



**PREMIER GATEWAY SECONDARY PLAN
WATER AND WASTEWATER SERVICING
FUNCTIONAL SERVICING PLAN
Town of Halton Hills**

Submitted to:
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1. INTRODUCTION

Amec Foster Wheeler was retained by Macaulay Shiomi Howson as a sub-consultant to prepare a Functional Servicing Plan for the Premier Gateway Secondary Plan (PGSP) Lands in the Town of Halton Hills.

The purpose of this report is to review the existing water and wastewater services accessible to the site, confirm their capacity, and describe servicing concepts for the site. The analysis of the water and wastewater services has been based on the water and wastewater Halton Region's hydraulic models. The servicing concepts are prepared in accordance with the land use and transportation planning framework for the PGSP Lands.

1.1 Study Area

The study area is shown in **Figure 1-1**. The subject lands are located in the southern limit of the Town of Halton Hills and is generally bounded by Eighth Line to the East, Steeles Avenue to the south, Sixth Line to the west, and agricultural lands to the north. The study area covers approximately 300 hectares.

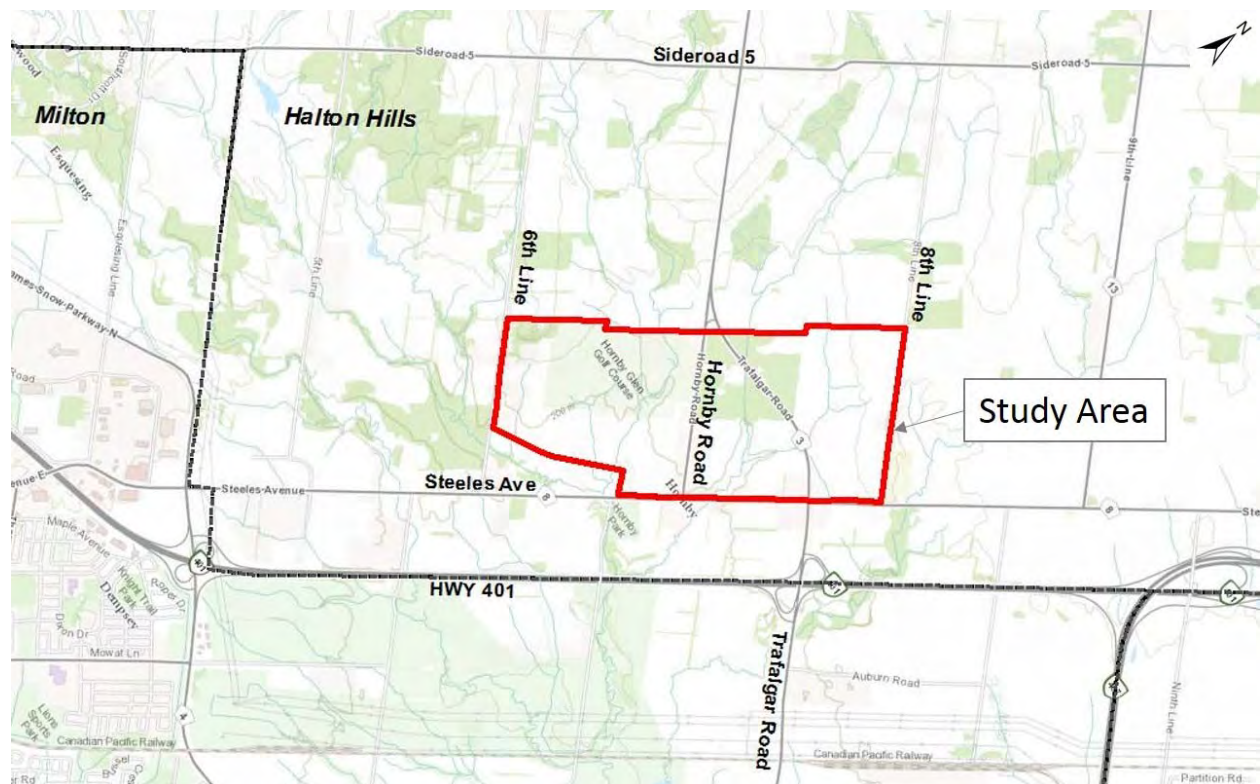


Figure 1-1. Study Area

1.2 Existing Conditions and Land Use

Current land uses within the study area are primarily agricultural, and woodlot. The Hornby Glen Golf Course is in the north-west quadrant of the site. There are 23 residential properties along Hornby Road, 19 residential properties along Sixth Line, four residential properties along Eighth Line, and a few residential and commercial properties along Steeles Avenue within the study area.

The site slopes from north-west to south-east, and from north-east to south-west. The developable lands range in elevation approximately 230 m at the north-west corner of the study area to approximately 194 m in the south part of the study area. The elevation contours are presented in **Figure 1-2**.

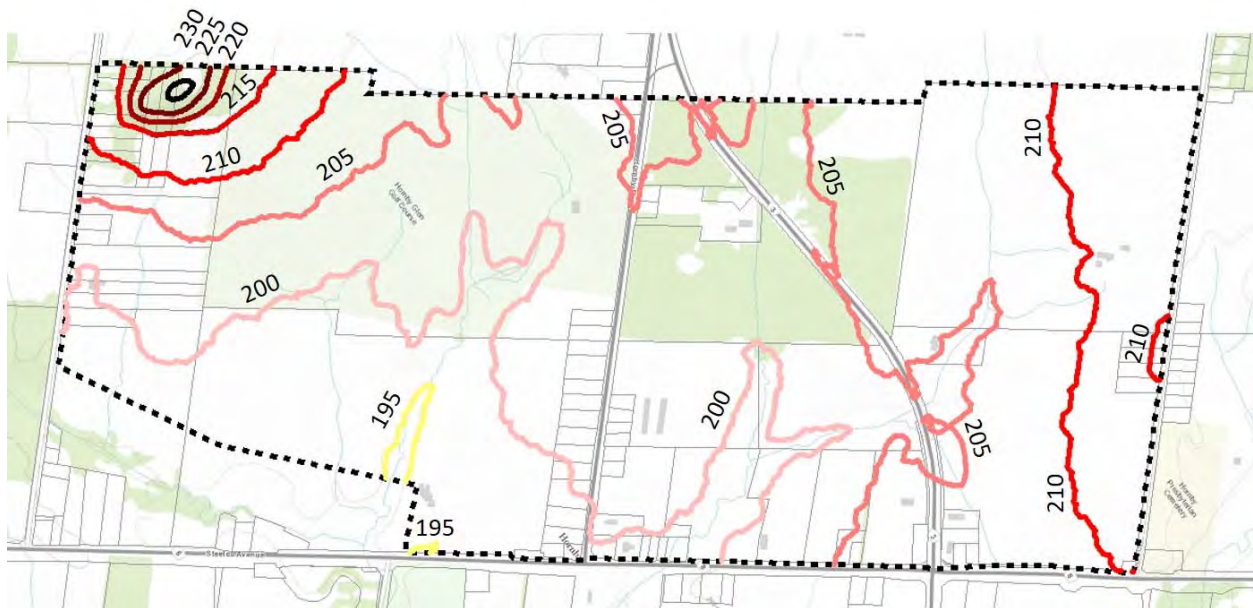


Figure 1-2. Elevation Contours

1.3 Planning Context

This Functional Servicing Plan is based on a planning concept developed for the Premier Gateway Lands and provided to Amec Foster Wheeler March 2017.

The planned land use for Premier Gateway is shown in **Figure 1-3**.

The new lands are designated as employment lands with a proposed employment population of 8307.

Background material for the Planning Context Inputs is included in **Appendix A**.

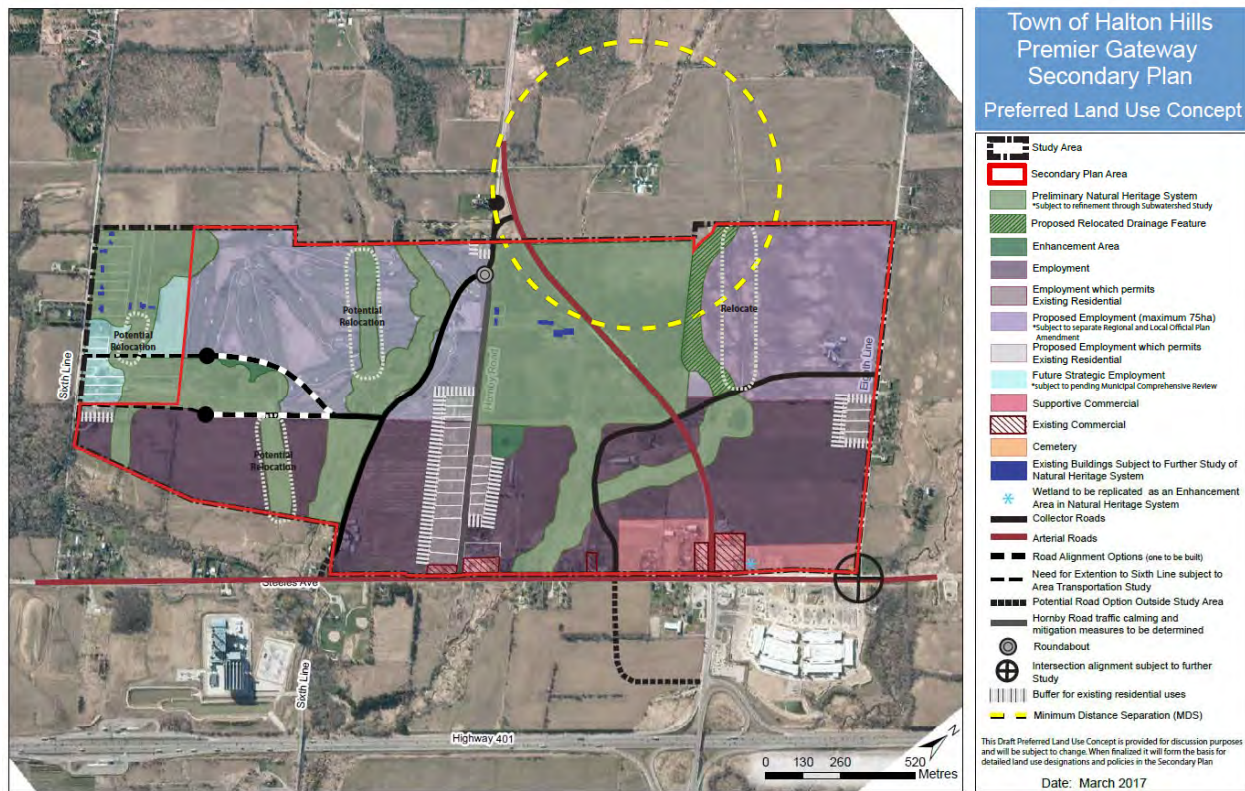


Figure 1-3. Land Use Plan for Premier Gateway

1.4 Methodology

The analysis is based on Halton Region’s most recent water and wastewater models as provided in February 2017. The Halton Region Planning Model is developed and updated within the Sustainable Halton Master Planning process for the Region’s water and wastewater infrastructure. This information along with existing contour mapping and existing wastewater collection and water distribution system forms the basis of the existing water and wastewater servicing, as well as an understanding of the planned projects to 2031.

The planning and design of water and wastewater infrastructure followed recognized standards and planning documents including:

- ▶ Design Guidelines for Sewage Works, MOE, 2008;
- ▶ Design Guidelines for Drinking Water Systems, MOE, 2008;
- ▶ Region of Halton Water and Wastewater Facilities Design Manual (last updated January 2012);
- ▶ Region of Halton Water and Wastewater Linear Design Manual (last updated April 2015);
- ▶ Sustainable Halton Water and Wastewater Master Plan, 2011;
- ▶ Water and Wastewater Model provided by Halton Region:
 - InfoWater – Updated 13 May 2016
 - InfoSewer – Updated 27 September 2016.

The following are the key steps to developing a servicing strategy for the PGSP:

1. Assess the available capacity of existing system using the provided model.
2. Identify options for extending services into the Service Area
3. Review the performance of the proposed servicing options.
4. Develop preferred strategy

2. WASTEWATER SERVICING EVALUATION

2.1 Approach to Wastewater Servicing

The Halton Region wastewater model provides the following information that is used to confirm the system's available capacity:

- ▶ Physical characteristics of sewer system, the sewer system from Premier Gateway study area to the Mid-Halton wastewater treatment plant, i.e. size, diameter, elevations and slopes of the sewer system;
- ▶ Baseline and projected demands on the wastewater collection system. The baseline and projected demands are included as peak wet weather flows for 2016 (Baseline from last Master Plan Update,) 2021, 2026 and 2031 future conditions;
- ▶ Modelled performance of baseline and projected demands through the wastewater treatment system.

The following steps were undertaken to evaluate the wastewater capacity:

1. Evaluate suitable connection points to the system;
2. Utilize Halton Model to verify downstream trunk conveyance capacity;
3. Add demands to the 2031 wet weather flow model associated with the demand in the built-out Premier Gateway Study Area and run model to confirm hydraulic conditions with these flows.

The planning scenarios utilized in Halton's wastewater model have a steady-state flow generation approach. Actual flow dynamics in the system may vary due to the flow attenuation that occurs with the storage within the system, and due to the variability associated with inflow & infiltration (I&I). The I&I component may vary with time.

The steady-state approach to demand evaluation is conservative and allows for high-level planning of infrastructure development. This approach is suitable for the review of steady state peak downstream capacity for this project. The model is used to establish peak flow servicing but is limited for evaluating other impacts such as: inflow infiltration, basement flooding, and overflow issues. These issues can be better understood with a more comprehensive time varying model that is calibrated with actual observed flow and rainfall data.

2.2 Existing Wastewater Services

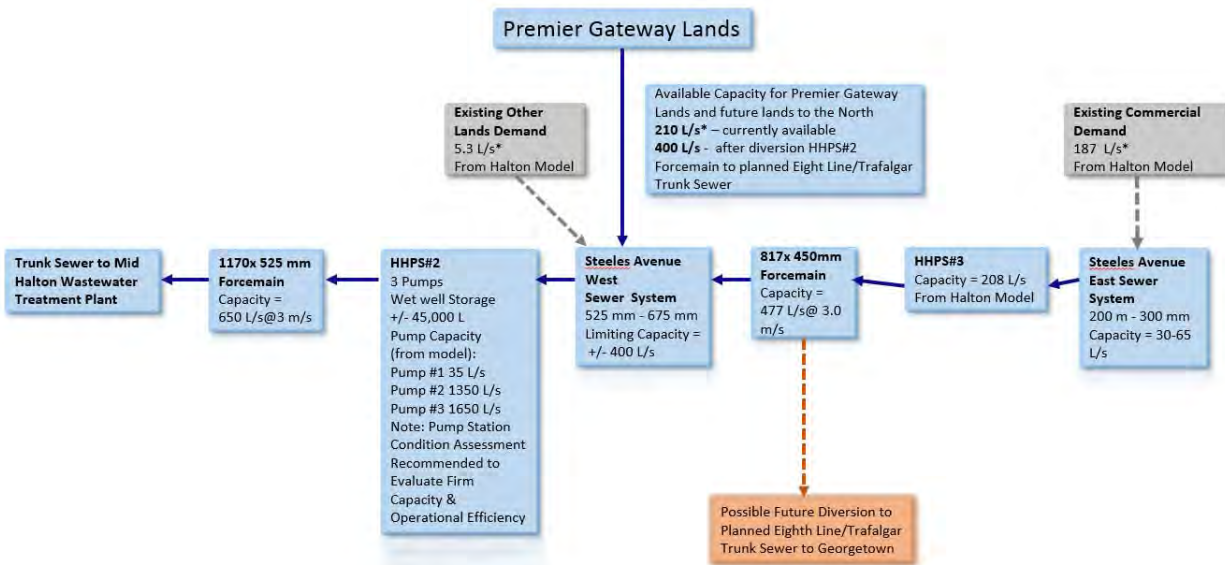
The lands are within the Mid-Halton Wastewater Treatment Plant Service area. The primary receiving system is described in this report as the Steeles Avenue West Sewer System. There is an approximate available capacity of 210 L/s in this system for the Premier Gateway Lands, this available capacity will increase to 400 L/s with the planned diversion of flows from HHPS #3. A portion of this capacity can be diverted in the future to what is described as the Eighth Line / Trafalgar Trunk Sewer to Georgetown. Details on the planning flows and capacities taken from information in the Halton Model are provided in **Appendix B**.

The evaluation of existing conditions is presented schematically in **Figure 2-1** and shown in Plan View in **Figure 2-2**. The overall context of the Region’s wastewater collection system is given in **Figure 2-3**. The evaluation of the existing capacities is based on the pipe dimensions and slopes as shown in the Halton model. The forcemain capacities are evaluated based on the pipe size and the maximum permissible velocity. The pump capacities are shown as per the Halton Region model.

Existing System Issues

The following issues are noted from the review of the Halton Planning model:

1. **Pump capacities for HHPS #2 are higher than the receiving forcemain.** At this time it is not known whether this is a real issue or simply a model coding issue.
2. **Planned design flows along Steeles Sewer exceed the full pipe capacity flow in bottleneck areas with low slope.** Note that flows higher than the full pipe capacity can be conveyed with minor surcharging. Given that the sewers in these areas are not connected to basements, this may be acceptable. For the purpose of this study, a limiting capacity of 400 L/s is assigned to the Steeles Avenue Sewer System based on the characteristics of the existing sewers (size and slopes).
3. **The planning design flows in the Halton model were provided without the sewershed and population tables.** The existing flows are given based on flows shown directly in the model. Flows shown are taken from the flows shown in the gravity pipes in the model runs as shown in **Appendix B**.



*Demands were taken from Halton Model Design Flows through the pipes, available capacity is estimated based on these demands. The actual existing and planned demand for external areas may be re-valuated with additional information on sewersheds.

Figure 2-1 Local Wastewater Collection System Schematic

There is a planning flow in Halton’s model which is tied to the PGSP lands at approximately 260¹ L/s, this flow is updated to 212 L/s in this report as shown in **Appendix B**. It is recommended that the external existing flows be evaluated with sewershed information to confirm the need for diverting flows and to confirm the existing demands and available capacity in the system.

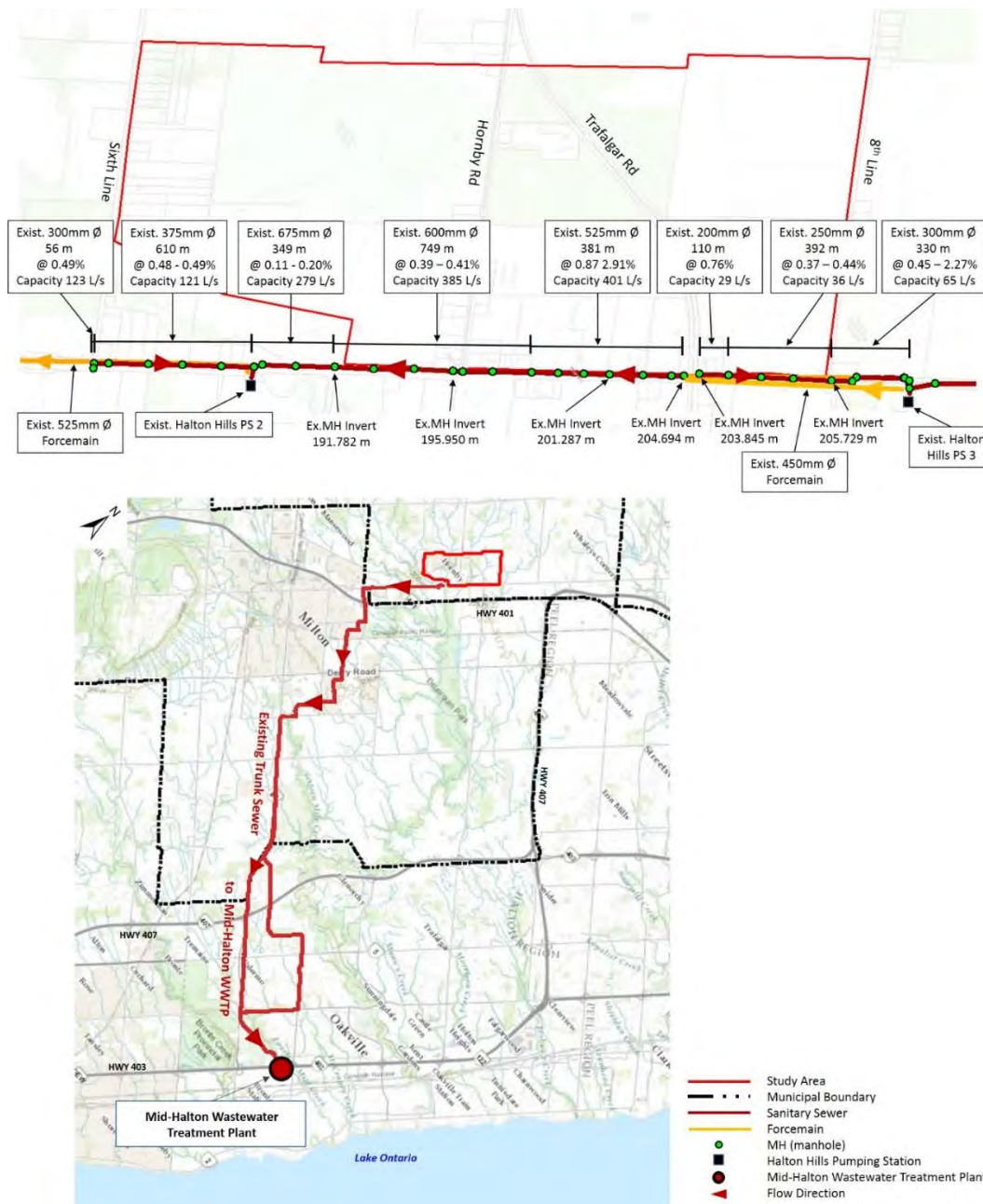


Figure 2-2. Existing Wastewater Services

¹ Note – the actual flow for PGSP is not clearly broken out in the model, this is an estimate of the intended planning flow based on a continuity calculation

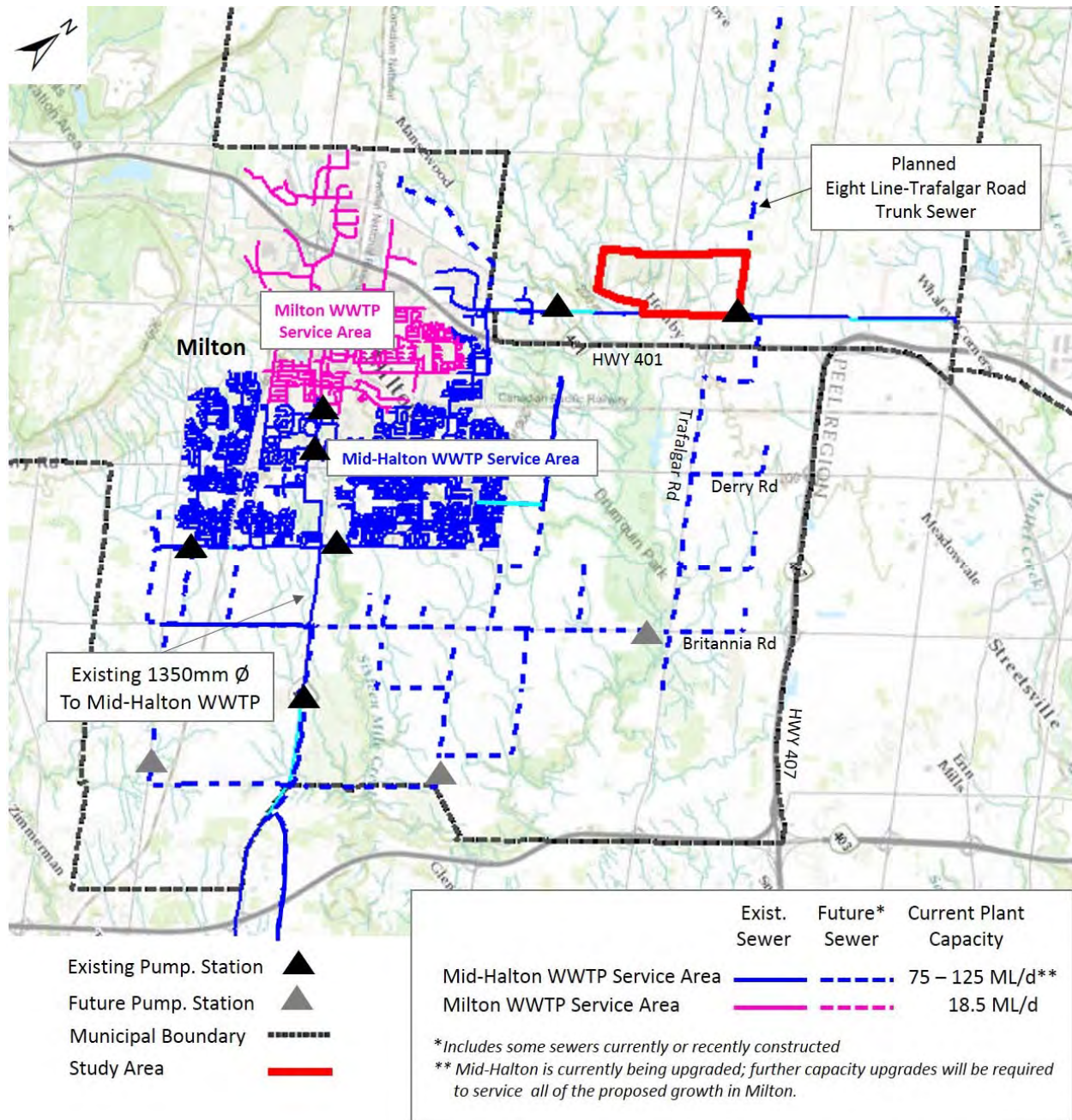


Figure 2-3. Halton Region Planning Context – Premier Gateway Wastewater Collection System

2.3 Demand Evaluation

The design flow for the Premier Gateway development is estimated based on Halton’s design criteria as follows:

Premier Gateway - Equivalent Population Estimate - 125 persons/ha (light industrial), 90 persons/ha (commercial), 55 persons/ha (prop. employment which permits exist. residential) yield a total service population of 21,326 for the proposed development of Premier Gateway.

Note that this method provides a conservative flow estimate as the population exceeds the planning population estimates of 8307 included in **Appendix A**.

Population Based Flow: 275 L/person-day

Peaking Factor: Modified Harmon Peak Factor

Inflow Infiltration Allowance: 0.28 L/s-ha

This evaluation provides a conservative estimate as it includes the full catchment area as contributing to inflow infiltration as well as a conservative population estimate.

The total estimated demand from the Premier Gateway Lands is 212 L/s. The calculation is provided in **Appendix B**. The demand associated with the lesser population is 134 L/s.

The design of the local sewer system in this evaluation is based on the higher flow. Limits on the receiving sewers can be evaluated based on a reduced flow if required.

2.4 Proposed Wastewater Servicing

A wastewater servicing plan consisting of a sewer network along the proposed roads and outletting to the Steeles Avenue Sewer System has been conceptually designed and is shown in **Figure 2-4**. A review of the topography confirms that these connections can be completed by gravity to the connection points as shown in the figure.

The detailed implementation needs to consider the following:

1. A full review of the external sewersheds to confirm / or reduce the flows in Halton's Planning model to within the full pipe capacity flow, and/or a hydraulic grade line based – risk review to verify potential impacts on buildings / basements that may be affected by the surcharging resulting from the flows in the Steeles Avenue Sewer;
2. The ultimate flow in the Steeles Avenue Sewer System can be reduced by diverting a portion of it through the planned Eighth Line / Trafalgar sewer system.

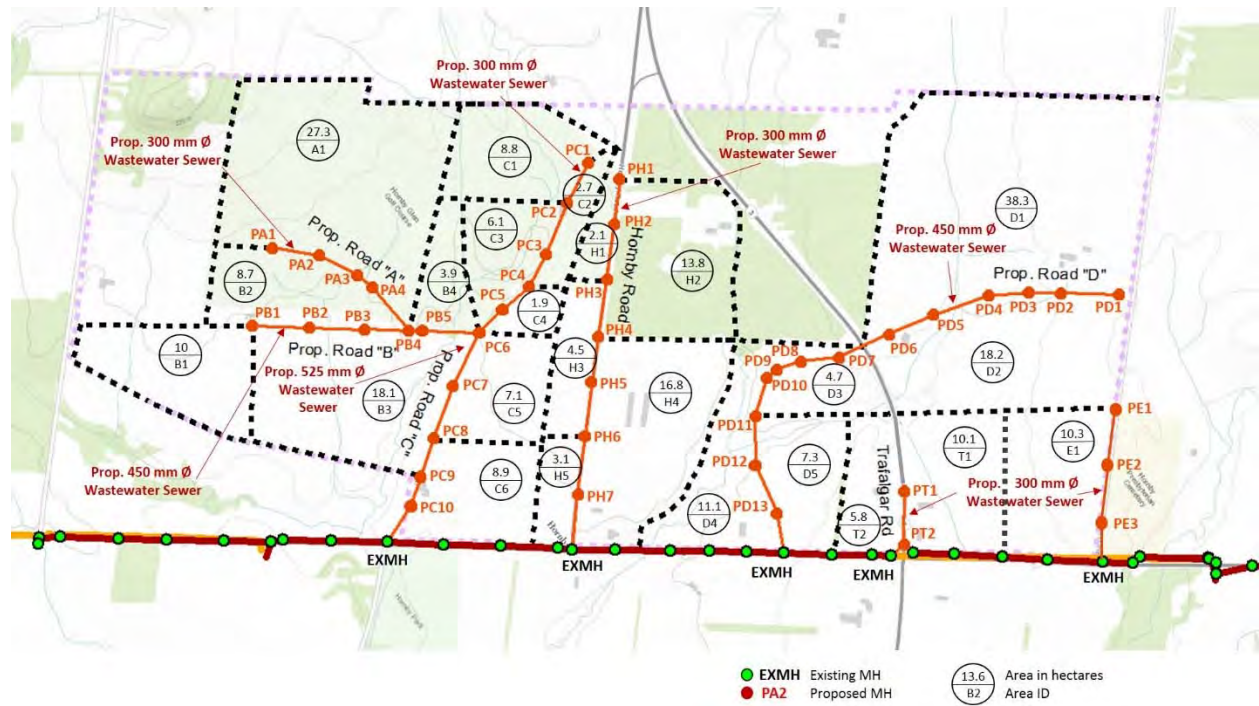


Figure 2-4. Proposed Wastewater Servicing Concept

The available capacity (210 L/s) is sufficient for servicing 90% of the demand associated with the proposed Premier Gateway Secondary Plan (212 L/s).

3. WATER SERVICING EVALUATION

3.1 Approach to Water Servicing

The demands associated with the PGSP were estimated for design conditions including average day demand, peak hourly demand, as well as max day with fire scenarios.

A review of the existing infrastructure and connection points to Milton M5L Zone were identified.

A system evaluation was conducted to evaluate how the planned system can support the demands associated with the proposed development of the PGSP. This includes confirming the pressure zone requirements, storage, and levels of service for average day, peak hourly, and fire flow conditions.

A preferred servicing plan, which provides the watermain infrastructure within the proposed road alignments for the PGSP was provided. The new layout supports the level of service provided for in the Halton Region Planning model while re-aligning infrastructure along the proposed Rights of Way. Opportunities for system improvement and optimization are provided where practical.

3.2 Existing Water Services

The PGSP lands are within the Milton Lake-based Water Supply System with Pressure Zone M5L. Water to pressure zone M5L is pumped from Oakville Zone 01 through Kitchen Reservoir and pumping station. The lands are currently accessible to Zone 5 watermains to the south. Zone M5L is serviced by a storage system which includes a 20 ML reservoir and integrates with the storage in other zones.

Currently the Milton M5L pressure zone is supplied by the water treatment plants at Lake Ontario and pumped through a series of pumping stations and reservoirs north to Milton.

The Halton planning context for the water distribution system development is shown in **Figure 3-1** and in **Figure 3-2**.

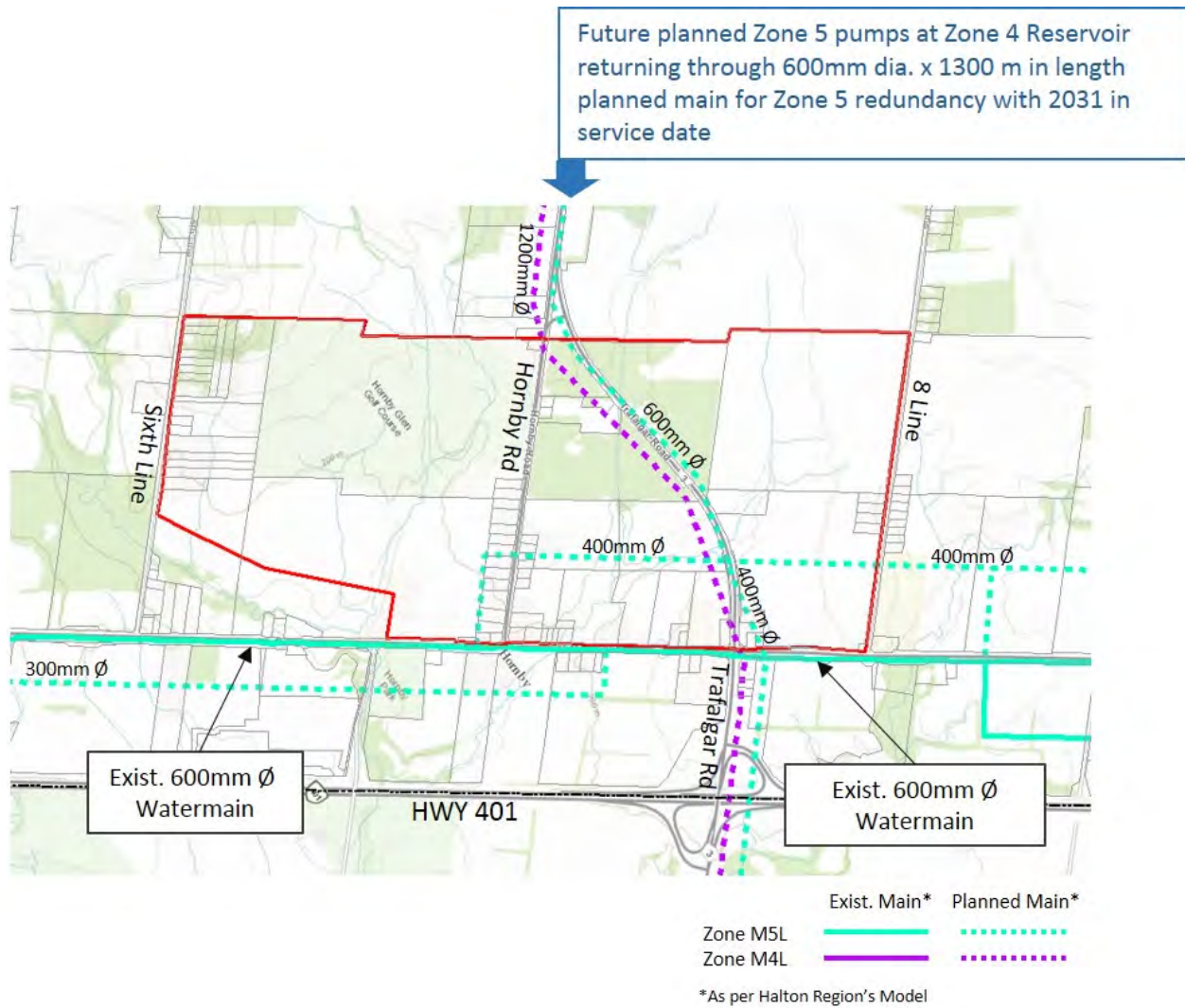


Figure 3-1. Existing and Planned Water Services in and Around the Subject Lands (Source Halton Region Model)

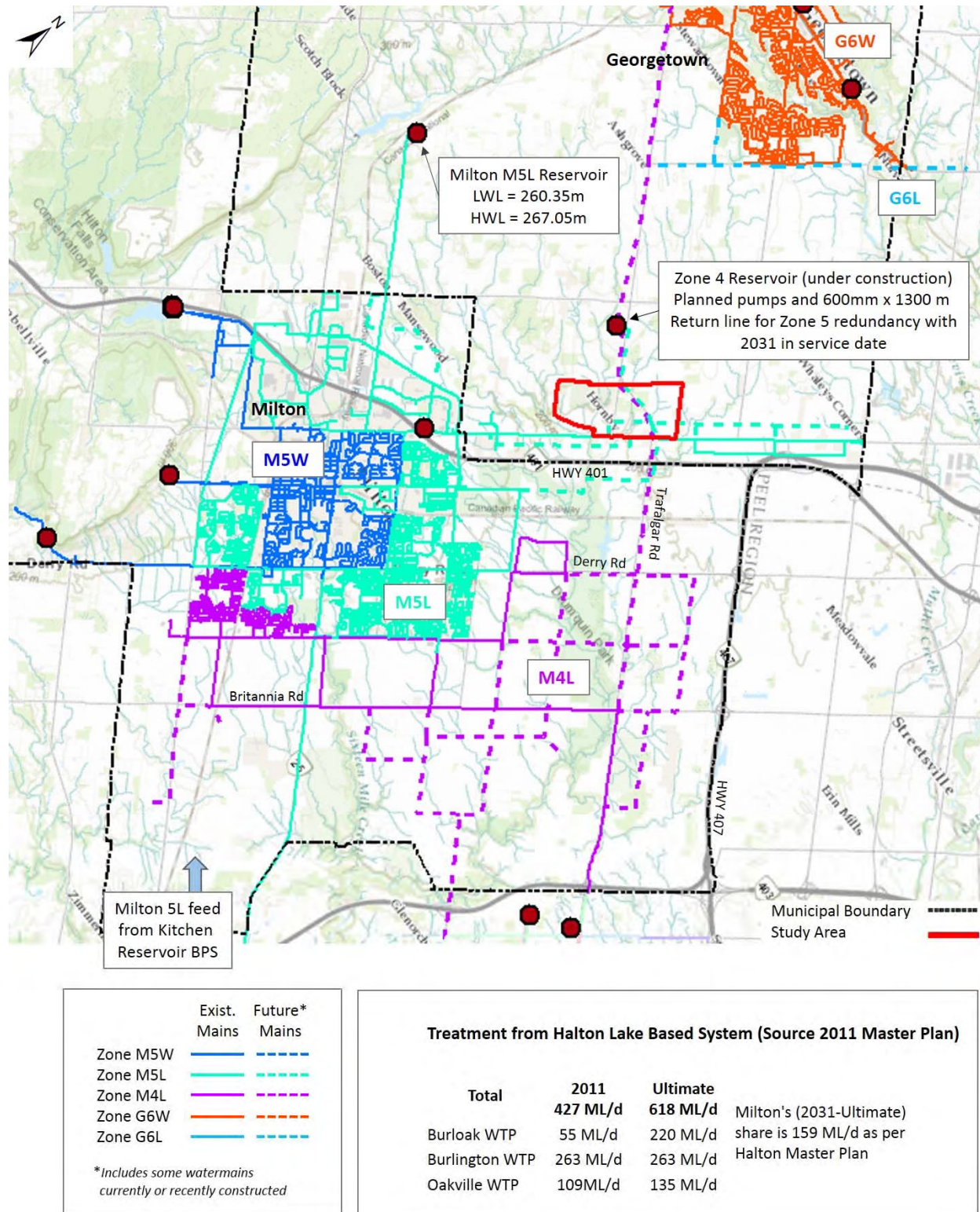


Figure 3-2. Existing and Planned Water Services in South Halton (Source - Halton Region Model)

3.3 Demand Evaluation

Based on the background information reviewed and listed in **Section 1**, Amec Foster Wheeler has identified the design criteria for the potable water servicing.

Table 3.1. Water System Design Criteria		
	Criteria	Source
Flow Demands		
Average Day Demand	275 L/cap/day	Halton Region
Maximum Daily Demand Peaking Factor	2.25	Halton Region
Maximum Hourly Demand Peaking Factor, Industrial	2.25	Halton Region
Fire Flow – MOECC recommendation for 21,000 population – 318 L/s Note that this is a bulk system fire flow in more than one location and not representing demand at a single point.		MOECC
Storage Requirements – Evaluated within the integrated Urban System (not solely for Premier Gateway)		
Pipe Design		
Commercial and Industrial Areas, Minimum Size	300 mm	Halton Region
Minimum Cover	1.7 m	Halton Region
Operation Pressure		
Pressure Range	Maximum working pressure: 690 kPa Minimum static pressure: 310 kPa	Halton Region
Minimum Pressure Under Fire Flow Conditions	140 kPa	

The equivalent design population² for this area is 21,326 based on:

- A mixed land use designation based on a population rate of 125 persons/ha

Similarly to the wastewater, this yields a conservative result which is higher than the planning estimate employment population of 8307. Note that the design cost of linear infrastructure is less sensitive to the population estimates due

² A design population is used for the purpose of sizing the infrastructure, the ultimate population may increase or decrease with a similar infrastructure concept, a substantial increase would require similar infrastructure layout with higher capacity.

The following demands are estimated to review the system capacity for the Premier Gateway development as calculated in **Table 3.1** and **Table 3.2**.

- ▶ Average Day Demand – 5.9 MLD
- ▶ Max Day Demand – 13.2 MLD
- ▶ Peak Hour Demand – 152.7 L/s
- ▶ Fire Flow – 318 L/s

Table 3.2. Water Demand Estimates						
Area (ha)	Type	Population Factor (Persons/ha)	Population	Demand Factor (l/person/day)	Average Day Demand	
					(MLD)	(L/s)
170.6	Mixed Industrial Commercial	125 person/ha	21,326	275	5.9	67.9
Peak Hourly Factor (Halton Guidelines)					x 2.25	
Peak Hour Demand					13.2	152.7
Max Day Factor (Halton Guidelines)					x 2.25	
Max Day Demand					13.2	152.7

3.4 Water System Evaluation

The system performance was evaluated with the 2031 background demands and the demands shown in **Section 3.3**.

An analysis with Halton's model confirms the following:

Peak Hourly Demand: System pressures are within the operating criteria range of 310 kPa to 690 KPa with the Premier Gateway Peak Hourly Demand and 2031 System Background Demands – without the operation of the planned Z 5 pumps and 600 mm return line.

Max Day + Fire Demand: System pressures are within the operating criteria range (above 140KPa) with the Premier Gateway Peak Hourly Demand and 2031 System Background Demands – without the operation of the planned Z 5 pumps and 600 mm return line.

Storage Evaluation

The evaluation of the water distribution system requirements is not presented in this report. Storage can be integrated with Master Planning for the Milton Lake-based pressure zone.

Pressure Zone Considerations

Based on the operating HGL range of 260.35 – 267.05 meters above sea level (masl) in the Zone 5 reservoir, buildings with a finished floor elevation of 197 – 229 masl are suited for service from Zone M5L. The existing topography of the site is suitable for integration within Zone M5L.

3.5 Proposed Water Servicing Plan

A proposed water servicing plan that is based on Halton’s Planning model and refined to integrate with the proposed road layout has been prepared. The servicing plan includes:

- New 300 mm watermains along the proposed West collector as well as a loop through the potential extension at Sixth Line to Steeles Avenue;
- New 400 mm watermains along Hornby Road and through the proposed East Collector (these mains maintain the function of the planned 400 mm mains in Halton’s planning model)
- A 600 mm watermain along Trafalgar Road (as per the Region’s model)

The proposed pipe network is sufficient to maintain the required level of service for normal operations and fire flow conditions within the proposed development within the boundary conditions maintained by the Region in Pressure District M5L.

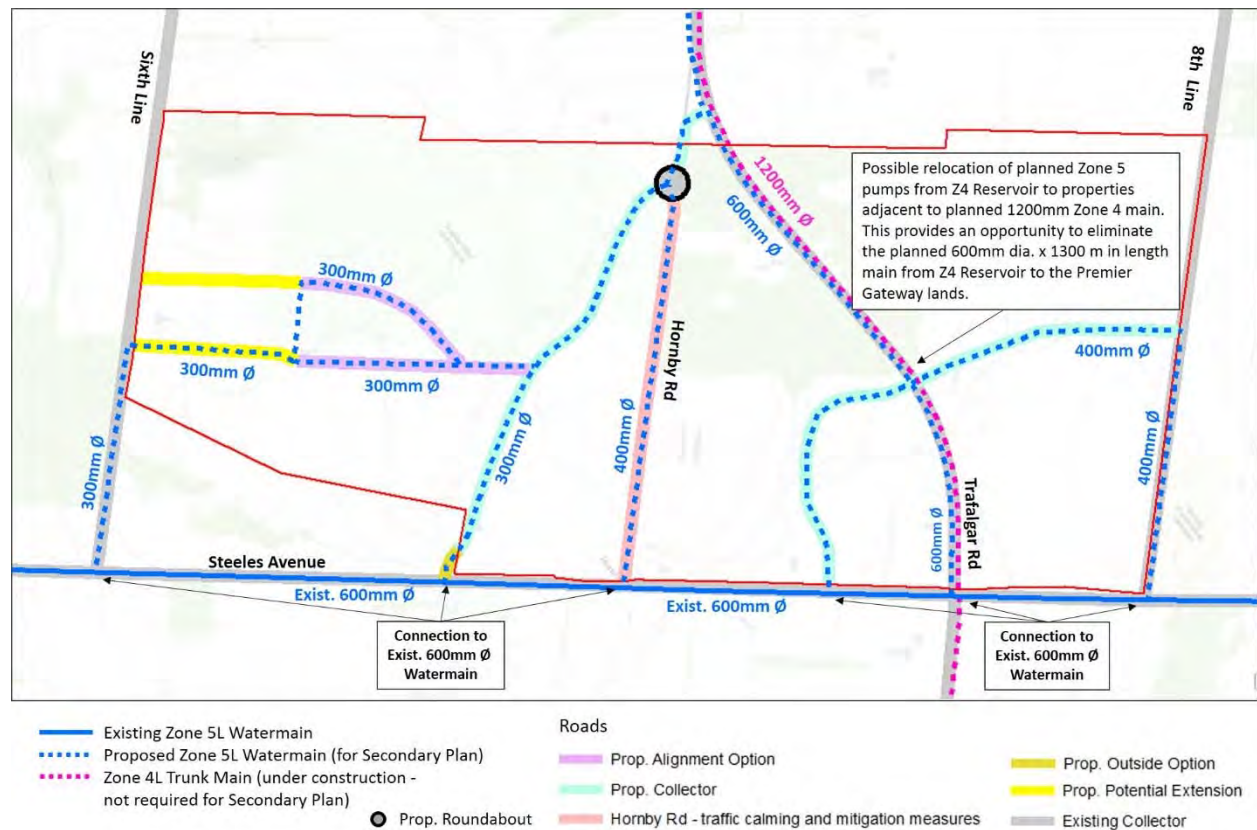


Figure 3-3. Proposed Water Servicing Plan

Opportunity to optimize Pressure District M5L: It is noted that the planned 600 mm x 1300 m main that extends from the North boundary of these lands to the proposed Zone 4L reservoir can be replaced if a booster station is located along the proposed Zone 4L transmission main along Trafalgar Road. This opportunity can be evaluated in the context of external land needs to the North of the PGSP lands.

4. CONCLUSIONS AND RECOMMENDATIONS

Halton Region's water distribution system and wastewater collection system have sufficient capacity to support the development of the PGSP lands with connections at the boundary of the site.

The following recommendations are provided water servicing:

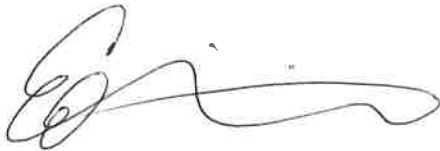
- ▶ A looped 300 mm water distribution network be constructed within the future Premier Gateway Area development along future rights of way. The system will connect to the existing zone M5L infrastructure along Steeles Avenue as shown in **Figure 3-3**;
- ▶ There may be an opportunity to eliminate or delay the 1300 mm x 600 mm water main to the North of the Premier Gateway lands by locating the planned Zone 5 booster pumps elsewhere along the planned Zone 4 transmission main;

The following recommendations are provided for wastewater servicing:

- ▶ Construction of local sewers along the proposed road layout as shown and connection to the Steeles Avenue Sewer System as shown in **Figure 2-4**;
- ▶ A review of the external flows and/or hydraulic grade risk analysis should be conducted at the detailed design / implementation phase to evaluate the impacts of the bottleneck portions of the Steeles Avenue Sewer.

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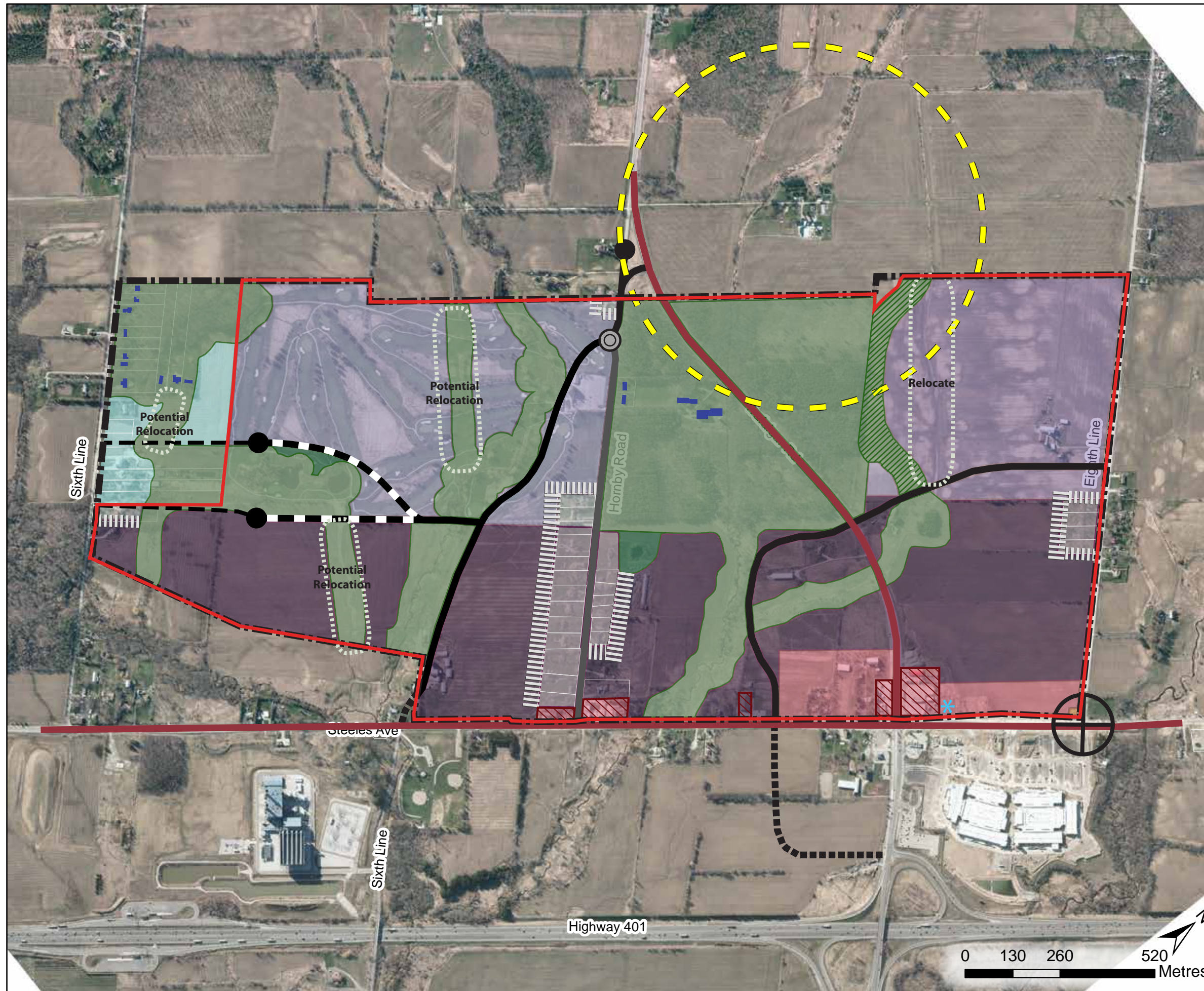
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

















APPENDIX A

Planning Context Inputs

Town of Halton Hills Premier Gateway Secondary Plan Preferred Land Use Concept



-  Study Area
-  Secondary Plan Area
-  Preliminary Natural Heritage System
*Subject to refinement through Subwatershed Study
-  Proposed Relocated Drainage Feature
-  Enhancement Area
-  Employment
-  Employment which permits Existing Residential
-  Proposed Employment (maximum 75ha)
*Subject to separate Regional and Local Official Plan Amendment
-  Proposed Employment which permits Existing Residential
-  Future Strategic Employment
*subject to pending Municipal Comprehensive Review
-  Supportive Commercial
-  Existing Commercial
-  Cemetery
-  Existing Buildings Subject to Further Study of Natural Heritage System
-  Wetland to be replicated as an Enhancement Area in Natural Heritage System
-  Collector Roads
-  Arterial Roads
-  Road Alignment Options (one to be built)
-  Need for Extension to Sixth Line subject to Area Transportation Study
-  Potential Road Option Outside Study Area
-  Hornby Road traffic calming and mitigation measures to be determined
-  Roundabout
-  Intersection alignment subject to further Study
-  Buffer for existing residential uses
-  Minimum Distance Separation (MDS)

This Draft Preferred Land Use Concept is provided for discussion purposes and will be subject to change. When finalized it will form the basis for detailed land use designations and policies in the Secondary Plan

Date: March 2017

Gross Employment - Total (ICI CATEGORIES ONLY)

Municipality	Development Area	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Halton Hills	Georgetown	12,635	12,682	12,705	12,728	12,751	12,774	12,797	12,862	12,927	12,991	13,056	13,121	13,179	13,237	13,296	13,354	13,412	13,543	13,674	13,806	13,937	14,068
Halton Hills	South Acton Special Study Area (Maple Leaf Lands)	409	410	428	447	465	484	502	511	520	529	538	547	563	579	596	612	628	643	658	672	687	702
Halton Hills	Acton, Excluding Maple Leaf Lands	3,352	3,381	3,421	3,462	3,502	3,543	3,583	3,628	3,673	3,717	3,762	3,807	3,869	3,931	3,992	4,054	4,116	4,167	4,217	4,268	4,318	4,369
Halton Hills	Halton Hills 401 Corridor	1,528	1,567	1,662	1,758	1,853	1,949	2,044	2,364	2,684	3,003	3,323	3,643	4,356	5,070	5,783	6,497	7,210	7,944	8,679	9,413	10,148	10,882
Halton Hills	Mansewood Employment Lands (Green Field)	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	70	70	70
Halton Hills	Rural Halton Hills	1,691	1,701	1,701	1,702	1,702	1,703	1,703	1,703	1,703	1,703	1,703	1,703	1,703	1,561	1,570	1,580	1,589	1,598	1,601	1,604	1,606	1,609
Halton Hills	Proposed Stewarttown Res/Mixed Use Area (Includes Existing Stewarttown)	46	46	46	46	46	46	46	46	46	46	46	46	57	68	79	90	101	109	117	124	132	140
Halton Hills	Southwest Georgetown Mixed Use Area	0	0	0	0	0	0	0	0	0	0	0	0	259	487	715	943	1,171	1,299	1,427	1,556	1,684	1,812
Halton Hills	North of Steeles Proposed Employment Area	0	0	0	0	0	0	0	0	0	0	0	0	906	1,692	2,479	3,265	4,051	4,902	5,753	6,605	7,456	8,307
Halton Hills	Total	19,730	19,856	20,034	20,211	20,389	20,566	20,744	21,182	21,621	22,059	22,498	22,936	24,820	26,704	28,588	30,472	32,356	34,277	36,198	38,120	40,041	41,962

Gross Employment - Industrial

Municipality	Development Area	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Halton Hills	Georgetown	4,683	4,695	4,704	4,713	4,721	4,730	4,739	4,763	4,788	4,812	4,837	4,861	4,888	4,914	4,941	4,967	4,994	5,033	5,072	5,111	5,150	5,189
Halton Hills	South Acton Special Study Area (Maple Leaf Lands)	219	219	224	229	233	238	243	244	245	246	247	248	250	252	254	256	258	264	270	275	281	287
Halton Hills	Acton, Excluding Maple Leaf Lands	1,239	1,248	1,251	1,254	1,256	1,259	1,262	1,287	1,312	1,336	1,361	1,386	1,430	1,473	1,517	1,560	1,604	1,627	1,649	1,672	1,694	1,717
Halton Hills	Halton Hills 401 Corridor	1,130	1,140	1,188	1,236	1,283	1,331	1,379	1,640	1,902	2,163	2,425	2,686	3,147	3,608	4,068	4,529	4,990	5,263	5,537	5,810	6,084	6,357
Halton Hills	Mansewood Employment Lands (Green Field)	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	70	70	70
Halton Hills	Rural Halton Hills	602	605	605	605	606	606	606	606	606	606	606	606	606	531	531	532	532	533	535	537	538	540
Halton Hills	Proposed Stewarttown Res/Mixed Use Area (Includes Existing Stewarttown)	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	43	43	44	44
Halton Hills	Southwest Georgetown Mixed Use Area	0	0	0	0	0	0	0	0	0	0	0	0	10	10	10	10	10	10	10	10	10	10
Halton Hills	North of Steeles Proposed Employment Area	0	0	0	0	0	0	0	0	0	0	0	0	677	1,288	1,900	2,511	3,122	3,761	4,400	5,039	5,678	6,317
Halton Hills	Total	7,984	8,018	8,082	8,147	8,211	8,276	8,340	8,652	8,963	9,275	9,586	9,898	11,043	12,188	13,332	14,477	15,622	16,604	17,586	18,569	19,551	20,533

Gross Employment - Commercial

Municipality	Development Area	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Halton Hills	Georgetown	5,245	5,268	5,282	5,296	5,311	5,325	5,339	5,379	5,419	5,459	5,499	5,539	5,565	5,591	5,618	5,644	5,670	5,742	5,814	5,887	5,959	6,031
Halton Hills	South Acton Special Study Area (Maple Leaf Lands)	160	161	169	178	186	195	203	209	214	220	225	231	240	249	257	266	275	280	285	289	294	299
Halton Hills	Acton, Excluding Maple Leaf Lands	1,090	1,099	1,137	1,174	1,212	1,249	1,287	1,307	1,327	1,347	1,367	1,387	1,405	1,423	1,440	1,458	1,476	1,493	1,510	1,528	1,545	1,562
Halton Hills	Halton Hills 401 Corridor	328	356	392	428	463	499	535	589	643	698	752	806	1,058	1,309	1,561	1,812	2,064	2,523	2,983	3,442	3,902	4,361
Halton Hills	Mansewood Employment Lands (Green Field)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Halton Hills	Rural Halton Hills	798	803	803	803	804	804	804	804	804	804	804	804	755	762	770	777	784	785	786	787	788	789
Halton Hills	Proposed Stewarttown Res/Mixed Use Area (Includes Existing Stewarttown)	4	4	4	4	4	4	4	4	4	4	4	4	12	20	27	35	43	48	53	58	63	68
Halton Hills	Southwest Georgetown Mixed Use Area	0	0	0	0	0	0	0	0	0	0	0	0	166	331	495	660	824	909	994	1,079	1,164	1,249
Halton Hills	North of Steeles Proposed Employment Area	0	0	0	0	0	0	0	0	0	0	0	0	189	324	460	595	730	892	1,053	1,215	1,376	1,538
Halton Hills	Total	7,625	7,691	7,787	7,883	7,980	8,076	8,172	8,292	8,412	8,531	8,651	8,771	9,390	10,009	10,628	11,247	11,866	12,672	13,478	14,285	15,091	15,897

Gross Employment - Institutional

Municipality	Development Area	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Halton Hills	Georgetown	2,707	2,719	2,719	2,719	2,719	2,719	2,719	2,719	2,720	2,720	2,721	2,721	2,726	2,732	2,737	2,743	2,748	2,768	2,788	2,808	2,828	2,848
Halton Hills	South Acton Special Study Area (Maple Leaf Lands)	30	30	35	40	46	51	56	58	61	63	66	68	73	79	84	90	95	99	103	108	112	116
Halton Hills	Acton, Excluding Maple Leaf Lands	1,024	1,034	1,034	1,034	1,034	1,034	1,034	1,034	1,034	1,034	1,034	1,034	1,034	1,035	1,035	1,036	1,036	1,047	1,058	1,068	1,079	1,090
Halton Hills	Halton Hills 401 Corridor	70	71	83	95	106	118	130	134	138	143	147	151	152	153	154	155	156	158	159	161	162	164
Halton Hills	Mansewood Employment Lands (Green Field)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Halton Hills	Rural Halton Hills	291	293	293	293	293	293	293	293	293	293	293	293	275	277	278	280	281	281	281	281	281	281
Halton Hills	Proposed Stewarttown Res/Mixed Use Area (Includes Existing Stewarttown)	0	0	0	0	0	0	0	0	0	0	0	0	3	6	10	13	16	18	21	23	26	28
Halton Hills	Southwest Georgetown Mixed Use Area	0	0	0	0	0	0	0	0	0	0	0	0	83	146	210	273	337	380	423	467	510	553
Halton Hills	North of Steeles Proposed Employment Area	0	0	0	0	0	0	0	0	0	0	0	0	40	80	119	159	199	250	300	351	401	452
Halton Hills	Total	4,122	4,147	4,164	4,181	4,198	4,215	4,232	4,239	4,246	4,253	4,260	4,267	4,387	4,507	4,628	4,748	4,868	5,001	5,134	5,266	5,399	5,532



APPENDIX B

Wastewater Evaluation

Sanitary Sewer Design
Relevant Information from Halton Region Planning Model

DESKTOP EVALUATION OF SEWER CAPACITY IN PREMIER GATEWAY

Flow Factors

Peak factor

Manning's n

0.013

Residential 275 l/person-day Modified Harmon: $(1 + 14/(4+(P/1000)^{.5})) * .8$

Type 3 Employment 275 l/person-day Babbitt: $5/(P/1000)^{.5}$

125.0 Extraneous 0.28 l/s-ha

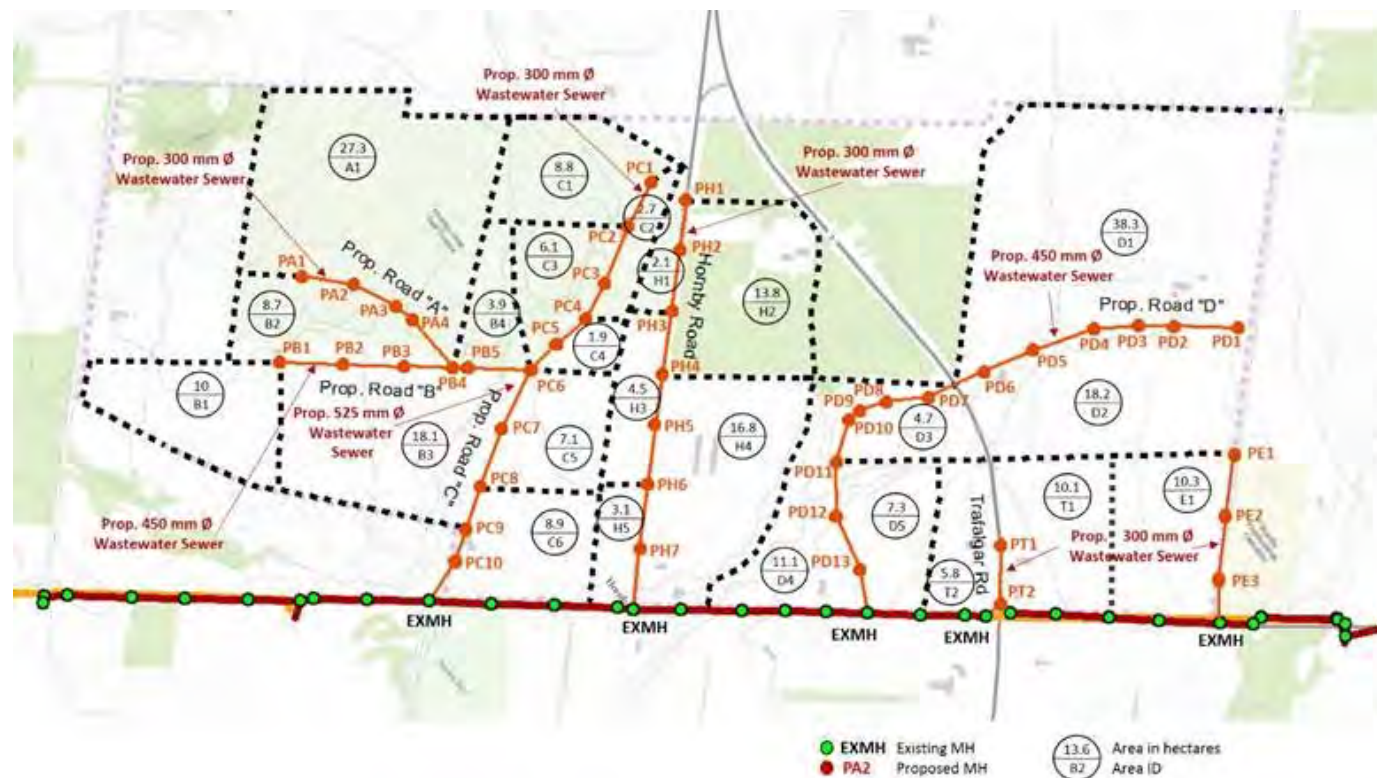
Model IDs	Area	Sewershed Area (ha)		persons/ha Employment (ha) Type 3	Population or equivalents		Dry weather Flow (l/s)			Extraneous Flow (l/s)	Design Flow (l/s)	US MH	DS MH	US Invert	DS Invert	US Obvert	DS Obvert	DS MH drop	Pipe length (m)	Pipe Slope (%)	Pipe Diameter (mm)	Full Flow Velocity (m/s)	Flow Capacity (l/s)	% Utilized		
		Increment	Cumulative		Incremental Res	Emp	Cumulative Res	Emp	Average																Peak Factor	Peak Flow
Demand and Conceptual Design of Sewer on Future Road "A"																										
A1		27.3	27	24.2	0	3030	0	3030	9.6	2.75	27	8	34	PA1	PA2	200.400	198.493	200.700	198.793	0.025	127.1	1.50%	300	1.68	118	28.9%
			27		0	0	0	3030	9.6	2.75	27	8	34	PA2	PA3	198.493	197.023	198.793	197.323	0.025	113.1	1.30%	300	1.56	110	31.0%
			27		0	0	0	3030	9.6	2.75	27	8	34	PA3	PA4	197.023	196.397	197.323	196.697	0.025	52.1	1.20%	300	1.50	106	32.3%
			27		0	0	0	3030	9.6	2.75	27	8	34	PA4	PB4	196.397	194.924	196.697	195.224	0.025	147.3	1.00%	300	1.37	97	35.3%
Demand and Conceptual Design of Sewer on Future Road "B"																										
B1, B2, B3		36.8	37	31.5	0	3933	0	3933	12.5	2.67	33	10	44	PB1	PB2	196.350	195.750	196.800	196.200	0.025	150.0	0.40%	450	1.13	180	24.3%
			37		0	0	0	3933	12.5	2.67	33	10	44	PB2	PB3	195.725	195.125	196.175	195.575	0.025	150.0	0.40%	450	1.13	180	24.3%
			37		0	0	0	3933	12.5	2.67	33	10	44	PB3	PB4	195.100	194.740	195.550	195.190	0.025	120.0	0.30%	450	0.98	156	28.0%
B4		3.9	68		0	0	0	6963	22.2	2.49	55	19	74	PB4	PB5	194.715	194.625	195.165	195.075	0.025	30.1	0.30%	450	0.98	156	47.5%
			68		0	0	0	6963	22.2	2.49	55	19	74	PB5	PC6	194.600	194.150	195.050	194.600	0.025	150.0	0.30%	450	0.98	156	47.5%
Demand and Conceptual Design of Sewer on Future Road "C"																										
C1, C2		10.9	11	3.1	0	388	0	388	1.2	3.22	4	3	7	PC1	PC2	200.650	198.865	200.950	199.165	0.025	119.0	1.50%	300	1.68	118	5.9%
			17	3.9	0	483	0	871	2.8	3.07	9	5	13	PC2	PC3	198.840	197.456	199.140	197.756	0.025	145.7	0.95%	300	1.33	94	14.1%
C3			17		0	0	0	871	2.8	3.07	9	5	13	PC3	PC4	197.431	196.519	197.731	196.819	0.025	96.0	0.95%	300	1.33	94	14.1%
			19		0	0	0	871	2.8	3.07	9	5	14	PC4	PC5	196.494	195.610	196.794	195.910	0.025	93.0	0.95%	300	1.33	94	14.6%
C4		1.90	19		0	0	0	871	2.8	3.07	9	5	14	PC5	PC6	195.585	194.310	195.885	194.610	0.225	85.0	1.50%	300	1.68	118	11.7%
			19		0	0	0	871	2.8	3.07	9	5	14	PC6	PC7	194.085	193.635	194.610	194.160	0.025	150.0	0.30%	525	1.09	236	38.7%
C5		7.10	94	4.7	0	582	0	8416	26.8	2.42	65	26	91	PC6	PC7	194.085	193.635	194.610	194.160	0.025	150.0	0.30%	525	1.09	236	38.7%
			94		0	0	0	8416	26.8	2.42	65	26	91	PC7	PC8	193.610	193.160	194.135	193.685	0.025	150.0	0.30%	525	1.09	236	38.7%
C6		8.90	103	4.7	0	582	0	8998	28.6	2.40	69	29	98	PC8	PC9	193.135	192.800	193.660	193.325	0.025	112.0	0.30%	525	1.09	236	41.4%
			103		0	0	0	8998	28.6	2.40	69	29	98	PC9	PC10	192.775	192.536	193.300	193.061	0.025	79.6	0.30%	525	1.09	236	41.4%
			103		0	0	0	8998	28.6	2.40	69	29	98	PC10	Ex. MH	192.511	191.941	193.036	192.466	0.025	114.0	0.50%	525	1.40	304	32.1%
Demand and Conceptual Design of Sewer on Hornby Road																										
H1, H2		15.9	16	3.1	0	388	0	388	1.2	3.22	4	4	8	PH1	PH2	201.900	201.104	202.200	201.404	0.025	113.7	0.70%	300	1.14	81	10.4%
			16		0	0	0	388	1.2	3.22	4	4	8	PH2	PH3	201.104	200.279	201.404	200.579	0.025	150.0	0.55%	300	1.01	72	11.8%
H3		4.5	20		0	0	0	388	1.2	3.22	4	6	10	PH3	PH4	200.279	199.454	200.579	199.754	0.025	150.0	0.55%	300	1.01	72	13.5%
H4		16.8	37	11.2	0	1403	0	1791	5.7	2.90	17	10	27	PH4	PH5	199.454	198.830	199.754	199.130	0.025	113.5	0.55%	300	1.01	72	37.6%
			37		0	0	0	1791	5.7	2.90	17	10	27	PH5	PH6	198.830	198.006	199.130	198.306	0.025	149.8	0.55%	300	1.01	72	37.6%
H5		3.1	40		0	0	0	1791	5.7	2.90	17	11	28	PH6	PH7	198.006	197.107	198.306	197.407	0.025	149.8	0.60%	300	1.06	75	37.1%
			40		0	0	0	1791	5.7	2.90	17	11	28	PH7	Ex. MH	197.107	196.209	197.407	196.509	0.025	149.6	0.60%	300	1.06	75	37.1%
Demand and Conceptual Design of Sewer on Planned Road "D"																										
D1, D2		56.5	57	43.9	0	5488	0	5488	17.5	2.57	45	16	61	PD1	PD2	207.050	206.300	207.500	206.750	0.025	150.0	0.50%	450	1.27	202	30.1%
			57		0	0	0	5488	17.5	2.57	45	16	61	PD2	PD3	206.300	206.126	206.750	206.576	0.025	86.8	0.20%	450	0.80	128	47.6%
			57		0	0	0	5488	17.5	2.57	45	16	61	PD3	PD4	206.126	205.913	206.576	206.363	0.025	106.9	0.20%	450	0.80	128	47.6%
			57		0	0	0	5488	17.5	2.57	45	16	61	PD4	PD5	205.913	205.613	206.363	206.063	0.025	150.0	0.20%	450	0.80	128	47.6%

D3, D4	15.8	57	6.4	0	0	0	5488	17.5	2.57	45	16	61	PD5	PD6	205.613	205.110	206.063	205.560	0.025	125.8	0.40%	450	1.13	180	33.6%
		72		0	800	0	6288	20.0	2.52	50	20	71	PD6	PD7	205.110	204.510	205.560	204.960	0.025	150.0	0.40%	450	1.13	180	39.2%
		72		0	0	0	6288	20.0	2.52	50	20	71	PD7	PD8	204.510	204.112	204.960	204.562	0.025	99.5	0.40%	450	1.13	180	39.2%
		72		0	0	0	6288	20.0	2.52	50	20	71	PD8	PD9	204.112	203.840	204.562	204.290	0.025	68.0	0.40%	450	1.13	180	39.2%
		72		0	0	0	6288	20.0	2.52	50	20	71	PD9	PD10	203.840	203.700	204.290	204.150	0.025	34.8	0.40%	450	1.13	180	39.2%
D5	7.3	80	8.1	0	1013	0	7301	23.2	2.47	57	22	80	PD10	PD11	203.700	203.221	204.150	203.671	0.025	106.5	0.45%	450	1.20	191	37.0%
		80		0	0	0	7301	23.2	2.47	57	22	80	PD11	PD12	203.221	202.645	203.671	203.095	0.025	128.0	0.45%	450	1.20	191	41.7%
		80		0	0	0	7301	23.2	2.47	57	22	80	PD12	PD13	202.645	202.038	203.095	202.488	0.025	134.81	0.45%	450	1.20	191	41.7%
							7301	23.2	2.47	57	22	80	PD13	Ex.MH	202.038	201.540	202.488	201.990	0.025	110.73	0.45%	450	1.20	191.25	41.7%

Demand and Conceptual Design of Sewer on Trafalgar Rd.																									
T1, T2	15.9	16	15.8	0	1973	0	1973	6.3	2.87	18	4	22	PT1	PT2	202.550	201.650	202.850	201.950	0.025	150.0	0.60%	300	1.06	75	30.0%
		16		0	0	0	1973	6.3	2.87	18	4	22	PT2	Ex.MH	201.650	201.496	201.950	201.796	0.025	43.9	0.35%	300	0.81	57	39.3%

Demand and Conceptual Design of Sewer on 8th Line																									
E1	10.3	10	10.1	0	1263	0	1263	4.0	2.99	12	3	15	PE1	PE2	207.700	206.800	208.000	207.100	0.025	150.0	0.60%	300	1.06	75	19.9%
		10		0	0	0	1263	4.0	2.99	12	3	15	PE2	PE3	206.800	206.305	207.100	206.605	0.025	150.0	0.33%	300	0.79	56	26.8%
		10		0	0	0	1263	4.0	2.99	12	3	15	PE3	PE4	206.305	205.928	206.605	206.228	0.025	107.8	0.35%	300	0.81	57	26.0%

Note- For Design Purposes - Existing Inverts to be verified in the field - Note that GIS and Model Data did not provide the same inverts - information is sufficient to confirm capacity and demand



TORAL DEMAND SUMMARY - PREMIER GATEWAY LANDS

Flow Factors

Peak factor

Residential	275 l/person-day	Modified Harmon: $(1 + 14/(4+(P/1000)^{.5}))^{*.8}$
Type 3 Employment	275 l/person-day	Babbitt: $5/(P/1000)^{.5}$
125.0 Extraneous	0.28 l/s-ha	

Area	Sewershed Area (ha)		persons/ha Employment Type 3	Population or equivalents				Dry weather Flow (l/s)			Extraneous Flow (l/s)	Design Flow (l/s)
	Increment	Cumulative		Incremental Res	Emp	Res	Cumulative Emp	Average	Peak Factor	Peak Flow		
PE3	10.3	10.3		0	1263	0	1263	4.0	<u>2.99</u>	12	3	15
PT2	15.9	26.2		0	1973	0	3236	10.3	<u>2.73</u>	28	7	35
PD13	79.6	105.8		0	7301	0	10538	33.5	<u>2.35</u>	79	30	108
PH7	40.3	146.1		0	1791	0	12328	39.2	<u>2.29</u>	90	41	131
PC10	102.9	249.0		0	8998	0	21326	67.9	<u>2.10</u>	143	70	212

Assignment of Developable Areas to Sewersheds

Developable Area - Secondary Plan	Area (ha)		Drainage Area Plan Assignment										
	Area (ha)	%	ID	%	ID	%	ID	%	ID				
Area-1	35.8	100%	D1							35.8 ha	0.0 ha	0.0 ha	0.0 ha
Area-2	42.1	38%	T1	24%	E1	39%	D5 & D2			15.8 ha	10.1 ha	16.2 ha	0.0 ha
Area-3	6.4	100%	D4							6.4 ha	0.0 ha	0.0 ha	0.0 ha
Area-4	11.2	100%	H4							11.2 ha	0.0 ha	0.0 ha	0.0 ha
Area-5	15.5	30%	C6	30%	C5	20%	C2	20%	H1	4.7 ha	4.7 ha	3.1 ha	3.1 ha
Area-6	3.9	100%	C3							3.9 ha	0.0 ha	0.0 ha	0.0 ha
Area-7	32.3	75%	A1	25%	B2					24.2 ha	8.1 ha	0.0 ha	0.0 ha
Area-8	5.8	100%	B1							5.8 ha	0.0 ha	0.0 ha	0.0 ha
Area-9	14.0	100%	B3							14.0 ha	0.0 ha	0.0 ha	0.0 ha
Area-10	3.6	100%	B3							3.6 ha	0.0 ha	0.0 ha	0.0 ha

A1	24.2 ha
B1	5.8 ha
B2	8.1 ha
B3	17.6 ha
C2	3.1 ha
C3	3.9 ha
C5	4.7 ha
C6	4.7 ha
D1	35.8 ha
D2	8.1 ha
D5	8.1 ha
D4	6.4 ha
E1	10.1 ha
H1	3.1 ha
H4	11.2 ha
T1	15.8 ha



Secondary Plan Preferred Land Use Concept



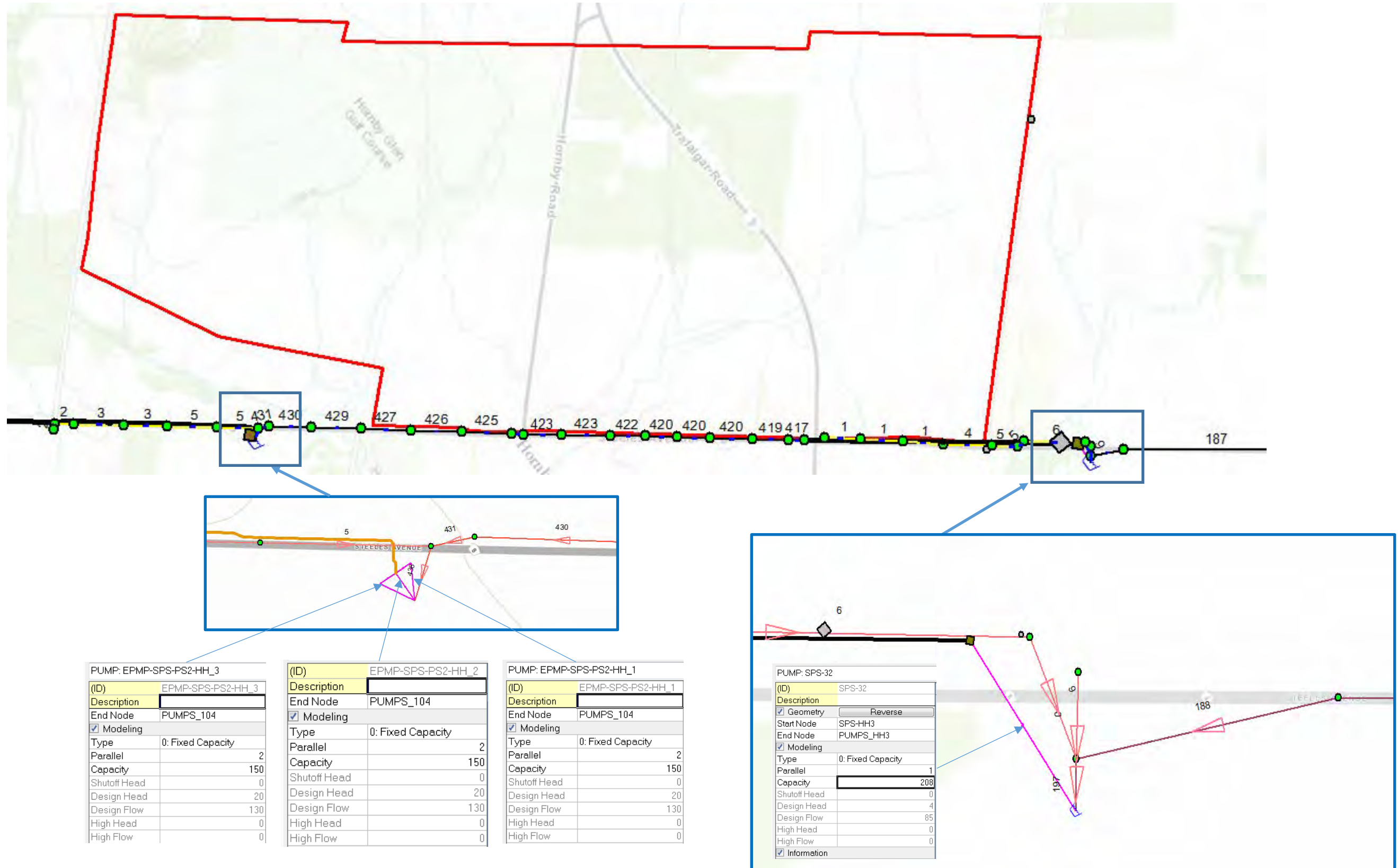
Area 1 = 35.8 ha
 Area 2 = 42.1 ha
 Area 3 = 6.4 ha
 Area 4 = 11.22 ha
 Area 5 = 15.53 ha
 Area 6 = 3.86 ha
 Area 7 = 32.32 ha
 Area 8 = 5.76 ha
 Area 9 = 14.04 ha
 Area 10 = 3.58 ha

Steeles Avenue Sewer Characteristics in Critical Section

	Slope Range		Velocity Range		Full Flow Capacity Range	
525 mm	0.87%	2.91%	1.85 m/s	3.39 m/s	401 l/s	734 l/s
600 mm	0.39%	0.41%	1.36 m/s	1.39 m/s	383 l/s	393 l/s
675 mm	0.11%	0.20%	0.78 m/s	1.05 m/s	279 l/s	376 l/s

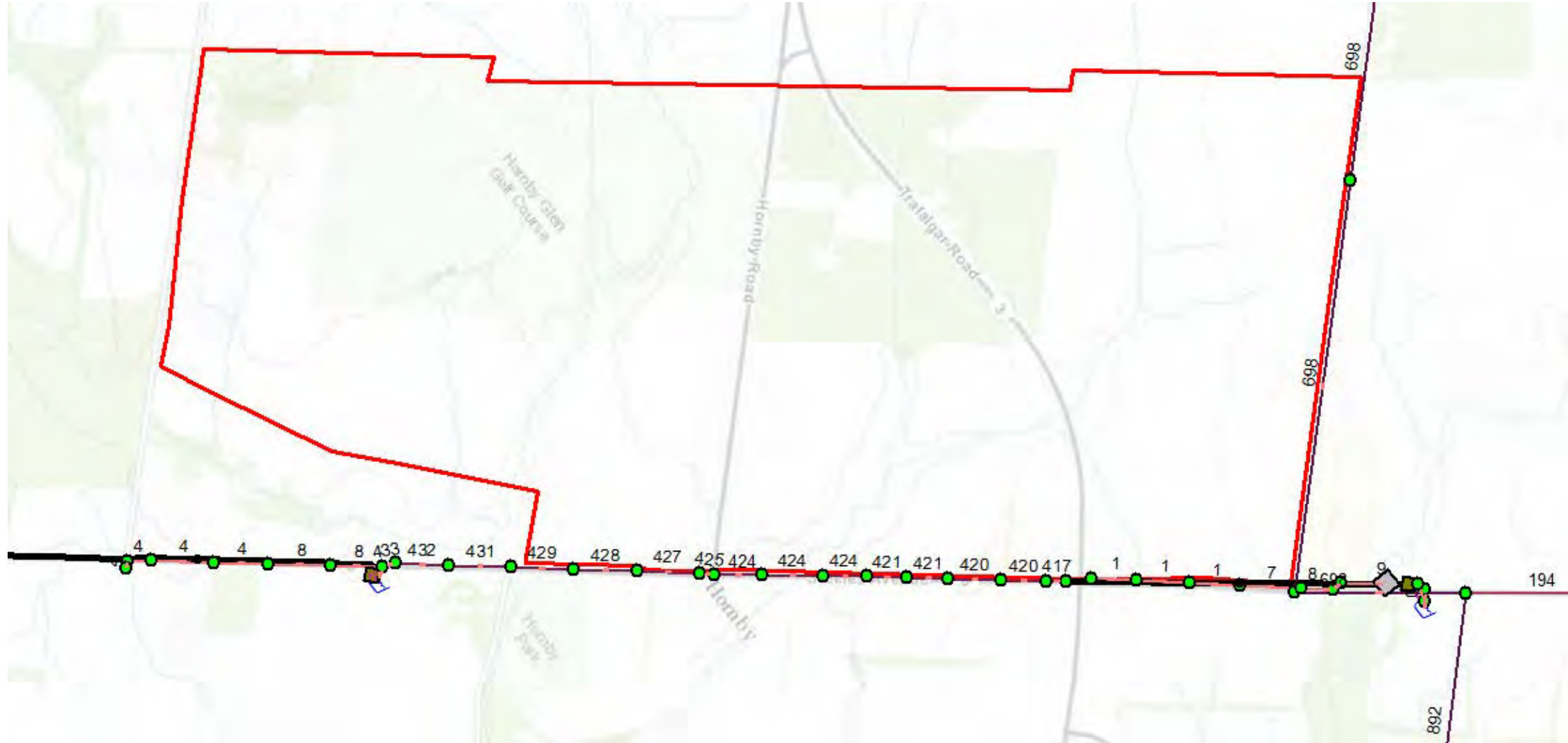
Total Wastewater Flow (L/s) along Steeles Avenue

- “2016-PEAK-WWF-OF, without overflow” Scenario from Halton Region Hydraulic Model



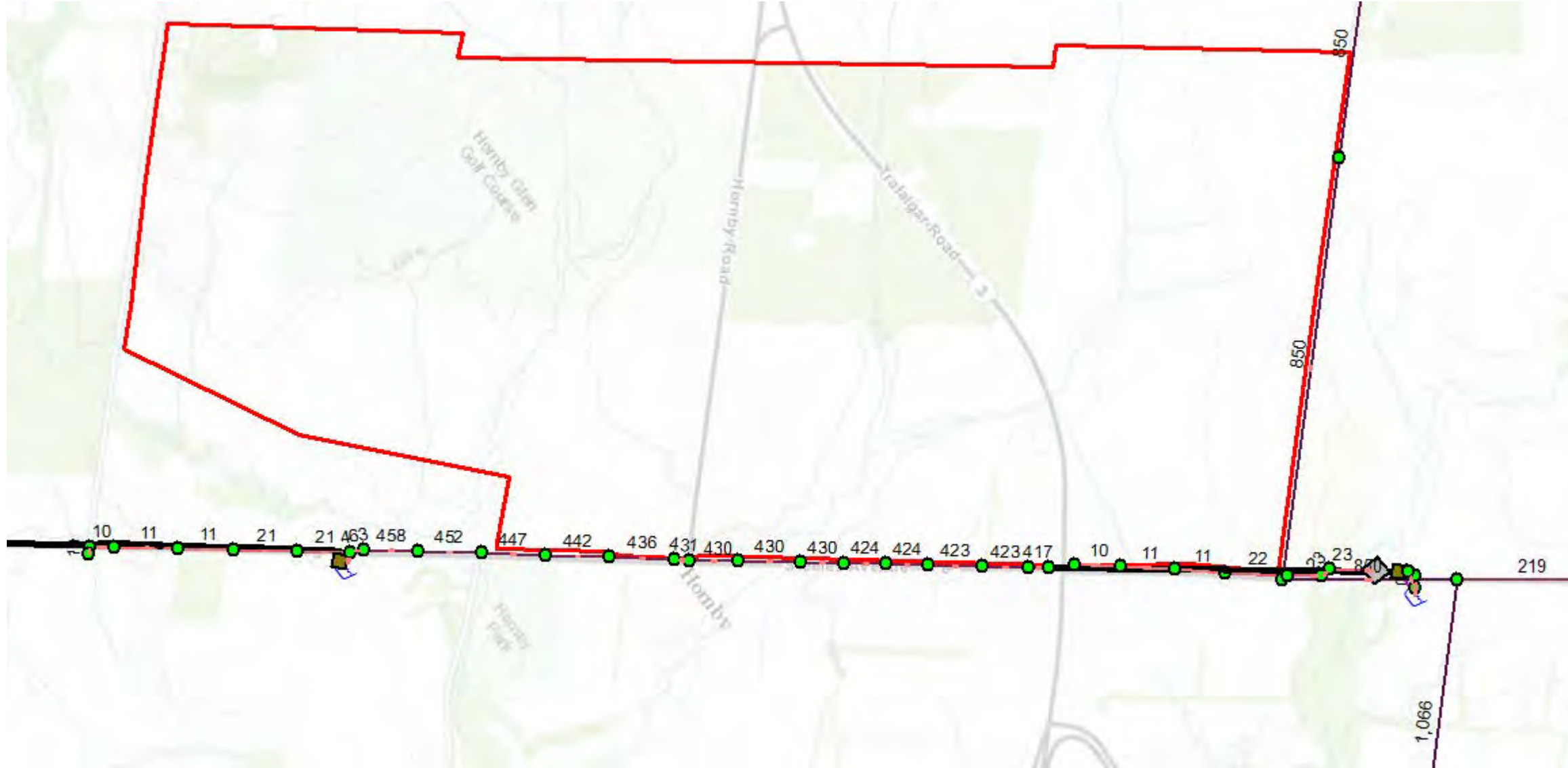
Total Wastewater Flow (L/s) along Steeles Avenue

- “2021-PEAK-WWF-OF, without overflow” Scenario from Halton Region Hydraulic Model



Total Wastewater Flow (L/s) along Steeles Avenue

- “2026-PEAK-WWF-OF, without overflow” Scenario from Halton Region Hydraulic Model





APPENDIX C

Water Evaluation

Modelling Analysis Summary Premier Gateway Phase 1 B Employment Area

The proposed watermain modelling was carried out for Maximum Day Plus Fire Flow and Peak Hourly Demand scenarios using InfoWater model. Modelling was carried out under 2031 demand conditions.

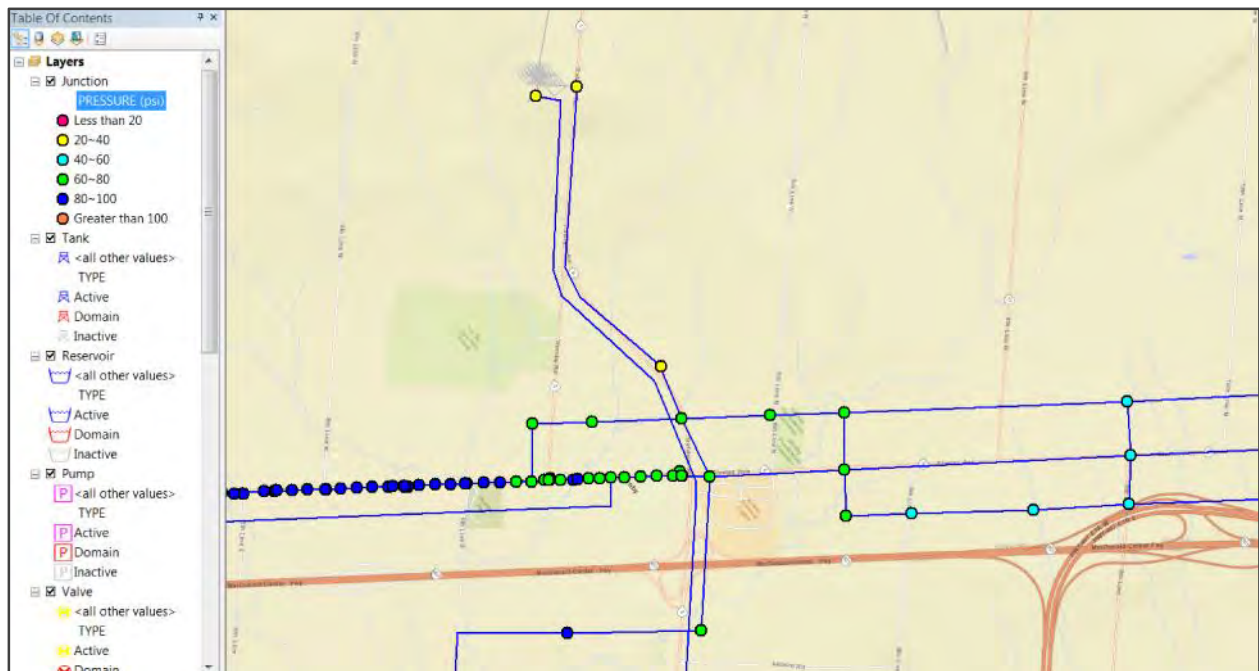
The following demands were used to check the system capacity for the proposed watermain analysis.

-) Max Day Demand – 152.7 L/s
-) Peak Hour Demand – 152.7 L/s (Max Day Factor and Peak Hour Factor are same according to Halton Guidelines)
-) Fire Flow – 318 L/s

The original model “InfoWater May13-2016-Z2PS-ValveIDs” was analyzed with 2031 Maximum Day Demand condition at background for the following two scenarios.

1.) Maximum Day Demand of the service area plus Fire Flow

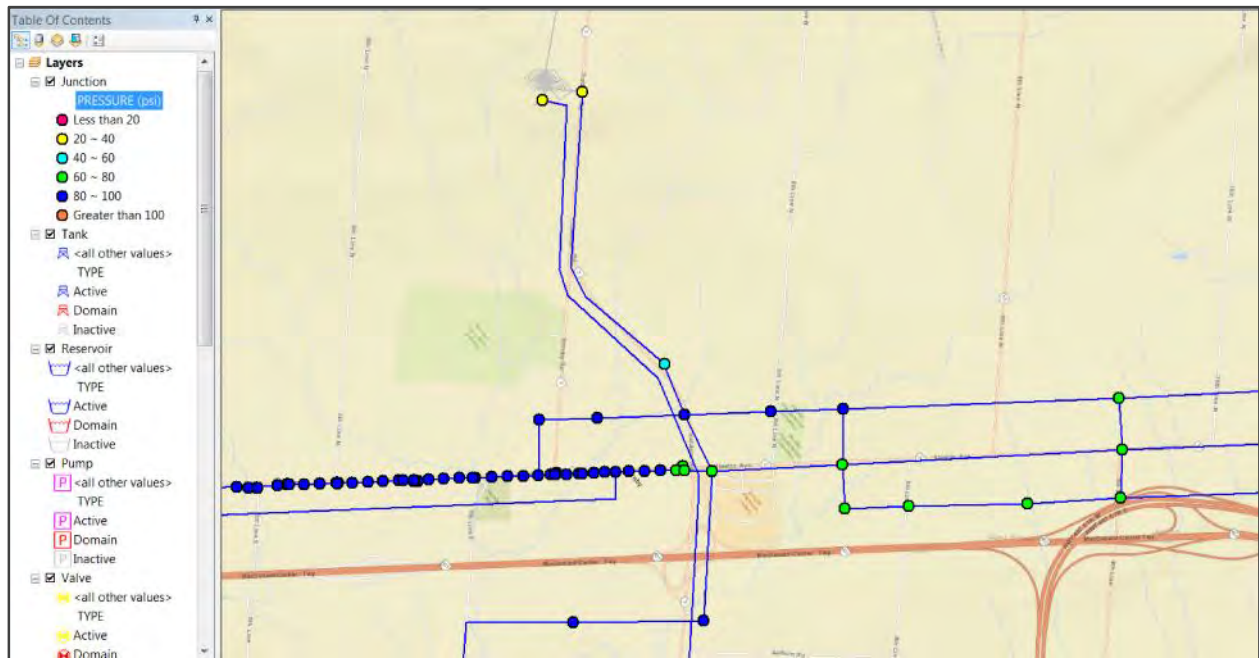
In this analysis, Max Day Demand of 152.7 L/s and Fire flow of 318 L/s were evaluated with 2031 Max Day Demand of the system at the background. Z 5 pumps and 600 mm return line were out of operation during the simulation. Resulting system pressures were within the operating criteria range (above 140 kPa or 20 psi). The following is the screenshot of the results where pressure ranges are in psi unit.



System Pressures at Max Day Demand plus Fire Flow

2.) Peak Hourly Demand

In this analysis, Peak Hourly Demand of 152.7 L/s was evaluated with 2031 Max Day Demand of the System at the background. Z 5 pumps and 600 mm return line were out of operation during the simulation. Please note that according to Halton Guidelines, Max Day Factor and Peak Hour Factor is same. System pressures were within the operating criteria range of 310 kPa – 690 kPa (or, 45 psi – 100 psi). The following is the screenshot of the results where pressure ranges are in psi unit.



System Pressures at Peak Hourly Demand