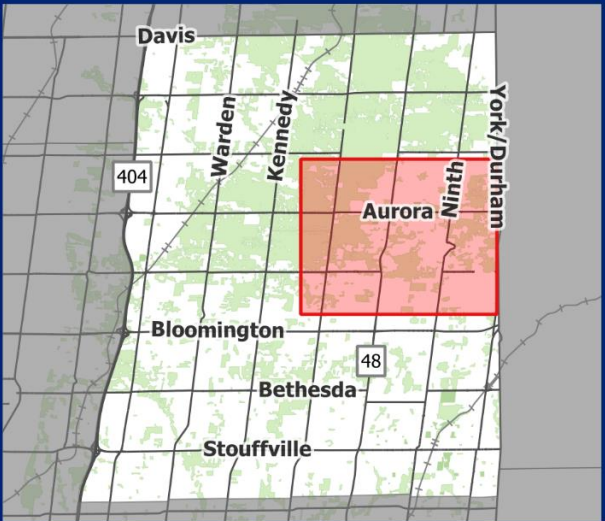


Figure 4-16
**Community of
Ballantrae-Musselman's Lake
Preferred Water Servicing Strategy**

4.7 Water Capital Program

As outlined in the previous sections, the Preferred Water Servicing Strategy has been developed to support the servicing needs of the existing and future growth areas within the Community of Stouffville to 2051. The capital costs for each project of the Preferred Strategy were estimated according to the costing methodology within **Section 3.7**. These projects are listed according to their project number and are shown in **Table 4-10**. The capital program table contains project descriptions, dimensions, proposed timing, and estimated total project cost.

The water capital program will work as a foundation for the Town of Whitchurch-Stouffville Capital Budget. The capital program provides a list and timing of new assets that the Town will operate and maintain; and therefore, it is the starting point for the planning of operation and maintenance costs and resources allocation for new water infrastructure.

4.8 Water Implementation Plan

The Water and Wastewater Master Plan sets out to satisfy the Class EA Master Plan Approach 1 requirements according to the MEA Class EA document. The Preferred Water Servicing Strategy will support the servicing needs of the Town of Whitchurch-Stouffville's future growth to 2051. This strategy will be implemented in accordance with each project Class EA schedule.

The Class EA requirements for each project have been identified in the Capital Program. Schedule A and A+ projects may move forward to design and construction, with A+ projects requiring public notification prior to implementation. Schedule B or equivalent projects that have been identified within the Preferred Water Servicing Strategy will be part of a developer-led local servicing plan and approved through the Planning Act Municipal development review process or will be satisfied through separate Class EA study prior to design and construction. The Preferred Water Strategy did not identify any Schedule C projects.

Further, any future Water EA project in the Town of Whitchurch-Stouffville should include the results of other Class EAs projects where applicable. During the next steps of the implementation program, primarily during detailed design of the projects, the following requirements should be considered:

- Communications and engagement,
- Finalization of property requirements,
- Refinement of infrastructure alignment,
- Identification of preferred construction methodologies,
- Completion of additional supporting investigations as required (e.g., natural environment, archaeological, cultural heritage, geotechnical, hydrogeological, etc.),
- Review and mitigation of potential construction related impacts, and,
- Satisfying of all provincial, municipal and conservation authority approval and permitting requirements.

With respect to Town planning and budgeting, this program will be utilized as a high-level baseline estimate for the Town capital budget. These costs will be further developed and refined during the implementation phases as detailed information becomes available.

The anticipated timing of each project within the Preferred Strategy has been established based on the projected population and employment growth within the Town of Whitchurch-Stouffville. The water program's project scheduling has also been cross-referenced with the wastewater program to support project coordination along common alignments.

Given the growth-related nature of the servicing strategies, the water capital program forms the foundation for the water component of the Town of Whitchurch-Stouffville Development Charges (DC) By-Law.

Table 4-10: Water Capital Program

Master Plan ID	Project Name	Project Description	Year in Service	Municipality	Class EA	Size/Capacity	Length (m)	Class Estimate Type	Project Complexity	Area Condition	Base Construction Cost (\$2023)	Crossings (\$2023)	Additional Costs (\$2023)	Soft Costs (Engineering + In-House) (\$2023)	Property Costs (\$2023)	Project Contingency (\$2023)	Non-Refundable HST (\$2023)	Total Estimated Cost (\$2023)
W01	Bethesda Side Road #1	New 300 mm diameter watermain along Bethesda Side Road from W09 to W08. Two creek crossings.	2031-2036	Stouffville	A+	300 mm	845	Class 4	High	Suburban	1,009,681	104,544	357,000	368,000	29,000	467,000	39,000	\$ 2,374,000
W02	Bethesda Side Road #2	New 300 mm diameter watermain along Bethesda Side Road from W10 to W09	2023-2026	Stouffville	A+	300 mm	240	Class 4	Med	Rural	243,483	-	65,000	74,000	5,000	58,000	7,000	\$ 452,000
W03	Bethesda Side Road 3	New 300 mm diameter watermain along Bethesda Side Road from Ninth Line to W10	2026-2031	Stouffville	A+	300 mm	695	Class 4	Med	Suburban	807,643	-	214,000	245,000	15,000	192,000	25,000	\$ 1,499,000
W04	Hwy 48 #1	New 300mm diameter watemain along Hwy 48 from Main Street to Hoover Park Drive. One creek crossing	2023-2026	Stouffville	A+	300 mm	862	Class 4	High	Suburban	1,013,515	500,000	484,000	500,000	40,000	634,000	53,000	\$ 3,225,000
W05	PRV Highway 48	PRV on Highway 48 south of Stouffville Road/Main Street	2023-2026	Stouffville	A+	-	-	-	-	-	-	-	-	-	-	-	-	\$ 1,000,000
W06	York Durham Line #1	New 300 mm diameter watermain along Main Street and York Durham Line, from Stouffville Well 1&2 to Loretta Crescent.	2031-2036	Stouffville	A+	300 mm	483	Class 4	High	Suburban	566,023	-	181,000	187,000	15,000	237,000	20,000	\$ 1,206,000
W07	York Durham Line #2	New 200 mm diameter watermain along York Durham Line, between Bethesda Side Road and proposed Post Gate Road	2031-2036	Stouffville	A+	200 mm	446	Class 4	High	Rural	335,734	-	107,000	111,000	9,000	141,000	12,000	\$ 716,000
W08	Bethesda Side Road #4	New 300 mm diameter watermain along Bethesda Side Road from W01 to Hwy 48	2046-2051	Stouffville	A+	300 mm	267	Class 4	Med	Rural	269,127	-	71,000	82,000	5,000	64,000	8,000	\$ 499,000
W09	Future Road #2	New 300 mm diameter watermain along future road connecting Baker Hill Boulevard to Bathesda Side Road and Main Street	2026-2031	Stouffville	A+	300 mm	440	Class 4	Med	Rural	433,436	-	115,000	132,000	8,000	103,000	13,000	\$ 804,000
W10	Future Road #3	New 300 mm diameter watermain along future road connecting Baker Hill Boulevard to Bethesda Side Road	2026-2031	Stouffville	A+	300 mm	410	Class 4	Low	Rural	404,943	-	85,000	115,000	5,000	61,000	11,000	\$ 682,000
W16	Future Road #9	New 300 mm diameter watermain along future road in northeast corner of Stouffville, connecting W37 to Bethesda Side Road	2026-2031	Stouffville	A+	300 mm	870	Class 4	High	Rural	841,834	-	269,000	278,000	22,000	353,000	30,000	\$ 1,794,000
W17	Future Road #10	New 300 mm diameter watermain along future road in northeast corner of Stouffville, connecting W19 to W16	2026-2031	Stouffville	A+	300 mm	455	Class 4	High	Rural	463,223	52,111	165,000	170,000	14,000	216,000	18,000	\$ 1,098,000
W18	Future Road #11	New 300 mm diameter watermain along future road in northeast corner of Stouffville, connecting W19 to W16	2026-2031	Stouffville	A+	300 mm	580	Class 4	High	Rural	581,943	52,111	203,000	209,000	17,000	266,000	22,000	\$ 1,351,000
W19	Future Road #12	New 300 mm diameter watermain along future road in northeast corner of Stouffville, connecting W17 and W18	2026-2031	Stouffville	A+	300 mm	350	Class 4	High	Rural	347,957	-	111,000	115,000	9,000	146,000	12,000	\$ 741,000
W21	PRV Future Road	PRV west of W34	2041-2046	Stouffville	A+	-	-	Class 4	-	-	-	-	-	-	-	-	-	\$ 900,000
W22	Main Street	300 mm watermain upgrade along Main Street from Ninth Line to Park Drive. One railway and one creek crossing.	2023-2026	Stouffville	A+	300 mm	1000	Class 4	High	Urban	1,186,336	1,000,000		722,000	58,000	916,000	77,000	\$ 4,658,000
W23	Second Street	200 mm watermain upgrade along Second Street from Ninth Line to Albert Street.	2023-2026	Stouffville	A+	200 mm	345	Class 4	Low	Urban	323,353	104,221	90,000	122,000	5,000	64,000	12,000	\$ 720,000
W24	Commercial Street	150 mm watermain upgrade along Commercial Street from Church Street North to Mill Street	2023-2026	Stouffville	A+	150 mm	145	Class 4	High	Urban	116,571	-	37,000	39,000	3,000	49,000	4,000	\$ 249,000
W25	Church Street North	200 mm watermain upgrade along Church Street North from Main Street to Warriner Street	2023-2026	Stouffville	A+	200 mm	276	Class 4	High	Urban	250,771	-	80,000	83,000	7,000	105,000	9,000	\$ 534,000
W26	O'Brien Avenue	150 mm watermain upgrade along O'Brien Avenue from Main Street to Burkholder Street	2023-2026	Stouffville	A+	150 mm	231	Class 4	High	Urban	187,549	52,111	77,000	79,000	6,000	100,000	8,000	\$ 510,000
W27	Lloyd Street	150 mm watermain upgrade along Lloyd Street from Main Street to Rose Avenue	2023-2026	Stouffville	A+	150 mm	375	Class 4	Med	Urban	298,827	52,111	93,000	107,000	7,000	84,000	11,000	\$ 652,000
W28	Orchard Park Boulevard	200 mm watermain upgrade along Orchard Park Boulevard from Main Street to Sunset Boulevard	2023-2026	Stouffville	A+	200 mm	197	Class 4	High	Urban	180,610	-	58,000	60,000	5,000	76,000	6,000	\$ 385,000

Table 4-10: Water Capital Program

Master Plan ID	Project Name	Project Description	Year in Service	Municipality	Class EA	Size/Capacity	Length (m)	Class Estimate Type	Project Complexity	Area Condition	Base Construction Cost (\$2023)	Crossings (\$2023)	Additional Costs (\$2023)	Soft Costs (Engineering + In-House) (\$2023)	Property Costs (\$2023)	Project Contingency (\$2023)	Non-Refundable HST (\$2023)	Total Estimated Cost (\$2023)
W29	PRV Millard Street	New PRV on Millard Street and Willoway	2023-2026	Stouffville	A+	-	-	-	-	-	-	-	-	-	-	-	-	\$ 1,000,000
W30	Future Road #14	New 200 mm diameter watermain along a future road from Forsyth Farm Drive to Auctioneers Crescent	2026-2031	Stouffville	A+	200 mm	180	Class 4	Med	Rural	138,868	-	37,000	42,000	3,000	33,000	4,000	\$ 258,000
W31	Mill Street	200 mm watermain upgrade along Mill Street from Main Street to George Street	2023-2026	Stouffville	A+	200 mm	98	Class 4	High	Urban	92,686	-	30,000	31,000	2,000	39,000	3,000	\$ 197,000
W33	HWY 48 #3	New 250 mm diameter watermain along HWY 48 from Spruceview Place to existing dead end.	2023-2026	Ballantrae	A+	250 mm	1173	Class 4	High	Rural	1,000,800	-	320,000	330,000	26,000	419,000	35,000	\$ 2,132,000
W34A	Future Road #15	New 300 mm diameter watermain along future road in northeast corner of Stouffville, connecting W19 to W20. One railway crossing	2026-2031	Stouffville	A+	300 mm	408	Class 4	High	Rural	418,584	500,000	294,000	303,000	24,000	385,000	32,000	\$ 1,958,000
W34B	Future Road #15	New 300 mm diameter watermain along future road in northeast corner of Stouffville, connecting W19 to W20. One creek crossing.	2041-2046	Stouffville	A+	300 mm	889	Class 4	High	Rural	875,420	500,000	440,000	454,000	36,000	577,000	48,000	\$ 2,932,000
W36	HWY 48 #2	New 300 mm diameter watermain along Hwy 48	2046-2051	Stouffville	A+	300 mm	540	Class 4	Med	Rural	543,953	52,272	158,000	181,000	11,000	142,000	18,000	\$ 1,106,000
W37	Future Road #16	New 300 mm diameter watermain along future road in northeast corner of Stouffville, connecting W30 to W16	2026-2031	Stouffville	A+	300 mm	268	Class 4	High	Rural	270,077	-	86,000	89,000	7,000	113,000	10,000	\$ 576,000
W38	York Durham Line #3	New 200 mm diameter watermain along York Durham Line, between Bethesda Side Road and Main Street	2026-2031	Stouffville	A+	200 mm	268	Class 4	High	Rural	203,997	-	65,000	67,000	5,000	85,000	7,000	\$ 434,000
W39	Gormely Fire Protection	New 300 mm diameter fire protection watermain on Stouffville Road from Union Street west	2023-2026	Gormley	A+	300 mm	347	Class 4	Low	Suburban	411,022	-	86,000	117,000	5,000	62,000	11,000	\$ 692,000
W40	Gormely Fire Protection	New 300 mm diameter fire protection watermain on Union Street from Stouffville Street south	2023-2026	Gormley	A+	300 mm	453	Class 4	Low	Suburban	531,831	-	112,000	151,000	6,000	80,000	15,000	\$ 896,000
W42	Master Plan	Water Master Plan (occurs every 5 years at \$300k each)	2026-2051	Stouffville	-													\$ 1,500,000
W43	Future Studies	Vandorf Future Service Area Study	2026-2031	Vandorf	-													\$ 250,000
W44	Future Studies	Gormley Future Service Area Study	2026-2031	Gormley	-													\$ 250,000
W45	Future Studies	Whitebelt Lands Future Service Area Study	2026-2031	Whitebelt	-													\$ 250,000
W48	Stouffville Road	600mm Watermain twinning on Stouffville Road from the Z2 BPS to Hwy48 (Town owned section)	2036-2041	Stouffville	A+	600 mm	530	Class 4	High	Rural	1,301,798	1,490,460	894,000	922,000	74,000	1,170,000	98,000	\$ 5,949,000
W49	Main Street	The existing aged 250mm watermain along Main Street from Hwy 48 to Weldon Road to be upgraded to 300mm	2041-2046	Stouffville	A+	300 mm	1230	Class 4	High	Urban	1,448,471	104,221	497,000	513,000	41,000	651,000	54,000	\$ 3,309,000
W50	Millard Street and Bearings Avenue	connect the existing 150mm watermain on Bearings Avenue to the existing 300mm watermain on Millard Street to improve resiliency	2041-2046	Stouffville	A+	300 mm	10	Class 4	Low	Urban	26,937	-	6,000	8,000	-	4,000	1,000	\$ 46,000
W51	Cam Fella Boulevard	Upgrade to the existing 150mm watermain along Cam Fella Boulevard cul-de-sac to 200mm, , and a new 200mm watermain on easement connecting	2026-2031	Stouffville	A+	200 mm	350	Class 4	Low	Suburban	322,143	42,383	77,000	104,000	300,000	84,000	16,000	\$ 944,000
W52	Ninth Line	New 300mm Watermain twinning on Ninth Line from Musselman Lake to Windsor Drive	2023-2026	Musselman's Lake	A+	300 mm	660	Class 4	High	Suburban	783,293	52,111	267,000	276,000	22,000	350,000	29,000	\$ 1,780,000
W53	Forsyth Farm Road	New 300mm Watermain on Forsyth Farm Road connecting W37 and Existing watermain on Forsyth Farm Road	2026-2031	Stouffville	A+	300 mm	250	Class 4	Med	Rural	252,981	-	67,000	77,000	5,000	60,000	8,000	\$ 469,000
W54	Forsyth Farm Road	New 200mm Watermain on Forsyth Farm Road connecting W37 and future watermain on York Durham Line	2026-2031	Stouffville	A+	200 mm	220	Class 4	High	Rural	174,123	500,000	216,000	223,000	18,000	283,000	24,000	\$ 1,437,000

Table 4-10: Water Capital Program

Master Plan ID	Project Name	Project Description	Year in Service	Municipality	Class EA	Size/Capacity	Length (m)	Class Estimate Type	Project Complexity	Area Condition	Base Construction Cost (\$2023)	Crossings (\$2023)	Additional Costs (\$2023)	Soft Costs (Engineering + In-House) (\$2023)	Property Costs (\$2023)	Project Contingency (\$2023)	Non-Refundable HST (\$2023)	Total Estimated Cost (\$2023)
W55	Future Road #17	New 250 mm diameter watermain along future road in northeast corner of Stouffville, connecting W16 to W56	2026-2031	Stouffville	A+	250 mm	170	Class 4	High	Rural	150,359	-	48,000	50,000	4,000	63,000	5,000	\$ 320,000
W56	Future Road #17	New 200 mm diameter watermain along future road in northeast corner of Stouffville, connecting W56 to W07	2031-2036	Stouffville	A+	200 mm	170	Class 4	High	Rural	137,119	500,000	204,000	210,000	17,000	267,000	22,000	\$ 1,357,000
W57	Hwy 48	New 300mm diameter watemain along Hwy 48 from Hoover Park Dr to new road within MZO 1 lands (Street A)	2023-2026	Stouffville	A+	300 mm	900	Class 4	High	Suburban	1,041,284	-	333,000	344,000	28,000	436,000	37,000	\$ 2,218,000
W58	MZO1 Loop	New 250mm diameter watemain within MZO 1 Lands to new Street A	2023-2026	Stouffville	A+	250 mm	820	Class 4	High	Rural	707,708	42,383	240,000	248,000	20,000	314,000	26,000	\$ 1,598,000
W59	Future Road #18	New 300mm diameter watermain within MZO 2 lands connecting W61 and W62	2031-2036	Stouffville	A+	300 mm	1650	Class 4	High	Rural	1,598,189	500,000	671,000	693,000	55,000	879,000	74,000	\$ 4,470,000
W60	Future Road #19	New 300mm diameter watermain within MZO 2 lands connecting W61 and south end of W62	2031-2036	Stouffville	A+	300 mm	1400	Class 4	High	Rural	1,376,289	552,272	617,000	637,000	51,000	808,000	68,000	\$ 4,109,000
W61	Future Road #20	New 300mm watermain within in MZO2 development connecting W59 and W60	2031-2036	Stouffville	A+	300 mm	350	Class 4	Med	Rural	347,957	-	92,000	106,000	7,000	83,000	11,000	\$ 646,000
W62	McCowan Road	New 300mm watermain on McCowan Road connecting W59 and W60	2031-2036	Stouffville	A+	300 mm	760	Class 4	High	Suburban	881,724	-	282,000	291,000	23,000	370,000	31,000	\$ 1,879,000
W63	McCowan Road	New 300mm watermain on McCowan Road from new pumping station to MZO2 development	2031-2036	Stouffville	A+	300 mm	505	Class 4	High	Suburban	591,097	-	189,000	195,000	16,000	248,000	21,000	\$ 1,259,000
W66	Ninth Line	New 200mm Watermain twinning on Ninth Line from Cedarvale Boulevard to Legendary Trail	2031-2036	trae - Musselman	A+	200 mm	1300	Class 4	High	Suburban	1,160,202	-	371,000	383,000	31,000	486,000	41,000	\$ 2,471,000
W67	MZO1 Loop	New 200mm diameter watemain within MZO 1 Lands along new Street A from W58 to W57.	2023-2026	Stouffville	A+	200 mm	270	Class 4	High	Rural	211,128	500,000	228,000	235,000	19,000	298,000	25,000	\$ 1,516,000
W68	MZO1 Servicing	New 250mm diameter watemain within MZO 1 Lands along new Street A from W58 to the West	2023-2026	Stouffville	A+	250 mm	200	Class 4	Low	Rural	175,796	-	37,000	50,000	2,000	27,000	5,000	\$ 297,000
W69	Future Railway Crossing	New 300mm watermain connecting W18 and W34 crossing the Go Transit Railway	2026-2031	Stouffville	A+	300 mm	650	Class 4	High	Rural	648,427	500,000	367,000	379,000	30,000	481,000	40,000	\$ 2,447,000
W70	Water Meter AMI	7 antennas/towers for water meter AMI	2026-2051	Stouffville	-													\$ 475,219
Total Program 2051																		\$79,476,219

5.0 Wastewater Master Plan

The *Wastewater Master Plan* provides an overall review of the wastewater policies and criteria, existing wastewater collection system, technical analysis, and development of the preferred wastewater servicing strategy for the Town of Whitchurch-Stouffville. This section has been organized as follows:

- 5.1 Wastewater System Policy and Criteria
- 5.2 Existing Wastewater Infrastructure
- 5.3 Wastewater Hydraulic Model
- 5.4 York Region Wastewater Master Plan Linkage
- 5.5 Assessment of Existing and Future Wastewater Infrastructure
- 5.6 Wastewater Servicing Strategy
- 5.7 Wastewater Capital Program
- 5.8 Wastewater Implementation Plan

The following sections should be read in conjunction with the other sections within the 2024 Master Plan.

5.1 Wastewater System Policy and Criteria

Wastewater policies, design criteria, and level of service requirements were updated as part of this Master Plan to provide guidelines and direction to the master planning process, in addition to ensuring that wastewater flows are adequately representative to support the decision making for sizing and timing of future infrastructure. Refer to **Appendix C** and **Appendix D** for the complete wastewater servicing policies and design criteria review.

5.1.1 Wastewater Servicing Principles and Policies

Specific servicing principles and policies have been developed to guide and provide direction for the development of wastewater servicing strategies. In general, the Town of Whitchurch-Stouffville is looking to build and maintain efficient, reliable, sustainable and well managed wastewater systems that provide high level of service to the public. In order to reach these goals, the servicing principles and policies have been structured as outlined in **Appendix C**.

5.1.2 Wastewater Design Criteria

A guiding principle of design criteria is to ensure that the flow projections are adequately predicted with an appropriate factor of safety and risk management. This overall principle also ensures that infrastructure has sufficient capacity to meet the growing needs of the Town and does not impede the approved/planned growth.

The wastewater flow criteria updated as part of the Town of Whitchurch-Stouffville Master Plan are summarized in **Table 5-1**.

Table 5-1: Wastewater Flow Criteria

Wastewater Flow Projection Methodology	
• Use existing flows for baseline. • Existing flows based on flow monitoring data. • Growth flows applied to the Baseline using design criteria.	
Wastewater Flow Criteria for Growth	
Parameter	Design Criteria
Average Dry Weather Flow (ADWF)	350 L/cap/d
Inflow and Infiltration Allowance	0.26 L/s/ha
Peaking Factor	Harmon Peaking Factor (2 – 4)
Wastewater System Criteria	
• Sizing treatment facilities for Average Day Flows (ADF) (Region Only). • Sizing of trunk sewers, pumping stations and collection system for Peak Wet Weather Flow (PWWF). • WWPS Firm Capacity based on largest pump out of service.	

The Wastewater Design Criteria Tech Memo is provided in **Appendix D**.

5.1.3 Wastewater Level of Service

Many municipalities use a range of level of service (LOS) requirements to identify when the wastewater system is no longer performing as designed. These level of service requirements can range from depth and flow in the wastewater sewer network, to depth of Hydraulic Grade Line (HGL) to ground level, among others. With regards to LOS, industry standards are adapting to factors such as growth and climate change. Standard surcharge state (d/D) analysis and basement flooding analysis are still suitable for high level assessments such as Master Planning, but more detail is recommended when reviewing the infrastructure to schedule planned improvements to the wastewater network. The Town of Whitchurch-Stouffville Master Plan Level of Service Requirements are as follow:

The Master Plan has recommended the following wastewater level of service requirements to identify when the wastewater system is no longer performing as designed:

- Design Storm - Chicago Design Storm with Areal Reduction Factor.
- Design Storm – 1 in 5-year Chicago Storm for sewer capacity; 1 in 25 Chicago Storm for basement flooding.
- Sewer capacity – Maintaining the flow in the sewers at less than 85% full under a 5-year design storm condition.
- Basement Flooding Risk – Ensuring the wastewater HGL does not approach within 1.8 metres of the ground surface under 25-year design storm conditions.

The Wastewater Level of Service Tech Memo is provided in **Appendix D**.

5.1.4 Flow Projection

The 2051 population and employment projections and the design criteria were utilized to calculate the average dry weather flow projections (ADWF). The total flows are shown in **Table 5-2**.

Table 5-2: Wastewater Flow Projections

	Project Population and Employment		ADWF (L/s)	
	2021	2051	2021	2051
Stouffville	43,940	83,271	178 L/s	337 L/s
Other	70	8,459	< 1 L/s	34 L/s

5.2 Existing Wastewater Infrastructure

The Region of York provides wastewater collection and treatment services to its nine (9) municipalities, including the Town of Whitchurch-Stouffville, through multiple components: the York Durham Sewage System (YDSS), the Georgina Wastewater System and some stand-alone facilities.

The Town of Whitchurch-Stouffville provides municipal wastewater services only to the Community of Stouffville. Aside from a small number of lots that are serviced by private systems, wastewater within the community of Stouffville is largely collected by the local municipal wastewater system and then conveyed to the YDSS. The YDSS is jointly owned and operated by York and Durham Regions. Once collected, wastewater is treated at the Duffin Creek Water Pollution Control Plant (WPCP) located in the City of Pickering and subsequently discharged to Lake Ontario.

Currently, the communities of Ballantrae-Musselman's Lake, Gormley, Bloomington, Vandorf and Preston Lake do not have municipal wastewater services. **Figure 5-1** shows the extent of the existing wastewater system in the Town of Whitchurch-Stouffville.

5.2.1 Stouffville Wastewater Collection System

The Community of Stouffville municipal wastewater collection system consists of small local sewers, approximately 119 km total sewer length, which connect to a number of larger subtrunk sewers conveying flows generally in a southerly direction to the main trunk sewers that are part of the YDSS.

The three (3) YDSS trunk sewers, owned and operated by York Region and servicing the Community of Stouffville, are as follows:

- YDSS West Branch: Little Rouge Creek.
- YDSS East Branch: Mantle Avenue and Reeves Way Boulevard.
- YDSS Main Branch: Ninth Line.

There are currently seventeen (17) local subtrunks, owned and operated by the Town, that collect and convey flows to the above YDSS trunk sewers. **Table 5-3** shows descriptions of the existing subtrunks sewers within the Community of Stouffville.

Table 5-3: Stouffville Wastewater Subtrunk System

#	Description
1	Southeast Subtrunk: Largest subtrunk in Stouffville. Located on Reeves Way Boulevard, Mantle Avenue and Regional Road 30. This trunk outlet to subtrunk 5.
2	Byers Pond Way Subtrunk: Located in the southeastern portion of the Town. Connects to subtrunk 1 south of Byers Pond and east of Stouffville Creek.
3	Central Subtrunk: Located north and east from the YDSS East Branch up to Greenwood Road
4	East Central Subtrunk: Located at the east central region of the Town, south of Main Street, north of subtrunk 5. Connects to subtrunk 3 approximately 100 metres upstream of the connection to the YDSS East Branch
5	Hoover Park Drive Subtrunk: Located on Hoover Park Drive at the southeast region of the Town, south of subtrunk 4. Connects to subtrunk 1 south of James Ratcliff Avenue
6	West Central Subtrunk: Located at the central region of the Town. The north section is located on Ninth Line. Connects to the YDSS Main at Hoover Park Drive. This trunk outlets to subtrunks 16 and 19.
7	West By-pass Subtrunk: Located south of Main Street and west of Ninth Line. Flow diversion for subtrunk 8 to the YDSS West. This trunk outlets to subtrunk 17.
8	Weldon Road / West Lawn Blvd Subtrunk: Located along West Lawn Boulevard and Weldon Road. Connects to subtrunk 7 north of Dougherty Crescent. The southern portion connects to the YDSS at Ninth Line and Hoover Park Drive.
9	Hoover Park Town Centre Subtrunk: Located within employment lands in the SW corner of Stouffville. Flows are pumped through the Rougeview temporary pumping station and forcemain to YDSS West.
10	Baker Hill Blvd Subtrunk: Located along Baker Hill Boulevard. Connection to YDSS West south of Ringwood Drive.
12	Winlane Drive Subtrunk: Located on Winlane Drive from Elm Road south to Main Street. Connects to subtrunk 17 at Sandale Road.
13	Northwest Industrial Subtrunk: Located on Automall Blvd / Highway 48 from Norman Jones Place to Main Street. Connects to subtrunk 10 at Main Road.
14	Edward St / Albert St Subtrunk: Located on Edward Street from south of Millard St to Main Street, and on Albert Street from Main Street to Sunset Boulevard. Connects to subtrunk 6 at Sunset Boulevard
16	Ninth Line East Subtrunk: Located in the northern/central region on Ninth Line from Millard Street to Main Street, and south through local roads west of the railway to Hoover Park Drive. The southern portion connects to the YDSS at Ninth Line and Hoover Park Drive
17	Sandiford Drive Subtrunk: Located in the west/central region on Sandiford Drive / Sandale Road and north through local roads to Edgevalley Road. Connects to subtrunk 7 at Sandale Road.
19	Millard / Bayberry Subtrunk: Located on Bayberry Street and Millard Street to Ninth Line. Connects to subtrunks 6 & 16 at Ninth Line and Millard Street.
20	O'Brien Subtrunk: Located on the east side of the railway from Main Street / O'Brien Avenue to Rose Avenue. Connects to the YDSS East on the west side of the Stouffville Creek crossing.

Existing Wastewater System

-  Municipal Sanitary Pumping Station (SPS)
-  Private Sanitary Pumping Station (SPS)
-  Municipal Forcemain
-  Gravity Main (Municipal)
-  Gravity Main (Regional - YDSS)

Subtrunks

- | | | |
|---|--|--|
|  1 |  7 |  13 |
|  2 |  8 |  14 |
|  3 |  9 |  16 |
|  4 |  10 |  17 |
|  5 |  11 |  19 |
|  6 |  12 |  20 |

Other Features

-  Railway
-  Wooded Area and Parks
-  Waterbodies
-  Settlement Area Boundary
-  Municipal Boundary
-  Regional Municipal Boundary

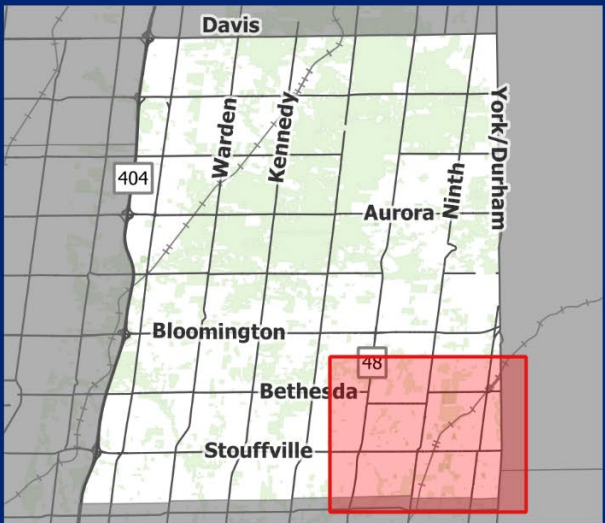
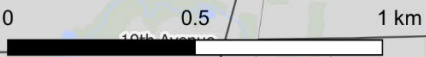
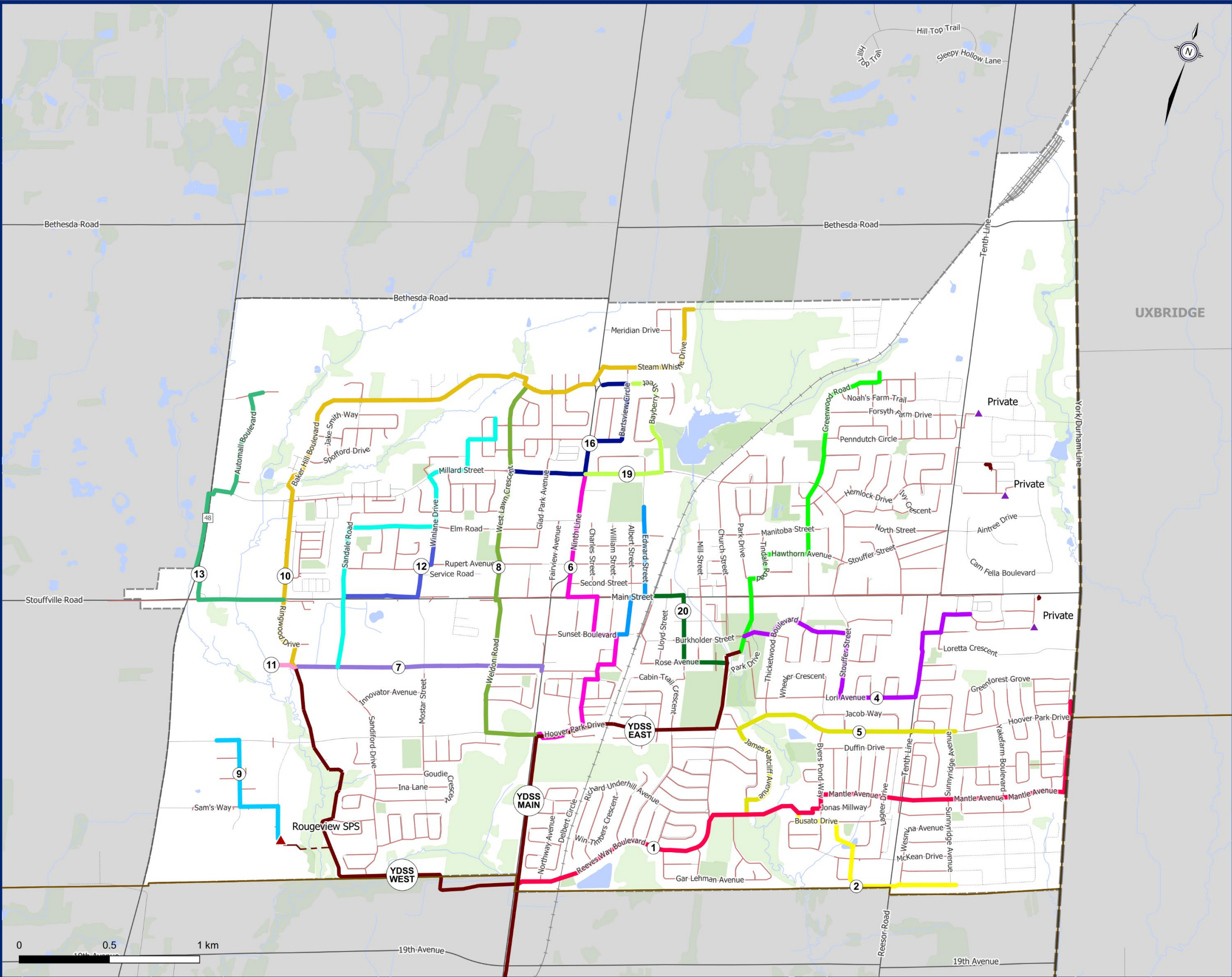


Figure 5-1
**Town of Whitchurch-Stouffville –
Stouffville Wastewater Infrastructure**

There are currently (4) private wastewater pumping stations (WWPS) in the Community of Stouffville:

- **Rougeview WWPS** is a temporary pumping station currently servicing subtrunk 9 and is located in the employment lands at the southwestern part of the Community of Stouffville at Rougeview Avenue.
- **The Eastern Gate WWPS** is a private pumping station located south of Main Street. This WWPS is located on the Eastern Gate Retirement Community.
- **The Northern Gate WWPS** is located east of Tenth Line and north of Aintree Drive. This WWPS is located on the Northern Gate Retirement Community.
- **The Tenth Line WWPS** is a temporary pumping station located east of Tenth Line and North of Forsyth Farm Drive. This WWPS is located on the Northern Gate Retirement Community.

5.3 Wastewater Hydraulic Model

Analysis of the existing and future wastewater collection system within the Town of Whitchurch-Stouffville was undertaken using the Town's latest wastewater hydraulic model in InfoWorks ICM. As part of this Master Plan, the wastewater hydraulic model was updated specifically for the Community of Stouffville, which is the only community within the Town with existing municipal wastewater services. The existing conditions wastewater hydraulic model was updated and calibrated in advance of the Master Plan, using flow monitoring data from the spring and summer of 2022. The model was calibrated based on the available flow data from 10 Town-owned flow monitors and 7 Region-owned flow monitors located at key locations to ensure a better coverage of the overall sanitary system as well as the Town's subtrunks. The model calibration included both dry weather flow calibration for base groundwater infiltration and typical weekday/weekend diurnal profile and wet weather flow calibration with 3 different critical events.

The wastewater model was calibrated to the standards prescribed in the CIWEM Code of Practice for the Hydraulic Modelling of Urban Drainage Systems (2017). The dry weather flow calibration was able to achieve 81% of peak dry weather flow being within $\pm 10\%$, and 92% of dry weather flow total volume being within $\pm 10\%$ of field observed data. The wet weather flow calibration was able to achieve 95% of peak wet weather flow being within -15% to $+25\%$, 100% of peak wet weather depth being within $\pm 0.1\text{m}$, and 95% of wet weather flow total volume being within -10% to $+20\%$ of field observed data. Overall, the results of the model calibration indicated a strong correlation between field and simulated results, so the model is considered suitably accurate for the purposes of Master Planning.

Population and employment projections were incorporated with the baseline existing model to create future growth scenarios. The growth projections were loaded as a separate subcatchments so that it is simple to identify the growth portion of the system flows.

5.4 York Region Wastewater Master Plan Linkage

Through the Regional Water and Wastewater Master Plan, the Region recommended a number of wastewater strategies. **Table 5-4** provides the recommendations relating to the Town's wastewater system.

Table 5-4: Regional Wastewater Strategy Recommendations for the Town

MP ID	Project Name	Implementation Timeline
WW8	North Markham Trunk Sewer Construct approximately 2.1 kilometres new gravity sewer assumed to be located on McCowan Road from Major Mackenzie Drive East and connecting to the existing 16th Avenue Sewer.	2032-2041
WW9	Primary Trunk Sewer Construct a new trunk sewer from the terminus of the Southeast Collector at Valley Farm Road to the Duffin Creek Water Pollution Control Plant to service growth in the overall York Durham Sewage System service area.	2022-2031
WW10	Duffin Creek Water Pollution Control Plant Outfall Effluent Strategy Optimize capacity of existing Duffin Creek Water Pollution Control Plant Outfall.	2022-2031

MP ID	Project Name	Implementation Timeline
WW11	Duffin Creek Water Pollution Control Plant Stage 1 and 2 Chlorine Chamber Expansion Construct a new chlorine contact chamber to increase the Duffin Creek Water Pollution Control Plant disinfection capacity.	2022-2031
WW12	Duffin Creek Water Pollution Control Plant Growth Expansion Implement several upgrades to optimize and/or expand Duffin Creek Water Pollution Control Plant beyond the current capacity during a new outfall to accommodate growth in the York Durham System service area. Upgrades to be implemented in phases and are expected to be confirmed by future planning and EA studies.	2032-2051

Figure 5-2 provides an overview of the Region's preferred wastewater strategy recommended in the York Region 2022 Water and Wastewater Master Plan.

Figure 6.2 Long-term Wastewater Infrastructure Plan

WW1	Peel System Cost-Shared Works
WW2	West Vaughan Sewage Servicing
WW3	Northeast Vaughan Wastewater Servicing
WW4	York Durham Sewage System Conveyance Optimization
WW5	York Durham Sewage System Expansion
WW6	Leslie Street Sewage Pumping Station and Forcemain
WW7	Richmond Hill Langstaff Gateway Provincial Urban Growth Centre Wastewater Servicing
WW8	North Markham Trunk Sewer
WW9	Primary Trunk Sewer
WW10	Duffin Creek Water Pollution Control Plant Outfall Effluent Strategy
WW11	Duffin Creek Water Pollution Control Plant Stage 1 and 2 Chlorine Chamber Expansion
WW12	Duffin Creek Water Pollution Control Plant Growth Expansions
WW13	Nobleton Wastewater Servicing
WW14	King City Wastewater System Upgrades
WW15	Yonge Street Sewer Twinning
WW16	York Durham Sewage System Interim Servicing
WW17	Newmarket Diversion Sewer
WW18	East Gwillimbury Sewage Pumping Station Expansions
WW19	Holland Landing Lagoon Decommissioning
WW20	East Queensville Sewage Pumping Station and Forcemain
WW21	Upper York Water Reclamation Centre
WW22	Upper York Servicing Infrastructure Expansions 1 and 2
WW23	Keswick Wastewater Servicing
WW24	Sutton Wastewater Servicing

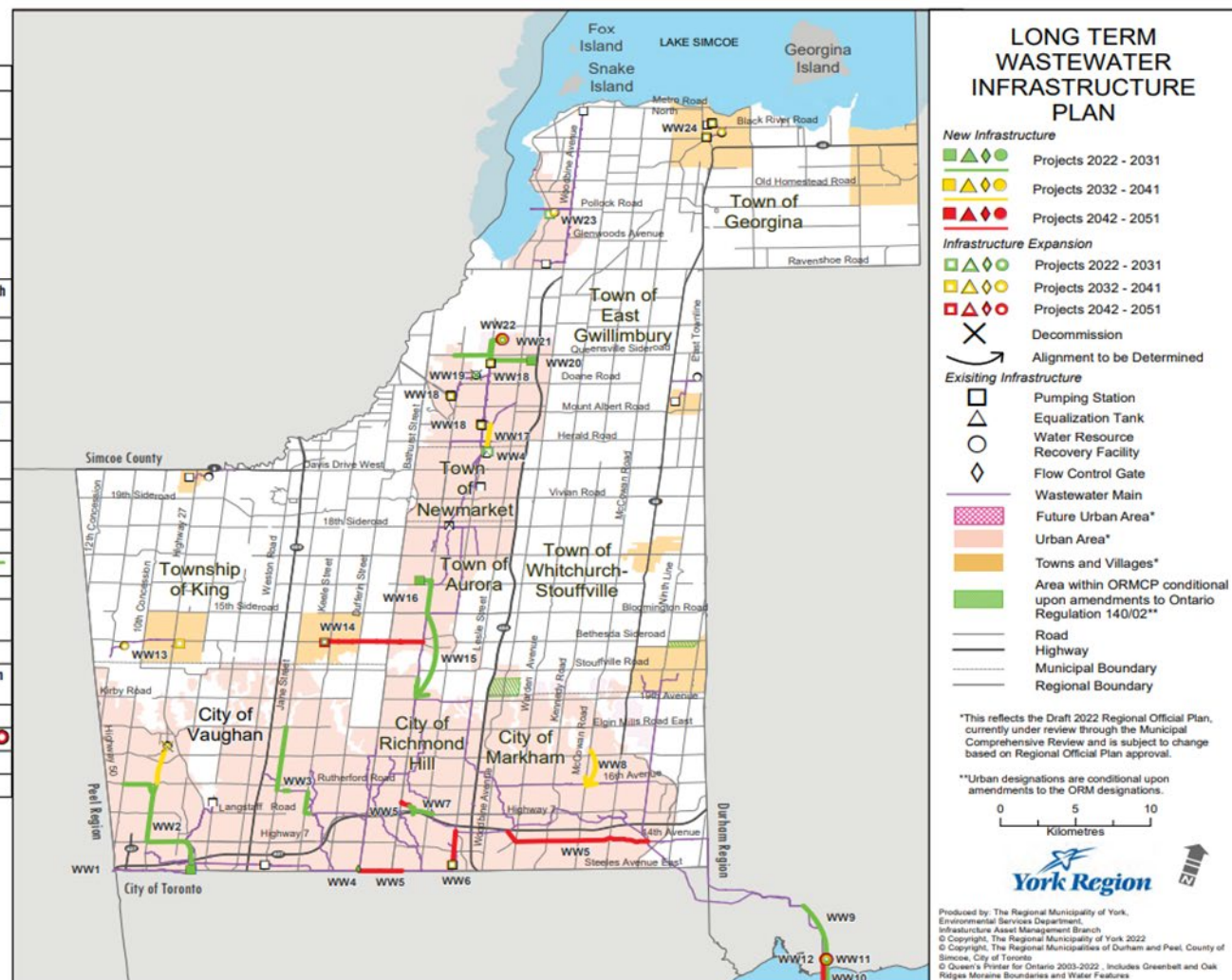


Figure 5-2: Regional Preferred Wastewater Strategy

5.5 Assessment of Existing and Future Wastewater Infrastructure

Following the established approach of the 2018 Water and Wastewater Master Plan, a critical initial step of the Master Plan Update process was the assessment of the existing infrastructure to determine the updated wastewater system baseline conditions. These updated baseline conditions became the basis of the future recommendations of the Master Plan and therefore it was important to ensure that they were determined through a comprehensive detailed analysis of the system. Once the existing system conditions were established, the potential impacts of the future growth flows on the wastewater collection system were analyzed to develop and recommend future servicing strategies.

The following sections describe current opportunities and constraints in the existing wastewater system and assess the capacity deficiencies in the wastewater collection system within the 2051 planning horizon.

5.5.1 Assumptions

The objective of the Town's Wastewater Master Plan is to assess the performance of the collection system and its ability to convey wastewater flows from the source (residences, institutions and businesses) to Regional infrastructure. It is assumed that the Regional infrastructure can provide sufficient conveyance until its final destination for treatment before discharging to the environment.

5.5.2 Opportunities and Constraints

The assessment of opportunities and constraints has primarily focused on the urban wastewater service areas within the Community of Stouffville. However, the Master Plan also explored future municipal serving opportunities to the rural settlements areas of Gormley and Vandorf-Preston Lake and the urban expansions areas within the Whitebelt.

Existing and future wastewater opportunities and constraints were identified through discussions with Town staff, as well as through hydraulic analyses and review of infrastructure data (e.g., GIS, design reports, as-built information, etc.). The recently re-calibrated InfoWorks ICM all-pipe hydraulic model for the Community of Stouffville was used to analyze the performance of the existing and future system under dry weather and wet weather flow conditions.

5.5.2.1 Stouffville

In general, the wastewater collection system of the Community of Stouffville has adequate capacity to convey existing and future peak wet weather flows. **Figure 5-3** highlight some of the key opportunities and constraints in the Community of Stouffville.

The following key issues and opportunities and constraints were identified:

- Significantly high or new growth projections in various areas within the Town including the Lincolnville Major Transit Station Area (MTSA), lands west of Highway 48, east of McCowan Road and south of Stouffville Road (also referred to as MZO Lands), among others.
- Opportunity to revisit servicing strategies to service new growth areas (e.g., flow split between subtrunks 1, 3 & 10).

- Opportunity to extend servicing to existing unserved areas that rely on septic systems (e.g., Cam Fella Boulevard, Loretta Crescent).
- Opportunity/constraint to locate new infrastructure along Highway 48. Requires coordination and buy-in from Ministry of Transportation (MTO).
- Opportunity/constraint for extension of servicing to new growth areas west of Highway 48 via Stouffville system and/or Markham system.
- Potential future capacity issues in various existing sewers due to projected growth flows (e.g., subtrunk 10, subtrunk 13, local sewer along Stouffville Road, YDSS West trunk sewer – including potential backwater conditions in local sewers connected to the YDSS West trunk sewer).
- Eastern Gate Private WWPS is the most significant risk in terms of source water protection because of its proximity to groundwater well #3 and aquifer.
- Opportunity to permanently remove temporary WWPS by implementing new and previously proposed gravity solutions.

5.5.2.2 Gormley and Vandorf-Preston Lake

Currently the communities of Gormley and Vandorf-Preston Lake do not have municipal wastewater services. Through the master planning process and consultation with the Town, interest was identified for potential extension of municipal wastewater services to these communities.

The following key issues and opportunities and constraints were identified:

- Currently there is no existing municipal wastewater infrastructure within or in the immediate vicinity of these communities.
- The communities are located within the Oak Ridges Moraine and Greenbelt Plan Protected Countryside.
- The Oak Ridges Moraine Conservation Plan restrict “partial servicing” of water or wastewater services.
- The Greenbelt Plan restricts the extension of lake-based water and wastewater services.
- Opportunity to explore extension of wastewater servicing to these communities via Stouffville or neighbouring municipalities (e.g., Markham, Richmond Hills, Aurora).

Note: Future Class EA studies will explore the strategy and feasibility in further detail of how to provide municipal wastewater services to these communities.

1. Potential capacity limitations in various existing sewers due to growth. Opportunity to align SOGR program (upsizing / replacing aging watermain) to support growth and fire flow needs.
2. New infrastructure required as extension of wastewater servicing to new growth areas.
3. Potential backwater conditions due to surcharge in YDSS west trunk sewer.
4. Opportunity to extend servicing to existing unserved areas that rely on septic systems.
5. Opportunity to decommission temporary SPS by extension of gravity solutions.
6. Opportunity to utilize Highway 48 for new infrastructure alignments, but with MTO Coordination & Agreement needed.

Wastewater Facilities

- ▲ Regional Sanitary Pumping Station (SPS)
- ▲ Municipal Sanitary Pumping Station (SPS)
- ▲ Private Sanitary Pumping Station (SPS)
- Forcemain
- Siphon
- Gravity Main (Regional)
- Gravity Main (Municipal)

Other Features

- Railway
- Wooded Area and Parks
- Waterbodies
- Settlement Area Boundary
- Municipal Boundary
- Regional Municipal Boundary

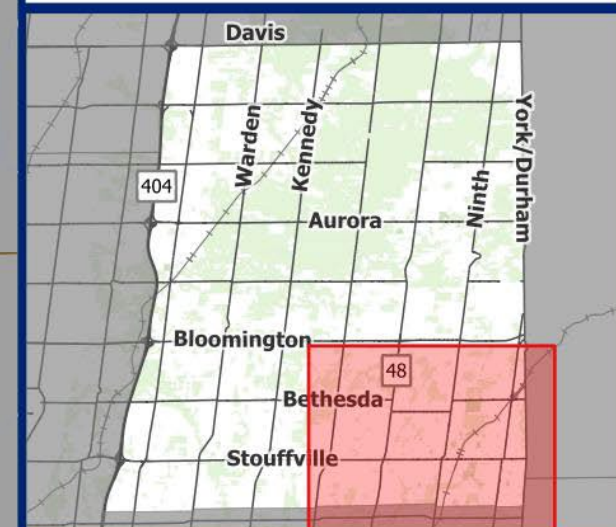
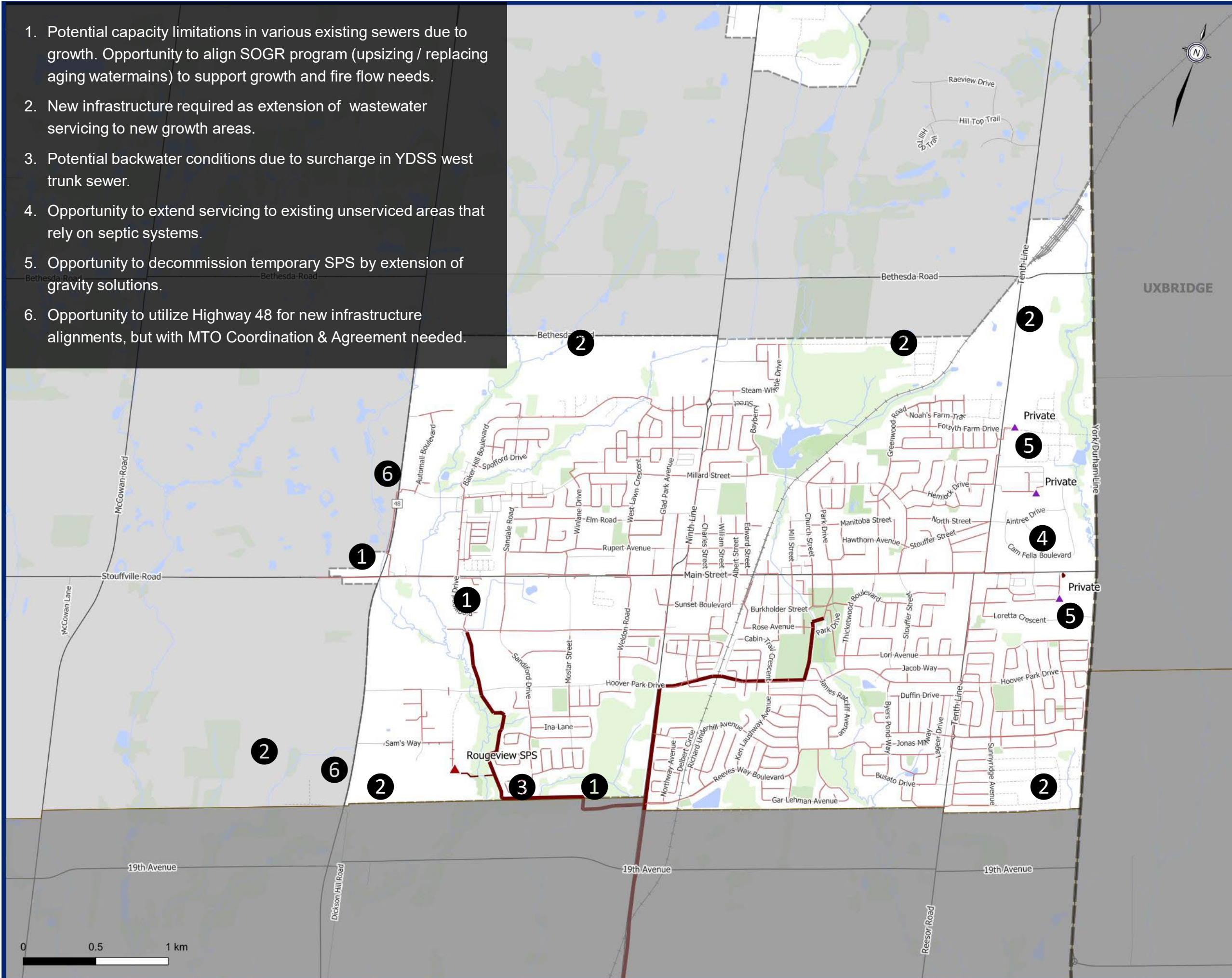


Figure 5-3

Opportunities and Constraints

Stouffville

5.6 Wastewater Servicing Strategy

The identification and assessment of servicing alternatives is a critical component of the master planning process. It enables a comprehensive review of various servicing solutions and should be documented to ensure the process has been carried out in a transparent and defensible manner.

5.6.1 Servicing Strategy Development

The 2024 Master Plan is an update to the 2018 Master Plan. As such, the servicing strategies in the 2018 Master Plan were reviewed to validate their continued need to service growth as well as new/updated strategies were developed to meet growth to the new 2051 planning horizon. The master plan servicing strategies were developed to address the problem / opportunity statement identified in Phase 1 of the Class EA process as described in more detail in **Section 3.6.1**.

Wastewater alternative servicing strategies were identified and reviewed in detail for existing and future growth areas within the Community of Stouffville, and at a high-level for Gormley, Vandorf-Preston-Lake and Whitebelt Lands. Collectively, all these area specific servicing solutions will form the overall wastewater servicing strategy for the Town of Whitchurch-Stouffville. The following section summarizes the wastewater alternative servicing strategies development for key growth areas within the Community of Stouffville as well as the high-level servicing review for Gormley, Vandorf-Preston-Lake and Whitebelt Lands.

5.6.1.1 Stouffville North-East / Old Elm (Formerly Lincolnville) GO Station

This area encompasses designated Greenfield Areas that are part of the Phase 3 developable areas in the North-east Community of Stouffville, as well as the Old Elm (formerly Lincolnville) GO Station area. This area is generally projected to be mainly residential with some allocation for employment growth. Currently there is no wastewater service in this area and new infrastructure will be required to provide service for future growth.

Building off the work of the 2018 Master Plan, the servicing strategy for this area remains consisting generally of:

- Convey flows from the areas west of the railway to future extension of Subtrunk 3 crossing the railway and water feature.
- Convey flows from the areas west of Tenth Line and east of the railway to future Subtrunk 15 and ultimately to Subtrunk 1.
- Convey remaining flows within the existing urban boundary to future extension of Subtrunk 1.

It should be noted that while the servicing strategy for this area remains the consistent with the 2018 Master Plan, there are two (2) major differences in this area that were considered in this Master Plan update:

1. Population and employment growth projections in this area have significantly increased when compared to the previous Master Plan mainly due to the Old Elm GO Major Transit Station Area and the new planning horizon to 2051.

2. Post-2051 growth outside the existing urban boundary to the north was not accounted for due to the uncertainty around these areas (commonly referred to as the Bethesda Lands) that were not approved for development by the Province of Ontario.

Figure 5-4 presents a high-level graphic overview of the wastewater servicing strategy for the Stouffville North-East / Old Elm (Formerly Lincolnville) GO Station Area.

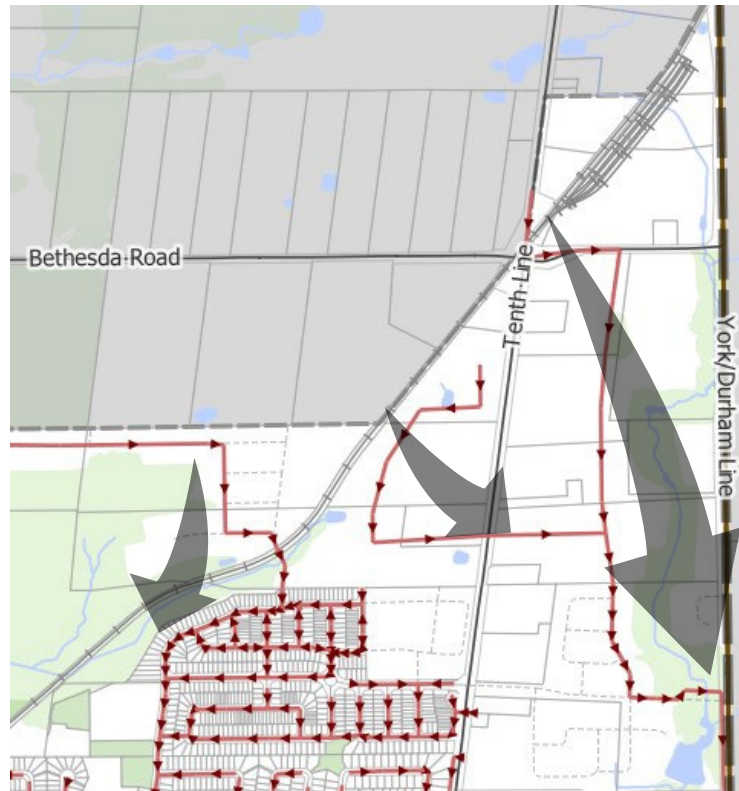


Figure 5-4: Stouffville North-East / Old Elm GO Station Wastewater Servicing Strategy

5.6.1.2 Stouffville Central-East / Cam Fella Boulevard

This area encompasses designated Built-Up Area of Cam Fella Boulevard. This area is at present mainly comprised of residential uses and is projected for future residential redevelopment with some allocation for employment growth. Currently, there is no wastewater service in this area and new infrastructure will be required to provide service for existing users and future growth.

This Master Plan Update explored opportunities to bring municipal wastewater services to this area in the future. The following alternatives to service the area were considered:

- **Alternative 1** – Convey flows west to Subtrunk 3 via existing sewers on Stouffer St. and on Main St.
- **Alternative 2** – Convey flows east to planned extension of Subtrunk 1 with a small area conveying flows west to Subtrunk 3 via existing sewers on Main St.

Figure 5-4 presents the wastewater servicing strategy for the Stouffville Central-East / Cam Fella Boulevard Area. **Table 5-5** lists the pros and cons for each alternative.

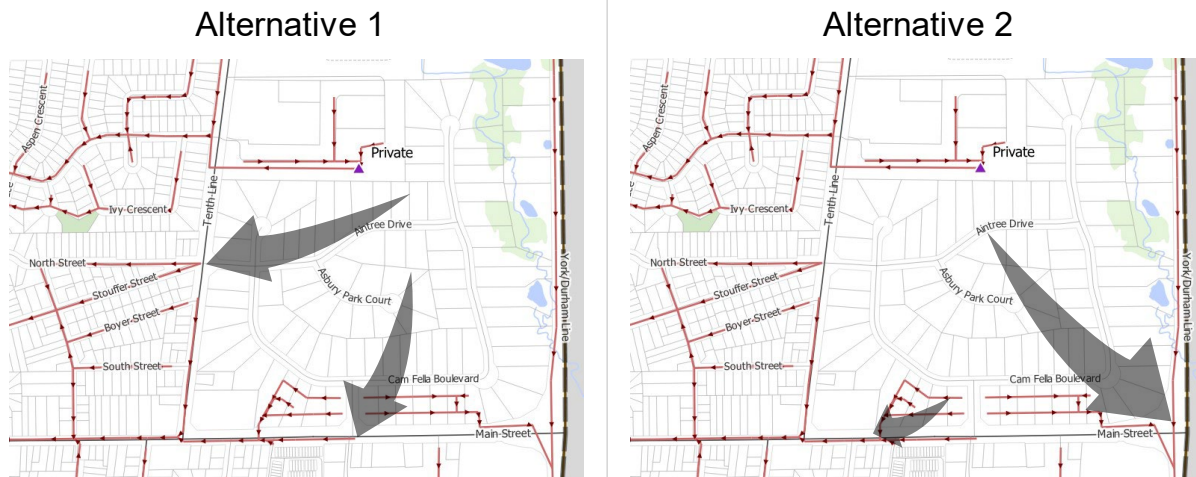


Figure 5-5: Stouffville Central-East / Cam Fella Boulevard Wastewater Servicing Strategy

Table 5-5: Stouffville Central-East / Cam Fella Boulevard Wastewater Servicing Strategy

Alternative	Pros	Cons
1	- For feasible gravity connection: - Maximizes use of existing infrastructure. - Can be implemented without depending on extension of Subtrunk 1. - Maximizes routes along road rights of way - Avoids TRCA Regulated lands.	- Gravity connection via Stouffer Road is not technically feasible based on ground and invert elevations of existing infrastructure. - Gravity connection via Main St is technically feasible to service some limited areas. - Some areas would require pumping solutions to convey flows to either Stouffer Road or Main St. - Potential for greater Greenhouse Gas Emissions and risk to wastewater overflows to the environment due to pumping solutions. - Potential for higher lifecycle cost due to operation and maintenance of pumping station(s). - Located within Wellhead Protection Area increasing risk of drinking water contamination – risk assessment may be required.
2	- Feasible gravity solution that avoids the need for pumping solutions in the area. - Potential for lower Greenhouse Gas Emissions and lower risk to wastewater overflows to the environment due to avoidance of pumping solutions. - Potential for lower lifecycle cost due to avoidance of pumping station(s).	- Cannot be implemented without planned extension of Subtrunk 1. - Some infrastructure located within TRCA Regulated lands. - Located within Wellhead Protection Area increasing risk of drinking water contamination – risk assessment may be required.

Alternative 2 provides a feasible gravity solution that avoids the need for new pumping stations in the area, as well as maximizes the use of the existing and planned infrastructure along Subtrunk 1; therefore, Alternative 2 was carried forward.

5.6.1.3 Stouffville Central-East / Loretta Crescent

This area encompasses designated Built-Up Area of Loretta Crescent. This area is at present comprised of residential uses and is located within areas in the community of Stouffville designated for intensification. Currently, there is no wastewater service in this area and new infrastructure will be required to provide service for existing users and future growth.

This Master Plan Update explored opportunities to bring municipal wastewater services to this area in the future. The following alternatives to service the area were considered:

- **Alternative 1** – Convey flows West to Subtrunk 4, and ultimately to the YDSS East trunk sewer.
- **Alternative 2** – Convey flows east to planned extension of Subtrunk 1.

Figure 5-6 presents the wastewater servicing strategy for the Stouffville Central-East / Loretta Crescent Area. **Table 5-6** lists the pros and cons for each alternative.



Figure 5-6: Stouffville Central-East / Loretta Crescent Wastewater Servicing Strategy

Table 5-6: Stouffville Central-East / Loretta Crescent Wastewater Servicing Strategy

Alternative	Pros	Cons
1	• Maximizes use of existing infrastructure. • Can be implemented without depending on extension of Subtrunk 1. • Maximizes routes along road rights of way • Avoids TRCA Regulated lands.	• Gravity connection via Loretta Crescent to the west is not technically feasible for the entire area based on ground and invert elevations of existing infrastructure. • Majority of the areas to the east would require a pumping solution to convey flows to existing system to the west. • Potential for greater Greenhouse Gas Emissions and risk to wastewater overflows to the environment due to pumping solution. • Potential for higher lifecycle cost due to operation and maintenance of pumping station. • Located within Wellhead Protection Area increasing risk of drinking water contamination – risk assessment may be required.

Alternative	Pros	Cons
2	• Feasible gravity solution that avoids the need for pumping solutions in the area. • Potential for lower Greenhouse Gas Emissions and lower risk to wastewater overflows to the environment due to avoidance of pumping solutions. • Potential for lower lifecycle cost due to avoidance of pumping station(s). • Maximizes use of existing and planned infrastructure along Subtrunk 1. • Maximizes routes along road rights of way • Avoids TRCA Regulated lands.	• Cannot be implemented without planned extension of Subtrunk 1. • Located within Wellhead Protection Area increasing risk of drinking water contamination – risk assessment may be required.

Alternative 2 provides a feasible gravity solution that avoids the need for a new pumping station in the area, as well as maximizes the use of the existing and planned infrastructure along Subtrunk 1; therefore, Alternative 2 was carried forward.

5.6.1.4 Stouffville North-West / Bethesda Road

This area encompasses designated Greenfield Area that are part of the Phase 3 developable areas in the North-west Community of Stouffville. This area is generally projected to be mainly residential with some allocation for employment growth. Currently there is no wastewater service in this area and new infrastructure will be required to provide service for future growth.

This Master Plan Update explored opportunities to bring municipal wastewater services to this area in the future. The following alternatives to service the area were considered:

- **Alternative 1** – Convey flows from lands west of the creeks to the east along Bethesda Road to planned Subtrunk 18. Remaining of the lands to convey flow south via Subtrunk 18 and new sewer north-south to Subtrunk 10.
- **Alternative 2** – Convey flows from lands west of the creeks to the south via additional creek crossing to planned local sewers connecting to Subtrunk 18. Remaining of the lands to convey flow south via Subtrunk 18 and new sewer north-south to Subtrunk 10.
- **Alternative 3** – Convey flows from lands west of the creeks to the west along Bethesda Road to planned extension of Subtrunk 13. Remaining of the lands to convey flow south via Subtrunk 18 and new sewer north-south to Subtrunk 10.

Figure 5-7 presents the wastewater servicing strategy for the Stouffville North-West /Bethesda Road Area. **Table 5-7** lists the pros and cons for each alternative.

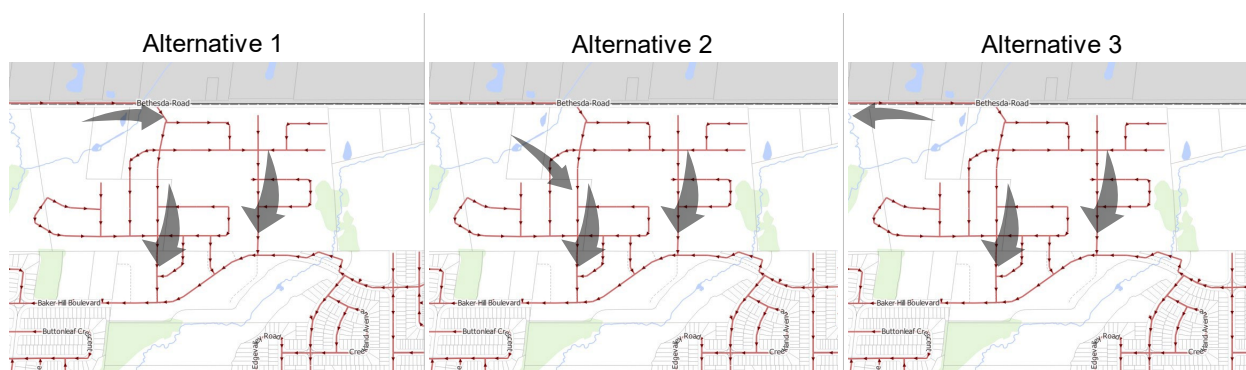


Figure 5-7: Stouffville North-West / Bethesda Road Wastewater Servicing Strategy

Table 5-7: Stouffville North-West / Bethesda Road Wastewater Servicing Strategy

Alternative	Pros	Cons
1	• Maximizes use of existing infrastructure. • Can be implemented without depending on extension of Subtrunk 13. • Maximizes routes along road rights of way • Avoids additional creek crossing. • Creek crossings coordinated with proposed watermain on same alignment.	• Gravity solution requires deep sewers to cross the creeks and connect to future Subtrunk 18 and existing Subtrunk 10. • Some infrastructure located within TRCA Regulated lands.
2	• Maximizes use of existing infrastructure. • Can be implemented without depending on extension of Subtrunk 13.	• Gravity solution requires deep sewers to cross the creeks and connect to future Subtrunk 18 and existing Subtrunk 10. • Some infrastructure located within TRCA Regulated lands. • Requires additional creek crossing that is not located on same alignment as proposed watermain along Bethesda Road. • Does not maximize routes along road rights of way.
3	• Maximizes use of existing infrastructure. • Can be implemented without depending on extension of Subtrunk 18. • Maximizes routes along road rights of way • Avoids additional creek crossing. • Creek crossings coordinated with proposed watermain on same alignment. • Longer alignment to connection to existing infrastructure. • Removes the need for deep sewers for the remaining of the lands east of the creeks.	• Cannot be implemented without planned extension of Subtrunk 13 along Highway 48 which would require coordination and agreement with MTO. • Some infrastructure located within TRCA Regulated lands.

Alternative 1 provides a feasible gravity solution that avoids the need for an additional creek crossing, is to be coordinated with the proposed watermain on the same alignment while being independent of the planned extension of Subtrunk 13. Therefore, Alternative 1 was carried forward.

5.6.1.5 Stouffville Central-West / Stouffville Road

This area is generally projected to be mainly residential with some allocation for employment growth. Currently there is existing wastewater service for this area. however, upgraded infrastructure will be required to provide service for future growth.

This Master Plan Update explored opportunities to upgrade municipal wastewater services to this intensified area in the future. The following alternatives to service the area were considered.

- **Alternative 1** – Convey flows to the east along Stouffville Road to existing Subtrunk 13. This would require upgrades to existing 200mm sewer on Stouffville Road to accommodate additional flows.
- **Alternative 2** – Convey flows to the south along Highway 48, and ultimately to the proposed McCowan Road gravity sewer.
- **Alternative 3** – Convey flows to the south via new sewers on future local roads, and ultimately to the proposed McCowan Road gravity sewer.
- **Alternative 4** – Convey flows to the west along Stouffville Road, and then south along McCowan Road, and ultimately to the proposed McCowan Road gravity sewer.

Figure 5-8 presents a high-level graphic overview of the wastewater servicing strategy for the Stouffville Central-West / Stouffville Road Area. **Table 5-8** lists the pros and cons for each alternative.

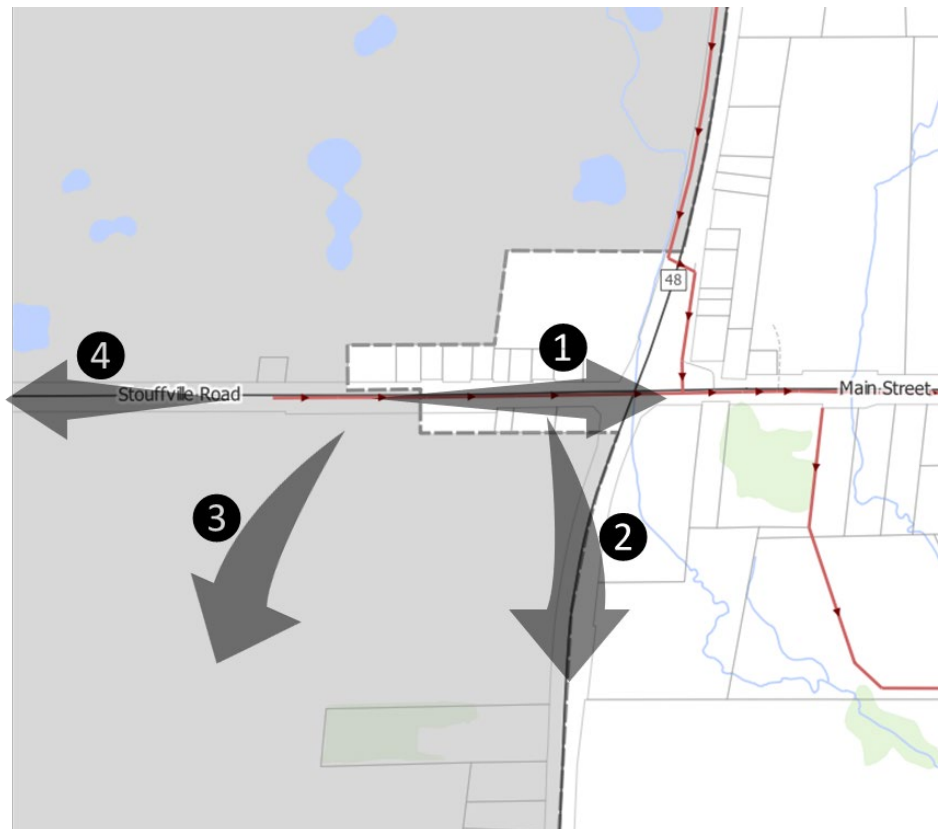


Figure 5-8: Stouffville Central-West / Stouffville Road Wastewater Servicing Strategy

Table 5-8: Stouffville Central-West / Stouffville Road Wastewater Servicing Strategy

Alternative	Pros	Cons
1	- Maximizes use of existing infrastructure. - Can be implemented without depending on the planned McCowan Road gravity sewer. - Can be coordinated with the proposed watermain upgrades on Stouffville Road.	Crossing Highway 48 would require coordination and agreement with MTO.
2	Opportunity to provide service to existing properties along Highway 48.	- There is no existing or planned infrastructure immediately to the south. Cannot be implemented without planned McCowan Road gravity sewer. - Work on Highway 48 would require coordination and agreement with MTO.
3	No work on Highway 48, which would require coordination and agreement with MTO.	- There is no existing or planned infrastructure immediately to the south. Cannot be implemented without planned McCowan Road gravity sewer and unplanned local sewers. - Within Oak Ridges Moraine boundary, restricted for development. - Uncertainty about location of future local roads or private easements.
4	No work on Highway 48, which would require coordination and agreement with MTO.	- There is no existing or planned infrastructure immediately to the west. Cannot be implemented without planned McCowan Road gravity sewer and unplanned Stouffville Road sewers. - No planned growth west of this area.

Alternative 1 provides a feasible gravity solution that maximizes the use of the existing infrastructure and avoids the dependence on the planned McCowan Road gravity sewer. It can also be coordinated with the proposed watermain upgrades on the same alignment on Stouffville Road to minimize local disruption. Therefore, Alternative 1 was carried forward.

5.6.1.6 Stouffville South-West / MZO Lands

This area encompasses designated Greenfield Areas in southwest Stouffville. This area is generally projected to be mainly residential with some allocation for employment growth. Currently there is no wastewater service in this area and new infrastructure will be required to provide service for future growth.

This Master Plan Update explored opportunities to bring municipal wastewater services to this area in the future. The following alternatives to service the area were considered:

- Alternative 1** – Gravity servicing via new trunk sewer along Highway 48.
- Alternative 2** – Gravity servicing via new trunk sewer along McCowan Road.
- Alternative 3** – Pumping-Gravity via new WWPS on 19th Avenue discharging to YDSS West via Stouffville.
- Alternative 4** – Pumping-Gravity via new WWPS on 19th Avenue discharging to YDSS Main via Markham.

Figure 5-9 presents a high-level graphic overview of the wastewater servicing strategy for the Stouffville South-West / MZO Lands Area. **Table 5-9** lists the pros and cons for each alternative.

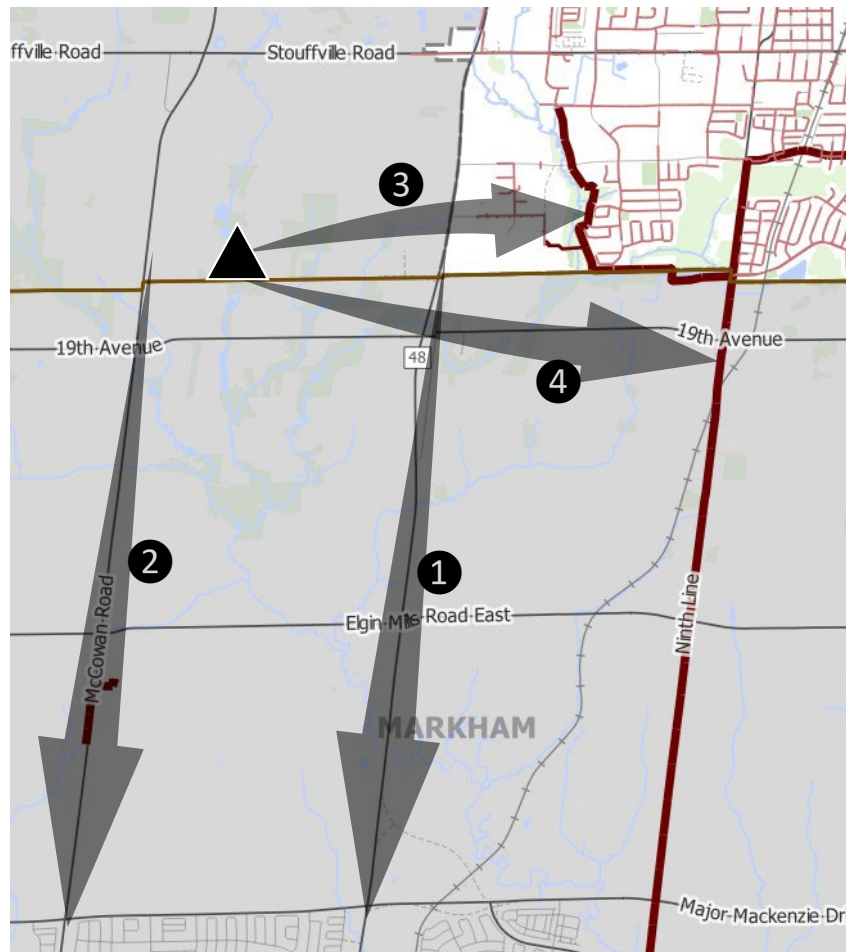


Figure 5-9: Stouffville South-West / MZO Lands Wastewater Servicing Strategy

Table 5-9: Stouffville South-West / MZO Lands Wastewater Servicing Strategy

Alternative	Pros	Cons
1	- Feasible gravity solution that avoids the need for pumping solutions in the area. - Potential for lower Greenhouse Gas Emissions and lower risk to wastewater overflows to the environment due to avoidance of pumping solutions. - Potential for lower lifecycle cost due to avoidance of pumping station(s). - Maximizes routes along road rights of way	- more than 6 km of trunk sewer on highway. - Work on Highway 48 would require coordination and agreement with MTO.

Alternative	Pros	Cons
2	• In line with the Regional Master Plan • No work on Highway 48, which would require coordination and agreement with MTO. • Feasible gravity solution that avoids the need for pumping solutions in the area. • Potential for lower Greenhouse Gas Emissions and lower risk to wastewater overflows to the environment due to avoidance of pumping solutions. • Potential for lower lifecycle cost due to avoidance of pumping station(s). • Maximizes routes along road rights of way	• More than 6 km of trunk sewer on regional road.
3	• Can be implemented without depending on the new gravity trunk sewer to Markham.	• Crossing Highway 48 would require coordination and agreement with MTO. • Potential for greater Greenhouse Gas Emissions and risk to wastewater overflows to the environment due to pumping solution. • Potential for higher lifecycle cost due to operation and maintenance of pumping station. • Some infrastructure located within TRCA Regulated lands.
4	• Can be implemented without depending on the new gravity trunk sewer to Markham. • Maximizes routes along road rights of way	• Crossing Highway 48 would require coordination and agreement with MTO. • Potential for greater Greenhouse Gas Emissions and risk to wastewater overflows to the environment due to pumping solution. • Potential for higher lifecycle cost due to operation and maintenance of pumping station.

Alternative 2 provides a feasible gravity solution that avoids the need for new pumping stations in the area and avoids construction on Highway 48. Therefore, Alternative 2 was carried forward.

5.6.2 High-Level Wastewater Servicing Review

The following section summarizes the high-level servicing review for Gormley, Vandorf-Preston-Lake and Whitebelt Lands. Please note that future Class EA studies will explore the strategy and feasibility in further detail of how to provide municipal wastewater services to these communities.

5.6.2.1 Gormley

Currently this area is not serviced by municipal sanitary sewers. This Master Plan Update explores opportunities to bring servicing to these areas in the future. The following wastewater servicing strategies were identified for Gormley:

1. Do Nothing
2. Gravity servicing via Markham system.
3. Servicing via Richmond Hill system.
 - a. Gravity servicing via Richmond Hill system.
 - b. Pumping/Gravity servicing via Richmond Hill system.
4. Gravity servicing via Stouffville system.
5. Local Treatment System

Figure 5-10 presents a high-level graphic overview of the wastewater servicing strategy for Gormley.

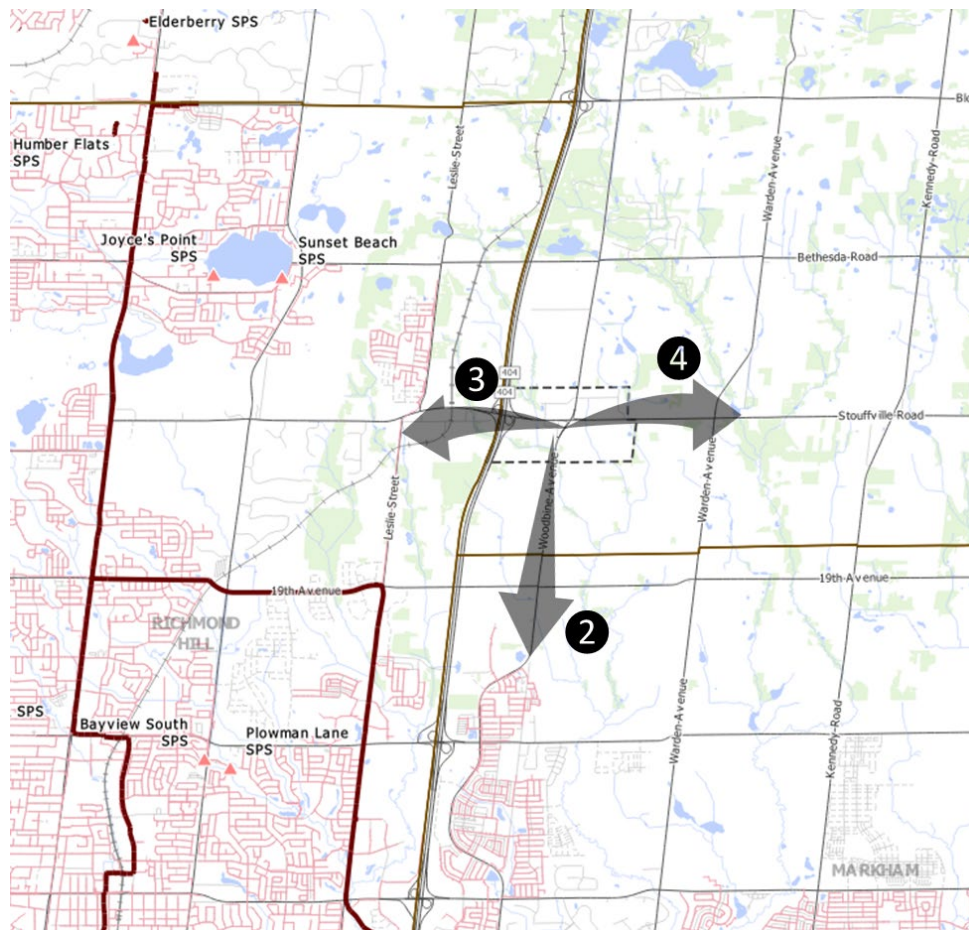


Figure 5-10: Gormley Wastewater Servicing Strategy

5.6.2.2 Vandorf

Currently this area is not serviced by municipal sanitary sewers. This Master Plan Update explores opportunities to bring servicing to these areas in the future. The following wastewater servicing strategies were identified for Vandorf:

1. Do Nothing
2. Gravity servicing via Aurora system.
3. Gravity servicing via new Gormley system.
4. Local Treatment System

Figure 5-11 presents a high-level graphic overview of the wastewater servicing strategy for the Vandorf.

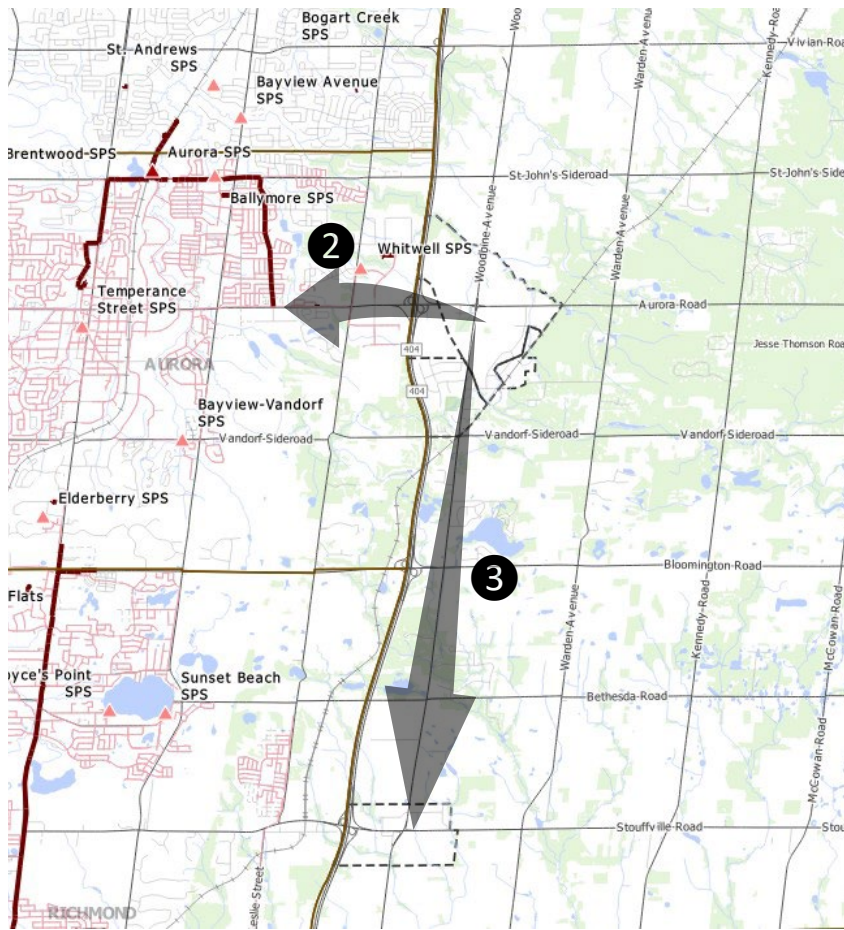


Figure 5-11: Vondorf Wastewater Servicing Strategy

5.6.2.3 Whitebelt Lands

Currently this area is not serviced by municipal sanitary sewers. This Master Plan Update explores opportunities to bring servicing to these areas in the future. The following wastewater servicing strategies were identified for Whitebelt Lands:

- Area 1 potential for inter-municipal servicing via Markham as part of Gormley future servicing strategy.
- Areas 2-6 does not have existing infrastructure in the immediate vicinity. Potential to explore servicing via Markham to the south.
- Area 7 adjacent to MZO lands. Potential to be serviced via the proposed McCowan Road gravity sewer.
- Area 8 & 9 part of the MZO lands. Proposed servicing via the proposed McCowan Road gravity sewer.

Figure 5-12 presents a high-level graphic overview of the wastewater servicing strategy for the Whitebelt Lands. As previously documented in **Section 5.6.1.6**, it is planned to service the Whitebelt Lands via the proposed McCowan Road gravity sewer in Regional Master Plan.

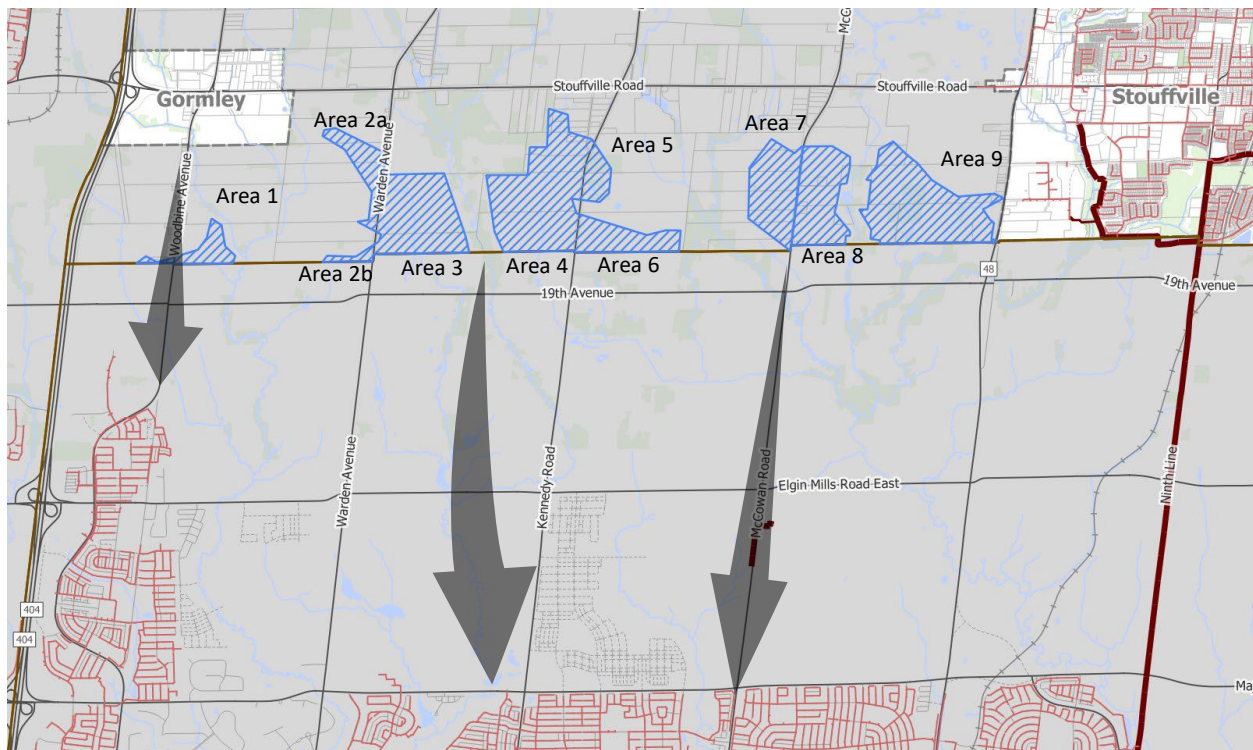


Figure 5-12: Whitebelt Lands Wastewater Servicing Strategy

5.6.3 Preferred Wastewater Servicing Strategy

Several separate wastewater servicing strategies are recommended throughout the Town of Whitchurch-Stouffville that collectively form the overall preferred wastewater strategy to service the projected growth to 2051. The preferred servicing strategy was developed to ensure that the extension of the existing wastewater collection system is aligned with existing planning policies, designates residential and employment growth areas and can support intensification.

The primary objective of the wastewater servicing strategy is to build off the configuration of the existing system within the Town of Whitchurch-Stouffville. Since only the Community of Stouffville has municipal wastewater services, the wastewater strategy focuses on this key area.

The Master Plan Update recommends that a separate study be carried out to evaluate the potential for municipal wastewater services for the communities of Gormley, Vandorf-Preston and the expanded urban area in the Whitebelt.

In general, the wastewater servicing strategy for the Community of Stouffville consists of the following:

- Intensification along the Main Street corridor will be serviced by existing infrastructure.
- Flows from new growth southeast will be conveyed west to the YDSS trunk sewer by gravity through the new subtrunk 2.
- Flows from new growth areas in the north will be conveyed south to the YDSS trunk sewer through subtrunk 10 (north-west), subtrunk 1 (east) and subtrunk 3 (central).
- Design and construction of subtrunk 1 will allow for the potential decommission of the private Northern Gate WWPS and Eastern Gate WWPS if required.
- Sewer upgrade on Stouffville Road west of Highway 48 to accommodate additional flows from intensification.
- Flows from areas west of Little Rouge River will be conveyed west and south via a proposed subtrunk along Nineteenth Avenue and via a proposed Regional trunk sewer on McCowan Road.
- Providing service to Stouffville South-West (MZO Lands) via a proposed Regional trunk sewer along Nineteenth Avenue and McCowan Road.

Key capital projects required to achieve this strategy include the following:

- Subtrunk 2 extension to service southeast growth areas.
- Subtrunk 1 extension up to Tenth Line to service northeast growth areas.
- New subtrunk 15 and connection to subtrunk 1.
- Decommissioning of the Rougeview WWPS.
- Sewer upgrade on Stouffville Road west of Highway 48.
- Extension of subtrunk 9 to a new trunk sewer along Nineteenth Avenue and McCowan Road.
- New trunk sewer along Nineteenth Avenue and McCowan Road. (Regional)

In addition to the key capital projects, several other projects and upgrades are included within the wastewater servicing strategy to address existing and future capacity needs within the collection system. The complete Preferred Wastewater Strategy is shown in **Figure 5-13**. Each capital project is listed along with its respective estimated capital cost in **Section 5.7**.

Proposed Wastewater System

-  Decommissioned Sanitary Pumping Station (SPS)
-  Connection Point
-  MP Capital Project - Stouffville
-  Future Local Collection
-  MP Capital Project - Outside of Stouffville

Existing Wastewater System

-  Regional Sanitary Pumping Station (SPS)
-  Private Sanitary Pumping Station (SPS)
-  Forcemain
-  Gravity Main (Regional)
-  Siphon
-  Gravity Main (Municipal)

Other Features

-  Railway
-  Wooded Area and Parks
-  Waterbodies
-  Settlement Area Boundary
-  Municipal Boundary
-  Regional Municipal Boundary

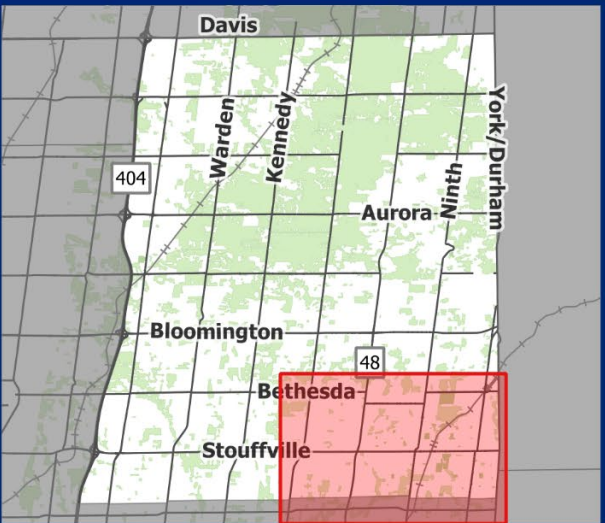
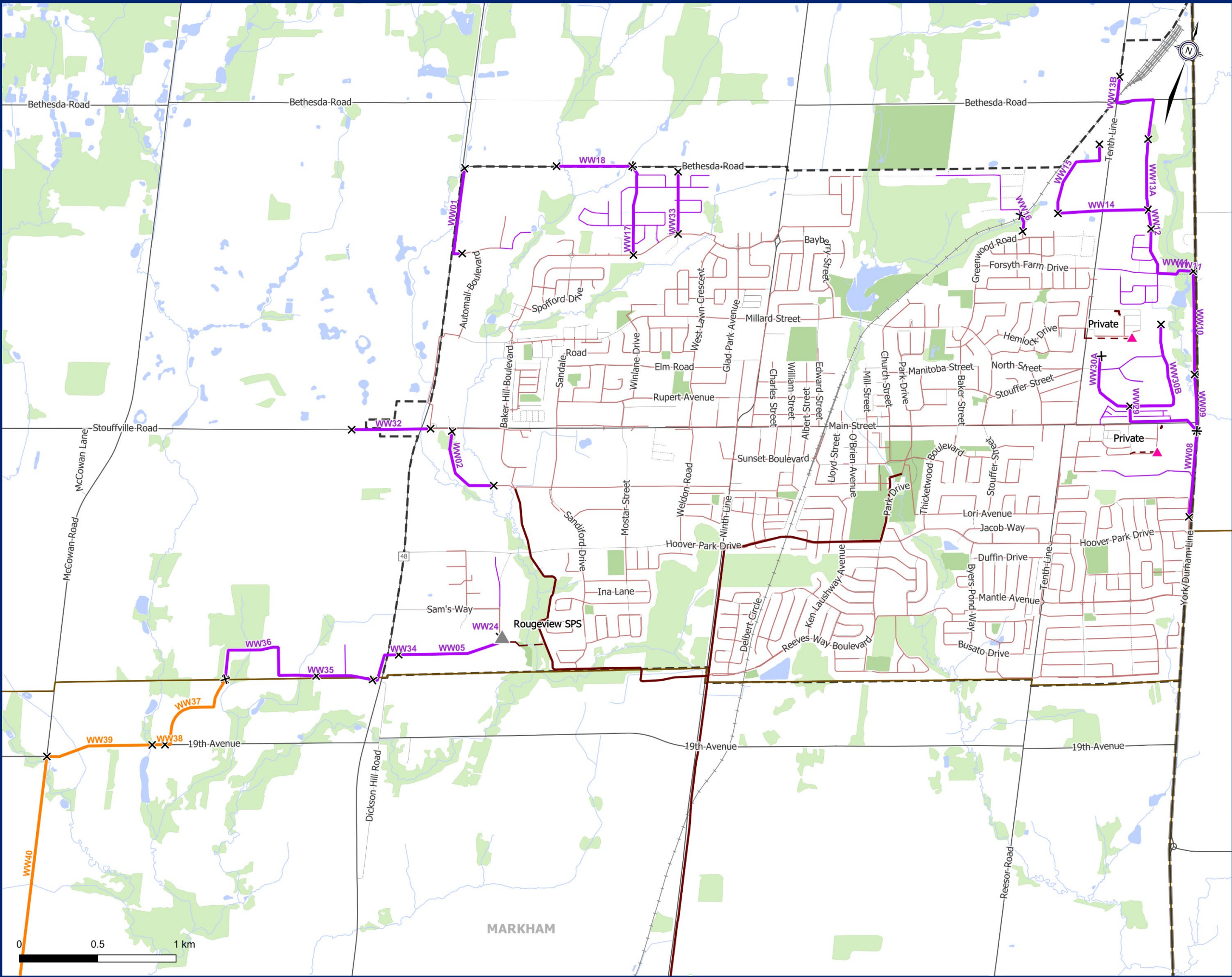


Figure 5-13

Community of Stouffville Preferred Wastewater Servicing Strategy

5.7 Wastewater Capital Program

As described in the previous sections, the Preferred Wastewater Servicing Strategy has been developed to support the servicing needs of the existing and future growth areas within the Community of Stouffville to 2051. The capital costs for each project of the Preferred Strategy were estimated according to the costing methodology within **Section 3.7**. These projects are listed according to their project number and are shown in **Table 5-10**. The capital program table contains project descriptions, dimensions, proposed timing, and estimated total project cost.

The wastewater capital program will work as a foundation for the Town of Whitchurch-Stouffville Capital Budget. The capital program provides a list and timing of new assets that the Town will operate and maintain; and therefore, it is the starting point for the planning of operation and maintenance costs and resources allocation for new wastewater infrastructure.

5.8 Wastewater Implementation Plan

The Water and Wastewater Master Plan sets out to satisfy the EA Approach 1 requirements according to the MEA Class EA document. The Preferred Wastewater Servicing will support the servicing needs of the Town of Whitchurch-Stouffville's future growth to 2051. This strategy will be implemented in accordance with each project Class EA schedule.

The Class EA requirements for each project have been identified in the Capital Program. Schedule A and A+ projects may move forward to design and construction, with A+ projects requiring public notification prior to implementation. Schedule B or equivalent projects that have been identified within the Preferred Wastewater Servicing Strategy will be part of a developer-led local servicing plan and approved through the Planning Act Municipal development review process or will be satisfied through separate Class EA study prior to design and construction. The Preferred Wastewater Strategy did not identify any Schedule C projects.

During the next steps of the implementation program, primarily during detailed design of the projects, the following requirements should be considered:

- Communications and engagement,
- Finalization of property requirements,
- Refinement of infrastructure alignment,
- Identification of preferred construction methodologies,
- Completion of additional supporting investigations as required (e.g., natural environment, archaeological, cultural heritage, geotechnical, hydrogeological, etc.),
- Review and mitigation of potential construction related impacts, and,
- Satisfying of all provincial, municipal and conservation authority approval requirements.

With respect to Town planning and budgeting, this program will be utilized as high-level baseline estimate for the Town capital budget. These costs will be further developed and refined during the implementation phases as more detailed information becomes available.

The anticipated timing of each project within the Preferred Strategy has been established based on the projected population and employment growth within the Town of Whitchurch-Stouffville. The wastewater program's project scheduling has also been cross referenced with the water program to support project coordination along common alignments.

Given the growth-related nature of the servicing strategies, the wastewater capital program forms the foundation for the wastewater component of the Town of Whitchurch-Stouffville Development Charges (DC) By-Law.

Table 5-10: Wastewater Capital Program

Master Plan ID	Project Name	Project Description	Year in Service	Class EA	Size/Capacity	Depth	Length (m)	Class Estimate Type	Project Complexity	Area Condition	Base Construction Cost (\$2023)	Crossings (\$2023)	Additional Costs (\$2023)	Soft Costs (Engineering + In-House) (\$2023)	Property Costs (\$2023)	Project Contingency (\$2023)	Non-Refundable HST (\$2023)	Total Estimated Cost (\$2023)
WW01	Subtrunk 13 Extension	200mm sewer on Highway 48 from Norman Jones Place to Bethesda Road	2046-2051	A+	200 mm	Sewer 5m	600	Class 4	Med	Rural	480,271	93,242	152,000	174,000	11,000	137,000	17,000	\$ 1,064,000
WW02	Subtrunk 11 Extension	250/300mm sewer on future road south of Main Street to YDSS West Trunk Sewer	2026-2031	A+	300 mm	Sewer 5m	545	Class 4	High	Rural	484,367	1,000,000	475,000	490,000	39,000	622,000	52,000	\$ 3,162,000
WW05	Subtrunk 9 Extension	375mm sewer on future road from the existing Rougeview SPS to Highway 48	2031-2036	A+	300 mm	Sewer 10m	700	Class 4	High	Urban	3,483,149	-	1,115,000	1,150,000	92,000	1,460,000	122,000	\$ 7,422,000
WW08	Subtrunk 1 Extension (Part 1 of 6)	600mm sewer on York/Durham Line from the existing subtrunk 1 sewer north of Hoover Park Drive to Main Street	2026-2031	Schedule B Completed	600 mm	Tunnel Sewer	700	Class 4	High	Urban	6,230,263	-	1,994,000	2,056,000	165,000	2,611,000	218,000	\$ 13,274,000
WW09	Subtrunk 1 Extension (Part 2 of 6)	450mm sewer on York/Durham Line from Main Street to the north limit of CamFella development	2026-2031	Schedule B Completed	450 mm	Tunnel Sewer	360	Class 4	High	Suburban	3,204,135	-	1,025,000	1,057,000	85,000	1,343,000	112,000	\$ 6,826,000
WW10	Subtrunk 1 Extension (Part 3 of 6)	450mm sewer on York/Durham Line from the north limit of CamFella development to Forsyth Farm Drive	2026-2031	Schedule B Completed	450 mm	Tunnel Sewer	660	Class 4	High	Suburban	5,874,248	-	1,880,000	1,939,000	155,000	2,462,000	206,000	\$ 12,515,000
WW11	Subtrunk 1 Extension (Part 4 of 6)	450mm sewer on Forsyth Farm Drive from York/Durham Line to Keeler Avenue	2026-2031	Schedule B/Integrated Planning	450 mm	Sewer 10m	510	Class 4	High	Rural	2,022,977	1,433,949	1,106,000	1,141,000	91,000	1,449,000	121,000	\$ 7,365,000
WW12	Subtrunk 1 Extension (Part 5 of 6)	450mm sewer on Keeler Avenue from Forsyth Farm Drive to the connection to subtrunk 15 on future road to the north	2026-2031	A+	450 mm	Sewer 10m	130	Class 4	High	Rural	515,661	-	165,000	170,000	14,000	216,000	18,000	\$ 1,099,000
WW13A	Subtrunk 1 Extension (Part 6 of 6)	375mm sewer on future road east of Tenth Line from the connection to subtrunk 15 to Bethesda Road (Deep Excavation Required)	2026-2031	Schedule B Completed	375 mm	Sewer 10m	450	Class 4	High	Rural	1,722,436	-	551,000	569,000	46,000	722,000	60,000	\$ 3,670,000
WW13B	Subtrunk 1 Extension (Part 6 of 6)	375mm sewer on future road east of Tenth Line from the connection to subtrunk 15 to Bethesda Road (Shallow Excavation Required)	2026-2031	Schedule B Completed	375 mm	Sewer 5m	660	Class 4	High	Rural	625,482	1,000,000	520,000	537,000	43,000	681,000	57,000	\$ 3,463,000
WW14	Subtrunk 15 (Part 1 of 2)	300mm on future road from the connection to subtrunk 1 to the west crossing Tenth Line	2026-2031	A+	300 mm	Sewer 5m	580	Class 4	High	Rural	515,473	52,111	182,000	187,000	15,000	238,000	20,000	\$ 1,209,000
WW15	Subtrunk 15 (Part 2 of 2)	300mm on future road west of Tenth Line and south of the Go Transit Railway	2026-2031	A+	300 mm	Sewer 5m	610	Class 4	High	Rural	542,136	-	173,000	179,000	14,000	227,000	19,000	\$ 1,155,000
WW16	Subtrunk 3 Extension	300mm sewer from the existing subtrunk 3 sewer north of Greenwood Road to the north side of the Go Transit Railway	2026-2031	Schedule B/Integrated Planning	300 mm	Sewer 10m	110	Class 4	High	Rural	408,998	1,000,000	451,000	465,000	37,000	591,000	49,000	\$ 3,003,000
WW17	Subtrunk 18	300mm sewer on future road from Baker Hill Boulevard to Bethesda Road (Subtrunk 18)	2023-2026	A+	300 mm	Sewer 10m	590	Class 4	Med	Rural	2,193,719	-	581,000	666,000	42,000	522,000	67,000	\$ 4,071,000
WW18	Subtrunk 18	300mm sewer on Bethesda Road from future sewer to the west of the creek (Subtrunk 18)	2031-2036	A+	300 mm	Sewer 5m	480	Class 4	High	Rural	426,598	186,484	196,000	202,000	16,000	257,000	22,000	\$ 1,306,000
WW24	Rougeview SPS Decommission	Rougeview Sanitary Pumping Station Decommission	2031-2036	A+							-			-	-	-	-	\$ 450,000
WW29	Main Street Sewer	300mm sewer on Main Street from Mohawk Gate to York Durham Line	2031-2036	A+	300 mm	Sewer 10m	560	Class 4	High	Suburban	2,498,608			842,000	67,000	1,069,000	89,000	\$ 5,434,000
WW30A	Cam Fella Boulevard Sewer (Part 1 of 2)	200mm sewer on Cam Fella Boulevard to Main St	2031-2036	A+	200 mm	Sewer 5m	450	Class 4	Low	Suburban	432,244	-	91,000	123,000	5,000	65,000	12,000	\$ 728,000
WW30B	Cam Fella Boulevard Sewer (Part 2 of 2)	200mm sewer on Cam Fella Boulevard to Main St	2031-2036	A+	200 mm	Sewer 5m	800	Class 4	Low	Suburban	768,434	-	161,000	219,000	9,000	116,000	21,000	\$ 1,295,000
WW31	Flow Monitoring	Flow Monitoring Program (ongoing, 4 more years remaining at \$160k per year)	2021-2026	-	-	-	-	-	-	-		-	-	-	-	-	-	\$ 640,000
WW32	Stouffville Road Sewer Upgrade	the existing 200mm sewer along Stouffville Road to be upgraded to 300mm	2036-2041	A+	300 mm	Sewer 5m	500	Class 4	High	Rural	444,373	1,000,000	462,000	477,000	38,000	605,000	51,000	\$ 3,078,000
WW33	Bona Land Development	375mm sewer on proposed Street A within Bona Land Development	2023-2026	A+	375 mm	Sewer 10m	400	Class 4	Low	Rural	1,531,054	-	322,000	436,000	19,000	231,000	42,000	\$ 2,580,000

Table 5-10: Wastewater Capital Program

Master Plan ID	Project Name	Project Description	Year in Service	Class EA	Size/Capacity	Depth	Length (m)	Class Estimate Type	Project Complexity	Area Condition	Base Construction Cost (\$2023)	Crossings (\$2023)	Additional Costs (\$2023)	Soft Costs (Engineering + In-House) (\$2023)	Property Costs (\$2023)	Project Contingency (\$2023)	Non-Refundable HST (\$2023)	Total Estimated Cost (\$2023)
WW34	Highway 48 Crossing	600mm sewer crossing Hwy 48 from Smartcentres to MZO1 lands	2031-2036	A+	600 mm	Sewer 10m	300	Class 4	High	Rural	1,343,061	1,433,949	889,000	917,000	73,000	1,164,000	97,000	\$ 5,917,000
WW35	MZO1 Lands Sewer	600mm sewer of future road	2023-2026	A+	600 mm	Sewer 5m	365	Class 4	Low	Rural	519,506	-	109,000	148,000	6,000	78,000	14,000	\$ 875,000
WW36	MZO2 Lands Sewer	600mm sewer of future road	2031-2036	A+	600 mm	Sewer 10m	930	Class 4	High	Rural	4,163,490	553,801	1,510,000	1,557,000	125,000	1,977,000	165,000	\$ 10,051,000
WW41	Master Plan	Wastewater Master Plan (occurs every 5 years at \$300k each)	2026-2051	-	-	-	-	-	-	-		-	-	-	-	-	-	\$ 1,500,000
WW42	Future Studies	Vandorf Future Service Area Study	2026-2031	-	-	-	-	-	-	-		-	-	-	-	-	-	\$ 250,000
WW43	Future Studies	Gormley Future Service Area Study	2026-2031	-	-	-	-	-	-	-		-	-	-	-	-	-	\$ 250,000
WW44	Future Studies	Whitebelt Lands Future Service Area Study	2026-2031	-	-	-	-	-	-	-		-	-	-	-	-	-	\$ 250,000
WW45	Flow Monitoring	Flow Monitoring Program (24 years; annual costs of \$200k expected)	2026-2051	-	-	-	-	-	-	-		-	-	-	-	-	-	\$ 4,800,000
Total Program 2051																		\$108,702,000

6.0 Further Considerations

The *Further Considerations* section provides an overall review of the permits and approvals, and mitigation measures that may be required for the preferred water and wastewater servicing strategy for the Town of Whitchurch-Stouffville.

6.1 Permits and Approvals

This section provides an overview of the key permits and approvals that may be required in advance of the construction activities, and which will be further explored during detailed design.

6.1.1 Department of Fisheries and Oceans Canada (DFO)

A permit may be required for any works that affect aquatic Species at Risk (SAR) identified in the *Species at Risk Act* (SARA). A Request for Review must be submitted to the Fish and Fish Habitat Program during detailed design to determine whether a permit may be required for construction of the recommended water and wastewater strategies.

6.1.2 Ministry of the Environment, Conservation and Parks

6.1.2.1 Permit to Take Water

A Permit to Take Water (PTTW) is required for any water takings over 50,000 L/day. For a taking of greater than 50,000 L/day, but less than 400,000 L/day, the water taking shall be registered in the Environmental Activity and Sector Registry.

In the event that groundwater is present within the range of excavation depth, there is potential for dewatering requirements to exceed 400,000 L/d: this would require MECP approval through the PTTW application process. Prior to submitting any PTTW applications, ensure all that of the other related necessary approvals are obtained first.

6.1.2.2 Environmental Activity and Sector Registry

Any activities that discharge air contaminants at the facility will be registered in the Environmental Activity and Sector Registry as prescribed by *O. Reg. 1/17*.

6.1.2.3 Environmental Compliance Approval

Environmental Compliance Approval(s) are required for all sewage works.

6.1.3 Ministry of Natural Resource and Forestry

Wildlife relocation permits may be required if wildlife removals are needed during construction. Similarly, fish relocation permits may be required if fish salvage or relocations are needed during construction. Permits or other authorization may be required to conduct an activity that could impact an endangered or threatened plant or animal or its habitat.

6.1.4 Ministry of Tourism, Culture and Sport

The Ministry of Citizenship and Multiculturalism (MCM), formerly Ministry of Tourism, Culture and Sport (MTCS) at the commencement of this study, must approve of the fieldwork and reporting completed as part of a Cultural Heritage Screening and Archaeological Assessment and must deem it compliant with the Ministry's standards. These studies may be required for identified Schedule B and Schedule C Class EA projects.

6.1.5 Conservation Authorities

Construction plans and supporting technical studies will be required to assess impacts, and to implement strategies to minimize and mitigate impacts, to regulated natural features and hazards. The Town of Whitchurch-Stouffville requires permits under *O. Reg 166/06* and *O. Reg 179/06*, from TRCA and LSRCA, respectively, for interference or alteration to wetlands or watercourses, or for development within regulated areas.

The following information has been provided for work within the jurisdiction of the TRCA.

Work within TRCA Jurisdiction

- If TRCA property access is required for the purpose of completing technical studies associated with this project, a Permission To Enter (PTE) must be obtained from TRCA Property staff prior to entry. Recommended contact Desiree Sampson, Property Coordinator at desiree.sampson@trca.ca for additional information.
- An archaeological review by TRCA's archaeological staff must precede any disturbance to TRCA property. If an archaeological assessment is required, scheduling will be subject to weather, seasonal programs and other field work and are at additional cost to the proponent. Recommended contact Alistair Jolly, Archaeologist at alistair.jolly@trca.ca for additional information.

6.1.6 Regional and Municipal Permits

The following permits may be required from the Town of Whitchurch-Stouffville and/or the Region of York for construction of the recommended works:

- Road Occupancy Permit.
- Traffic Controls Plans.
- Tree removal will be conducted in order to comply with the Town and Region's By-law as required.

6.1.7 Drinking Water Source Protection

The *Clean Water Act* (2006) and the Source Protection Plans (SPPs) that follow under it provide guidance and requirements in land use planning for the protection of Ontario's water resources. In some circumstances, sewage infrastructure may be considered an activity that poses a "significant" risk to drinking water quality. The Town lies on the divide between two Source Protection Areas:

1. Lakes Simcoe and Couchiching / Black River Source Protection Area, which occupies approximately the northern half of Town, and,
2. Toronto Source Protection Area, which occupies the remaining southern portion of the Town.

Within the Town boundaries, there are no identified surface water intake protection zones (IPZ) but there are several Wellhead Protection Areas (WHPA). These WHPAs are associated with the municipal wells serving the Town of Whitchurch-Stouffville, as well as a few wells that lie in the neighbouring towns (e.g., Newmarket, East Gwillimbury).

One of the objectives of York Region's source protection program is to work with Conservation Authorities, local municipalities and other Regional departments to ensure new development considers source protection vulnerable areas.

The Master Plan recommends a number of infrastructure projects to support development proposals in potentially vulnerable areas. The Town of Whitchurch-Stouffville in collaboration with York Region will determine the need for any new Risk Management Plans and continue to complete best practice education for sites within vulnerable areas that do not require a Risk Management Plan.

6.1.8 Utilities

The preferred servicing strategies may require relocation of utilities and/or temporary easements to enable the construction of the proposed works. Detailed plan and profile drawings of the recommended sewers will be circulated to the various utility companies once a preferred route has been established.

Coordination to address any utility conflicts will be completed with the utility companies and through the Town as part of detailed design. Conservation Authorities will also need to be contacted for permits and approvals for any utility relocations identified within their regulation limit.

6.2 Impacts and Mitigation Measures

As an Approach 1 Master Plan Class EA the study has recommended detailed studies to further review the potential impacts and determine appropriate mitigation measures. The potential effects associated with the preferred strategies are provided below, as are the proposed mitigation measures developed to avoid or minimize those impacts.

6.2.1 Archaeological and Built/ Cultural Resources

A Stage 1 Archaeological Assessment and Cultural Heritage Screening are recommended during the next stage of each of the recommended Water and Wastewater strategies (e.g., Class EA or Detailed Design). The Stage 1 Archaeological Assessment will confirm the archeological potential of the area. The Cultural Heritage Screening will identify all cultural heritage resources nearby to the preferred water and wastewater strategies.

General mitigation measures include:

- Avoid planning of future water and wastewater servicing routes within or close to cemeteries.
- Plan future water and wastewater servicing routes within previously disturbed road right of ways.

6.2.2 Air Quality, Dust and Noise

The recommended servicing strategies are located within the Community of Stouffville and Ballantae-Musselman's Lake area. These areas are composed of agriculture, recreational, residential, and limited commercial/industrial developments. The majority of construction will take place in existing and future road rights-of-ways which may be adjacent to potential sensitive receptors such as residential and business properties. Specific air quality, dust and noise mitigation measures should be prepared during the design stages. This will help to minimize the impact of odour problems and generation of sulfides and other odorous compounds which may be generated by the construction and operation of the recommended strategies. However, in general the Town of Whitchurch-Stouffville will:

- Employ a noise and dust control strategy to reduce emissions during construction of the recommended projects.
- Obtain an Environmental Compliance Approval for Air and Noise during detailed design where required.
- Develop a construction-staging plan to minimize community disruption where required.
- Use low noise equipment during construction, where possible.
- Restrict working hours for construction, in accordance with the Town of Whitchurch-Stouffville's Noise Control By-law.
- During implementation of the design stage, as required by the Town, the proponent should provide noise, odour and/or dust mitigation plan including direction on how to submit complaints.
- As recommended by the MECP, non-chloride dust suppressants will be used during the construction phase.

6.2.3 Species at Risk

The desktop review identified 22 Species at Risk and 12 Species of Conservation Concern within the study area.

Any work that may impact the habitat of threatened or endangered species shall meet all associated regulations, including registration and permitting, as well as comply with all regulations within the Endangered Species Act.

To minimize any harm to wildlife and wildlife habitat, the following mitigation measures should be implemented during the construction process:

- Any vegetation clearing that must occur during construction shall not occur during the breeding bird season (April 15 to August 15). If this is not possible, prior to vegetation clearing, a qualified biologist must complete a nest search.
- Measures must be implemented to protect trees from direct and indirect physical damage.
- Once the construction has been completed, all disturbed areas shall be rehabilitated, stabilized and revegetated to ensure the project site is restored to pre-construction conditions.
- Installation of exclusion fencing surrounding the active construction area.

6.2.4 Significant Natural Environment Features

It is recommended that future planning avoid any significant natural environment features including environmental significant areas, significant wetlands, woodlands, ANSIs and valleylands. If preferred alternatives cannot avoid these area, additional studies are recommended to conform to applicable policies of the Greenbelt, ORMCP, Town and Regional Official Plans.

Works in or surrounding significant wetlands, and fish habitat will require a *Development, Interference with Wetland and Alterations to Shorelines and Watercourses* permit from either the LSRCA or TRCA, depending on the area's conservation authority jurisdiction.

Current flora, fauna, Ecological Land Classification (ELC) systems and fisheries data information should be confirmed at the time of design with the respective conservation authorities. Additionally, it is also recommended to that TRCA's Living City Policies regards to hazard and environmental management be included in the "Servicing Principles and Policies Paper", such as:

- Avoid new wetland and watercourse crossings wherever possible.
- Where watercourse crossings have to occur, consider aerial crossing or within the roadway and for crossings below the watercourse maintain a minimum 2 metre separation from the bottom of the watercourse and pipe. Confirmation can be provided at later design stages where the design information become available.
- Adhere to TRCA's hierarchy of avoid, mitigate, compensate for impacts to regulated features.
- Follow TRCA's Crossing Guideline for all new crossings.
- Consult with the TRCA early on in the project to determine potential concerns, routing options and study requirements.

6.2.5 Surface and Groundwater

The surface water features associated with the creeks and lakes are considered to be sensitive receptors. As shallow groundwater is understood to discharge to these watercourses, they are considered to be susceptible to impacts from changes in groundwater quantity and/or quality. Mitigation of potential impacts to surface water and groundwater should include the following:

- Appropriate selection of construction methods to minimize dewatering near creeks.
- Appropriate selection of linear sewer route and construction methods to minimize potential disruption of current state of interaction between groundwater and surface water.
- Employing clay collars as necessary to reduce preferential seepage along the proposed alignment, especially where it is proposed to slope towards and/or cross any creeks.
- Development of an erosion and sediment control plan to ensure dewatering discharge does not impact surface water while protecting the watercourse from sediment laden runoff.
- Development and implementation of a spills response plan in the event of a fuel spill or sediment release.

In order to protect surface and groundwater features, the design of the municipal service corridors should include trench barrier mechanism to prevent the horizontal and vertical transport of potential contaminants through the disturbed soil and materials around the municipal services, especially in areas currently with no municipal wastewater sewer services. This methodology will be considered during design and permits and approvals stage in consultation with the Town.

For any development occurring within a WHPA, the development of a Source Water Impact Assessment and Mitigation Plan may be required.

A geotechnical evaluation for ground settlement, excavation basal heaving and the selection of an appropriate dewatering mechanism should be performed by a geotechnical engineer for the phases of the project that will require a PTTW or where groundwater is under artesian conditions. In addition, a hydrogeological impact assessment should be performed for these projects.

Flood Hazard Management principles should be implemented for works within conservation authority's floodplain areas to ensure no negative impacts on the water surface elevations or volume. Ensure flood information is confirmed at the time of design.

Erosion and Sediment Control Plans (ESC) will be required at detailed design stage to illustrate the base information, proposed ESC measures, and the staging information for the proposed works. The ESC plans must comply with the TRCA Erosion and Sediment Control Guideline. The most up-to-date guideline can be found at www.sustainabletechnologies.ca.

6.2.6 Contaminated Areas

It is recommended that a Phase One Environmental Site Assessment be performed to identify potential contaminating activities and provide an assessment of the risk of contaminated groundwater and soils to support the design phases of planned works.

If soils are contaminated, they will be disposed of consistent with Part XV.1 of the Environmental Protection Act and *O.Reg 153/04*, Records of Site Condition. The MECP's York-Durham District Office will be contacted for future consultation if contaminated sites are present.

Activities involving the management of excess soil will be completed in accordance with the MECP's latest version of *Management of Excess Soil – A Guide for Best Management Practices*. All waste generated during construction will be disposed of in accordance with provincial requirements. The areas of construction disturbance will be kept to a minimum.

6.2.7 Traffic Management

During detailed design of the recommended projects the proponent will prepare a traffic management plan. This plan will need to consider required signage, traffic control measures to aid the safe ingress and egress of trucks to and from the site, and mitigation of impacts to vehicular traffic in addition to other pedestrian and cycling movements.

6.2.8 Utilities

During detailed design of the recommended projects, the proponent will need to contact the relevant utility firms to confirm and ensure impacts to utilities are minimized or avoided during construction and operations.

7.0 Engagement and Consultation

Indigenous rightsholders and interest holders, public and stakeholder consultation, engagement and participation are an important component to the success of this study and is mandated as part of the Class EA Process. Given the complexity and potentially sensitive nature of this study, it is imperative that the Master Plan ensures meaningful engagement and communication with interested parties to provide information, listen to, and work to address issues and concerns.

Effective consultation was used to obtain valuable comments and feedback on the overall study process, and better understand potential sensitivities and issues related to the Master Plan. The overarching strategy for engagement and consultation included several goals and objectives.

The primary goals and objectives were to:

- Present clear and concise information at key stages of the study process;
- Solicit community, regulatory, Regional and Local staff input;
- Identify concerns that might arise from the undertaking;
- Undertake Indigenous communities' consultation and engagement;
- Consider stakeholder comments when developing the preferred solution; and,
- Meet and exceed Municipal Class EA Consultation requirements.

The Communications and Consultation Plan for this Master Plan is driven by five key principles:

- **Respect:** for all parties engaged in the process;
- **Clear, consistent communication:** to ensure broad understanding, and that all communicators on behalf of the Class EAs are using consistent messages;
- **Demonstrated organizational and community values:** to ensure all communications reflect the values of the Town as an organization and as a community;
- **Transparency:** to communicate the EA process and its results openly; and
- **Flexibility:** changeable to adapt to different stakeholders, concerns and opportunities that may arise throughout the MP process.

A broad range of methods were used through the Master Planning process to advise the public and stakeholders of the study and solicit input. Methods included notices, newsletters, a project website, comment forms, and two (2) virtual public information centres.

7.1 Communication and Consultation Plan

An important component at the outset of the public consultation process is to develop a Communication and Consultation Plan. The primary objective of the Plan is to encourage two-way communication with the community, regulatory agencies, Regional and Local staff. The Plan is designed to:

- Build on past communication protocols and consultation plans from previous Master Plan and municipal planning initiatives, to ensure consistency and continuity;
- Meet public and agency notification and consultation requirements for Master Plan Approach 1 (Phases 1 and 2 of the Municipal Class EA process (MCEA);
- Ensure the general public, Councillors, stakeholders, external agencies (including federal and provincial), Indigenous Communities and special interest groups have an opportunity to participate in the study process;
- Ensure that information is provided to interested and affected stakeholders early and often throughout the study process; and,
- Contact external agencies to obtain legislative or regulatory approvals, or to collect pertinent technical information.

The Study Contact List was initially developed based on the project team's knowledge of the study area and information provided by Town staff and Ministry of the Environment, Conservation and Parks (MECP). The study contact list was updated throughout the process to include any and all relevant agencies, stakeholders, landowners, and interested parties including Indigenous Communities, government agencies, utilities and other special interest groups.

The Public and Agency Consultation Plan outlines the public notifications based on key study milestones such as study commencement, Public Information Centres (PIC), and study completion. Notifications were issued via the local newspaper Stouffville Sun-Tribune and Stouffville On the Road), direct mailing and/or emailing to local residents, businesses and stakeholders in the study contact list, and via the Town's project website.

This study was undertaken partially during the COVID-19 pandemic. Enhanced effort to consult and notify stakeholders via online platforms was used by the project team. Stakeholders were provided opportunity to review key study information during prescribed review periods. The project team ensured stakeholders were provided appropriate contact information to address all potential concerns.

The Communication and Consultation Plan and Contact list is provided in **Appendix E**.

7.2 Indigenous Engagement

Indigenous communities have unique understanding of the natural environment given their relationship with traditional lands, practices, and way of life. As such they provide valuable information to help identify solutions and measures to mitigate impacts to natural, archaeological, and cultural resources. During the initial stages of this project, the Ministry of the Environment, Conservation and Parks (MECP) was contacted to identify First Nation groups that may be potentially affected by this study. The following Nations were identified as Rightsholder or Interest Holders for the Master Plan:

- Williams Treaties First Nations
 - Alderville First Nation
 - Curve Lake First Nation
 - Hiawatha First Nation
 - Mississaugas of Scugog Island First Nation
 - Chippewas of Georgina Island
 - Chippewas of Rama First Nation
 - Chippewas of Beausoleil First Nation
 - Mississaugas of the Credit First Nation
- Kawartha Nishnawbe
- Huron-Wendat Nation

7.3 Contact List

A list of Indigenous Communities, stakeholders, review agencies and other interested parties was developed at the outset of the study. All project communications were distributed to the contacts on the list. The contact list was updated throughout the study as more individuals became aware of the study or provided feedback.

7.4 Notice of Study Commencement

The Notice of Study Commencement was published and distributed on May 19, 2022. The notice was made public by the following means:

- Mailed / e-mailed to the contacts listed on contact list, and,
- Advertised in the Whitchurch-Stouffville “On the Road”, a monthly newspaper, and the “Stouffville Sun” (Sun Tribune), a weekly newspaper.

Comments received through Notice of Commencement are provided in **Appendix E**.

7.5 Public Information Centres

The study included two Public Information Centres (PIC). The PICs were intended to elicit input on the Class EA process, servicing constraints and opportunities, alternative concepts and proposed strategies to address the servicing challenges and opportunities, and the technically feasible solution.

7.5.1 Public Information Centre No. 1

PIC No. 1 was held during Phase 1 of the Class EA study process to introduce the project and receive feedback regarding the Problem and Opportunity Statement, Study Background and Class EA Process. The Notice of PIC No. 1 was published and distributed on August 11, 2022. The notice was made public by the following means:

- Mailed / e-mailed to the contacts listed on contact list, and,
- Advertised in the “Stouffville Sun” (Sun Tribune), a weekly newspaper.

PIC No. 1 was held virtually on August 25, 2022 on the Town’s project website: <https://www.cometogetherws.ca/wwwmp>. Details on the attendance, comments received, and materials presented during PIC No. 1 are provided in **Appendix E**.

7.5.2 Public Information Centre No. 2

PIC No. 2 was held during Phase 2 of the Class EA study process to provide an update on the study and receive feedback regarding the preliminary water and wastewater servicing strategies. The Notice of PIC No. 2 was first published and distributed on August 24, 2023. The notice was made public by the following means:

- Mailed / e-mailed to the contacts listed on contact list, and,
- Advertised in the “Stouffville Sun” (Sun Tribune), a weekly newspaper.

PIC No. 2 was held virtually on from September 6, 2023 to September 20, 2023 on the Town’s project website: <https://www.cometogetherws.ca/wwwmp>. Details on the attendance, comments received, and materials presented during PIC No. 2 are provided in **Appendix E**.

7.6 Notice of Completion

At the end of the Master Plan study, a Notice of Completion (**Appendix E**) was published and sent to all stakeholders with information on the Public Review Period including schedule and locations.

A summary of all communications and responses with public and agency stakeholders including copies of associated correspondence is provided in **Appendix E**.