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AREA SERVICING PLAN ADDENDUM
FOR
407 WEST EMPLOYMENT AREA
IN THE
TOWN OF OAKVILLE

OCTOBER 2023

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AREA SERVICING PLAN ADDENDUM FOR 407 WEST EMPLOYMENT AREA IN THE TOWN OF OAKVILLE

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1.0 INTRODUCTION

This Area Servicing Plan Addendum (***ASP Addendum***) identifies the municipal servicing strategy to support the development of the 407 West Employment Area lands in the Town of Oakville. The ASP Addendum is an update to the approved Area Servicing Plan for the 407 West Employment Area completed by MMM and approved in 2014.

The total Study Area in the 2014 ASP consisted of approximately 251 hectares and is generally located north of the Dundas Street; west of Bronte Road; south of 407 Highway; and east of Tremaine Road. The ASP Addendum generally matches the 2014 ASP Study Area. A location map of the Study Area is provided in ***Figure 1***.

The purpose of this addendum is to update the land use for the area east of Fourteen Mile Creek and west of Bronte Road within the Study Area, herein referred to as the Palermo Village lands. The land use for the Palermo Village lands is updated in this addendum from employment lands to residential and mixed-use designation; to support an Official Plan Amendment application for these lands. The lands west of Fourteen Mile Creek and east of Tremaine Road in the Study Area remain unchanged from the original approved 2014 ASP.

In addition to the land use changes for the Palermo Village lands, this ASP Addendum updates the 2014 ASP with the most current information for the lands to the east and west of the 2014 ASP Study Area, as described below:

- East of the Study Area - the land uses for the area east of Bronte Road and north of Dundas Street, herein identified as the East Bronte Lands, is expanded to include potential future high-density residential development of these lands.

- West of Study Area - the Evergreen lands located west of Tremaine Road have proceeded to draft plan approval since the 2014 ASP was completed. This addendum updates the final draft plan and populations for the Evergreen lands.

The ASP Addendum focuses on updating the wastewater and water servicing strategy and requirements for the Palermo Village lands based on the updated land use. This ASP Addendum demonstrates the proposed land use changes for the Palermo Village lands can be accommodated in the existing and proposed Regional water and wastewater

infrastructure, and can support development of these lands as outlined in the Official Plan Amendment.

1.1 Area Servicing Plan Objectives

The ASP Addendum purpose is the achieve the requirements of the Terms of Reference of the initial ASP (2014) for the 407 West Employment Area Secondary Plan, based on an updated land-use for the eastern portion of the secondary plan. The general objectives of the approved 2014 ASP are excerpted below:

The specific purposes of this report are to provide:

- *Detailed information on proposed land uses.*
- *Detailed information on system demands (water) and flows (wastewater).*
- *A specific plan for implementing the Region's Master Plan in and around the 407 West Employment Area.*
- *A discussion of the impact that the proposed development of the 407 West Employment will have on planned Regional Infrastructure in terms of proposed capacity and timing.*

Palermo Village Corporation has retained **David Schaeffer Engineering Ltd.** to complete this ASP Addendum.

The objective of this ASP Addendum is to provide technical details of the proposed water supply, wastewater collection system for the Palermo Village lands in the context of the approved 2014 ASP, and demonstrate the servicing requirements of these lands can be addressed. The ASP Addendum is intended to outline the Regional infrastructure design requirements and servicing strategy requirements to support the Official Plan Amendment (OPA) for the Palermo Village lands. The balance of the Study Area located west of Fourteen Mile Creek and east of Tremaine Road remain as employment land use designation, and the servicing strategy and design remains unchanged from the approved 2014 report. The focus of this ASP Addendum will be supporting the OPA and future planning applications for the Palermo Village lands; however, the lands west of the creek are still considered in this report for completeness.

The development of this ASP Addendum has been integrated with the development of the Environmental Impact Study for the Palermo Village lands (EIR/FSS, DSEL et. al. September 2023). Specifically, the infrastructure identified in this report has been designed with regard for the existing environmental conditions on the Palermo Village lands and the associated constraints, opportunities, impacts and required mitigation measures have been assessed.

1.2 Required Approvals

The Palermo Village lands are seeking to have their proposed modifications to the Official Plan (Livable Oakville Plan) approved through the Ontario Land Tribunal. The Region of Halton will use this ASP Addendum to review the servicing requirements of the Palermo Village lands. The Palermo Village lands will also require Zoning By-law Amendments and Draft Plan(s) of Subdivision approvals.

In addition to the planning approvals noted above, permits and approvals are expected to be required for the development of the proposed infrastructure identified in this ASP Addendum report. Requirements for permits and approvals will be further detailed in subsequent EIR/FSS documents for these lands.

2.0 PREVIOUS STUDIES AND REPORTS

The following materials have been reviewed in order to identify the constraints which govern development within the subject lands:

- **Sustainable Halton Water & Wastewater Master Plan**
  Region of Halton, 2012.
  (Master Plan Update)

- **2017 Development Charges Water/Wastewater Technical Report**
  GM Blue Plan and Region of Halton, 2016.
  (2017 W&WW Technical Study)

- **2022 Development Charges Water/Wastewater Technical Report**
  GM Blue Plan and Region of Halton, 2022.
  (2022 W&WW Technical Study)

- **Stormwater Management Planning and Design Manual**
  Ministry of the Environment, March 2003
  (SWMP Design Manual)

- **Erosion and Sediment Control Guidelines for Urban Construction**
  Conservation Halton et al., December 2006.
  (CH Erosion Guidelines)

- **Area Servicing Plan, 407 West Employment Area,**
  MMM, June 2014
  (ASP)

- **Fourteen Mile Creek / McCarney Creek Flood Management Alternative Assessment & PCSWMM Model**
  AMEC, July 17, 2013.
  (AMEC Flood Management Assessment)

- **Fourteen Mile Creek Main and West Branches Subwatershed Plan**
  Philips Engineering, January 2002 and Addendum May 2003.
  (Subwatershed Plan)

- **Study Report: Thermal Impacts of Urbanization Including Preventative and Mitigation Techniques**
  Credit Valley Conservation, January 2011.
  (CVC Thermal Impacts)

- **Evaluation of an Innovative Technique for Augmenting Stream Baseflows and Mitigating the Thermal Impacts of Stormwater Ponds**
  Toronto and Region Conservation Authority, April 2013.
  (TRCA Base flows &Thermal Impacts)

- **Ministry of Natural Resources Draft Guidance for Development Activities in Redside Dace Protected Habitat**
  Ministry of Natural Resources, February 2011.
  (MNR Redside Dace Protected Habitat)

3.0 PROPOSED UPDATES TO 2014 AREA SERVICING PLAN

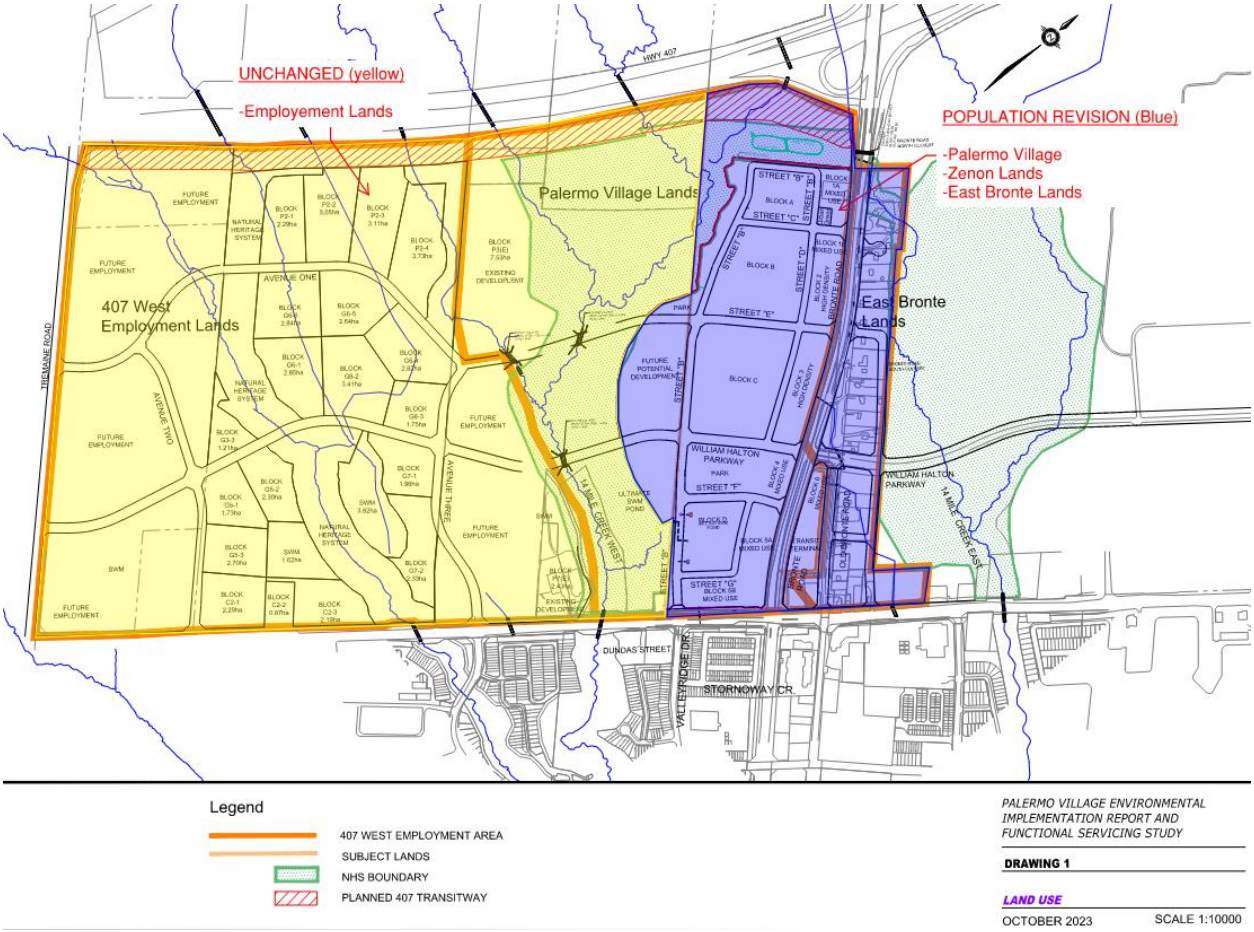
3.1 2014 ASP Proposed Land Uses and Study Area

The ASP studied the servicing impacts of the Evergreen lands (residential development west of Tremaine Road), 407 West Employment Lands between Tremaine Road and Bronte Road, and existing land use lands east of Bronte Road.

The 2014 ASP Study Area is provided in ***Appendix A***.

The land uses for the 2014 ASP Study area were generally comprised of:

- Future residential development west of Tremain Road (Evergreen development)
- Employment land uses between Tremaine Road and Bronte Road (407 West Employment Lands)
- Existing residential uses immediately east of Bronte Road



3.2 ASP Addendum Proposed Land Uses and Study Area

The ASP Addendum Study Area is generally the same as the 2014 ASP, and comprised of the following proposed land uses:

Located west of Fourteen Mile Creek and east of Tremaine Road per 2014 ASP

- Future Employment Lands
- Natural Heritage System

Located east of Fourteen Mile Creek, and west of Bronte Road (updated from 2014 ASP)

- Mixed-use development
- Residential
- Parks
- Stormwater ponds
- Natural Heritage System

The land uses west of Fourteen Mile Creek are herein referred to as Employment Area.

The proposed residential, mixed use, and related land uses for the Palermo Village Lands are provided ***Figure 1***.

The Evergreen lands are located west of Tremaine Road and were accounted for in the 2014 ASP as residential development. The latest draft plan has been used for these lands to update population assumptions from the 2014 ASP.

The lands located east of Bronte Road and west of Glenorchy Conservation Area, herein referred to as Bronte East lands, were considered in the 2014 ASP as existing residential (single detached, low density). The Bronte East lands are not part of the OPA for the Palermo Village lands; however, are considered for potential future development ad high-density development and related uses in this study. The Bronte East lands have been considered for future potential development in this ASP Addendum differs from the 2014 ASP which assumed the existing land use remains. The purpose of considering the Bronte East lands for future development is to demonstrate the OPA for the Palermo Village lands does not preclude future potential development of Bronte East lands.

3.3 Palermo Village - Development Limits and Concept Plan

The Environmental Impact Report (Beacon, 2023) for the Palermo Village lands describes comprehensive physical and natural heritage constraints and opportunities for the purposes of identifying an ecologically-appropriate development concept.

Specifically, the EIR defines a comprehensive development setback line, inclusive of policy and regulatory constraints associated with the components described in ***Table 3-1.***

The development concept for the Palermo Village Lands discussed in ***Section 3.3*** reflect the comprehensive development setback line defined in the EIR for Palermo Village lands. The EIR does not address the development limits for the East Bronte lands, as these lands are not proceeding with planning applications at this time. The East Bronte Lands assume a development limit based on the Core 2 limit from the North Oakville Creeks Subwatershed Study for the purposes of approximately developable area for servicing capacity requirements. This preliminary development limit will need to be updated through future EIR/FSS works. Similarly, the Employment Lands located west of Fourteen Mile Creek will require an EIR report to define the western limit of the NHS that forms the eastern boundary of these employment lands. For the purpose of this ASP Addendum, the NHS limit for the eastern boundary of the Employment Lands has been used from the approved ASP.

Table 3-1: Summary of Development Constraints

Constraint	Impact to Development Area
Natural Heritage System (NHS):	
Habitats for Threatened and Endangered Species	*30m setback from watercourse meander belt width, for the protection of Redside Dace habitat*
Fish Habitat	*30m setback from bank of watercourses*
Wetlands	*15m setback from wetlands*
Significant Valleylands	*7.5m setback from Fourteen Mile Creek valleylands – measured from the greater of physical top of slope or long-term stable top of slope*
Significant Woodlands	*10m setback from significant woodlands*
Significant Wildlife Habitat	*No additional setback required – as contained within defined NHS*
Physical Constraints:	
Watercourses	*30m setback from bank*
Hazard Lands	*As per Conservation Halton's policies, the regulated limit includes both the regulatory floodplain and erosion hazard plus a regulated 7.5m (for Fourteen Mile Creek and its tributaries) regulated setback from the greater of the flooding or erosion hazard. The erosion hazard is calculated as the greater of the physical top of slope as staked by Conservation Halton or the long term stable top of slope for a confined system or the meander belt width for an unconfined system.*

The development constraints identified above have been incorporated on the development concept illustrated in ***Appendix B***.

4.0 WASTEWATER SERVICING

4.1 Wastewater Design Criteria

The wastewater mains will be designed in accordance with the following ***Halton Design Criteria***:

Sewer Design Criteria

Average dry weather flow	➢	275 litres per capita per day
Infiltration	➢	0.286 litres per second per hectare
Peaking Factor (Residential)	➢	Peak Flow Factor – Harmon Formula
Peaking Factor (Commercial and Industrial)	➢	Peak Flow Factor – Modified Harmon Formula

Population Criteria

Single family	➢	55 persons / hectare
Semi-detached	➢	100 persons / hectare
Townhouse	➢	135 persons / hectare
Community Services	➢	40 persons / hectare
Light Commercial	➢	90 persons / hectare
Light Industrial	➢	125 persons / hectare

The concept plans for the Palermo Village lands indicate residential areas with a mix of low, medium and high-density use and mixed-use areas. The East Bronte lands are composed mainly of high-density urban centers. Given that a significant portion of the lands are medium-density and high-density, the population projections have been designed using ***Halton Design Criteria*** for high-density blocks or estimated unit counts and populations/unit where more conservative (e.g. greater population).

The 2014 ASP included the following area and populations for the subject lands:

Table 4-1: 407 West Employment Lands Population (2014, MMM)

Property	Area (Ha)	Population
Evergreen	56	2,170
407 West Employment	116.1	13,057

Palermo Lands	39.4	4,533
East Bronte*	13	715
Total	**224.5**	**20,475**

*Note: Bronte East lands were assumed to discharge to existing sewer on Old Bronte Road in 2014 ASP

It is understood that the Region of Halton confirmed through the 2014 ASP there was capacity in the Mid-Halton WWTP for the proposed population of 20,475 persons for the 407 West Employment Lands.

As part of this ASP Addendum, the populations for the Evergreen lands, Palermo lands, and East Bronte lands have been updated using the latest available information. The updated areas, populations, and receiving downstream sanitary sewers are illustrated in ***Figure 7***. Below is a summary of the updated populations:

Table 4-2: Proposed 407 West Employment Lands Population

Property	Area (Ha)	Population
Evergreen**	42.5	4,123
407 West Employment	116.1	13,057
Palermo Village Lands***	42.77	16,017
East Bronte*	12.4	6,809
Total	**213.77**	**40,006**

*Note: Bronte East lands were assumed to discharge to existing sewer on Old Bronte Road
Note: Updated Evergreen area was based on the developable area shown in the most recent Concept Plan provided in ***Appendix F*.
****Note: Palermo Village Land population and area count are inclusive of the Zenon Lands located west of Street B and east of the 14 Mile Creek.*

4.2 Existing Wastewater Services

Existing wastewater mains are currently available in the vicinity of the Study Area:

Table 4-3: Summary of Existing Wastewater Mains

Street	Size	Location
To Mid-Halton Wastewater Treatment Plant		

Old Bronte Road	825 mm	Henderson Road to Bronte Road
Valleyridge Drive	300 mm	Dundas Street to Bronte Road
Grand Oak Trail	675 mm	Dundas Street to Upper Middle Road
Colonel William Parkway	600 mm	Dundas Street to Valleyridge Drive

These sanitary sewers are shown on ***Figure 4.***

4.3 Proposed Wastewater Servicing

A proposed wastewater analysis has been carried out by both David Schaeffer Engineering Ltd. (DSEL) and Civica Infrastructure Inc. (Civica).

DSEL has prepared drainage areas and populations draining to the Colonel Willaims Outlet, located south of Dundas Street, to reflect the latest Evergreen development, and utilized the approved ASP for West Employment Land populations and areas to Colonel Williams Outlet.

The Palermo Village lands populations and areas have been estimated from the concept plan in ***Appendix B***. The Palermo Village lands will be directed to the existing Valleyridge Drive trunk sewer outlet, maximizing use of the existing available capacity; with the Valleyridge Drive sewer capacity utilized the residual Palermo Village area will drain to the Old Bronte Sewer.

The East Bronte lands are proposed to drain to the Old Bronte trunk sewer.

The Colonel Williams trunk sewer and Valley Ridge Trunk sewer, confluence south of Dundas Street at approximately Richview Boulevard where this trunk confluences with the Old Bronte Trunk before flowing to the Mid-Halton WWTP. As such, it is important to review the downstream impacts to all three trunk systems even though the land use changes are limited to the east half of the Study Area.

Civica was retained to completed downstream hydraulic modeling of the Region's infrastructure to demonstrate there are no impacts of the proposed development on existing infrastructure based on the proposed updates to drainage areas and populations outlined in this ASP Addendum.

The preliminary drainage areas and populations to the Colonel William trunk outfall, Valleyridge Drive trunk outfall, and the Old Bronte trunk outfall are provided on ***Figure 7***.

The downstream sanitary assessment conducted by Civica is provided in ***Appendix C***.

Colonel William Parkway Outlet:

The approved 2014 ASP designed the 407 West Employment lands, the Evergreen lands, and Palermo lands to discharge to the existing 600mm sanitary sewer on Colonel William Parkway. Design sheets were prepared in support of the ASP to confirm the capacity in the Colonel William Parkway sewer from Dundas Street upstream to the transmission corridor downstream.

Design sheets for Colonel William Parkway were updated to include the increased population from the Evergreen lands and to remove the contribution from the Palermo lands. It was found through a sanitary analysis that the Colonel William Parkway sewer was constrained downstream therefore, in an effort to provide relief, it was determined that the portion of the Palermo and Zenon lands would be sent to the Valleyridge Drive trunk sewer. The population difference to the Colonel William Parkway sewer is defined as follows:

Property	**Population to Colonel William Outlet**	
	2014 ASP (Option 1) [1] **Total Area = 211.5 ha**	**2023 ASP Addendum[2]** **Total Area = 158.6 ha**
Evergreen	2,170	4,123
407 West Employment	13,057	13,057
Palermo Lands	4,533	0
Total	**19,760**	**17,180**

[1] This option in the 2014 ASP assumed that lands east of Fourteen Mile Creek (herein referred to as Palermo Village Lands) to the Colonel William outlet, and not to Valleyridge Drive (referred to as Option 2 in 2014 ASP)
[2] This ASP Addendum does not propose to direct the lands east of Fourteen Mile Creek (Palermo Village Lands) to Colonel William outlet as an option, and instead directs Palermo Village drainage to Valleyridge Drive consistent with Option 2 in the 2014 ASP.

As demonstrated in the updated Colonel William Parkway Design Sheets provided in ***Appendix D***, the sanitary trunk sewer has capacity for the proposed areas and populations. This sewer leg is located on Richview Boulevard which conveys wastewater from the Colonel William Parkway trunk sewer east to connect into the Valleyridge Drive trunk sewer. The constraining sewer leg is 43 m long and has a slope of 0.16% resulting in a low pipe flow capacity. This sewer leg was not flagged in the 2014 ASP as Richview Boulevard is located south of the transmission corridor where the original design were sheets terminated.

Valleyridge Drive Outlet:

The design proposed as part of the 2014 ASP included two wastewater outlet alternatives for the lands east of Fourteen Mile Creek: connect to Valleyridge Drive, or a new sanitary sewer to be installed on Dundas Street to Colonel William Parkway outlet.

The capacity in the Valleyridge Drive sanitary sewer was stated as 10,000 persons.

Design sheets for Valleyridge Drive were updated to include the increased population from the Palermo Village lands. The population difference to the Valleyridge Drive sewer is defined as follows:

Property	Population to Valleyridge Drive Outlet	
	2014 ASP Option 2[1] **Total Area = 39.4 ha**	**2023 ASP Addendum** **Total Area = 35.11 ha**
Palermo Village Lands	4,533	9,538
Total	**4,533**	**9,538[2]**

[1] The 2014 ASP included an Option 2 drainage strategy wherein the lands east of Fourteen Mile Creek (Palermo Village lands) drained to Valleyridge Drive outlet, and not Colonel Williams outlet per Option 1.

2 The 9,538 population was determined for the Palermo Village lands; however, a population of 10,300 people were modeled in the downstream analysis to leave approximately 7% tolerance for future plan changes.

The design sheet for the Valleyridge Drive sanitary trunk sewer provided in ***Appendix D*** was also updated to include the increased population from the Palermo Village lands. A downstream sanitary capacity analysis has been completed by Civica Infrastructure Inc. to assess the impacts between existing and proposed sanitary conditions for Colonel William Parkway, Richview Boulevard, Valleyridge Drive, Rochester Circle, Bronte Road, and Old Bronte Road.

The Region of Halton's InfoSewer Model was used and verified to accurately represent the existing sewer system, including any recent updates to the model along with cross-referencing the model with as-builts provided by the Region. Two development scenarios were used for the model consisting of existing conditions (2021-Peak-WWF), and proposed conditions (2031-Peak-WWF + Proposed Flows). Using a proposed population of 10,300 persons to the Valleyridge Drive sewer (greater than the estimated 9,538 populations being directed to Valleyridge Drive from the Subject property to be conservative), it was determined that there are three locations downstream that will be surcharged. The locations are identified in ***Appendix B*** of the report. Although areas of surcharged were identified in the sewer, there is at least 1.8 m freeboard from basements to avoid backflow conditions.

It is also quite possible that these conditions may not translate into a bottleneck surcharge condition using a dynamic hydraulic analysis model. A dynamic model may need to be conducted to verify this. In the event of surcharging, there is an opportunity to send additional flows from the Palermo Village Lands to the Old Bronte Road sewer to eliminate the surcharge conditions at the Valleyridge Drive sewer. Further investigation to confirm capacity will be provided in a subsequent submission if required. All other sewer lines are well under the threshold for surcharge and have capacity under proposed sanitary conditions.

The Valleyridge Drive design sheets, from Dundas Street to Bronte Road, can be found in ***Appendix D***. As demonstrated in the design sheets, the sanitary trunk sewer on Valleyridge Drive has capacity for the Palermo Village lands, and no upsizing within the local system is required. It was found that one sewer leg results in a pipe capacity over 90%.

Old Bronte Road Outlet:

The 2014 ASP assumed that the East Bronte lands would discharge to the existing 825 mm sanitary trunk sewer on Old Bronte Road. The 2014 ASP assumed that the lands have a population of approximately 715 people, which is generally reflective of single detached residential for the area (current land use).

The Bronte East lands are not part of the current OPA for the Palermo Village lands, and is subject to a separate and future planning process. However, to demonstrate the development of the Palermo Village lands does not preclude future high-density development of Bronte East lands, a preliminary population was provided by Perkins&Will for these lands to evaluate future potential servicing. The provided population was used for Civica's downstream analysis of the Old Bronte outlet.

The 2014 ASP directed the Palermo Village lands to two potential outlets: Valleyridge Drive outlet, and Colonel William outlet, and did not consider any drainage from these lands in the Old Bronte outlet. This ASP Addendum proposes a population increase on the Palermo Village lands that exceeds the capacity of the Valleyridge Drive outlet. As such, a portion of the Palermo Village Lands have been directed to the Old Bronte outlet for conveyance to Mid-Halton. The Palermo Village lands will direct approximately 6,479 people to the Old Bronte Sewer, and 9,538 people to the Valleyridge Drive outlet.

Property	**Population to Old Bronte Outlet**	
	2014 ASP MMM **Total Area = 13.0 ha**	**2023 ASP Addendum** **Total Area = 20.06 ha**
Palermo Village Lands	0	6,479
Bronte East Lands	715	6,809

Total	**715**	**13,288**

[1] The Bronte East lands preliminary population estimate provided by Perkins&Will for these lands. The provided population was used for Civica's downstream analysis of the Old Bronte outlet.

Total Population Updates to Mid-Halton WWTP:

The Study Area is directed to the Mid-Halton WWTP. As noted earlier in this report, the total assumed population to the Mid-Halton WWTP from the 2014 ASP was 20,475 people. The population estimates for Evergreen lands, Palermo Village Lands, and the Bronte East Lands have been updated in this ASP Addendum from the 2014 ASP. A summary table of the 2014 ASP total population and the ASP Addendum population to Mid-Halton WWTP is provided below.

Property	**Population to Mid-Halton WWTP**	
	2014 ASP **Total Area = 224.5 ha**	**2023 ASP** **Total Area = 213.77 ha**
Evergreen	2,170	4,123
407 West Employment	13,057	13,057
Palermo Village Lands	4,533	16,017
Bronte East Lands	715	6,809
Total	**20,475**	**40,006**

The increased population on the Palermo Village Lands and Evergreen lands represents an increased population of 13,437 persons to the Mid-Halton WWTP. The Bronte East Lands are not part of the proposed OPA for the Palermo Village Lands; however, estimates of potential future populations are included for reference to demonstrate the Palermo Village lands development does not preclude the Bronte East lands from draining to Mid-Halton WWTP as part of a future planning process. The capacity in the Bronte Road trunk sewer to the Mid-Halton WWTP was confirmed using sanitary sewer modeling. With the potential future development of the Bronte East lands considered, the total population increase to Mid-Halton WWTP would be 19,531 people.

Refer to ***Appendix C*** for the sanitary sewer analysis completed by Civica for additional information on the downstream hydraulic analysis reflecting the updated populations from the Study Area.

The increase in proposed population from the study area and Evergreen lands of 13,437 people, and potentially an additional 6,094 people from Bronte East lands, results in

wastewater contribution increases to the Mid-Halton WWTP. The available treatment capacity for the proposed increases in population and flows from the Study Area to Mid-Halton WWTP is to be confirmed by Halton Region through review of this report and related Official Plan Amendment.

It was determined through review that a potential constraining factor for treatment would be the existing North Pump Station, located immediately north of the Mid-Halton WWTP, that lifts incoming flows from the Bronte trunk sewer system into the Mid-Halton WWTP. As such, the Region's InfoSewer model was used to analyze the proposed flows at the inlet of the north Pumping Station (SPS85).

According to the Region's "Integrated Growth Management Strategy – Water and Wastewater Assessment" (February 2021) the capacity of the north pumping station is 3,656 L/s with an expansion of 2,000 L/s planned for completion in 2028 (Region IPFS ID 7528) per the Region's Water and Wastewater Technical study (2017). Using the Region's InfoSewer model the 2026 and 2031 model scenario maximum flows at the north pump station inlet were found to be 3,586 L/s and 5,479 L/s, respectively. Based on this analysis it was found that both the existing and proposed scenarios exceed the North Pump Station capacity under the proposed development conditions; however, under the expansion scenario, both are within capacity. It is recommended that the timeline for the North Pump Station expansion consider the proposed increase in design flows from the development from the Palermo Village lands, and if appropriate the Bronte East lands.

The development of the Palermo Village lands are expected to precede the North Pump Station upgrade, and precede development of the Employment Lands and the Bronte East lands. Development of the Palermo Village lands prior to the North Pump Station upgrade (Region Project # 7528) can be accommodated as the populations (16,017) are less than the 2014 ASP population of 20,475 assumed from the Study Area.

Local Wastewater Servicing in Palermo Village Lands

The Palermo Village lands will be serviced by a network of local gravity wastewater sewers designed in accordance with the Region's standards and specifications. The local sewers will convey flows to existing wastewater mains located on Valleyridge Drive and Old Bronte Road outlets as shown on ***Figure 7***.

A local trunk sewer, within the Palermo Village lands, will drain to the existing 300 mm gravity trunk sewer on Valleyridge Drive south of Dundas Street and accept flows from approximately 9,538 people. A second local trunk sewer will drain to the existing 825 mm gravity trunk sewer in Old Bronte Road and accept flows from approximately 6,479 people. Population assumptions were determined from the Perkins&Will Massing Study (August, 2023) for high-density land uses, and Gerrard Design lotted concept plan (version CP-69, dated June 2023) for the mid-rise and low-rise areas.

The existing sewer on Valleyridge Drive must be extended from the south side of Dundas Street to the Palermo Village lands. The sewer must cross two existing storm sewers and a trunk watermain. The existing infrastructure within Dundas Street has been

considered in the depth of wastewater sewer on the north side of Dundas Street, and a copy of the Dundas Street as-constructed drawings and crossing design is provided in ***Appendix G.*** The extension of the Valleyridge sewer into the Subject Lands is sloped between 0.3% and 1.1%, which is done to balance the sewer capacity with limiting how much the site grading must be raised to drain to the Valleyridge Drive outlet.

A section of Valleyridge sewer system extension, within the Palermo Village lands is less than 90% capacity between Dundas Street and the first major east west collector road (William Halton Parkway) with exception of one segment of pipe at 94% capacity which is the pipe crossing Dundas Street to connect to the ValleyRidge sewer. The Region of Halton standards for new sewers is to be designed between 60% and 70% full. The outlet at Dundas Street is fixed due to crossing existing infrastructure, and the sewer can only be steepened so much before the site needs to be raised excessively to accommodate the pipe slope. As such, the ability to achieve the Regional Design Standards for this section of sewer is not possible, albeit the sewer will still function at 80% - 90% full. It may be possible to upsize the sewer to a 375 mm diameter within the Subject Lands and discharge to the existing 300 mm diameter at Valleyridge Drive so the Q/Qfull is less than 90%. North of William Halton Parkway (extension) the sewers are sized per Region of Halton Design standards. Refer to ***Appendix D*** for design sheets illustrating the pipe capacity and slopes.

Due to the crossing and depth constraints discussed above, it is proposed that the Valleyridge Drive sewer will accept drainage from approximately 35.11 ha and a population of approximately 9,538. The remaining high-density population inside the Palermo Village lands is proposed to send 7.66 ha and a population of approximately 6,479 to the Old Bronte Trunk sewer.

Local Wastewater Servicing in Employment Lands

The local wastewater sewer network for the Employment Lands is unchanged from the approved 2014 ASP, and has been reflected on ***Figure 4*** in for completeness. The local sewer network will discharge to the Colonel William outlet at Dundas Street.

Local Wastewater Servicing in Bronte East Lands

The local wastewater network in the Bronte East Lands will be determined through future development applications, and outlet to the Old Bronte Sewer.

5.0 WATER SERVICING

5.1 Existing Watermains

Existing watermains are currently available in the vicinity of the Study Area as follows:

Table 5-1: Summary of Existing Watermains

Street	Size	Location
Zone O3		
Dundas Street	1200 mm	Tremaine Road to east of Old Bronte Road
Valleyridge Drive	300 mm	South of Dundas Street
Colonel William	300 mm	South of Dundas Street
Zone 5 – Transmission Watermain		
Bronte Road and Old Bronte Road	900 mm	Upper Middle Road to north of Highway 407 (Milton)

The existing watermains are illustrated in ***Figure 2.***

5.2 Water Design Criteria

The water supply servicing the Study Area will be designed according to the ***Master Plan Update*** and ***Region of Halton Linear Design Manual*** with regard for watermain sizing, depth, crossings, valves, hydrants, and service connections such that adequate pressures and fire flows can be achieved. The water supply will be designed with the following criteria:

Water Design Factors

- Average Daily Demand – Residential ➢ 314 L/person/day
- Average Daily Demand - Employment ➢ 213 L/person/day
- Maximum Daily Demand Peaking Factor ➢ 1.9 times average day
- Peak House Demand Peaking Factor ➢ 3.0 times average day

Population Criteria

- Single family ➢ 55 persons / hectare
- Semi-detached ➢ 100 persons / hectare
- Townhouse ➢ 135 persons / hectare

Community Services	➢	40 persons / hectare
Light Commercial	➢	90 persons / hectare
Light Industrial / Employment Lands	➢	125 persons / hectare

Please note that the ***Master Plan Update*** demand design criteria has been used in conjunction with the ***Halton Design Criteria*** population criteria to estimate the capacity requirements for the subject lands. The following table summarizes the land uses and the populations for each parcel within the Study Area.

Table 5-2: Land Use and Population for Servicing Options

	Palermo East Lands		***East Bronte Lands***	
	Area (ha)	**Population**	**Area (ha)**	**Population**
Potential Future Development	-	-	12.4	6,809
Residential and Related Uses	42.77	16,017	-	-

The water servicing for the Evergreen Lands west of Tremaine Road are not reliant on the Study Area for servicing, and have not been included in the water demand modeling. The Evergreen Lands use the same wastewater outlet on Colonel Williams, as described in ***Section 4.3***, and have been included in the downstream sanitary capacity analysis. The watermain analysis has been completed for the Palermo East and East Bronte Lands is provided in ***Appendix E***. Employment Lands were modelled as part of the 2014 ASP and have not been remodeled as part of the ASP Addendum.

5.3 Proposed Water Servicing – Layout and Sizing

A 600 mm diameter trunk watermain (Region Project ID # 5627) is proposed in the 2022 Water and Wastewater Technical Study to be extended within Bronte Road - north from Dundas Street and west through the Study Area to Tremaine Road. A network of new local watermains will be extended from this trunk watermain to provide a looped and grid-style layout, in accordance with ***Halton Design Criteria*** and MOE guidelines.

The water distribution system will be sized to meet the pressures and flows in accordance with the ***Halton Design Criteria*** under both interim and ultimate servicing scenarios. The system will be looped internally in order to provide system security. The watermain analysis is included in ***Appendix C.*** Based on the watermain analysis, local Pressure Reducing Valves (PRVs) are recommended for the Palermo East and East Bronte Lands. Additional study of PRV requirements for the lands west of Fourteen Mile Creek are

required prior to draft plan approval. No improvements to the existing water infrastructure are necessary to service the Study Area.

In accordance with the ***Master Plan Update***, the subject site will be located within Zone O3, which are supplied by the Burloak Water Purification Plant (WPP), the Burlington WPP and the Oakville WPP.

The conceptual watermain servicing plan is illustrated in ***Figures 5***. Final watermain sizing will be completed at the detailed design stage based on the actual development characteristics. The watermain layout and sizing for the Employment Lands, west of Fourteen Mile Creek, remains unchanged from the 2014 ASP. Watermain sizes for the Palermo East lands and the East Bronte Lands have been updated and provided to reflect the populations addressed in ***Section 4.3***.

The watermain analysis is included in ***Appendix E***. As noted in the watermain analysis there is an area of the Palermo Village lands, located in the north of the site, that is close to 40 psi under peak flow demands. To meet the minimum pressures under peak hour demand, the northern portion of the Palermo Village has been artificially lowered through cutting of the site to improve conditions. However, some areas including the Temple and high-density blocks fall short of the minimum 40 psi by 0.06 psi to 3.05 psi under the 2031 scenario. For the Temple and high-density blocks, a booster pump will be required to meet the minimum pressures. The alternative options, subject to Region review, are proposed to increase pressures and listed below for Blocks A & B and adjacent freehold lots on the Palermo Village Lands:

- A local Region booster pumping station to supplement peak hour pressures to the higher elevation freehold single-family homes and townhomes
- A connection to the RR25 900 mm watermain with a pressure reducing valve to reduce pressure from Zone 267 HGL to Zone O3 HGL
- Extension of Zone O4 infrastructure (Future Zone 223.5) to the west
- Adjusting the Zone O3 operation to supply an increased HGL during peak hour conditions
- Townhouses within Blocks A & B could be designed as condominium blocks with booster pumps at the supply connection.

There are two proposed watermain crossing of the Fourteen Mile Creek valley within Zone O3. The proposed watermain has been bundled with the proposed road crossing of the Fourteen Mile Creek Valley, in order to minimize the infrastructure footprint within the Natural Heritage System. As noted in ***Section 3.2***, it is expected that additional analysis be completed at the EIR/FSS level to address environmental impacts and necessary permits for the watermain construction in this area. The installation of the watermain may be via trenchless methodology or another construction technique that best suits the environmental and construction constraints. Due to the ecological sensitivity of this watercourse and to protect against impacts from any future changes in erosion

processes, it is recommended that watermain infrastructure be installed with at least 3 metres of cover between the obvert of the infrastructure and the invert of the watercourse.

6.0 INFRASTRUCTURE CONSTRUCTION AND PHASING

As noted in ***Section 1.0,*** this ASP Addendum is intended to support future development applications of the proposed residential and mixed-use designations on the Palermo Village Lands.

The larger Study Area will be developed in discrete phases as individual land owners proceed with development applications. The development timing is unknown at this time for properties outside the Palermo Village lands; however, it is expected the Palermo Village lands will precede development of the Employment Lands and Bronte East lands. Generally speaking, phasing considerations are required in order to determine the timing for construction of infrastructure while minimizing cost and environmental impacts, minimizing requirements for temporary throw-away infrastructure, and avoiding liability impacts associated with out-of-phase works.

The servicing plans outlined in ***Sections 4.0*** and ***Section 5.0*** have been laid out in a logical way to respect property boundaries and major roads. The Palermo Village lands are independent of lands west of Fourteen Mile Creek and the Palermo East lands for water and wastewater servicing requirements. It is expected that the Palermo Village lands will proceed with development before the Employment Lands. The Palermo East lands will be required to provide a connection to the Valleyridge Drive outlet and Old Bronte Outlet for wastewater servicing, and extend the 600 mm trunk watermain from Dundas Street north on Bronte Road and west through the site to Fourteen Mile Creek. The 600 mm watermain can be extended west to Tremaine Road as part of future development applications for those lands.

The development phasing of the Employment Lands west of Fourteen Mile Creek will be further explored through EIR/FSS reports as part of the typical development process in North Oakville. The development of the Palermo Village lands, in advance of the Employment Lands will provide a connection to the 600 mm trunk watermain. Furthermore, the wastewater servicing of the Employment Lands relies on connection to the Colonel Williams outlet and the timing is not impacted by the Palermo Village lands development.

As previously noted, there is a DC eligible watermain within the Study Area as outlined in ***Section 5.0***. Additional proposed watermain and wastewater sewer infrastructure may be eligible for Regional Development Charges (DC). The minimum criteria for DC eligible watermains is greater than 400 mm diameter watermains internal to the development and greater than and including 400 mm diameter watermains external to the development. For sanitary sewers, the minimum criteria for DC eligible sewers is greater than 450 mm diameter (internal and external to the development). As additional design and sizing exercises are undertaken for the Study Area through separate EIR/FSS reports, wastewater and watermain infrastructure may be identified as eligible for Regional DCs.

The development timing of Palermo Village is anticipated in advance of the North Wastewater Pumping Station Capacity Upgrade (Region Project 7528), and advance of the Employment Lands. The timing of Palermo Development should align with the pending Allocation Program, which is expected later in 2023. It is expected that the North Wastewater Pumping Station upgrades will be part of the next Allocation Program and in place before build-out of the Employment Lands. As such, the Palermo Village lands are expected to be able to proceed with development prior to completion of the North Pumping Station upgrades.

7.0 MUNICIPAL CLASS ENVIRONMENTAL ASSEMENT REQUIREMENTS

The Terms of Reference for the ASP specify that all DC projects that may potentially require a Municipal Class Environmental Assessment (MCEA) should be defined in the ASP.

There are no anticipated requirements for MCEA within the Palermo Village Lands resulting from this Addendum. The 600 mm trunk watermain MCEA through the Palermo Village Lands is expected to have been satisfied through the Region's Master Plan process that established the size and location.

8.0 CONCLUSIONS

This ASP Addendum presents recommended water supply and wastewater collection system solutions for the proposed Study Area in the Town of Oakville, Halton Region.

The results of this analysis indicate that lands, specifically Palermo Village lands, are generally serviceable for water and wastewater without impact to existing infrastructure, and the OPA, ZBA, and Draft Plan can be supported with required infrastructure outlined in this report.

Prepared by,
David Schaeffer Engineering Ltd.

Ryan Kerr, P.Eng.
Manager of Design Administration

FIGURES

NOTE:
The servicing strategy for the 407 West Employment lands remains unchanged from the approved June 2014 North Oakville West Area Servicing Plan (MMM) - and are not proposed to be amended, and shown for completeness

407 West Employment Lands

Evergreen Lands

East Bronte Lands

Palermo Village Lands

Zenon Lands

HWY 407

TREMAINE ROAD

AVENUE ONE

AVENUE TWO

AVENUE THREE

BRONTE ROAD

WILLIAM HALTON PARKWAY

14 MILE CREEK WEST

14 MILE CREEK EAST

DUNDAS STREET

VALLEYRIDGE DR.

STORNOWAY CR.

COLONEL WILLIAMS PARKWAY

OLD BRONTE ROAD

FUTURE EMPLOYMENT

NATURAL HERITAGE SYSTEM

BLOCK P2-1 2.29ha

BLOCK P2-2 3.05ha

BLOCK P2-3 3.11ha

BLOCK P2-4 3.73ha

BLOCK P3(E) 7.53ha

EXISTING DEVELOPLEMT

BLOCK G6-6 2.84ha

BLOCK G6-5 2.64ha

BLOCK G6-1 2.85ha

BLOCK G6-2 3.41ha

BLOCK G6-4 2.82ha

BLOCK G6-3 1.75ha

BLOCK G3-3 1.21ha

BLOCK G5-2 2.30ha

BLOCK G7-1 1.96ha

BLOCK G5-1 1.73ha

SWM 3.82ha

BLOCK G5-3 2.70ha

SWM 1.62ha

BLOCK G7-2 2.33ha

BLOCK C2-1 2.29ha

BLOCK C2-2 0.87ha

BLOCK C2-3 2.19ha

BLOCK P7(E) 2.43ha

EXISTING DEVELOPMENT

FUTURE POTENTIAL DEVELOPMENT

STREET "A"

STREET "B"

STREET "C"

STREET "D"

STREET "E"

STREET "F"

BLOCK A

BLOCK B

BLOCK C

BLOCK D

PARK

BLOCK 1A MIXED USE

BLOCK 1B MIXED USE

BLOCK 2 HIGH DENSITY

BLOCK 3 HIGH DENSITY

BLOCK 4 MIXED USE

BLOCK 5A MIXED USE

BLOCK 5B MIXED USE

BLOCK 6 MIXED USE

TRANSIT TERMINAL

ULTIMATE SWM POND

INTERIM SWM POND

Legend

- SUBJECT AREA
- BOUNDARY DIVIDE
- NHS BOUNDARY
- PLANNED 407 TRANSITWAY

Stonybrook Consulting Inc.
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R.J. Burnside & Associates Limited
J.F. Sabourin and Associates Inc.
GEO Morphix Ltd.
Beacon Environmental
DS Consultants Ltd.

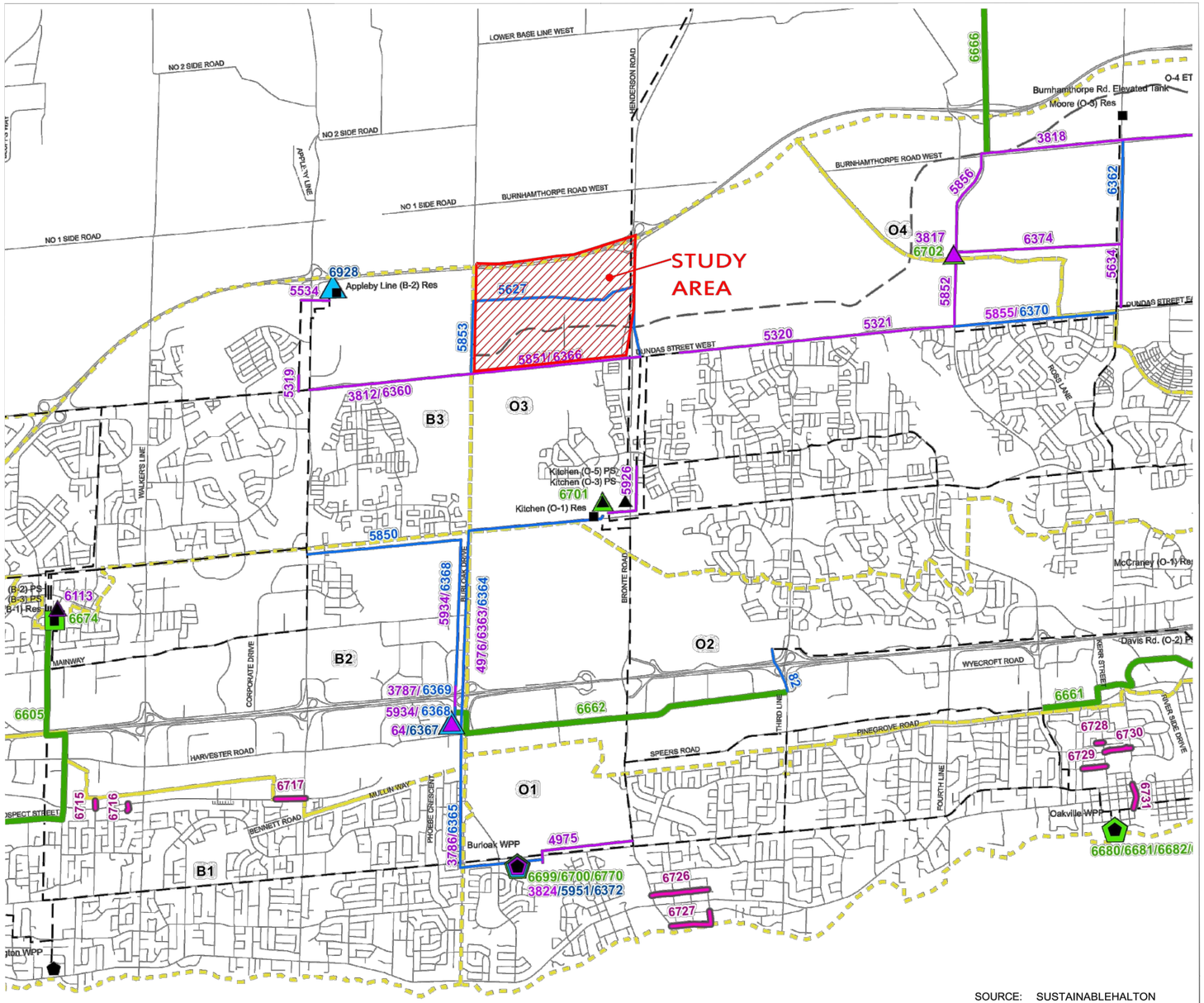
PALERMO VILLAGE ENVIRONMENTAL IMPLEMENTATION REPORT AND FUNCTIONAL SERVICING STUDY

DRAWING 1

LAND USE

OCTOBER 2023

SCALE 1:10000



SOURCE: SUSTAINABLEHALTON WATERANDWASTEWATER MASTERPLAN,AECOM2013

Legend

Existing Infrastructure
- Water Pumping Station
- Water Well
- Water Standpipe
- Water Reservoir
- Water Purification Plant
- Elevated Water Tower
- Existing Watermain

Previously Approved Infrastructure
- Water Pumping Station
- Water Well
- Water Purification Plant
- Water Reservoir
- Watermain (Proposed/Upgrade Infrastructure)

Proposed/Upgrade Infrastructure
- Water Pumping Station
- Water Well
- Water Purification Plant
- Water Reservoir
- Watermain
- Distribution Built Boundary Watermain

Funded Infrastructure
- Water Pumping Station
- Water Reservoir
- Watermain (Proposed/Upgrade Infrastructure)
- X Existing Interregional connections
- Existing Milton Groundwater Servicing
- Existing Central Milton Groundwater Service Area Boundary
- Water Pressure Zones
- Proposed Lake Base Service Area

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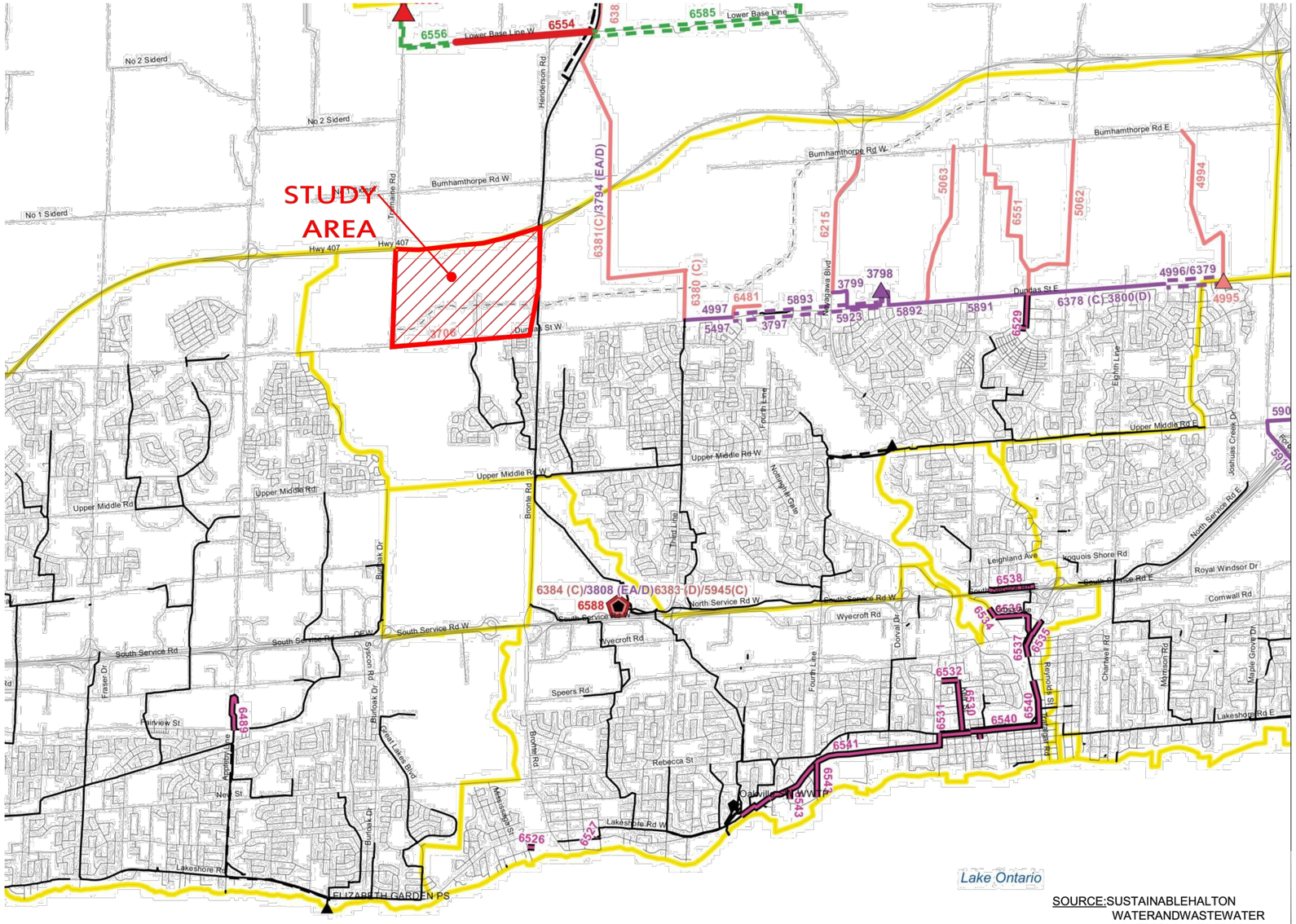
PALERMO VILLAGE ENVIRONMENTAL IMPLEMENTATION REPORT AND FUNCTIONAL SERVICING STUDY

DRAWING 2

EXISTING EXTERNAL AND MASTER PLAN PROJECTS - WATER

OCTOBER 2023 SCALE 1:60000



SOURCE: SUSTAINABLEHALTON WATERANDWASTEWATER MASTERPLAN,AECOM2011. UPDATEDPERDIRECTION FROMREGIONOFHALTON

Legend

Existing Infrastructure
- Wastewater Pumping Station
- Wastewater Treatment Plant
- Wastewater Main
- Wastewater Forcemain

Previously Approved Infrastructure
- Wastewater Pumping Station
- Wastewater Treatment Plant
- Wastewater Main
- Distribution-Built Boundary Wastewater main

Proposed/Upgrade Infrastructure
- Wastewater Pumping Station
- Wastewater Treatment Plant
- Proposed Alignment - Wastewater Main
- Wastewater Forcemain

Funded Infrastructure
- Wastewater Pumping Station
- Wastewater Treatment Plant
- Wastewater Main
- Wastewater Forcemain
- WWTP Drainage Area
- Proposed Lake Base Service Area

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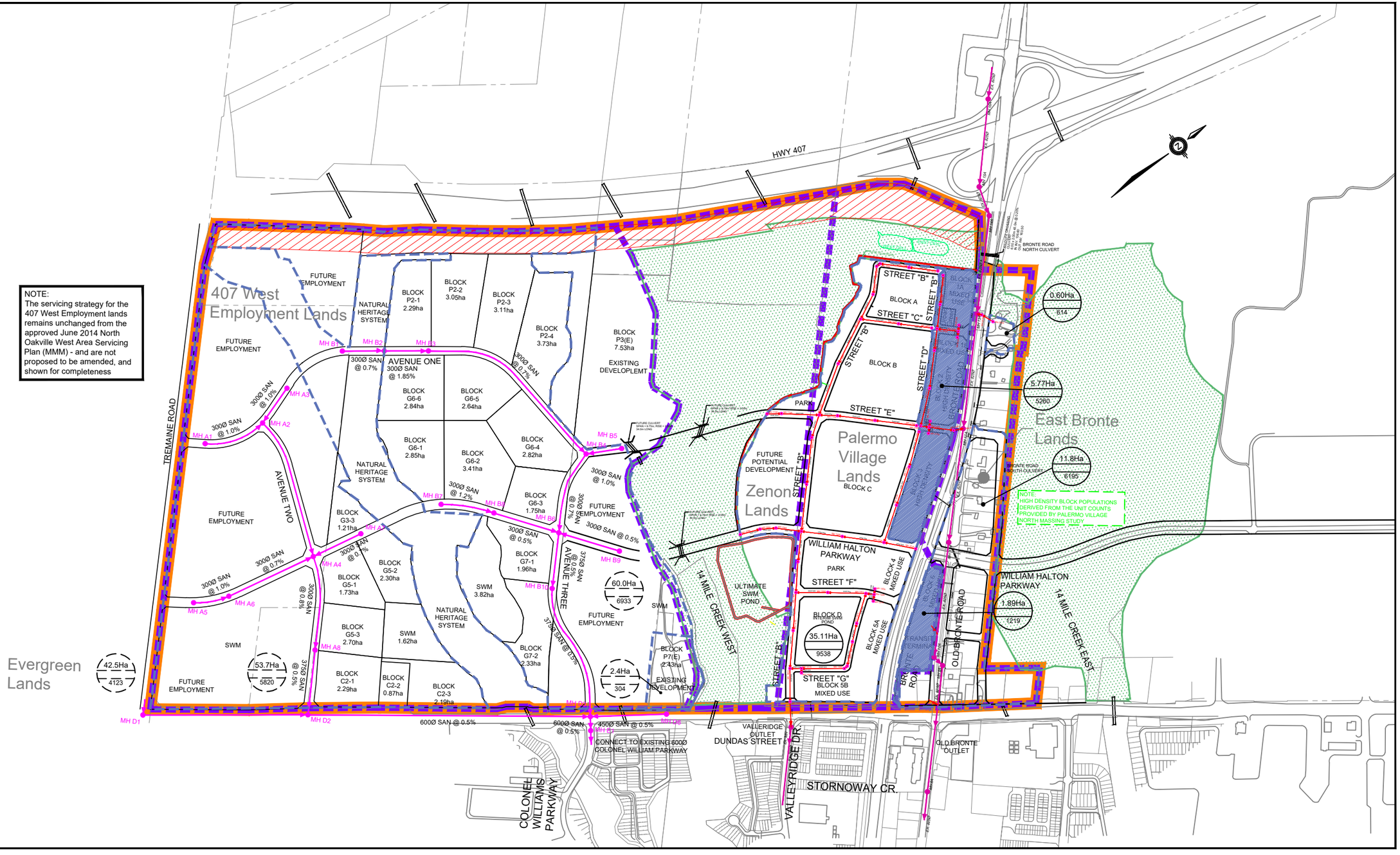
PALERMO VILLAGE ENVIRONMENTAL IMPLEMENTATION REPORT AND FUNCTIONAL SERVICING STUDY

DRAWING 3

EXISTING EXTERNAL AND MASTER PLAN PROJECTS - WASTEWATER

OCTOBER 2023 SCALE 1:55000

NOTE:
The servicing strategy for the 407 West Employment lands remains unchanged from the approved June 2014 North Oakville West Area Servicing Plan (MMM) - and are not proposed to be amended, and shown for completeness



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Beacon Environmental
DS Consultants Ltd.

Legend

- SUBJECT AREA
- BOUNDARY DIVIDE
- NHS BOUNDARY
- PLANNED 407 TRANSITWAY
- SANITARY DRAINAGE AREA TOTAL POPULATION (43.79 / 16 482)
- EXTERNAL SANITARY DRAINAGE AREA EXTERNAL TOTAL POPULATION (53.7 / 5820)
- SANITARY DRAINAGE TO EAST BRONTE LANDS
- EXTERNAL SANITARY MANHOLE
- PROPOSED SANITARY MANHOLE
- EXTERNAL SANITARY SEWER
- PROPOSED SANITARY TRUNK
- SANITARY DRAINAGE DELINEATION

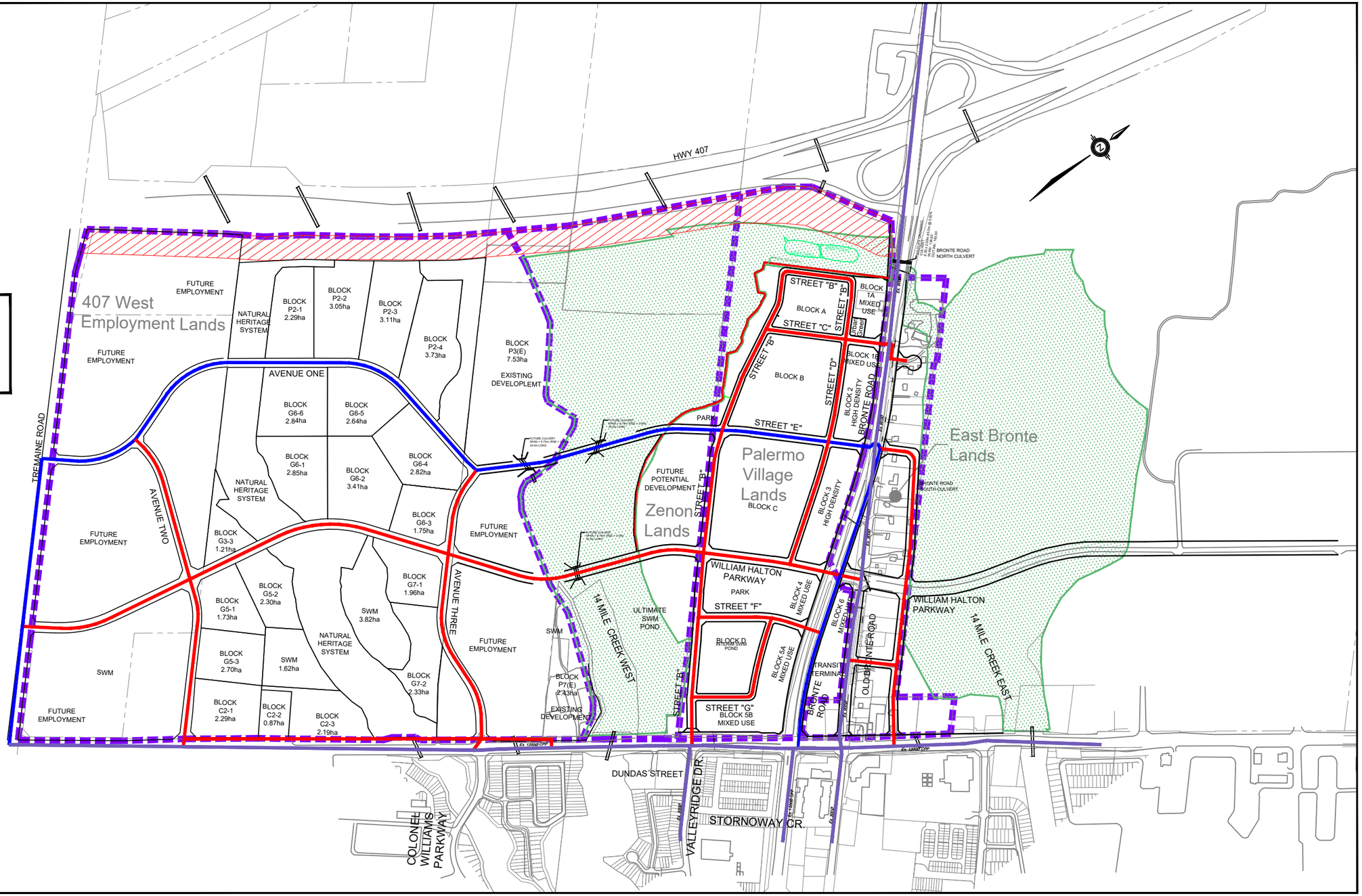
PALERMO VILLAGE ENVIRONMENTAL IMPLEMENTATION REPORT AND FUNCTIONAL SERVICING STUDY

DRAWING 4

PROPOSED CONDITIONS WASTEWATER DISTRIBUTION

OCTOBER 2023 SCALE 1:10000

NOTE:
The servicing strategy for the 407 West Employment lands remains unchanged from the approved June 2014 North Oakville West Area Servicing Plan (MMM) - and are not proposed to be amended, and shown for completeness



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GEO Morphix Ltd.
Beacon Environmental
DS Consultants Ltd.

Legend

- SUBJECT AREA
- BOUNDARY DIVIDE
- NHS BOUNDARY
- PLANNED 407 TRANSITWAY
- EXISTING REGIONAL WATERMAIN
- PROPOSED REGIONAL WATERMAIN
- PROPOSED LOCAL WATERMAIN

PALERMO VILLAGE ENVIRONMENTAL IMPLEMENTATION REPORT AND FUNCTIONAL SERVICING STUDY

DRAWING 5

PROPOSED CONDITIONS WATER DISTRIBUTION

OCTOBER 2023 SCALE 1:10000

NOTE:
The servicing strategy for the 407 West Employment lands remains unchanged from the approved June 2014 North Oakville West Area Servicing Plan (MMM) - and are not proposed to be amended, and shown for completeness

407 West Employment Lands

Evergreen Lands

East Bronte Lands

Palermo Village Lands

Zenon Lands

HWY 407

TREMAINE ROAD

BRONTE ROAD

WILLIAM HALTON PARKWAY

14 MILE CREEK WEST

14 MILE CREEK EAST

DUNDAS STREET

VALLEYRIDGE DR.

STORNOWAY CR.

COLONEL WILLIAMS PARKWAY

AVENUE ONE

AVENUE TWO

AVENUE THREE

OLD BRONTE ROAD

FUTURE EMPLOYMENT

NATURAL HERITAGE SYSTEM

BLOCK P2-1 2.29ha

BLOCK P2-2 3.05ha

BLOCK P2-3 3.11ha

BLOCK P2-4 3.73ha

BLOCK P3(E) 7.53ha

EXISTING DEVELOPLEMT

BLOCK G6-6 2.84ha

BLOCK G6-5 2.64ha

BLOCK G6-1 2.85ha

BLOCK G6-2 3.41ha

BLOCK G6-4 2.82ha

BLOCK G6-3 1.75ha

BLOCK G3-3 1.21ha

BLOCK G5-1 1.73ha

BLOCK G5-2 2.30ha

BLOCK G5-3 2.70ha

BLOCK G7-1 1.96ha

BLOCK G7-2 2.33ha

BLOCK C2-1 2.29ha

BLOCK C2-2 0.87ha

BLOCK C2-3 2.19ha

SWM 3.82ha

SWM 1.62ha

SWM

ULTIMATE SWM POND

BLOCK D INTERIM SWM POND

INTERIM POND P.P. ELEV= 150.90

BLOCK P7(E) 2.43ha

EXISTING DEVELOPMENT

FUTURE POTENTIAL DEVELOPMENT

PARK

STREET "B"

STREET "C"

STREET "D"

STREET "E"

STREET "F"

STREET "G"

BLOCK A

BLOCK B

BLOCK C

BLOCK 1A MIXED USE

BLOCK 1B MIXED USE

BLOCK 2 HIGH DENSITY

BLOCK 3 HIGH DENSITY

BLOCK 4 MIXED USE

BLOCK 5A MIXED USE

BLOCK 5B MIXED USE

BLOCK 6 MIXED USE

TRANSIT TERMINAL

BRONTE ROAD NORTH CULVERT

BRONTE ROAD SOUTH CULVERT

NO-222 NO-223 NO-224 NO-225 NO-227 NO-228 NO-229 NO-230 NO-231 NO-234 NO-235 NO-236 NO-237 NO-238 NO-239 NO-240 NO-241 NO-245 NO-246 NO-247 NO-248 NO-249 NO-250 NO-251 NO-252 NO-253 NO-254

NO-2067 NO-2068 NO-2069 NO-2070 NO-2071 NO-2072 NO-2073 NO-2075 NO-2076 NO-2077 NO-2078 NO-2079 NO-2080 NO-2081 NO-2082 NO-2083 NO-2085 NO-2086 NO-2087 NO-2088 NO-2089 NO-2090 NO-2091 NO-2092 NO-2093 NO-2094 NO-2095 NO-2096 NO-2097 NO-2098 NO-2099 NO-2100 NO-2101 NO-2102 NO-2103 NO-2104

WJ-3046-O WM-10406-O WJ-3116-O WM-10408-O WM-10410-O WJ-3114-O WJ-1150-O WM-10314-O WJ-3-O

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GEO Morphix Ltd.
Beacon Environmental
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Legend

- SUBJECT AREA
- BOUNDARY DIVIDE
- NHS BOUNDARY
- PLANNED 407 TRANSITWAY
- SERVICE AREA (SERVICE/RETAIL/OFFICE)
- EMPLOYMENT (SPECIFIC USE TBD)
- LIGHT EMPLOYMENT
- GENERAL EMPLOYMENT
- OPEN SPACE/ PARK
- STORMWATER MANAGEMENT
- RESIDENTIAL/ MIXED USE
- WATER ANALYSIS NODE
- EXISTING REGIONAL WATERMAIN
- PROPOSED REGIONAL WATERMAIN
- PROPOSED LOCAL WATERMAIN

PALERMO VILLAGE ENVIRONMENTAL IMPLEMENTATION REPORT AND FUNCTIONAL SERVICING STUDY

DRAWING 6

DETAILED WATER NODE

OCTOBER 2023

SCALE 1:10000

NOTE:
The servicing strategy for the 407 West Employment lands remains unchanged from the approved June 2014 North Oakville West Area Servicing Plan (MMM) - and are not proposed to be amended, and shown for completeness

407 West Employment Lands

Evergreen Lands

East Bronte Lands

Palermo Village Lands

Zenon Lands

HWY 407

TREMAINE ROAD

AVENUE ONE

AVENUE TWO

AVENUE THREE

14 MILE CREEK WEST

14 MILE CREEK EAST

WILLIAM HALTON PARKWAY

STREET "B"

STREET "C"

STREET "D"

STREET "E"

STREET "F"

STREET "G"

BLOCK A

BLOCK B

BLOCK C

BLOCK D

PARK

FUTURE EMPLOYMENT

NATURAL HERITAGE SYSTEM

EXISTING DEVELOPLEMT

FUTURE POTENTIAL DEVELOPMENT

ULTIMATE SWM POND

SWM

BLOCK P2-1 2.29ha

BLOCK P2-2 3.05ha

BLOCK P2-3 3.11ha

BLOCK P2-4 3.73ha

BLOCK P3(E) 7.53ha

BLOCK G6-6 2.84ha

BLOCK G6-5 2.64ha

BLOCK G6-1 2.85ha

BLOCK G6-2 3.41ha

BLOCK G6-4 2.82ha

BLOCK G6-3 1.75ha

BLOCK G7-1 1.96ha

BLOCK G7-2 2.33ha

BLOCK G3-3 1.21ha

BLOCK G5-1 1.73ha

BLOCK G5-2 2.30ha

BLOCK G5-3 2.70ha

BLOCK C2-1 2.29ha

BLOCK C2-2 0.87ha

BLOCK C2-3 2.19ha

BLOCK P7(E) 2.43ha

BLOCK 4 MIXED USE

BLOCK 5A MIXED USE

BLOCK 5B MIXED USE

BLOCK D INTERIM SWM POND

60Ha / 814

5.77Ha / 5260

60.0Ha / 6933

42.5Ha / 4123

53.7Ha / 5820

2.4Ha / 304

1.89Ha / 1219

35.11Ha / 9538

MH A1 MH A2 MH A3 MH A4 MH A5 MH A6 MH A7 MH A8 MH B1 MH B2 MH B3 MH B4 MH B5 MH B6 MH B7 MH B8 MH B9 MH B10 MH C1 MH D1 MH D2 MH D3 MH D4 MH D5 MH D6

300Ø SAN @ 0.7%
300Ø SAN @ 1.0%
300Ø SAN @ 1.85%
300Ø SAN @ 1.2%
300Ø SAN @ 0.5%
375Ø SAN @ 0.5%
375Ø SAN @ 0.7%
600Ø SAN @ 0.5%
450Ø SAN @ 0.5%

BRONTE ROAD NORTH CULVERT

BRONTE ROAD SOUTH CULVERT

OLD BRONTE ROAD

OLD BRONTE OUTLET

VALLEYRIDGE OUTLET

DUNDAS STREET

STORNOWAY CR.

VALLEYRIDGE DR.

COLONEL WILLIAMS PARKWAY

CONNECT TO EXISTING 600Ø COLONEL WILLIAM PARKWAY

NOTE:
HIGH DENSITY BLOCK POPULATIONS DERIVED FROM THE UNIT COUNTS PROVIDED BY PALERMO VILLAGE NORTH MASSING STUDY

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GEO Morphix Ltd.
Beacon Environmental
DS Consultants Ltd.

Legend

- SUBJECT AREA
- BOUNDARY DIVIDE
- NHS BOUNDARY
- PLANNED 407 TRANSITWAY
- SERVICE AREA (SERVICE/ RETAIL/ OFFICE)
- LIGHT EMPLOYMENT
- GENERAL EMPLOYMENT
- EMPLOYMENT (SPECIFIC USE TBD)
- STORMWATER MANAGEMENT
- 43.79 / 16 482 — SANITARY DRAINAGE AREA TOTAL POPULATION
- 53.7 / 5820 — EXTERNAL SANITARY DRAINAGE AREA EXTERNAL TOTAL POPULATION
- RESIDENTIAL/ MIXED USE
- OPEN SPACE
- EXTERNAL SANITARY MANHOLE
- PROPOSED SANITARY MANHOLE
- EXTERNAL SANITARY SEWER
- PROPOSED SANITARY TRUNK
- SANITARY DRAINAGE DELINEATION
- SANITARY DRAINAGE TO EAST BRONTE LANDS

PALERMO VILLAGE ENVIRONMENTAL IMPLEMENTATION REPORT AND FUNCTIONAL SERVICING STUDY

DRAWING 7

DETAILED WASTEWATER CATCHMENT

OCTOBER 2023

SCALE 1:10000

APPENDIX A

2014 ASP STUDY AREA (MMM GROUP, 2014)

AREA SERVICING PLAN FOR 407 WEST EMPLOYMENT AREA

LAND USE PLAN

HIGHWAY 407

TREMAINE ROAD

BRONTE ROAD

DUNDAS STREET

REGIONAL ROAD 25

AVENUE ONE

AVENUE TWO

AVENUE THREE

AVENUE FOUR

BURNHAMTHORPE ROAD

Future Employment

Natural Heritage System

BlockP2-1 2.29ha

BlockP2-2 3.05ha

BlockP2-3 3.11ha

BlockP2-4 3.73ha

BlockP3(E) 7.53ha Existing Development

SWM

BlockG6-6 2.84ha

BlockG6-5 2.64ha

BlockG6-4 2.82ha

BlockG6-1 2.85ha

BlockG6-2 3.41ha

BlockG6-3 1.75ha

BlockG3-3 1.21ha

BlockG5-1 1.73ha

BlockG5-2 2.30ha

BlockG5-3 2.70ha

SWM 1.62ha

SWM 3.82ha

BlockG7-1 1.96ha

BlockG7-2 2.33ha

BlockC2-1 2.29ha

Block C2-2 0.87ha

BlockC2-3 2.19ha

BlockP7(E) 2.43ha Existing Development

LEGEND

- 407 WEST EMPLOYMENT AREA
- EXISTING PROPERTY LINE
- SUBJECT PROPERTY
- SERVICE AREA (SERVICE/RETAIL/OFFICE)
- LIGHT EMPLOYMENT
- GENERAL EMPLOYMENT
- EMPLOYMENT (SPECIFIC USE TBD)
- OPEN SPACE
- STORMWATER MANAGEMENT
- PLANNED 407 TRANSITWAY

SITE STATISTICS

TOTAL SITE AREA: 251.6 Ha
EMPLOYMENT AREA: 146.76 Ha
OPEN SPACE: 68.3 Ha
STORMWATER MANAGMENT AREA: 14.6 Ha
PLANNED 467 TRANSITWAY: 12.3 Ha
ROAD AREA: 15.7 Ha

FOR THE PURPOSES OF OUR CONCEPTUAL SERVICING ANALYSIS, CONSERVATIVE LAND USE ASSUMPTIONS HAVE BEEN MADE FOR THE ENTIRE 467 WEST EMPLOYMENT AREA

Scale 0 100 200 300 400 500m

Client

Bentall Kennedy

Prepared by

Date: JUNE 2013

Project No.: 1409222.001

EXHIBIT 1.1

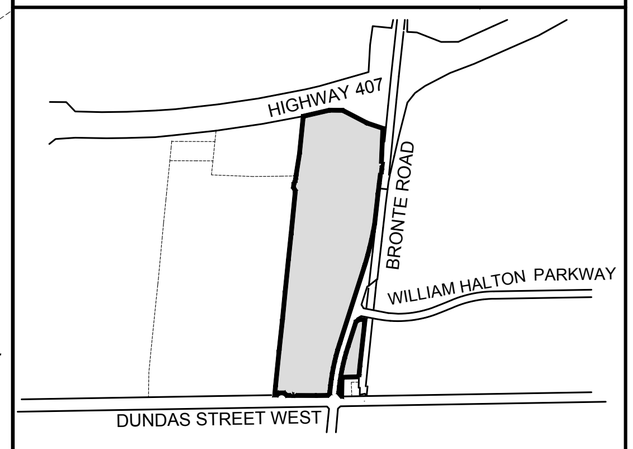
APPENDIX B

PALERMO VILLAGE CONCEPT PLAN (KORSIAK, 2023)

DRAFT PLAN OF SUBDIVISION
24T-

PART OF LOT 31
CONCESSION 1, NORTH OF DUNDAS STREET

GEOGRAPHIC TOWNSHIP OF TRAFALGAR
NOW IN THE
TOWN OF OAKVILLE
REGIONAL MUNICIPALITY OF HALTON



KEY MAP — Subject Lands

OWNER'S AUTHORIZATION

I HEREBY AUTHORIZE KORSIAK URBAN PLANNING TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE TOWN OF OAKVILLE FOR APPROVAL.

SIGNED _____ DATE Month Day, 2023
Gord Buck
PALERMO VILLAGE IV CORPORATION
ARGO (PALERMO VILLAGE) LIMITED
4900 Palladium Way, Suite 105
Burlington, Ontario L7M 0W7

SIGNED _____ DATE Month Day, 2023
Michael Shapira
NEWMARK PALERMO HOLDINGS INC.

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE CORRECTLY AND ACCURATELY SHOWN.

SIGNED _____ DATE Month Day, 2023
Shan Goonewardena, Ontario Land Surveyor
R-PE Surveying LTD.
ONTARIO LAND SURVEYORS
643 CHRISLEA ROAD, SUITE 7, WOODBRIDGE, ONTARIO L4L 8A3
Tel.(416)635-5000 Fax (416)635-5001

ADDITIONAL INFORMATION (UNDER SECTION 51 (17) OF THE PLANNING ACT)

A) SHOWN ON PLAN
B) SHOWN ON PLAN
C) SHOWN ON PLAN
D) SHOWN ON PLAN
E) SHOWN ON PLAN
F) SHOWN ON PLAN
G) SHOWN ON PLAN
H) MUNICIPAL AND PIPED WATER TO BE PROVIDED
I) CLAY LOAM
J) SHOWN ON PLAN
K) SANITARY AND STORM SEWERS TO BE PROVIDED
L) SHOWN ON PLAN

LAND USE SCHEDULE

Land Use	Lots/Blocks	Block Total	Area (ha)	Units
□ Single Detached (12.80m)	1, 6-16, 26, 27	14	0.59	14
△ Single Detached (11.60m)	2, 5, 17-22	8	0.35	8
◇ Single Detached (11.00m)	3, 4, 23-25	5	0.23	5
○ Single Detached (15.24m)	28	1	0.03	1
Medium Density Residential Condominium Block	29-32	4	16.42	
High Density Residential Condominium Block	33-36	4	7.38	
Mixed Use Condominium Block	37-39	3	2.71	
Stormwater Management Pond	40	1	0.06	
Park	41	1	2.25	
Village Sqaure	42	1	0.16	
Walkway (3m)	43	1	0.01	
Natural Heritage System (NHS)	44, 45	2	5.68	
Open Space	46, 47	2	1.45	
Transit Terminal	48	1	1.24	
Transitway	49	1	1.50	
Residential Reserve	50, 51	2	0.11	
Road Widening	52, 53	2	0.43	
0.3m Reserve	54, 55	2	0.00	
17m ROW (1,774 m)			3.06	
22m ROW (1,446 m)			3.27	
26m ROW (291 m)			0.80	
Totals	1-55	55	47.73	28

SDE CALCULATIONS

Unit Type	Lots/Blocks	Units	SDE*
Single Detached	1-28	28	28
Total		28	28.0

* SDE Factors:
Single Detached - 1.00

August 8, 2023	First Submission	A	WS
Jan. 17, 2023	Draft for Review	A	KC
DATE	REVISION	DWG	BY

NOTES:
- Pavement illustration is diagrammatic
- Connector or Avenue to Arterial daylight triangle = 15m
- Connector or Avenue to Connector or Avenue daylight triangle = 7.5m
- All other daylight triangles = 3.5m

ARGO DEVELOPMENT CORP

SCALE 1:2000 | August 8, 2023 | A
DRAWN BY: WS | CHECKED BY: KC

KORSIAK Urban Planning
206-277 Lakeshore Road East
Oakville, Ontario L6J 1H9
T: 905-257-0227
info@korsiak.com

S:\Korsiak & Company\ARGO\Newmark\Draft Plan of Subdivision\2023-08\Palermo - Draft Plan - Aug-08-23_kc.dwg

APPENDIX C

WASTEWATER CAPACITY ANALYSIS (CIVICA, 2023)

CIVICA
Water Management Solutions

Prepared For

David Schaeffer Engineering Ltd.

Report For

Mid-Halton WWTP Sanitary Sewer Capacity Analysis

August 22nd, 2023

330 Rodinea Road, Unit 3
Vaughan, Ontario, Canada L6A 4P5
(905) 417-9792
www.civi.ca

STATEMENT OF QUALIFICATIONS AND LIMITATIONS

The attached Sanitary Capacity Analysis (the "Report") has been prepared by Civica Infrastructure Inc. (the "Consultant") at the request of, and for the exclusive use of, David Schaeffer Engineering Ltd. (the "Client") in accordance with the terms of agreement between the Consultant and the Client, including the scope of work detailed therein (the "Agreement").

Please note that the information, data, analysis, recommendations, and conclusions contained in the Report was prepared for the specific purposes described in the Report and the Agreement and may be based upon information which has not been independently verified by the Consultant. The Consultant shall be entitled to rely upon the accuracy and completeness of information that was provided to the Consultant and has no obligation to update such information. The material in this report reflects the Consultant's best professional judgement in the light of the information available to it at the time of preparation and publication.

The Consultant agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement. The Consultant makes no other representations, any guarantees, or warranties whatsoever, whether expressed or implied, with respect to the Report or any part thereof.

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This Statement of Qualifications and Limitations is attached to, and forms part of the Report and any usage of the Report is subject to the terms therein.

August 22, 2023 **CIVICA REF: DSE21-0001**

David Schaeffer Engineering Ltd.
600 Alden Road, Suite 700
Markham, Ontario
L3R 0E7

Attention: Scott Ackerl

Dear Mr. Ackerl,

RE: Mid-Halton WWTP Sanitary Capacity Analysis

Civica Infrastructure Inc. (Civica) is pleased to submit the Sanitary Capacity Analysis for the proposed development block north of Dundas Street, south of Highway 407, between Tremaine Road and Bronte Road, in the Region of Halton. The Region of Halton's InfoSewer model was used to assess the existing and proposed conditions of the sanitary sewer downstream of the proposed development blocks. The model was used for the hydraulic analysis to determine the peak flow and Hydraulic Grade Line (HGL) elevation within the downstream sanitary sewer.

Based on the analysis and assumptions presented in the following report, the findings can be summarized as follows:

1. The expected sanitary peak flow from the proposed development, as observed at the outlet, is anticipated to be 405.86 L/s;
2. The proposed scenario was developed by adding the flows to the Regions 2031 scenario (as advised by the Region). During the capacity analysis process, it was noted that this scenario increases flows to SPS-85 by 1,541.75 L/s. This increase exceeds the capacity of the outlet by 745 L/s causing a bottleneck to occur prior to the addition of the proposed development lands;
3. Under the proposed scenario, the sanitary sewer is experiencing a minor bottleneck just upstream of the pumping station. However, the water level (HGL) is anticipated to be greater than basement level (1.8 m below surface level) at any point within the system. Therefore, basement flooding is not expected to occur under the proposed conditions; and,
4. The existing sanitary sewer system has the capacity to accommodate the proposed dry-weather flow's while maintaining free-flow conditions.

Do not hesitate to contact us for further clarification and/or comment.

Sincerely,

CIVICA INFRASTRUCTURE INC.

Robert Hughson

Project Manager

Encl. Mid-Halton WWTP Sanitary Sewer Capacity Analysis Report

Document History & QA/QC

Prepared by:

Robert Hughson
Project Manager
Civica Infrastructure Inc.

Reviewed by:

Alan Villalobos
Business Unit Leader
Civica Infrastructure Inc.

Approved by:

Edward Graham, M.A.Sc.Eng., P.Eng.
President
Civica Infrastructure Inc.

Revision History

Name	Date	Reason for Change	Version
Robert Hughson	**2021-10-05**	**Draft Report**	**Version 1**
Robert Hughson	**2022-06-01**	**Revised Site Stats**	**Version 2**
Robert Hughson	**2023-08-22**	**Revised Site Stats**	**Version 3**

TABLE OF CONTENTS

Civica Infrastructure Inc. • 330 Rodinea Road, Unit 3, Vaughan, Ontario, Canada, L6A 4P5 • 905-417-9792 | www.civi.ca | info@civi.ca

List of Figures

List of Tables

1.0 Introduction

This memo summarizes the sanitary servicing analysis for the proposed 222.4 ha of commercial and residential development, in Halton Region. The existing lands are primarily being used for agricultural purposes with some industrial-commercial-institutional (ICI) use areas (< 10 ha). The proposed development will be primarily residential with the ICI areas being retained and some additional commercial/institutional use areas being added. **Figure 1-1** shows the location of the site and the tributary area.

The capacity conditions in the existing sanitary sewer system have been evaluated from the proposed development to the downstream outlet into the pumping station (SPS85) located at the north portion of the Mid Halton Wastewater Treatment Plant (WWTP) on North Service Road, southwest of Third Line.

1.1 Servicing Connections

Sanitary flows from the existing development lands can be divided into three groups based on the conveyance they're being discharged into, these groups are (west to east):

1. Colonel William Parkway;
2. Valleyridge Drive; and,
3. Old Bronte Road.

The proposed development land will maintain these same connections. **Figure 1-2** shows the downstream sewer conveyance flow the outlet.

1.2 Capacity Analysis Approach

The sewer capacity before and after redevelopment was quantified using the Region of Halton's InfoSewer model. The following information was considered in the analysis:

1. Verification the model correctly represents the sewer system, including any updates to the model to reflect changes (i.e. sewer construction) since the model was initially prepared; and,
2. As-built drawings were also obtained from the Region to confirm the invert elevations and pipe sizes in the sanitary sewers running along Colonel William, Richview, and Valleyridge.

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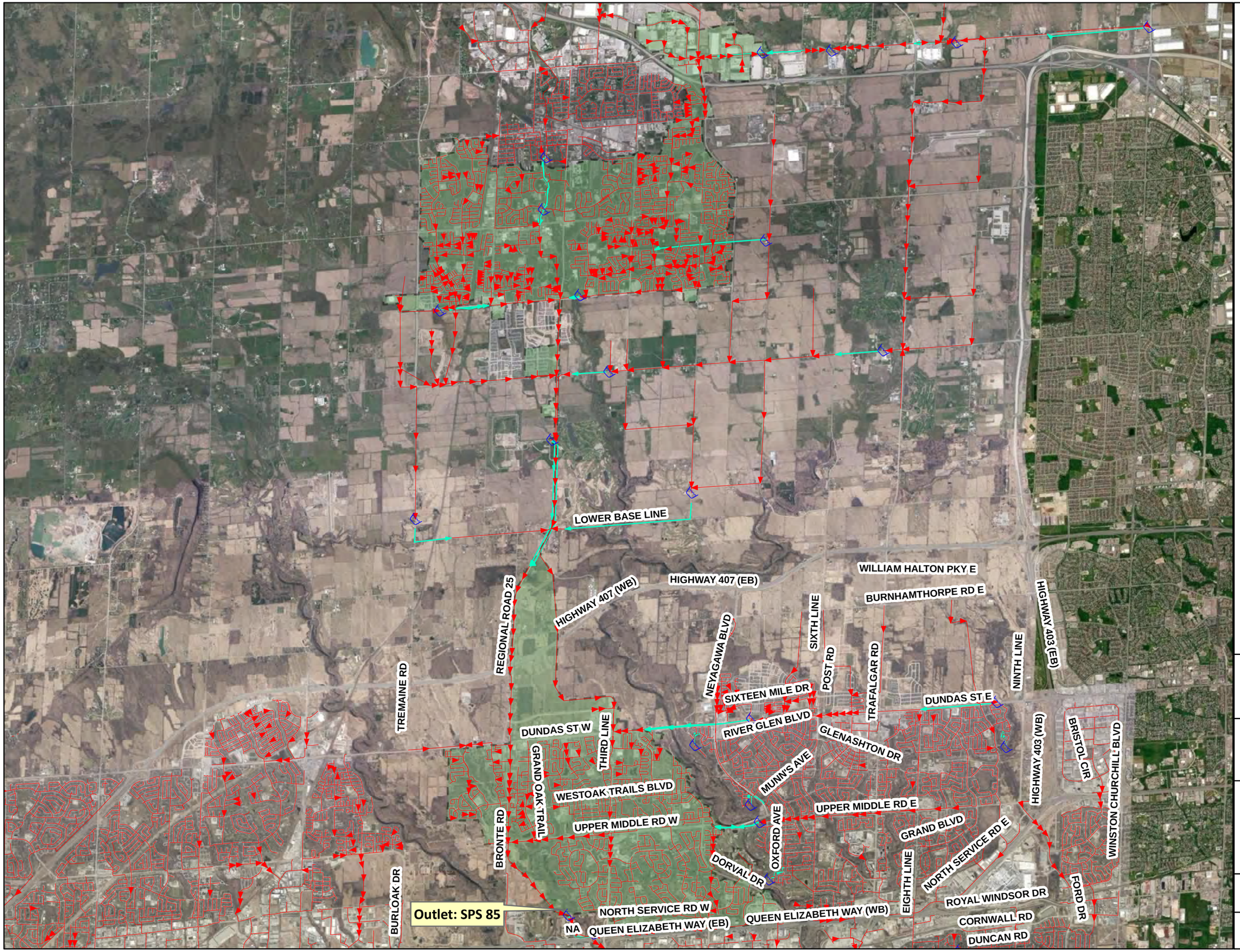


Legend

- Drainage Area
- Wetwell
- Gravity Main
- Forcemain

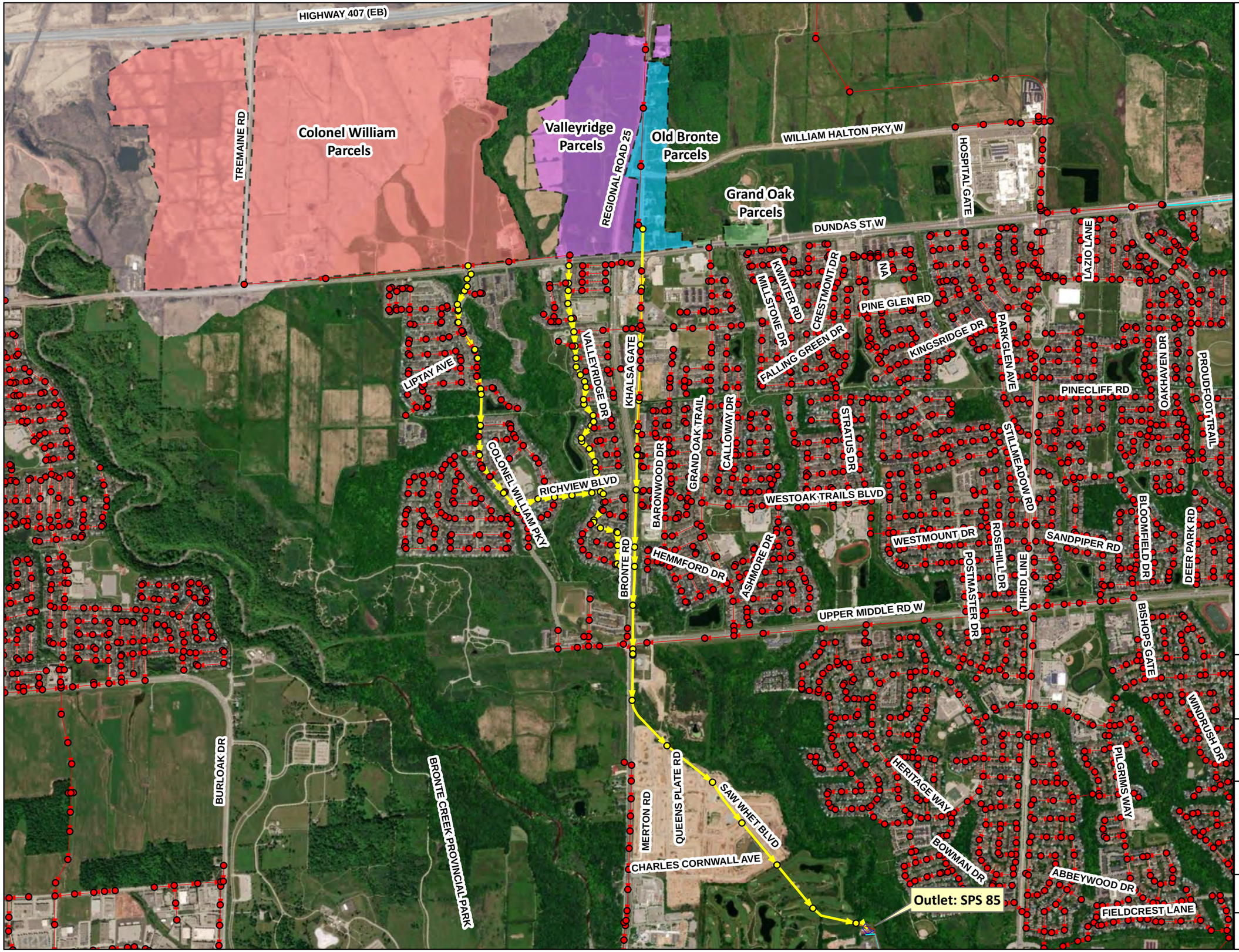
CIVICA Water Management Solutions

Mid-Halton WWTP
Sanitary Capacity Analysis

Figure 1-1:
Mid-Halton Wastewater Treament Plant (SPS 85) Tributary Drainage Area

Drawn By: R.H. Date: Sep 24, 2021

0 475 950 1,900 Meters



Legend

Manhole

TYPE
- Sanitary
- Conveyance
- Inactive

Gravity Main

TYPE
- Sanitary
- Conveyance
- Inactive

Manhole

TYPE
- Sanitary
- Conveyance
- Inactive

Wetwell

- <all other values>

TYPE
- Active
- Domain
- Inactive

Gravity Main

TYPE
- Sanitary
- Conveyance
- Inactive

Convey_ID
- Colonel William
- Valleyridge
- Old Bronte
- Grand Oak

Forcemain

- <all other values>

TYPE
- Active
- Domain
- Inactive

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Water Management Solutions

Mid-Halton WWTP Sanitary Capacity Analysis

Figure 1-2: Downstream Conveyance of Sanitary Flows to the Mid-Halton WWTP at SPS-85

Drawn By: R.H. Date: Jun 2, 2022

0 120 240 480 Meters

2.0 Methodology

Total flow and resulting hydraulic gradelines (HGL) in the sewer system are calculated using a calibrated pipe-by-pipe InfoSewer model. This model was developed and calibrated by the Region in 2011 and updated in 2016. The baseline model represents existing conditions at the time of the flow monitoring period and is characterized by flow monitoring data.

3.0 Model Development

Total flow and resulting hydraulic gradelines (HGL) in the sewer system were calculated using the Region of Halton's InfoSewer model. The per capita dry-weather sewage generation in the model was determined by the Region based on their water use data for each catchment area. For the new development, the residential DWF generation rate of 275 L/ca/day generation rate was used, as per the Region's design standards.

4.0 Sanitary Sewer Capacity Analysis

4.1 Model Scenario

To assess the performance of the sanitary sewer system downstream of the new developments, the following two (2) development scenarios were utilized and analyzed:

1. Existing Conditions (2021-Peak-WWF)
2. Proposed Conditions (2031-Peak-WWF + Proposed Flows)

The existing scenario (Scenario 1) represents the existing conditions, and it was calibrated by the Region using water consumption data. Scenario 2 includes the proposed development on top of the existing scenario. Flows generated from the proposed site was estimated as per the design criteria and is presented in the section below. In addition to the flows being added from the proposed development, it has been noted that 1,541.75 L/s of additional flow has been added to the model by the region in the 2031 scenario (as compared to the 2021 scenario). This has the effect of causing a bottleneck condition at the tributary outlet (SPS-85) prior to the addition of the proposed development lands.

The diurnal pattern for the proposed developments is related to the proposed population. The theoretical I/I is related to the catchment area. The peak of both DWF and I/I were adjusted to match the peak of the design storm (8:00 am).

4.2 Proposed Development and Design Flow

The proposed development consists of residential and non-residential development totaling 41,816 persons and 222.4 ha. The existing area contains 7.53 ha existing commercial development which is currently accessing Dundas Street via a private road. Also, there's a 2.43 ha commercial development on Dundas Street. It is anticipated that both of these commercial properties will be maintained under the proposed development conditions. **Table 4-1** summarizes the future developments and corresponding design peak flows. As shown, the peak flow to be discharged to the Mid-Halton WWTP is estimated to be 399.94 L/s.

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Table 4-1: Proposed Development Design Flows

Development	Population	Area (ha)	Peaking Factor	Avg DWF (L/s)	I/I (L/s)	Peak Flow (L/s)
Colonel William (1)	4123	42.5	*3.32*	43.59	11.05	54.64
Colonel William (2)	13057	116.1	*2.27*	94.38	30.19	124.57
Valleyridge (1)	12588	40.5	*2.85*	114.38	10.53	124.91
Valleyridge (2)	399	1.4	*3.22*	4.09	0.36	4.45
Old Bronte	11649	21.9	*2.31*	85.68	5.69	91.37
Total	**41816**	**222.4**	*3.08*	**342.12**	**57.82**	**399.94**

4.3 1 in 25-Year Design Storm

The analysis approach uses the calibrated model to simulate the performance of the sewer under the Region's 25-year design storm. Discussions with the Region regarding the development of the model confirmed that it has been calibrated to incorporate these wet-weather flows.

4.4 Level of Service

Assuming that the typical basement elevation is 1.8 m below the road centerline (refer to **Figure 4-3**), different levels of service were established prior to conducting the sanitary sewer capacity assessment. In general, the targeted level of service can be described as:

The maximum Hydraulic Grade Line (HGL) of the sanitary system shall be maintained below basement elevation (1.8 m below the ground elevation) during the 1 in 25-year design storm.

However, Civica considered four (4) different levels of services to establish the capacity of the sanitary sewer system. These levels of service are described below:

1. Free Flow – The maximum flow depth is below the obvert of the pipe, no surcharge of the pipe;

2. Surcharge with Free Board (FB) greater than 2.8 m – The pipe is operating under surcharge conditions, and the distance between the ground elevation and the HGL is greater than 2.8 m;

3. Surcharge with FB less than 2.8 m but greater than 1.8 m - This level of surcharge means there is less than 1.0 m of depth between the HGL and the floor of the basement; and,

4. Surcharge with FB less than 1.8 meters – This level of service has potential basement flooding risk.

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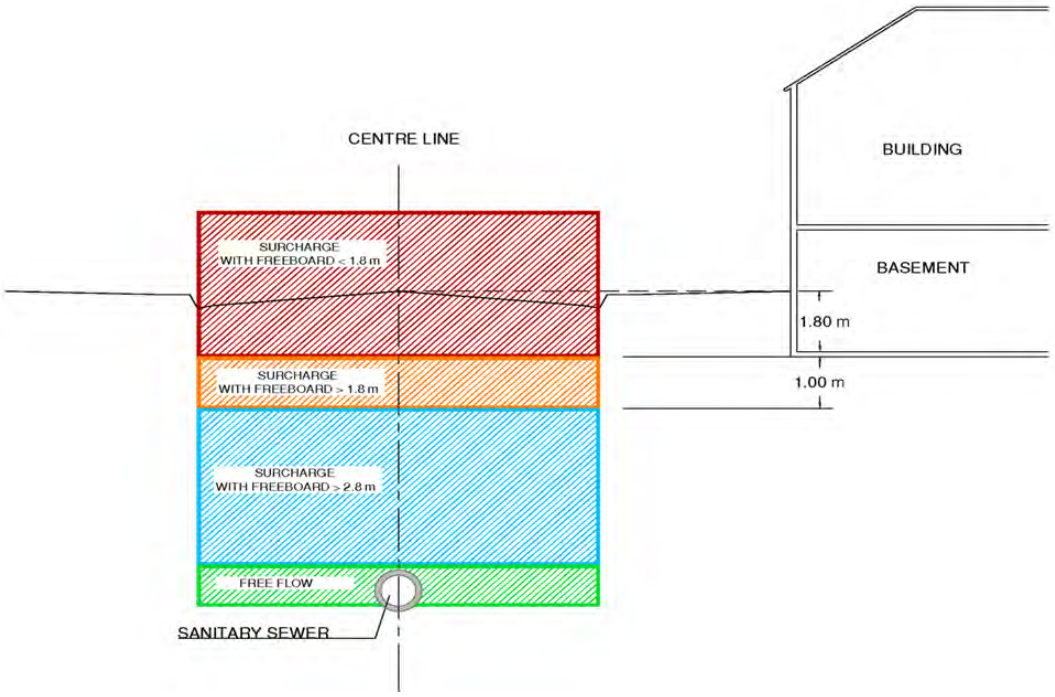


Figure 4-1: Freeboard Concept

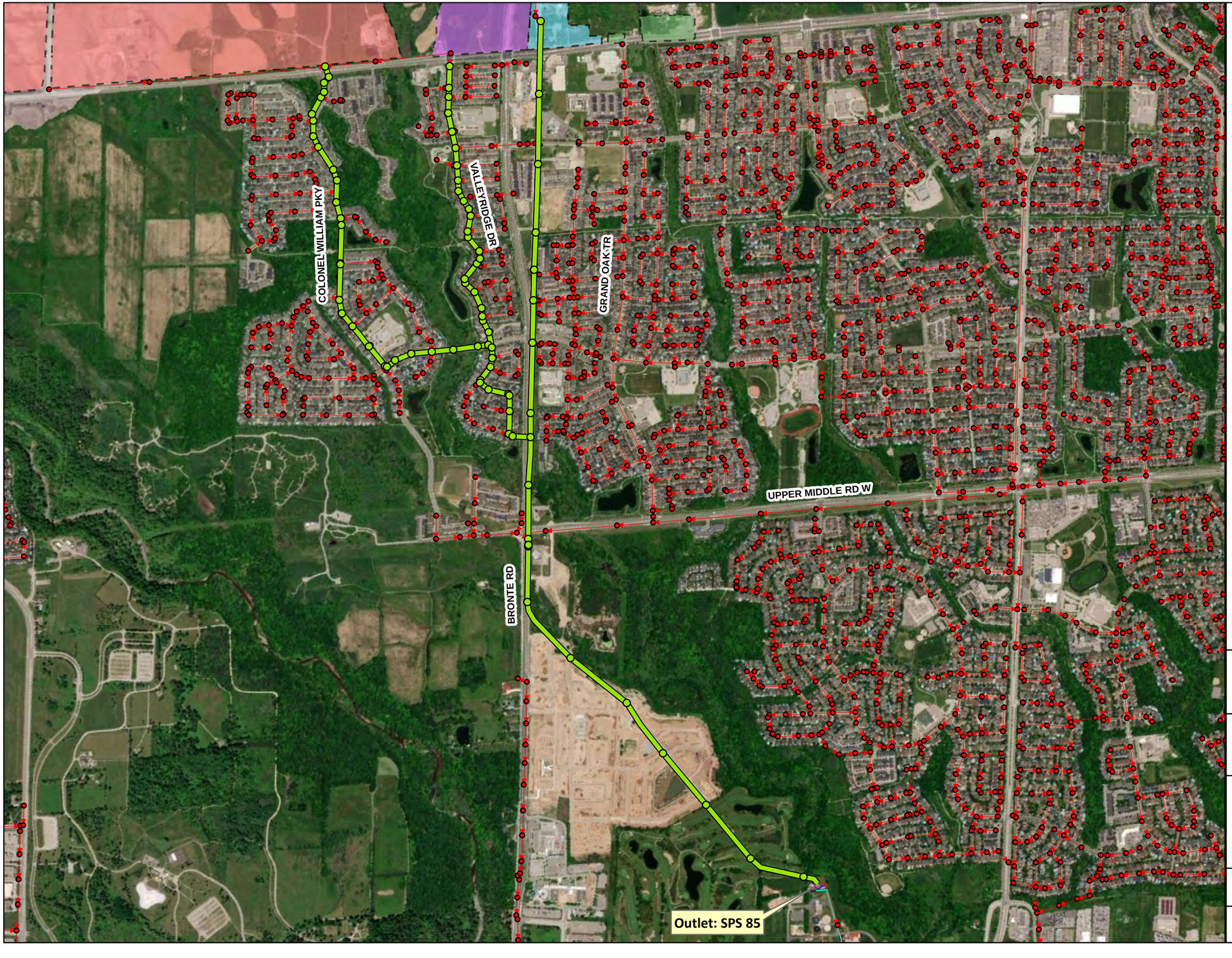
5.0 Capacity Analysis Results

5.1 Existing Sanitary Sewer Operation Conditions (Scenario 1)

This scenario represents the existing conditions under a 1 in 25-Year design storm without the proposed land developments. Sanitary sewer operating conditions along the conveyances under this this scenario are illustrated in **Figure 5-1**. **Appendix A** shows the HGL profiles under WWF conditions. As the tables in **Appendix B** show, the sanitary sewer is not surcharging under the existing conditions along all conveyances.

5.2 Sanitary Sewer Operating Conditions with Proposed Development (Scenario 2)

In this scenario, the proposed developments were added using the Region's design flow criteria. The resulting sanitary sewer operating conditions are shown in **Figure 5-2**. As the tables in **Appendix B** show, the conveyance sewers are able to accommodate the existing and proposed flows without causing surcharge. **Appendix A** shows the HGL under WWF conditions.



Legend

Proposed Site

- Colonel William
- Grand Oak
- Old Bronte
- Valleyridge
- Manhole
- Wetwell
- Gravity Main
- Forcemain

Sanitary Manholes

- At or Above Surface
- Within Basement Level (0 - 1.8 m)
- Below Basement (> 1.8 m)

Sanitary Sewers

- Surcharge State=2 (Bottleneck)
- Surcharge State=1 (Backup)
- Within Capacity (No Surcharge)

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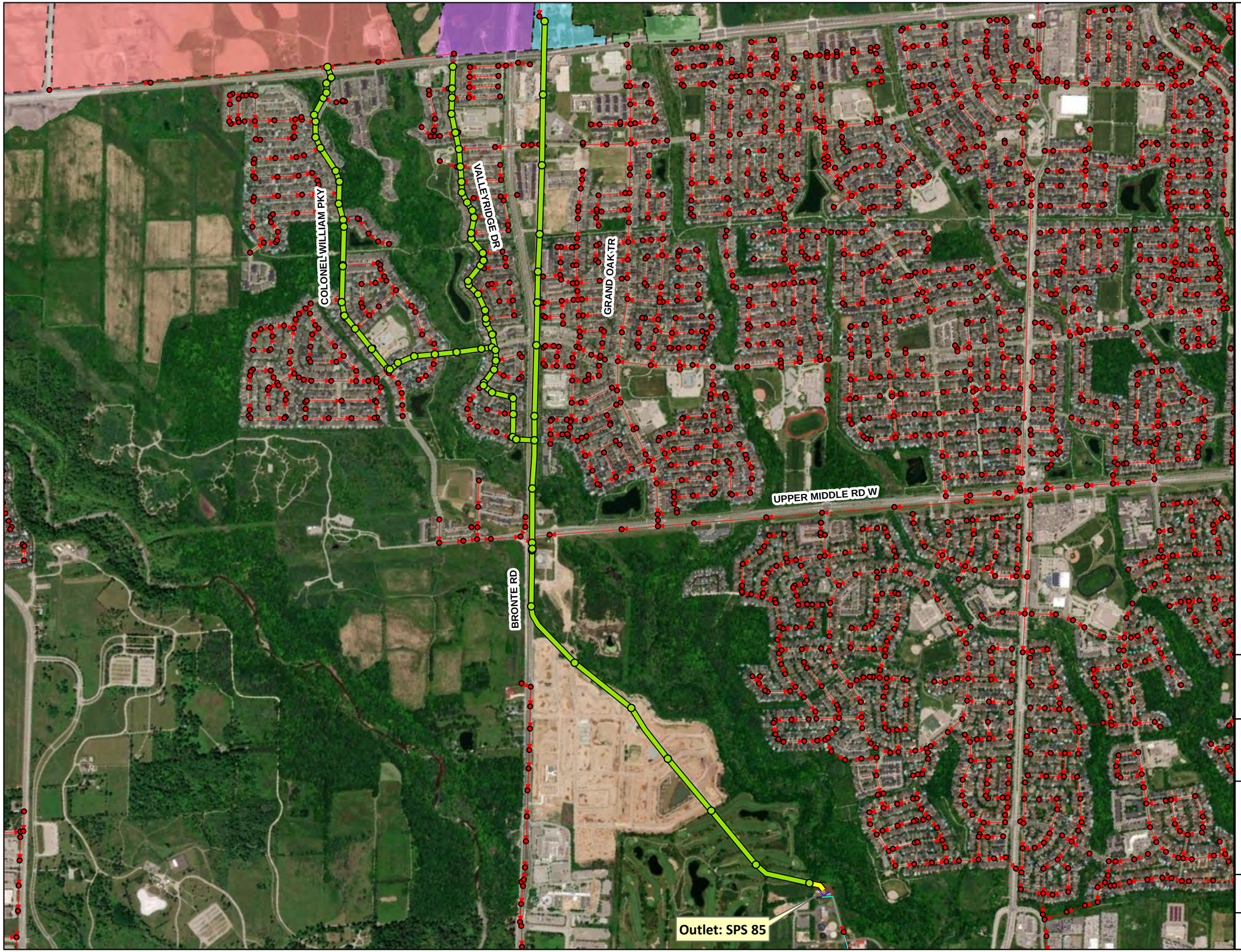
Mid-Halton WWTP
Sanitary Capacity Analysis

Figure 5-1:
Existing Sanitary Sewer Operating Conditions

Drawn By: R.H. Date: Jun 2, 2022

0 95 190 380 Meters



Legend

Proposed Site

- Colonel William
- Grand Oak
- Old Bronte
- Valleyridge
- Manhole
- Wetwell
- Gravity Main
- Forcemain

Sanitary Manholes

- At or Above Surface
- Within Basement Level (0 - 1.8 m)
- Below Basement (> 1.8 m)

Sanitary Sewers

- Surcharge State=2 (Bottleneck)
- Surcharge State=1 (Backup)
- Within Capacity (No Surcharge)

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Mid-Halton WWTP
Sanitary Capacity Analysis

Figure 5-2:
Proposed Sanitary Sewer Operating Conditions

Drawn By: R.H. Date: Jun 2, 2022

0 95 190 380
Meters

6.0 Conclusions

Based on the analysis and assumptions presented in the report, the findings can be summarized as follows:

1. The expected sanitary peak flow from the proposed development, as observed at the outlet, is anticipated to be 405.86 L/s;
2. The proposed scenario was developed by adding the flows to the Regions 2031 scenario (as advised by the Region). During the capacity analysis process, it was noted that this scenario increases flows to SPS-85 by 1,541.75 L/s. This increase exceeds the capacity of the outlet by 745 L/s causing a bottleneck to occur prior to the addition of the proposed development lands;
3. Under the proposed scenario, the sanitary sewer is experiencing a minor bottleneck just upstream of the pumping station. However, the water level (HGL) is anticipated to be greater than basement level (1.8 m below surface level) at any point within the system. Therefore, basement flooding is not expected to occur under the proposed conditions; and,
4. The existing sanitary sewer system has the capacity to accommodate the proposed dry-weather flow's while maintaining free-flow conditions.

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Appendix A
Sanitary Sewer System Hydraulic Gradeline Profiles

August 22nd, 2023

330 Rodinea Road, Unit 3
Vaughan, Ontario, Canada L6A 4P5
(905) 417-9792
www.civi.ca

Figure A-1: Existing HGL Profile on Colonel William Pkwy

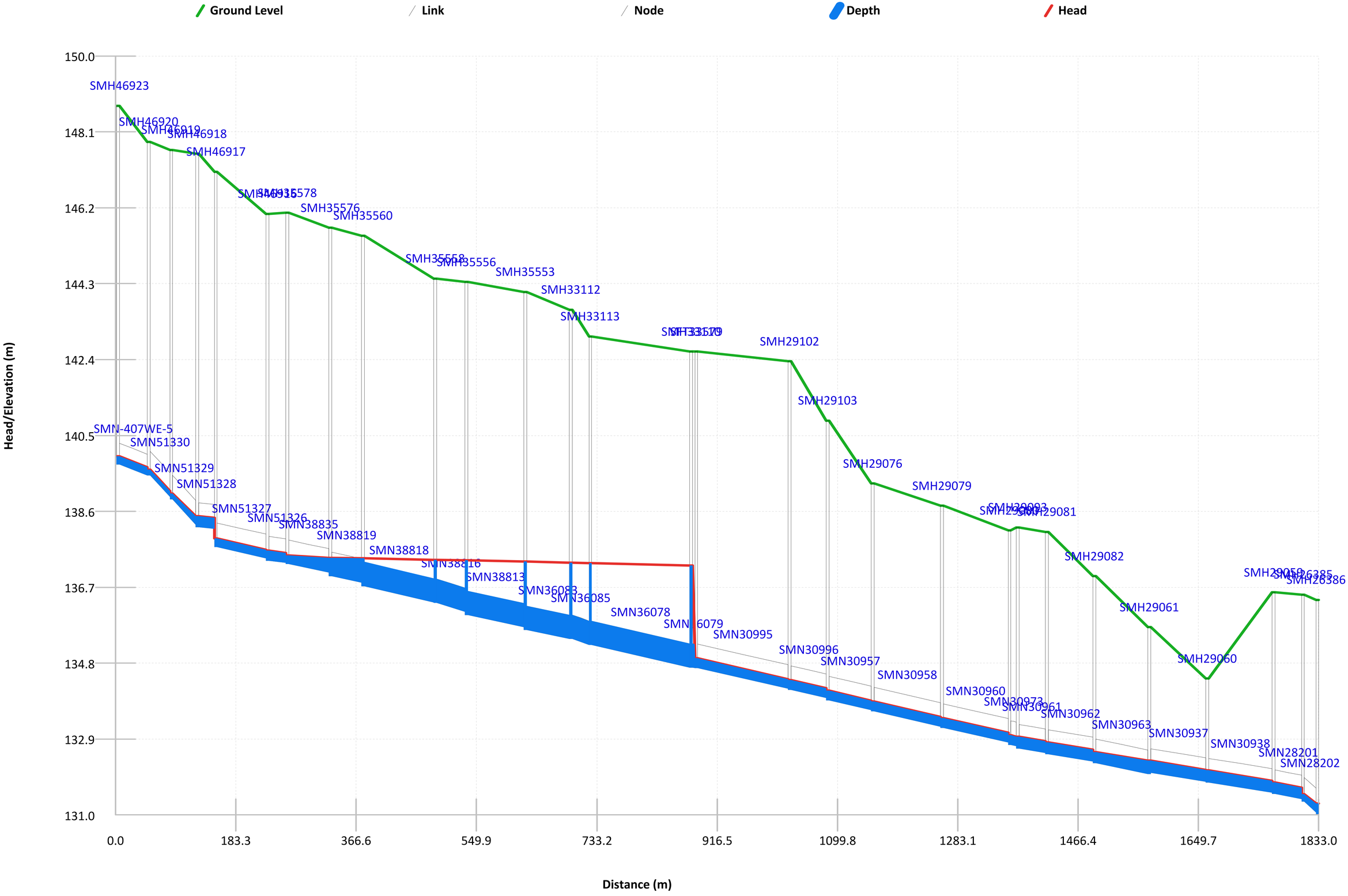


Figure A-2: Proposed HGL Profile on Colonel William Pkwy

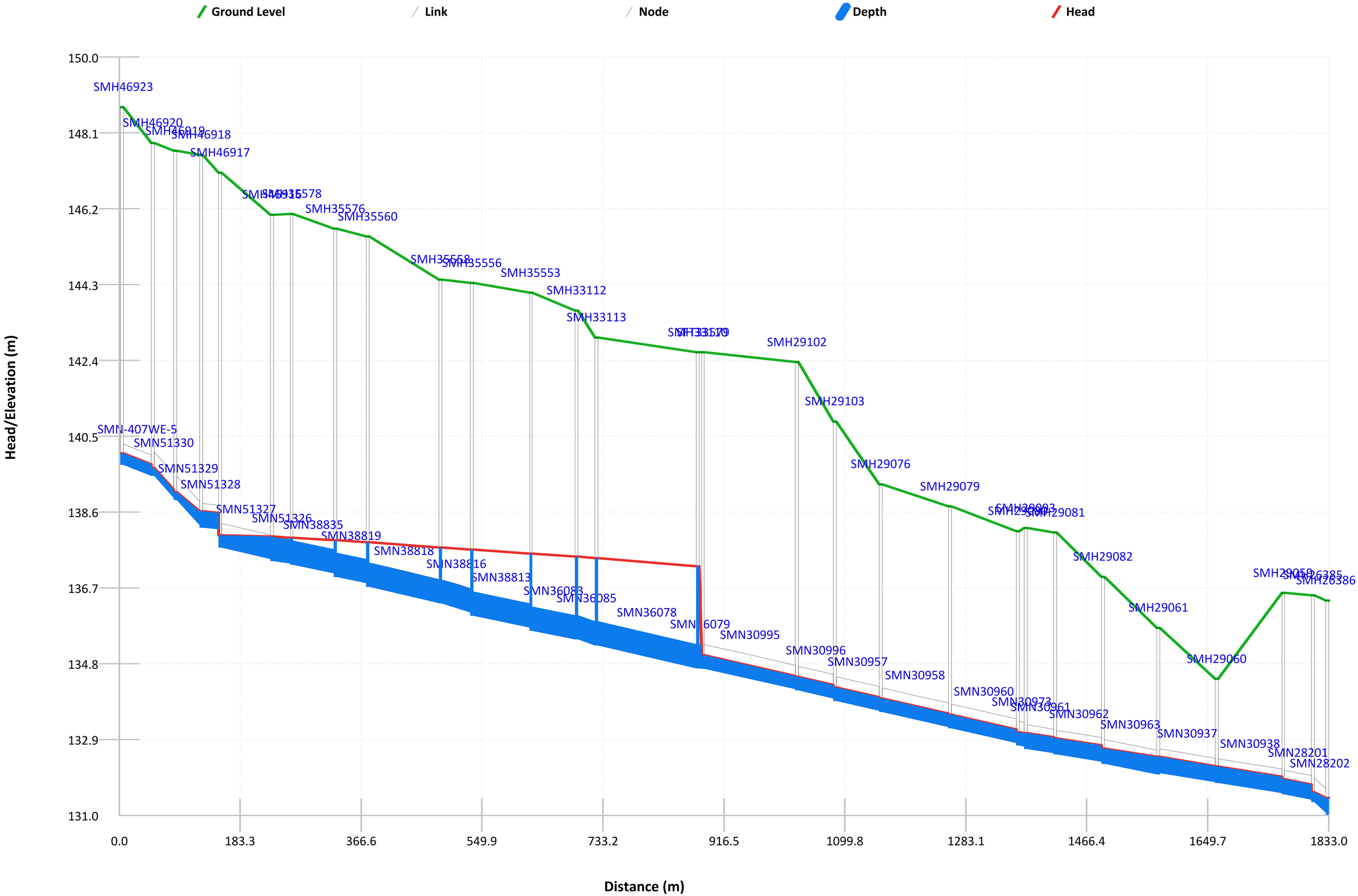


Figure A-3: Existing HGL Profile on Valleyridge Dr

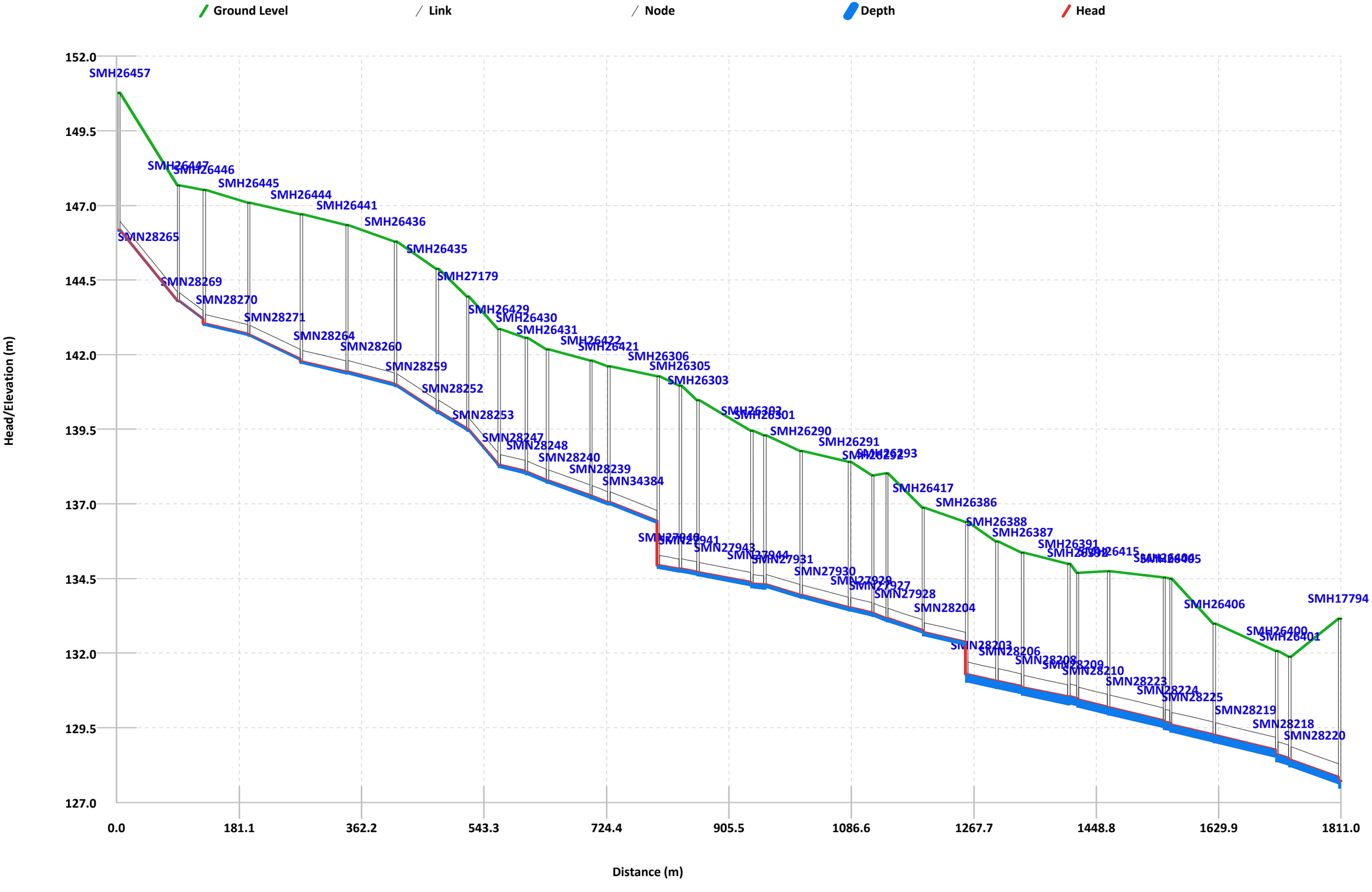


Figure A-4: Proposed HGL Profile on Valleyridge Dr

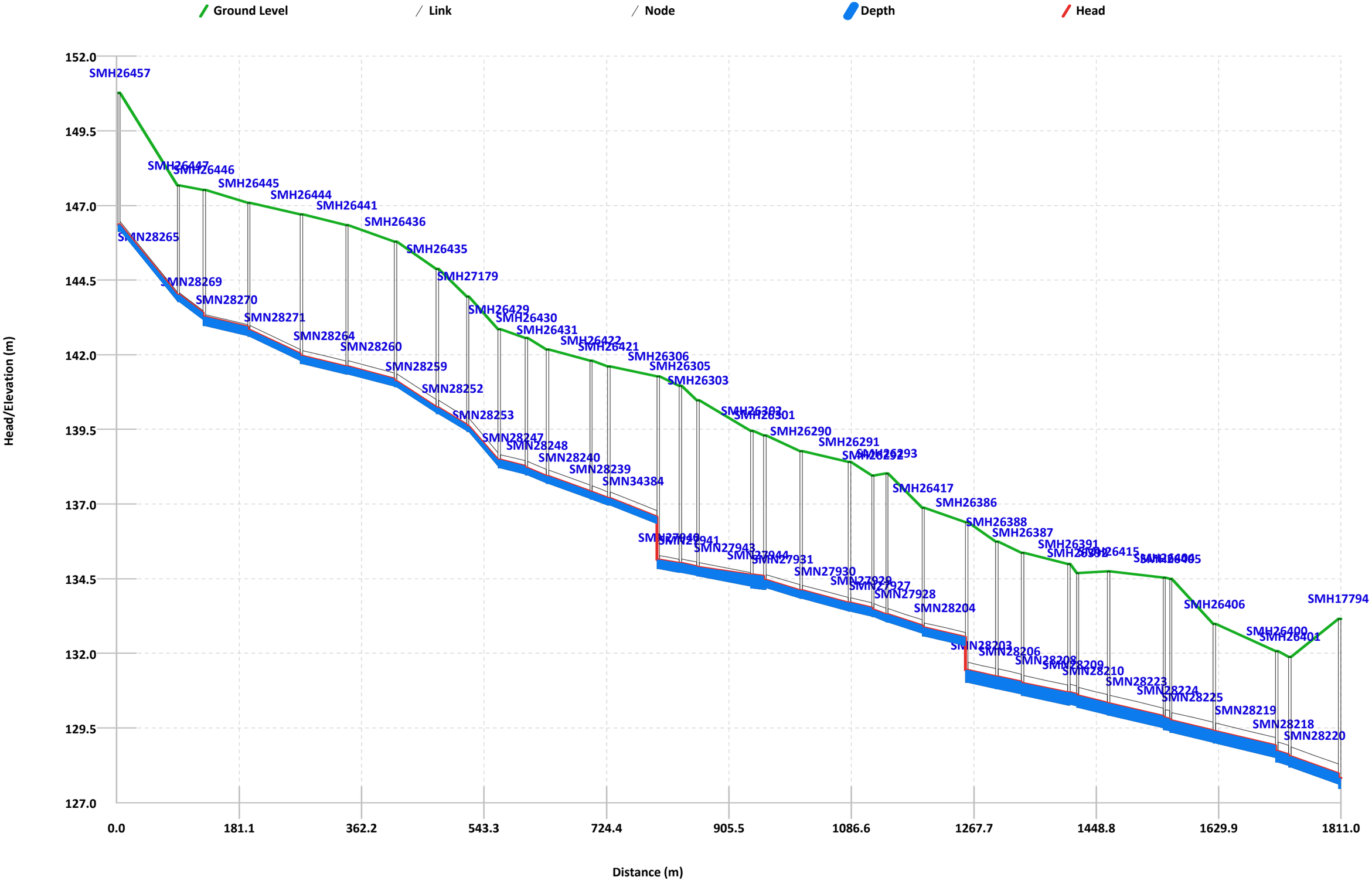


Figure A-5: Existing HGL Profile on Old Bronte Rd

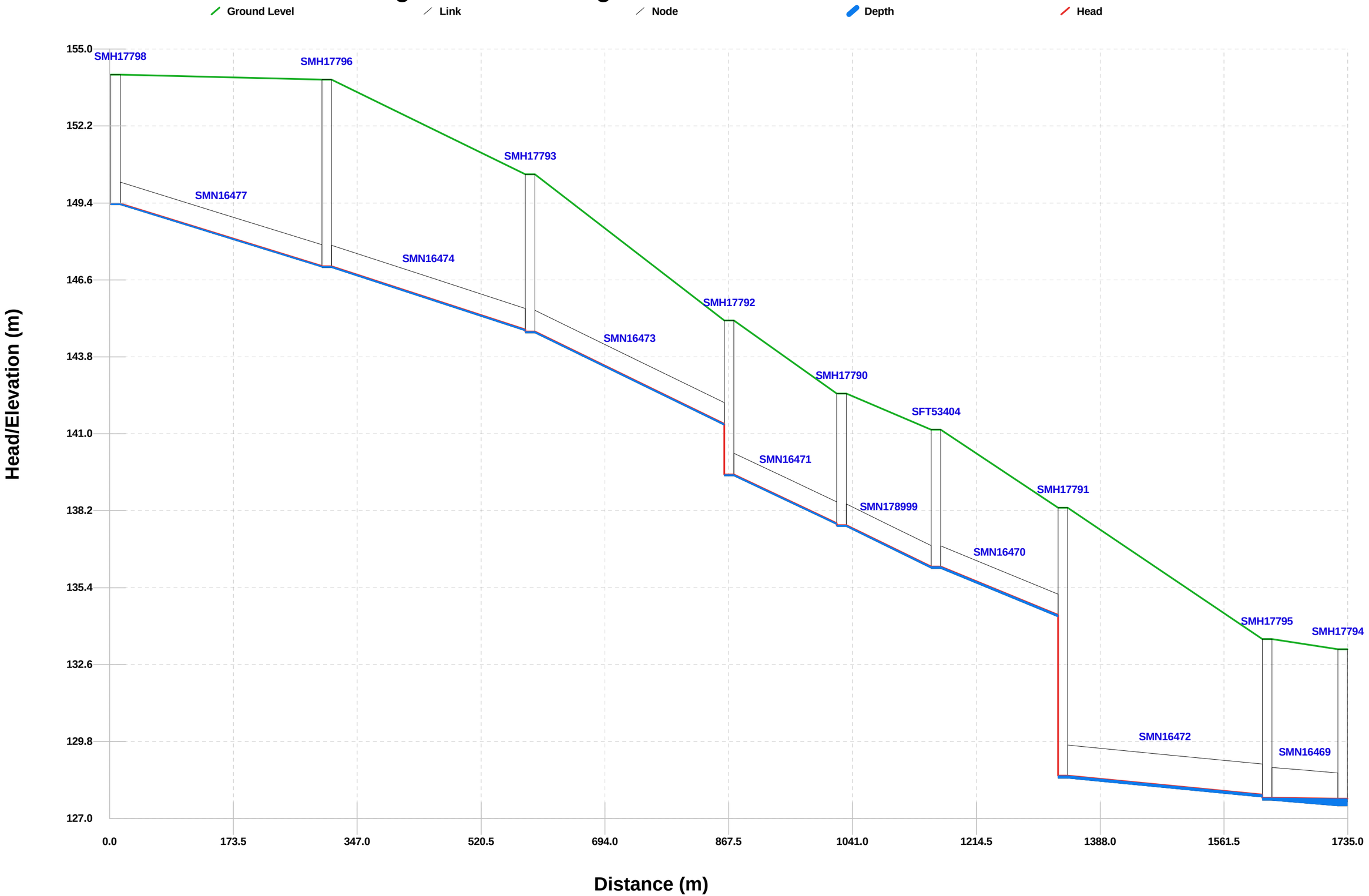


Figure A-6: Proposed HGL Profile on Old Bronte Rd

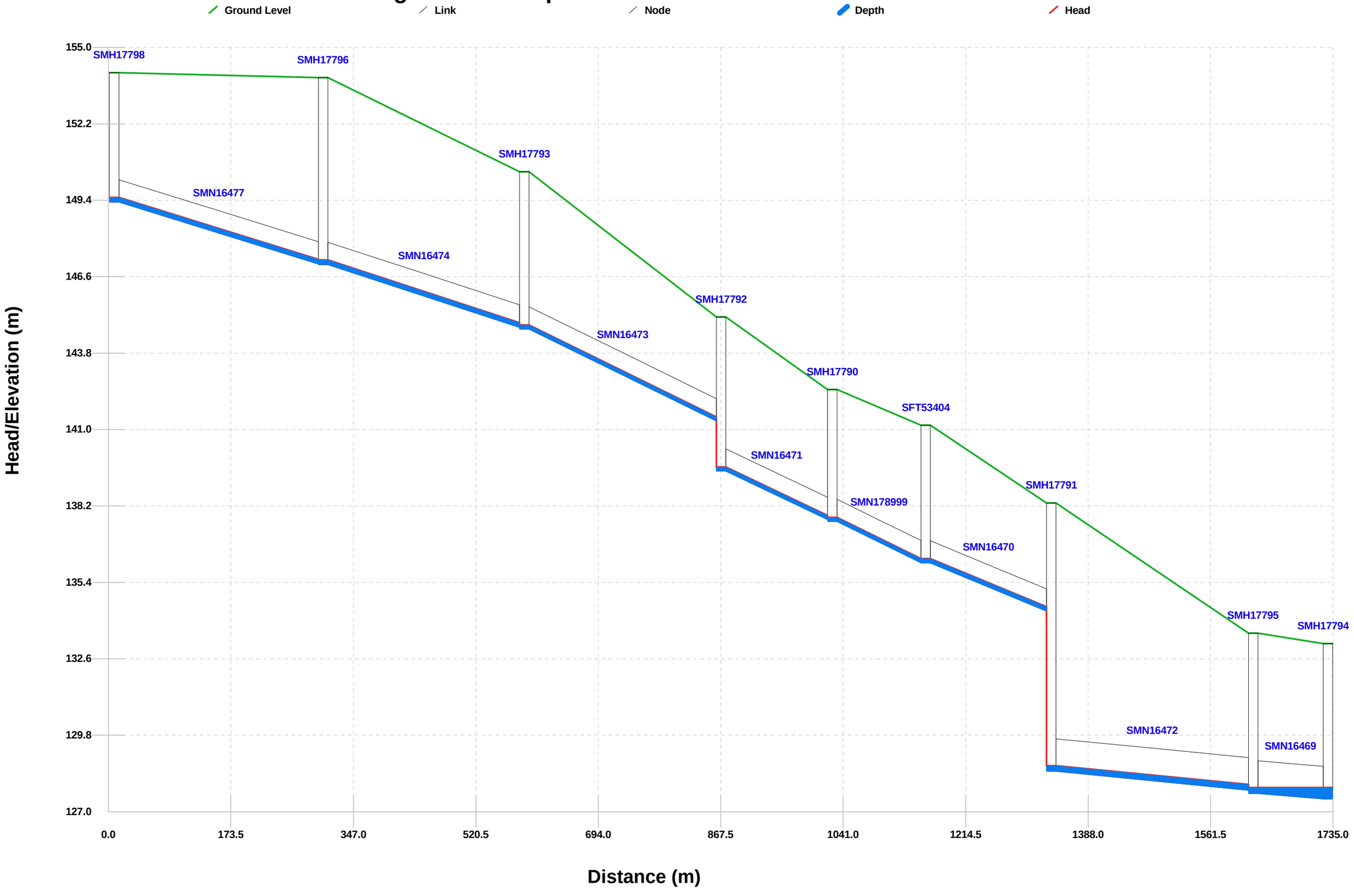


Figure A-7: Existing HGL Profile at the study outlet

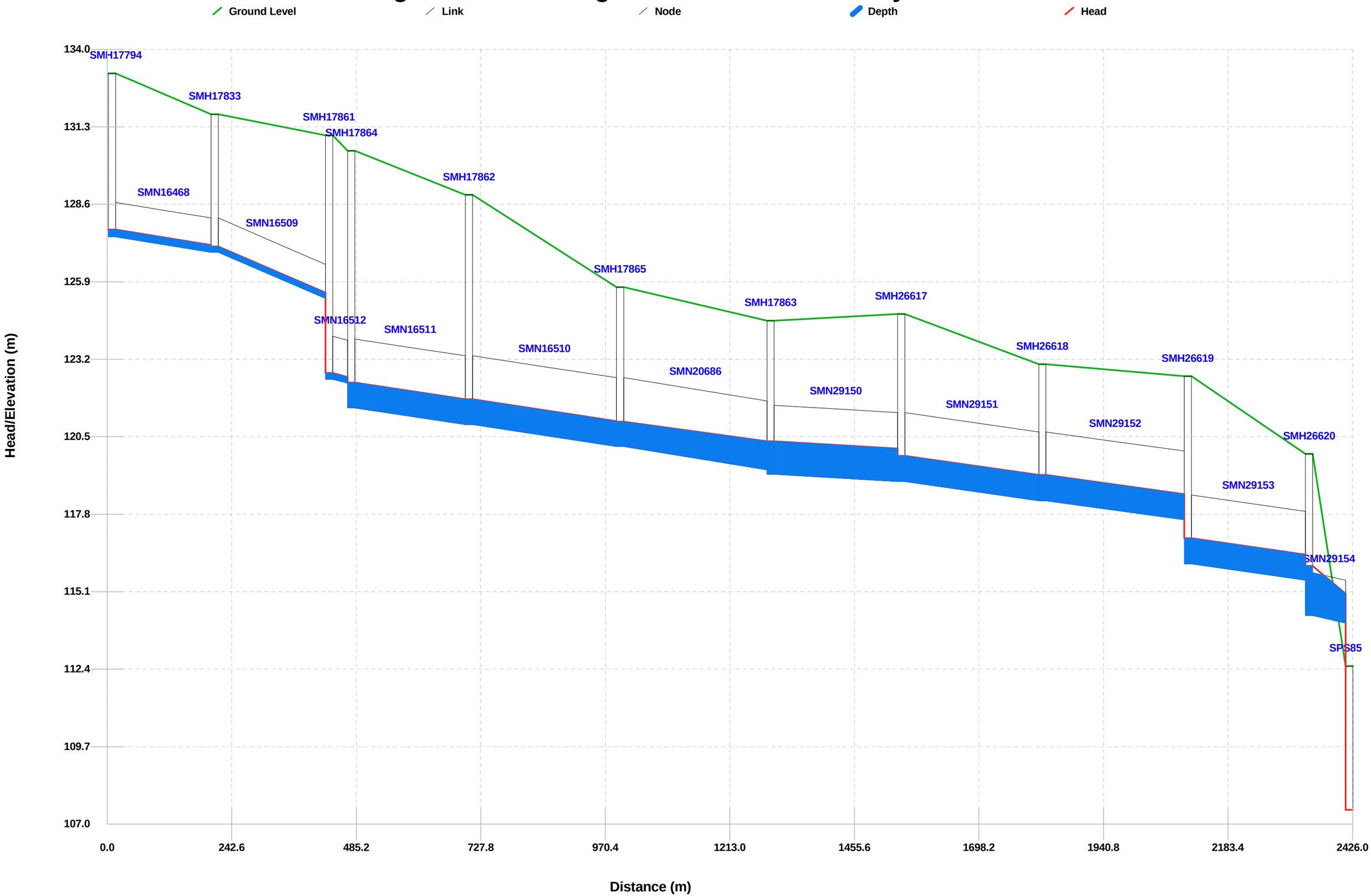
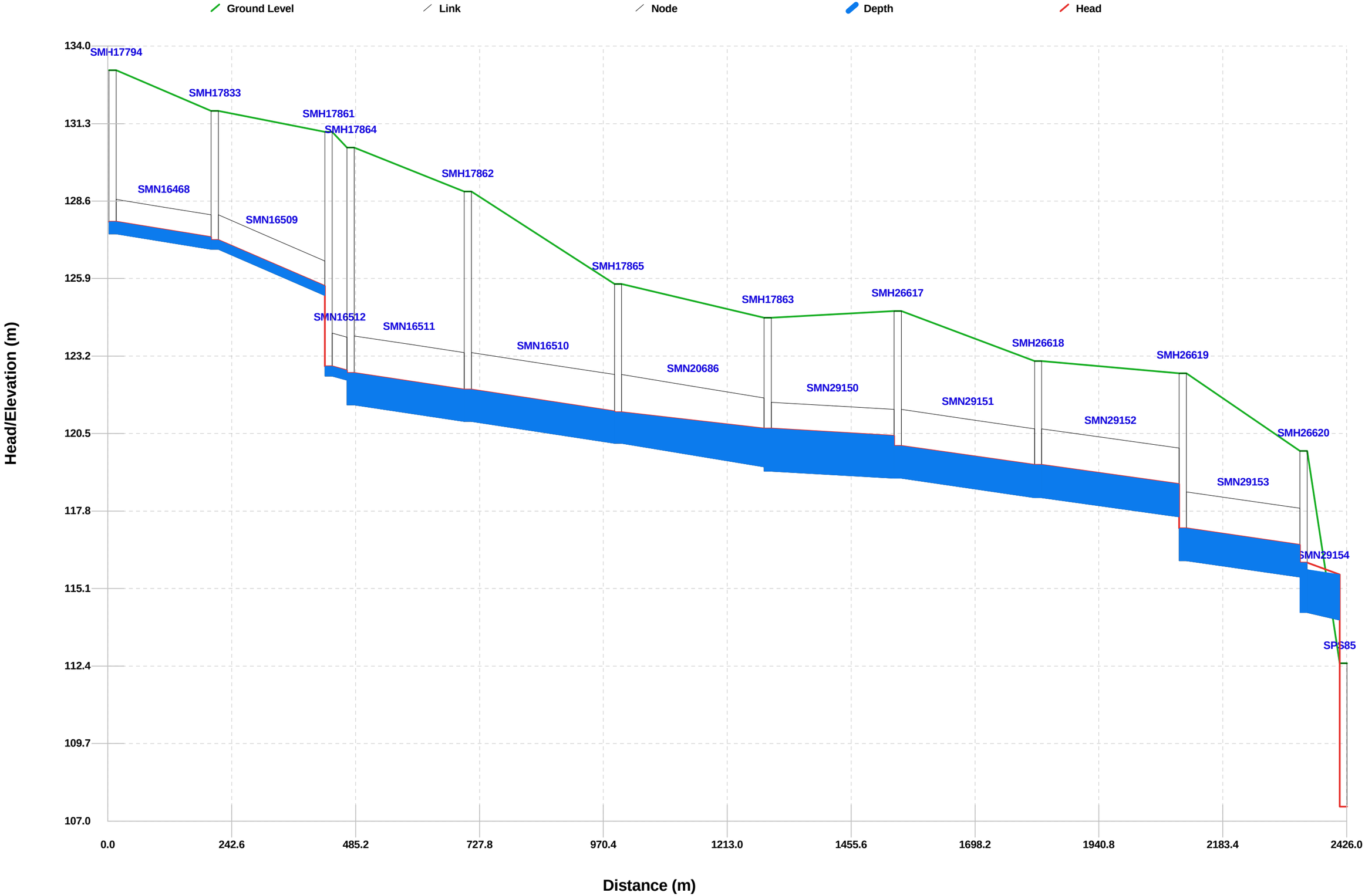


Figure A-8: Proposed HGL Profile at the study outlet



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Appendix B
Sanitary Sewer System Performance Tables

August 22nd, 2023

330 Rodinea Road, Unit 3
Vaughan, Ontario, Canada L6A 4P5
(905) 417-9792
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Table B-1: Existing and Proposed peak flows along Colonel William Parkway

Street	US Node ID	DS Node ID	Length (m)	Height (mm)	US invert level (m AD)	DS invert level (m AD)	US Ground level (m)	Conduit Full capacity (L/s)	Existing			Proposed		
									Max DS Flow (L/s)	Freeboard (m)	Surcharge State (q/QCap)	Max DS Flow (L/s)	Freeboard (m)	Surcharge State (q/QCap)
Colonel William Parkway	SMH46923	SMH46920	45.54	525	139.780	139.505	148.750	335	99.40	8.774	30%	193.95	8.683	58%
	SMH46920	SMH46919	32.08	600	139.505	138.962	147.850	801	99.55	8.202	12%	194.11	8.144	24%
	SMH46919	SMH46918	37.71	600	138.902	138.270	147.650	797	99.70	8.605	13%	194.26	8.546	24%
	SMH46918	SMH46917	25.88	600	138.210	138.170	147.550	242	99.85	9.071	41%	194.41	8.933	80%
	SMH46917	SMH46916	79.67	600	137.710	137.429	147.100	366	100.04	9.176	27%	194.61	9.079	53%
	SMH46916	SMH35578	27.68	600	137.369	137.310	146.050	284	100.23	8.435	35%	194.81	8.316	69%
	SMH35578	SMH35576	66.14	600	137.280	137.071	146.071	346	100.41	8.570	29%	195.01	8.469	56%
	SMH35576	SMH35560	48.54	600	136.976	136.821	145.698	348	100.60	8.501	29%	195.20	8.401	56%
	SMH35560	SMH35558	113.92	600	136.731	136.318	145.503	371	109.72	8.548	30%	204.59	8.454	55%
	SMH35558	SMH35556	46.58	600	136.308	136.088	144.425	423	109.91	7.908	26%	204.79	7.823	48%
	SMH35556	SMH35553	91.34	600	136.008	135.706	144.340	354	110.09	8.102	31%	204.98	8.004	58%
	SMH35553	SMH33112	69.90	600	135.630	135.410	144.095	345	110.28	8.232	32%	205.18	8.132	59%
	SMH33112	SMH33113	27.53	600	135.410	135.260	143.647	454	122.86	8.024	27%	218.11	7.944	48%
	SMH33113	SMH33110	160.13	600	135.260	134.690	142.976	367	123.04	7.477	34%	218.30	7.383	59%
	SMH33110	SFT33579	4.03	600	134.690	134.680	142.600	307	123.68	7.645	40%	218.96	7.535	71%
	SFT33579	SMH29102	148.49	600	134.679	134.161	142.600	364	123.88	7.680	34%	219.18	7.585	60%
	SMH29102	SMH29103	57.21	600	134.131	133.931	142.355	364	124.03	7.983	34%	219.33	7.888	60%
	SMH29103	SMH29076	69.59	600	133.871	133.625	140.873	366	124.18	6.761	34%	219.48	6.667	60%
	SMH29076	SMH29079	108.78	600	133.595	133.214	139.297	364	127.45	5.457	35%	222.73	5.363	61%
	SMH29079	SMH29080	105.63	600	133.184	132.817	138.738	363	127.96	5.308	35%	223.23	5.214	62%
	SMH29080	SMH29093	8.53	600	132.757	132.724	138.124	383	128.11	5.128	34%	223.38	5.038	58%
Richview Blvd	SMH29093	SMH29081	43.00	600	132.664	132.557	138.198	307	147.62	5.241	48%	242.82	5.132	79%
	SMH29081	SMH29082	73.33	600	132.527	132.346	138.086	306	148.01	5.265	48%	243.20	5.155	80%
	SMH29082	SMH29061	85.30	600	132.300	132.030	136.979	346	148.28	4.405	43%	243.47	4.308	70%
	SMH29061	SMH29060	90.54	600	132.060	131.832	135.700	309	152.82	3.342	50%	248.05	3.233	80%
	SMH29060	SMH29059	103.69	600	131.816	131.558	134.416	307	152.97	2.301	50%	248.21	2.191	81%
	SMH29059	SMH26385	43.52	600	131.528	131.396	136.572	339	153.15	4.761	45%	248.40	4.663	73%

(1) Freeboard = Distance from the HGL elevation to the ground surface elevation
Red bolded values highlight areas where **bottlenecks** exist

Table B-2: Existing and Proposed peak flows along Valleyridge Drive

Street	US Node ID	DS Node ID	Length (m)	Height (mm)	US invert level (m AD)	DS invert level (m AD)	US Ground level (m)	Conduit Full capacity (L/s)	Existing			Proposed		
									Max DS Flow (L/s)	Freeboard (m)	Surcharge State (q/QCap)	Max DS Flow (L/s)	Freeboard (m)	Surcharge State (q/QCap)
Valleyridge Drive	SMH26457	SMH26447	90.81	300	146.164	143.804	150.771	156	0.60	4.594	0%	132.16	4.395	85%
	SMH26447	SMH26446	37.31	300	143.774	143.175	147.669	123	1.73	3.870	1%	133.54	3.595	>100%
	SMH26446	SMH26445	67.14	375	142.970	142.633	147.521	125	8.03	4.486	6%	140.82	4.176	>100%
	SMH26445	SMH26444	79.95	375	142.603	141.804	147.085	176	8.53	4.426	5%	141.39	4.227	81%
	SMH26444	SMH26441	68.79	450	141.689	141.344	146.697	202	13.44	4.929	7%	147.04	4.724	73%
	SMH26441	SMH26436	73.45	450	141.354	140.943	146.340	214	15.46	4.904	7%	149.36	4.709	70%
	SMH26436	SMH26435	62.50	450	140.913	140.055	145.790	335	20.38	4.802	6%	154.51	4.662	46%
	SMH26435	SMH27179	44.91	450	140.025	139.458	144.883	321	22.73	4.777	7%	157.11	4.636	49%
	SMH27179	SMH26429	46.23	450	139.428	138.273	143.952	452	23.13	4.455	5%	157.57	4.341	35%
	SMH26429	SMH26430	39.81	450	138.203	138.004	142.851	202	24.76	4.542	12%	159.47	4.347	79%
	SMH26430	SMH26431	29.41	450	137.974	137.710	142.570	271	25.08	4.503	9%	159.85	4.347	59%
	SMH26431	SMH26422	65.71	450	137.680	137.188	142.176	247	26.73	4.396	11%	161.77	4.231	65%
	SMH26422	SMH26421	24.63	450	137.158	136.960	141.810	256	28.61	4.550	11%	163.90	4.390	64%
	SMH26421	SMH26306	74.76	450	136.960	136.334	141.609	181	28.89	4.527	16%	164.19	4.391	63%
	SMH26306	SMH26305	31.33	450	134.823	134.698	141.281	181	29.42	6.335	16%	164.73	6.120	91%
	SMH26305	SMH26303	24.62	450	134.708	134.610	140.957	180	29.59	6.126	16%	164.91	5.911	91%
	SMH26303	SMH26302	81.52	450	134.580	134.254	140.479	181	30.92	5.773	17%	166.25	5.559	92%
	SMH26302	SMH26301	17.06	450	134.184	134.139	139.453	156	31.06	5.128	21%	166.41	4.819	>100%
	SMH26301	SMH26290	53.97	450	134.190	133.850	139.305	227	31.42	5.002	14%	166.77	4.828	74%
	SMH26290	SMH26291	73.21	450	133.830	133.420	138.768	214	32.21	4.820	15%	167.58	4.638	78%
	SMH26291	SMH26292	33.58	450	133.410	133.240	138.418	203	32.42	4.887	16%	167.79	4.697	83%
	SMH26292	SMH26293	18.58	450	133.220	133.060	137.961	265	34.58	4.631	13%	169.96	4.479	64%
	SMH26293	SMH26417	53.87	450	133.050	132.670	138.032	240	34.91	4.866	15%	170.30	4.702	71%
	SMH26417	SMH26386	65.36	450	132.570	132.250	136.876	200	35.37	4.178	18%	170.78	3.986	85%
Rochester Circle	SMH26386	SMH26388	44.19	675	131.020	130.820	136.386	567	183.38	5.102	32%	413.28	4.938	73%
	SMH26388	SMH26387	37.57	675	130.800	130.630	135.736	567	184.16	4.671	33%	414.08	4.508	73%
	SMH26387	SMH26391	69.49	675	130.580	130.260	135.375	572	185.65	4.530	33%	415.61	4.368	73%
	SMH26391	SMH26392	10.39	675	130.291	130.239	134.992	596	185.80	4.442	31%	415.76	4.286	70%
	SMH26392	SMH26415	45.67	675	130.179	129.947	134.692	601	186.02	4.255	31%	415.99	4.100	69%
	SMH26415	SMH26404	84.67	675	129.918	129.495	134.744	596	186.35	4.567	31%	416.32	4.410	70%
	SMH26404	SMH26405	6.63	675	129.435	129.403	134.534	586	186.57	4.837	32%	416.55	4.678	71%
	SMH26405	SMH26406	65.69	675	129.343	129.015	134.494	596	186.85	4.891	31%	416.83	4.735	70%
	SMH26406	SMH26400	95.41	675	128.987	128.510	132.986	596	187.79	3.739	32%	417.79	3.582	70%
	SMH26400	SMH26401	17.04	675	128.353	128.242	132.076	680	189.85	3.479	28%	419.90	3.339	62%
	SMH26401	SMH17794	75.69	675	128.182	127.618	131.882	728	190.00	3.465	26%	420.05	3.332	58%

(1) Freeboard = Distance from the HGL elevation to the ground surface elevation
Red bolded values highlight areas where **bottlenecks** exist

Table B-3: Existing and Proposed peak flows along Old Bronte Road

Street	US Node ID	DS Node ID	Length (m)	Height (mm)	US invert level (m AD)	DS invert level (m AD)	US Ground level (m)	Conduit Full capacity (L/s)	Existing			Proposed		
									Max DS Flow (L/s)	Freeboard (m)	Surcharge State (q/QCap)	Max DS Flow (L/s)	Freeboard (m)	Surcharge State (q/QCap)
Old Bronte Road	SMH17798	SMH17796	303.914	825	149.330	147.060	154.071	1244	8.97	4.691	1%	96.69	4.585	8%
	SMH17796	SMH17793	292.301	825	147.040	144.740	153.895	1277	10.29	6.802	1%	98.13	6.700	8%
	SMH17793	SMH17792	285.614	825	144.670	141.310	150.448	1561	10.76	5.729	1%	98.72	5.637	6%
	SMH17792	SMH17790	155.080	825	139.470	137.700	145.128	1538	11.24	5.608	1%	99.31	5.516	7%
	SMH17790	SFT53404	127.839	825	137.620	136.110	142.464	1564	11.54	4.794	1%	99.62	4.703	6%
	SFT53404	SMH17791	176.972	825	136.100	134.340	141.155	1435	20.98	4.985	2%	110.12	4.900	8%
	SMH17791	SMH17795	293.289	1200	128.470	127.780	138.310	1896	21.28	9.751	1%	110.43	9.643	6%
	SMH17795	SMH17794	99.648	1200	127.660	127.460	133.535	1751	21.59	5.782	1%	110.74	5.670	6%

(1) Freeboard = Distance from the HGL elevation to the ground surface elevation
Red bolded values highlight areas where **bottlenecks** exist

Table B-4: Existing and Proposed peak flows along Bronte Road to the outlet at SPS-85

Street	US Node ID	DS Node ID	Length (m)	Height (mm)	US invert level (m AD)	DS invert level (m AD)	US Ground level (m)	Conduit Full capacity (L/s)	Existing			Proposed		
									Max DS Flow (L/s)	Freeboard (m)	Surcharge State (q/QCap)	Max DS Flow (L/s)	Freeboard (m)	Surcharge State (q/QCap)
Bronte Road	SMH17794	SMH17833	200.155	1200	127.460	126.920	133.159	2031	209.89	5.438	10%	528.60	5.281	26%
	SMH17833	SMH17861	224.458	1200	126.920	125.311	131.740	3310	210.19	4.615	6%	528.91	4.496	16%
	SMH17861	SMH17864	31.427	1500	122.500	122.360	131.009	4731	216.01	8.291	5%	534.79	8.168	11%
	SMH17864	SMH17862	231.696	2400	121.500	120.920	130.460	12420	3584.19	8.077	29%	5439.93	7.849	44%
	SMH17862	SMH17865	301.488	2400	120.920	120.160	128.933	12464	3584.50	7.132	29%	5440.25	6.904	44%
	SMH17865	SMH17863	300.237	2400	120.160	119.340	125.711	12973	3584.82	4.688	28%	5440.57	4.467	42%
	SMH17863	SMH26617	258.640	2400	119.190	118.940	124.541	7718	3585.14	4.201	47%	5440.89	3.864	71%
	SMH26617	SMH26618	280.811	2400	118.940	118.269	124.772	12135	3585.45	4.938	30%	5441.22	4.706	45%
	SMH26618	SMH26619	289.601	2400	118.269	117.600	123.031	11931	3585.77	3.860	30%	5441.54	3.625	46%
	SMH26619	SMH26620	239.165	2400	116.070	115.500	122.605	12119	3586.08	5.640	30%	5441.87	5.408	45%
	SMH26620	SPS85	68.777	1500	114.263	114.000	119.900	4383	3586.36	4.605	82%	5442.15	4.137	>100%

(1) Freeboard = Distance from the HGL elevation to the ground surface elevation
Red bolded values highlight areas where **bottlenecks** exist

APPENDIX D

SANITARY DESIGN SHEETS (DSEL, 2023)

DAVID SCHAEFFER ENGINEERING LTD.
600 ALDEN ROAD, SUITE 606
MARKHAM, ONTARIO
L3R 0E7
TEL: (905) 475-3080
FAX: (905) 475-3081

THE REGIONAL MUNICIPALITY OF HALTON

SANITARY SEWER DESIGN

Note: To be conservative, industrial Kav is considered to be 1

n (PVC): 0.013
n (Conc): 0.013

Single Family:	55	pph
Semi-detached:	100	pph
Townhouse:	250	pph
Commercial:	90	pph
School:	70	pph
Park:	0	pph
Community Services:	40	pph
Condo:	1023	pph
Infil.Flow (INF):	0.286	L/s/ha

SHEET No.: 1 **OF** 3
LOCATION: Palermo
PROJECT No.: 20-1218
DATE: 25 Sep 2023
DESIGNED BY: RY
CHECKED BY: KD

STREET	MANHOLE FROM	MANHOLE TO	LENGTH (m)	PHASE	TRIBUTARY AREA HECTARE INCREMENT SINGLE F.	SEMI.	TOWNHOUSE	CONDO	SCHOOL	PARK	INSTITUTIONAL	COMMERCIAL	EXTERNAL	INFILT	TOTAL	POPULATION TRIBUTARY INCREMENT SINGLE F.	SEMI.	TOWNHOUSE	CONDO	SCHOOL	PARK	INSTITUTIONAL	COMMERCIAL	EXTERNAL	TOTAL	AVG. L/s INC.	AVG. L/s TOTAL	PEAKING FACTOR	MAX L/s	INF. L/s	MAX FLOW EXP.	SEWER SIZE	SLOPE	Q L/s	VEL (m/s) FULL	VEL (m/s) ACT.	PIPE TYPE	PIPE CLASS	Q/Qf	REMARKS
BLOCK 1A/1B																																									
	204A	206A	16.00					0.40						0.12	0.52				410						410	1.30	1.30	3.83	5.00	0.15	5.15	200	1.00	32.80	1.04	0.76	PVC	SDR-35	0.16	
To STREET "C", Pipe 206A - 209A															0.52									410															
	205A	206A	16.00					1.00							1.00				1023						1023	3.26	3.26	3.79	12.34	0.29	12.63	200	1.00	32.80	1.04	0.98	PVC	SDR-35	0.38	
To STREET "C", Pipe 206A - 209A															1.00									1023															
STREET "C"																																								
	106A	107A	87.00											0.41	0.41									0	0.00	0.00	3.60	0.00	0.12	0.12	200	1.00	32.80	1.04	0.23	PVC	SDR-35	0.00	
	107A	108A	99.50											0.16	0.57									0	0.00	0.00	3.60	0.00	0.16	0.16	200	1.60	41.49	1.32	0.32	PVC	SDR-35	0.00	
To STREET "B", Pipe 108A - 109A															0.57									0															
Contribution From BRONTE ROAD, Pipe 202A - 203A															0.60									614															
	203A	206A	48.50											0.09	0.69									614	0.00	1.95	3.82	7.47	0.20	7.66	200	0.55	24.32	0.77	0.69	PVC	SDR-35	0.32	
Contribution From BLOCK 1A/1B, Pipe 204A - 206A															0.52									410															
Contribution From BLOCK 1A/1B, Pipe 205A - 206A															1.00									1023															
	206A	209A	55.50							0.16					2.37						0			2047	0.00	6.52	3.47	22.61	0.68	23.29	250	0.30	32.57	0.66	0.72	PVC	SDR-21	0.71	
To STREET "D", Pipe 209A - 210A															2.37									2047															
STREET "D"																																								
Contribution From STREET "C", Pipe 206A - 209A															2.37									2047															
Contribution From STREET "B", Pipe 208A - 209A															0.00									0															
	209A	210A	57.50											0.08	2.45									2047	0.00	6.52	3.45	22.48	0.70	23.18	250	0.30	32.57	0.66	0.72	PVC	SDR-21	0.71	
	210A	211A	99.50											0.17	2.62									2047	0.00	6.52	3.41	22.22	0.75	22.97	250	0.80	53.19	1.08	1.04	PVC	SDR-35	0.43	
	211A	212A	101.00											0.16	2.78									2047	0.00	6.52	3.38	22.02	0.80	22.82	250	1.25	66.49	1.35	1.22	PVC	SDR-35	0.34	
To STREET "E", Pipe 212A - 215A															2.78									2047															
STREET "D"																																								
	118A	119A	95.00											0.17	0.17									0	0.00	0.00	3.60	0.00	0.05	0.05	200	1.00	32.80	1.04	0.17	PVC	SDR-35	0.00	
	119A	120A	105.50											0.18	0.35									0	0.00	0.00	3.60	0.00	0.10	0.10	200	1.00	32.80	1.04	0.23	PVC	SDR-35	0.00	
	120A	122A	102.50											0.17	0.52									0	0.00	0.00	3.60	0.00	0.15	0.15	200	1.00	32.80	1.04	0.25	PVC	SDR-35	0.00	
To WILLIAM HALTON PARKWAY, Pipe 122A - 123A															0.52									0															
BLOCK 2/3																																								
	213A	215A	16.00					2.30							2.30				2353						2353	7.49	7.49	3.53	26.44	0.66	27.10	250	1.00	59.47	1.21	1.18	PVC	SDR-35	0.46	
To STREET "E", Pipe 215A - 216A															2.30									2353															
	214A	215A	16.00					1.44							1.44				1474						1474	4.69	4.69	3.69	17.31	0.41	17.72	200	1.00	32.80	1.04	1.06	PVC	SDR-35	0.54	
To STREET "E", Pipe 215A - 216A															1.44									1474															
STREET "E"																																								
	113A	114A	38.00											0.08	0.08									0	0.00	0.00	3.60	0.00	0.02	0.02	200	1.10	34.40	1.09	0.13	PVC	SDR-35	0.00	
	114A	115A	98.00							0.49				0.21	0.78						0			0	0.00	0.00	3.60	0.00	0.22	0.22	200	1.00	32.80	1.04	0.29	PVC	SDR-35	0.01	
To STREET "B", Pipe 115A - 116A															0.78									0															
	110A	111A	109.50											0.26	0.26									0	0.00	0.00	3.60	0.00	0.07	0.07	200	1.00	32.80	1.04	0.21	PVC	SDR-35	0.00	
	111A	112A	98.50											0.22	0.48									0	0.00	0.00	3.60	0.00	0.14	0.14	200	1.00	32.80	1.04	0.25	PVC	SDR-35	0.00	
	112A	115A	48.00											0.10	0.58									0	0.00	0.00	3.60	0.00	0.17	0.17	200	3.20	58.67	1.87	0.38	PVC	SDR-35	0.00	
To STREET "B", Pipe 115A - 116A															0.58									0															
Contribution From STREET "D", Pipe 211A - 212A															2.78									2047															
	212A	215A	23.00											0.05	2.83									2047	0.00	6.52	3.37	21.96	0.81	22.77	250	0.30	32.57	0.66	0.72	PVC	SDR-35	0.70	
Contribution From BLOCK 2/3, Pipe 213A - 215A															2.30									2353															
Contribution From BLOCK 2/3, Pipe 214A - 215A															1.44									1474															
	215A	216A	64.00											0.16	6.73									5874	0.00	18.70	3.09	57.77	1.92	59.70	375	0.30	96.03	0.87	0.92	PVC	SDR-35	0.62	
	216A	217A	25.50												6.73									5874	0.00	18.70	3.09	57.77	1.92	59.70	375	0.30	96.03	0.87	0.92	PVC	SDR-35	0.62	

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THE REGIONAL MUNICIPALITY OF HALTON

SANITARY SEWER DESIGN

Note: To be conservative, industrial Kav is considered to be 1

n (PVC): 0.013
n (Conc): 0.013

Single Family:	55	pph
Semi-detached:	100	pph
Townhouse:	250	pph
Commercial:	90	pph
School:	70	pph
Park:	0	pph
Community Services:	40	pph
Condo:	1023	pph
Infil.Flow (INF):	0.286	L/s/ha

SHEET No.: 2 **OF** 3
LOCATION: Palermo
PROJECT No.: 20-1218
DATE: 25 Sep 2023
DESIGNED BY: RY
CHECKED BY: KD

STREET	MANHOLE		LENGTH (m)	PHASE	TRIBUTARY AREA HECTARE											POPULATION TRIBUTARY											AVG. L/s	AVG. L/s	PEAKING	MAX	INF.	MAX FLOW	SEWER					PIPE		Q/Qf	REMARKS
					INCREMENT										TOTAL	INCREMENT										TOTAL														
	FROM	TO			SINGLE F.	SEMI.	TOWNHOUSE	CONDO	SCHOOL	PARK	INSTITUTIONAL	COMMERCIAL	EXTERNAL	INFILT		SINGLE F.	SEMI.	TOWNHOUSE	CONDO	SCHOOL	PARK	INSTITUTIONAL	COMMERCIAL	EXTERNAL		INC.	TOTAL	FACTOR	L/s	L/s	EXP.	SIZE	SLOPE	Q L/s	VEL (m/s) FULL	VEL (m/s) ACT.	TYPE	CLASS		
BRONTE ROAD																																							
	201A	202A	69.00					0.60							0.60				614						614	1.95	1.95	3.93	7.68	0.17	7.85	200	1.00	32.80	1.04	0.85	PVC	SDR-35	0.24	
	202A	203A	37.00												0.60				614						614	0.00	1.95	3.93	7.68	0.17	7.85	200	0.55	24.32	0.77	0.69	PVC	SDR-35	0.32	
To STREET "C", Pipe 203A - 206A															0.60										614														
WILLIAM HALTON PARKWAY																																							
	124A	125A	53.50											0.14	0.14										0	0.00	0.00	3.60	0.00	0.04	0.04	200	1.00	32.80	1.04	0.17	PVC	SDR-35	0.00	
	125A	126A	42.00				4.35							0.11	4.60			1088							1088	3.46	3.46	3.74	12.95	1.32	14.27	200	1.00	32.80	1.04	1.01	PVC	SDR-35	0.43	
	126A	127A	66.50											0.16	4.76										1088	0.00	3.46	3.71	12.85	1.36	14.21	200	0.30	17.96	0.57	0.63	PVC	SDR-35	0.79	
To STREET "B", Pipe 127A - 128A															4.76										1088														
	121A	122A	84.50											0.24	0.24										0	0.00	0.00	3.60	0.00	0.07	0.07	200	1.00	32.80	1.04	0.19	PVC	SDR-35	0.00	
Contribution From STREET "D", Pipe 120A - 122A															0.52										0														
	122A	123A	110.00											0.28	1.04										0	0.00	0.00	3.60	0.00	0.30	0.30	200	1.00	32.80	1.04	0.32	PVC	SDR-35	0.01	
	123A	127A	107.50											0.27	1.31										0	0.00	0.00	3.60	0.00	0.37	0.37	200	1.00	32.80	1.04	0.35	PVC	SDR-35	0.01	
To STREET "B", Pipe 127A - 128A															1.31										0														
BLOCK 4/5A																																							
	131A	133A	17.00					1.46							1.46				1494						1494	4.76	4.76	3.68	17.50	0.42	17.92	200	1.00	32.80	1.04	1.07	PVC	SDR-35	0.55	
To STREET "F", Pipe 133A - 134A															1.46										1494														
	132A	133A	15.00					1.07							1.07				1095						1095	3.49	3.49	3.77	13.14	0.31	13.45	200	1.00	32.80	1.04	0.99	PVC	SDR-35	0.41	
To STREET "F", Pipe 133A - 134A															1.07										1095														
BLOCK 5B																																							
	140A	141A	11.50					1.71							1.71				1750						1750	5.57	5.57	3.63	20.22	0.49	20.71	200	1.00	32.80	1.04	1.10	PVC	SDR-35	0.63	
To STREET "G", Pipe 141A - 142A															1.71										1750														
STREET "G"																																							
	129A	130A	91.50											0.16	0.16										0	0.00	0.00	3.60	0.00	0.05	0.05	200	1.00	32.80	1.04	0.17	PVC	SDR-35	0.00	
	130A	134A	81.50											0.13	0.29										0	0.00	0.00	3.60	0.00	0.08	0.08	200	1.00	32.80	1.04	0.21	PVC	SDR-35	0.00	
To STREET "F", Pipe 134A - 135A															0.29										0														
	129A	138A	22.00											0.04	0.04										0	0.00	0.00	3.60	0.00	0.01	0.01	200	1.00	32.80	1.04	0.09	PVC	SDR-35	0.00	
	138A	139A	10.00											0.02	0.06										0	0.00	0.00	3.60	0.00	0.02	0.02	200	1.00	32.80	1.04	0.12	PVC	SDR-35	0.00	
	139A	141A	112.00											0.19	0.25										0	0.00	0.00	3.60	0.00	0.07	0.07	200	1.00	32.80	1.04	0.19	PVC	SDR-35	0.00	
Contribution From BLOCK 5B, Pipe 140A - 141A															1.71										1750														
	141A	142A	30.00											0.04	2.00										1750	0.00	5.57	3.52	19.61	0.57	20.18	200	0.60	25.41	0.81	0.90	PVC	SDR-35	0.79	
To STREET "B", Pipe 142A - 143A															2.00										1750														
STREET "F"																																							
Contribution From BLOCK 4/5A, Pipe 131A - 133A															1.46										1494														
Contribution From BLOCK 4/5A, Pipe 132A - 133A															1.07										1095														
	133A	134A	21.50											0.21	2.74										2589	0.00	8.24	3.44	28.35	0.78	29.13	250	0.55	44.10	0.90	0.96	PVC	SDR-35	0.66	
Contribution From STREET "G", Pipe 130A - 134A															0.29										0														
	134A	135A	100.00											0.21	3.24										2589	0.00	8.24	3.34	27.52	0.93	28.45	300	0.30	52.97	0.75	0.76	PVC	SDR-35	0.54	
	135A	136A	83.00							2.26				0.18	5.68						0				2589	0.00	8.24	3.11	25.63	1.62	27.25	300	0.90	91.74	1.30	1.13	PVC	SDR-35	0.30	
To STREET "B", Pipe 136A - 137A															5.68										2589														
STREET "B"																																							
Contribution From STREET "B", Pipe 109A - 115A															3.72										538														
Contribution From STREET "E", Pipe 112A - 115A															0.58										0														
Contribution From STREET "E", Pipe 114A - 115A															0.78										0														
	115A	116A	61.50				5.26							0.13	10.47			1315							1853	4.19	5.90	3.40	20.05	2.99	23.05	200	0.85	30.24	0.96	1.06	PVC	SDR-35	0.76	
	116A	117A	123.00											0.27	10.74										1853	0.00	5.90	3.39	19.99	3.07	23.07	250	0.55	44.10	0.90	0.91	PVC	SDR-35	0.52	

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THE REGIONAL MUNICIPALITY OF HALTON

SANITARY SEWER DESIGN

Note: To be conservative, industrial Kav is considered to be 1

n (PVC): 0.013
n (Conc): 0.013

Single Family:	55	pph
Semi-detached:	100	pph
Townhouse:	250	pph
Commercial:	90	pph
School:	70	pph
Park:	0	pph
Community Services:	40	pph
Condo:	1023	pph
Infil.Flow (INF):	0.286	L/s/ha

SHEET No.: 3 **OF** 3
LOCATION: Palermo
PROJECT No.: 20-1218
DATE: 25 Sep 2023
DESIGNED BY: RY
CHECKED BY: KD

STREET	MANHOLE		LENGTH (m)	PHASE	TRIBUTARY AREA HECTARE											POPULATION TRIBUTARY											AVG. L/s	AVG. L/s	PEAKING	MAX	INF.	MAX FLOW	SEWER					PIPE		Q/Qf	REMARKS
					INCREMENT											INCREMENT																				VEL (m/s)					
	FROM	TO			SINGLE F.	SEMI.	TOWNHOUSE	CONDO	SCHOOL	PARK	INSTITUTIONAL	COMMERCIAL	EXTERNAL	INFILT	TOTAL	SINGLE F.	SEMI.	TOWNHOUSE	CONDO	SCHOOL	PARK	INSTITUTIONAL	COMMERCIAL	EXTERNAL	TOTAL	INC.	TOTAL	FACTOR	L/s	L/s	EXP.	SIZE	SLOPE	Q L/s	FULL	ACT.	TYPE	CLASS		
	117A	127A	123.00											0.26	11.00										1853	0.00	5.90	3.38	19.93	3.15	23.08	250	0.55	44.10	0.90	0.91	PVC	SDR-35	0.52	
Contribution From WILLIAM HALTON PARKWAY, Pipe 123A - 127A															1.31										0														
Contribution From WILLIAM HALTON PARKWAY, Pipe 126A - 127A															4.76										1088														
	127A	128A	80.00				6.51							0.17	23.75			1628							4569	5.18	14.54	3.13	45.52	6.79	52.31	300	0.50	68.38	0.97	1.07	PVC	SDR-35	0.77	
	128A	136A	80.00											0.17	23.92										4569	0.00	14.54	3.13	45.52	6.84	52.36	300	0.50	68.38	0.97	1.07	PVC	SDR-35	0.77	
Contribution From STREET "F", Pipe 135A - 136A															5.68										2589														
	136A	137A	99.50											0.22	29.82										7158	0.00	22.78	2.91	66.30	8.53	74.83	300	0.75	83.75	1.18	1.34	PVC	SDR-35	0.89	
	137A	142A	99.50											0.30	30.12										7158	0.00	22.78	2.91	66.30	8.61	74.91	300	0.80	86.49	1.22	1.38	PVC	SDR-35	0.87	
Contribution From STREET "G", Pipe 141A - 142A															2.00										1750														
	142A	143A	86.50				2.52							0.47	35.11			630							9538	2.01	30.36	2.80	85.00	10.04	95.04	300	1.25	108.11	1.53	1.72	PVC	SDR-35	0.88	
	143A	144A	66.00												35.11										9538	0.00	30.36	2.80	85.00	10.04	95.04	300	1.10	101.42	1.43	1.63	PVC	SDR-35	0.94	
STREET "B"																																							
	207A	208A	76.00												0.00										0	0.00	0.00	4.00	0.00	0.00	0.00	200	1.00	32.80	1.04	0.06	PVC	SDR-35	0.00	
	208A	209A	63.50												0.00										0	0.00	0.00	4.00	0.00	0.00	0.00	200	1.00	32.80	1.04	0.06	PVC	SDR-35	0.00	
To STREET "D", Pipe 209A - 210A															0.00										0														
	101A	102A	76.00											0.15	0.15										0	0.00	0.00	3.60	0.00	0.04	0.04	200	1.00	32.80	1.04	0.17	PVC	SDR-35	0.00	
	102A	103A	76.00											0.13	0.28										0	0.00	0.00	3.60	0.00	0.08	0.08	200	1.00	32.80	1.04	0.21	PVC	SDR-35	0.00	
	103A	104A	11.00											0.03	0.31										0	0.00	0.00	3.60	0.00	0.09	0.09	200	1.00	32.80	1.04	0.21	PVC	SDR-35	0.00	
	104A	105A	74.00											0.12	0.43										0	0.00	0.00	3.60	0.00	0.12	0.12	200	1.00	32.80	1.04	0.23	PVC	SDR-35	0.00	
	105A	108A	72.00											0.12	0.55										0	0.00	0.00	3.60	0.00	0.16	0.16	200	1.30	37.40	1.19	0.29	PVC	SDR-35	0.00	
Contribution From STREET "C", Pipe 107A - 108A															0.57										0														
	108A	109A	130.50				2.15							0.22	3.49			538							538	1.71	1.71	3.65	6.25	1.00	7.25	200	1.00	32.80	1.04	0.83	PVC	SDR-35	0.22	
	109A	115A	142.50											0.23	3.72										538	0.00	1.71	3.62	6.20	1.06	7.26	200	1.00	32.80	1.04	0.83	PVC	SDR-35	0.22	
To STREET "B", Pipe 115A - 116A															3.72										538														

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THE REGIONAL MUNICIPALITY OF HALTON

SANITARY SEWER DESIGN

Note: To be conservative, industrial Kav is considered to be 1

n (PVC): 0.013
n (Conc): 0.013

Single Family:	55	pph
Semi-detached:	100	pph
Townhouse:	135	pph
Commercial:	285	pph
Community Services	40	pph
School	40	pph
Infil.Flow (INF):	0.286	L/s/ha

SHEET No.: 1 OF 1
LOCATION: Palermo
PROJECT No.: 1218
DATE: 09 Feb 2021
DESIGNED BY: RY
CHECKED BY: KD

STREET	MANHOLE		LENGTH	TRIBUTARY AREA HECTARE							POPULATION TRIBUTARY						AVG.	AVG.	PEAKING	MAX	INF.	MAX	SEWER					PIPE			REMARKS
				INCREMENT						TOTAL	INCREMENT					TOTAL	L/s	L/s	FACTOR	L/s	L/s	FLOW	SIZE	SLOPE	Q	VEL (m/s)				
	FROM	TO	(m)	SINGLE F.	SEMI.	TOWNHOUS	COMMERCIA	SCHOOL	INFILT		SINGLE F.	SEMI.	TOWNHOUS	COMMERCIA	SCHOOL		INC.	TOTAL				EXP.			L/s	FULL	ACT.	TYPE	CLASS	Q/Qf	
VALLEYRIDGE DRIVE																														
	1A	2A	85.80							35.11	9538					9538	30.36	30.36	2.80	85.00	10.04	95.04	300	2.87	163.82	2.32	2.40	PVC	SDR-35	0.58	
						0.16				35.27			22			9560														
	2A	3A	37.50			0.95			0.01	36.23			129			9689	0.41	30.84	2.97	91.59	10.36	101.95	300	1.95	135.04	1.91	2.10	PVC	SDR-35	0.76	
						0.34				36.57			46			9735														
	3A	4A	67.50			3.07			0.05	39.69			415			10150	1.32	32.31	2.95	95.30	11.35	106.65	375	0.50	123.98	1.12	1.26	PVC	SDR-35	0.86	
	4A	5A	80.00			0.36				40.05			49			10199	0.16	32.46	2.95	95.76	11.45	107.22	375	1.01	176.20	1.60	1.67	PVC	SDR-35	0.61	
	5A	6A	69.00			3.13		2.82	0.16	46.16			423		113	10735	1.71	34.17	2.92	99.77	13.20	112.97	450	0.51	203.61	1.28	1.31	PVC	SDR-35	0.55	
				0.29		1.42			0.06	47.93	16		192			10943														
	6A	7A	73.00	14.00						61.93	770					11713	2.45	37.28	2.89	107.74	17.71	125.45	450	0.53	207.56	1.31	1.37	PVC	SDR-35	0.60	
	7A	8A	63.00	0.38		0.86				63.17	21		117			11851	0.44	37.72	2.88	108.63	18.07	126.70	450	1.40	337.34	2.12	1.96	PVC	SDR-35	0.38	
	8A	9A	45.00	0.26		1.07				64.50	15		145			12011	0.51	38.23	2.88	110.10	18.45	128.55	450	1.22	314.91	1.98	1.87	PVC	SDR-35	0.41	
	9A	10A	46.00	0.33						64.83	19					12030	0.06	38.29	2.87	109.89	18.54	128.43	450	2.50	450.79	2.83	2.44	PVC	SDR-35	0.28	
				0.34						65.17	34					12064														
				0.63					0.04	65.84	35					12099														
	10A	11A	39.60				2.21			68.05				630		12729	2.01	40.51	2.85	115.47	19.46	134.93	450	0.48	197.53	1.24	1.34	PVC	SDR-35	0.68	
	11A	12A	29.50	0.17						68.22	16					12745	0.05	40.57	2.85	115.61	19.51	135.12	450	0.88	267.45	1.68	1.68	PVC	SDR-35	0.51	
	12A	13A	65.50	0.78		0.35				69.35	43		48			12836	0.29	40.86	2.85	116.44	19.83	136.27	450	0.76	248.55	1.56	1.59	PVC	SDR-21	0.55	
	13A	14A	24.80	1.42		0.21			0.02	71.00	79		29			12944	0.34	41.20	2.84	117.01	20.31	137.31	450	0.76	248.55	1.56	1.60	PVC	SDR-21	0.55	
PHASE 2	14A	15A	75.50	0.16						71.16	9					12953	0.03	41.23	2.84	117.09	20.35	137.44	450	0.40	180.32	1.13	1.25	PVC	SDR-21	0.76	
				0.11						71.27	7					12960														
	15A	16A	31.20	0.73						72.00	41					13001	0.13	41.38	2.84	117.52	20.59	138.11	450	0.40	180.32	1.13	1.25	PVC	SDR-21	0.77	
	16A	17A	24.60	0.19						72.19	11					13012	0.04	41.42	2.84	117.62	20.65	138.27	450	0.40	180.32	1.13	1.25	PVC	SDR-21	0.77	
				0.58						72.77	32					13044														
	17A	18A	81.50	0.91					0.03	73.71	51					13095	0.16	41.68	2.84	118.37	21.08	139.45	450	0.40	180.32	1.13	1.25	PVC	SDR-21	0.77	
	18A	19A	17.10	0.09						73.80	5					13100	0.02	41.70	2.84	118.42	21.11	139.52	450	0.50	201.60	1.27	1.37	PVC	SDR-21	0.69	
	19A	20A	54.26	0.31						74.11	18					13118	0.06	41.75	2.84	118.58	21.20	139.78	450	0.52	205.59	1.29	1.39	PVC	SDR-21	0.68	
				0.52						74.63	29					13147														
	20A	21A	72.75	1.09						75.72	60					13207	0.19	42.04	2.83	118.96	21.66	140.62	450	0.56	213.35	1.34	1.43	PVC	SDR-21	0.66	
	21A	22A	34.02	0.22						75.94	13					13220	0.04	42.08	2.83	119.08	21.72	140.80	450	0.50	201.60	1.27	1.37	PVC	SDR-21	0.70	
									0.02	75.96						13220														
	22A	23A	18.51	1.89						77.85	104					13324	0.33	42.41	2.83	120.02	22.27	142.28	450	0.86	264.40	1.66	1.69	PVC	SDR-21	0.54	
PHASE 3				0.13						77.98	8					13332														
	23A	25A	55.00	0.17						78.15	10					13342	0.03	42.47	2.83	120.18	22.35	142.53	450	0.50	201.60	1.27	1.37	PVC	SDR-21	0.71	
	25A	26A	65.30	0.27		0.80				79.22	15		108			13465	0.39	42.86	2.83	121.29	22.66	143.94	450	0.49	199.57	1.25	1.36	PVC	SDR-21	0.72	
										79.22						13465														
				0.32						79.54	18					13483														
	26A	27A	43.70	236.16						315.70	23132					36615	73.63	116.54	2.39	278.53	90.29	368.82	675	0.46	570.11	1.59	1.69	CONC	180-D	0.65	
	27A	28A	37.60			0.57				316.27			77			36692	0.25	116.79	2.39	279.12	90.45	369.57	675	0.45	563.88	1.58	1.68	CONC	180-D	0.66	
	28A	29A	69.30	0.55		1.17				317.99	31		158			36881	0.60	117.39	2.39	280.56	90.95	371.50	675	0.46	570.11	1.59	1.69	CONC	180-D	0.65	
	29A	30A	10.28						0.02	318.01						36881	0.00	117.39	2.39	280.56	90.95	371.51	675	0.78	742.39	2.07	2.07	CONC	180-D	0.50	
	30A	31A	46.90	0.30						318.31	17					36898	0.05	117.44	2.39	280.69	91.04	371.72	675	0.51	600.30	1.68	1.76	CONC	180-D	0.62	
	31A	32A	85.00	0.57						318.88	32					36930	0.10	117.54	2.39	280.93	91.20	372.13	675	0.48	582.38	1.63	1.72	CONC	180-D	0.64	
	32A	33A	6.90	0.15						319.03	9					36939	0.03	117.57	2.39	281.00	91.24	372.24	675	1.45	1012.20	2.83	2.60	CONC	180-D	0.37	
	33A	34A	65.00	0.47						319.50	26					36965	0.08	117.66	2.39	281.20	91.38	372.57	675	0.54	617.70	1.73	1.81	CONC	180-D	0.60	
				0.71						320.21	40					37005														
	34A	35A	96.10	0.89					0.05	321.15	49					37054	0.16	117.94	2.39	281.87	91.85	373.72	675	0.51	600.30	1.68	1.77	CONC	180-D	0.62	
									0.02	321.17						37054														
	35A	36A	17.00	3.00						324.17	165					37219	0.53	118.46	2.39	283.13	92.71	375.84	675	0.65	677.70	1.89	1.94	CONC		0.55	
	36A	37A	75.20							324.17						37219	0.00	118.46	2.39	283.13	92.71	375.84	675	0.75	727.97	2.03	2.04	CONC		0.52	

APPENDIX E

WATER HYDRAULIC ANALYSIS (MES, 2023)

Municipal Engineering Solutions

September 28, 2023 Project No. 17001-22

Mr. Mack McLean
600 Alden Road, Suite 700
Markham, ON
L3R 0E7

Subject: Palermo Development
Water Distribution Modeling
Town of Oakville, Region of Halton

Dear Mr. McLean,

We are pleased to submit our report entitled "Palermo Development Watermain Analysis" outlining the results of our water distribution analysis for the proposed residential development in the Town of Oakville, Region of Halton.

This development layout was incorporated into the Region of Halton's existing Infowater water models dated August 2022 and modeled utilizing the design information provided to Municipal Engineering Solutions. The findings of our analysis are summarized in the following report.

We trust you find this report satisfactory. Should you have any questions or require further clarification, please call.

Yours truly,

Municipal Engineering Solutions

John C. Bourrie

Per: John C. Bourrie, P.Eng.

/LMC

File Location: D:\Projects\2021\21-012 Palermo Halton DSEL 17001-22\3.0 Report\Final Report Sept 2023\17001-22 Palermo Watermain Analysis_20230928.docx

55 Gilbank Drive, Aurora, Ontario L4G 6H9

Tel: 905.726.1016 Cell: 416.434.0186 Fax: 905.726.1225

PALERMO DEVELOPMENT

WATER ANALYSIS

PREPARED BY:

MUNICIPAL ENGINEERING SOLUTIONS

FOR:

DSEL
September 2023

Project Number: 17001-22

TABLE OF CONTENTS

APPENDICES

Section 1 – INTRODUCTION

Municipal Engineering Solutions ("MES") was retained by DSEL to conduct a hydraulic water analysis for the proposed Palermo development located in the Town of Oakville in the Region of Halton. As part of this hydraulic assessment MES was requested to undertake the following:

1. Calculate/verify water demands for the proposed development using Region of Halton, provincial and industry design standards;
2. Add the subject watermains/development to the Region's existing water model;
3. Run the model to size the subject mains to achieve service criteria during Average Day, Peak Hour, and fire flow during Maximum Day demand; and
4. Prepare a Report summarizing the modeling results for agency review and design purposes.

1.1 Development Background

The Palermo Development is at the initial stages of planning and will consist of single family homes, street townhomes, back to back townhomes and high density blocks located north of Dundas Street West on both sides of Bronte Road in the Town of Oakville. Areas to the east of Bronte Road will be developed at a later date but are included in this analysis to confirm the system can adequately supply the entire area. Supply will also be provided to the existing Temple on Bronte Road. The proposed development is shown below on **Figure 1**.

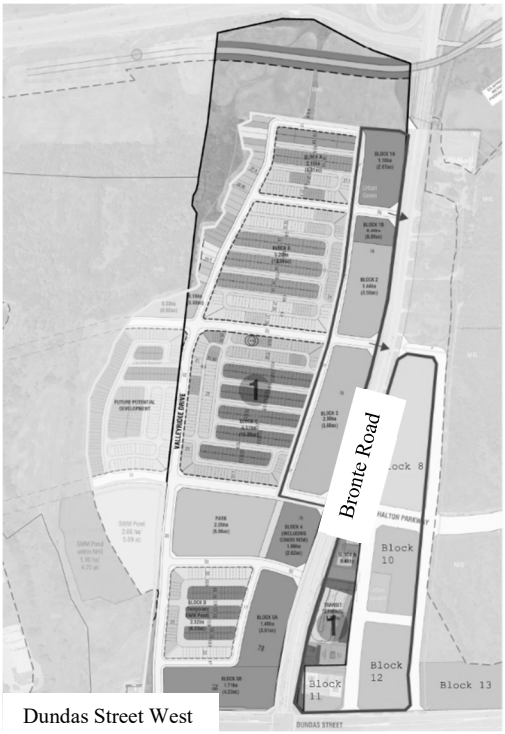

Figure 1 - Proposed Palermo Development

Section 2 – WATERMAIN DESIGN CRITERIA

The design criteria utilized to estimate the water demands for the hydraulic water model follows general industry standards and is calculated using the design criteria and guidelines outlined in the Region of Halton's October 2019 Water and

Wastewater Linear Design Manual, the Ministry of the Environment, Conservation and Parks (MECP) Watermain Design Criteria, and the Fire Underwriters Survey.

The following sections summarize the specific design criteria used to carry out the hydraulic watermain assessment for this development.

2.1 Equivalent Population Densities & Water Design Factors

To calculate the equivalent population and water design factors for this development MES used Region of Halton criteria as noted in the *"Region of Halton Water and Wastewater Linear Design Manual, October 2019"*. **Table 1** summarizes the population densities and **Table 2** summarizes the average daily demand and peaking factors used for this analysis.

Table 1 – Equivalent Population Density

Type of Development	Equivalent Population (Persons/Ha)	Equivalent Population (Persons/Unit)
Single Family	55	3.750
Semi-Detached	100	3.750
Townhouse	135	2.820
Apartment	285	1.830
Light Commercial	90	
Community Services	40	

Source: Region of Halton Water and Wastewater Linear Design Manual, October 2019, 2022 Development Charges Update December 2021 (Table A-2)

Table 2 - Water Design Factors

Type of Development	Average Daily Demand (m^3 per capita)	Maximum Daily Demand Peaking Factor	Peak Hourly Demand Peaking Factor
Residential	0.275	2.25	4.00
Industrial	0.275	2.25	2.25
Commercial	0.275	2.25	2.25
Community Services	0.275	2.25	2.25

Source: Region of Halton Water and Wastewater Linear Design Manual, October 2019

Section 3 –FLOW DEMANDS

Utilizing the equivalent population data and the corresponding Average Day, Maximum Day, and Peak Hour data from **Table 1** the water demands for this development were calculated.

3.1 Equivalent Population Flow Demands

The calculated demands for the development are summarized in **Table 3**. For additional details on the development water demands and assigned demand nodes used in the water model see **Appendix A**.

Table 3 – Water Demand for Palermo Development

Development	Average Day Demand (L/S)	Maximum Day Demand (L/S)	Peak Hour Demand (L/S)
Argo	40.07	90.15	160.26
Zenon	1.63	3.68	6.53
East of Bronte Road	21.21	47.73	83.74
Total	62.91	141.55	250.53

3.2 Fire Flow Demands

The fire demands for this development were based on typical flows calculated using the Fire Underwriters Survey ("FUS") formula outlined in the *'Water Supply For Public Fire Protection Guideline'*, dated 1999. Since the detailed design data (specifics) for the proposed units/buildings are not known at this time, fire flows that have been used by MES for other similar developments previously submitted in Halton were utilized. Once the building designs/configurations are known for the proposed development the fire flows for each unit/building must be confirmed using the FUS criteria to determine the actual fire flow required. Building construction and sprinkler systems may need to be designed to suit the available flow and pressure. The fire flows used are shown in **Table 4**.

Table 4 - Fire Flow Requirements

Building	Fire Flow (L/S)
Singles	167
Street Towns	250
B2B Towns	283
ICI	273*

Source: Fire Underwriters Survey, * Halton Fire Flow Certification Letter Sample

3.3 External Demands

The Region of Halton InfoWater model that was provided by the Region to MES included water demands for existing and known future developments within the Region.

Section 4 – OTHER SYSTEM REQUIREMENTS

4.1 System Pressure Requirements

In addition to meeting the various flow requirements, the system must also satisfy minimum and maximum pressure requirements as outlined by the Region of Halton. The Region's pressure requirements are outlined in the Water and Wastewater Linear Design Manual and stipulate the following:

1. The water system shall be designed to maintain as close as possible to a maximum working pressure of 690 kPa (100 psi) as a best management practice.
2. The minimum system pressure shall not be less than 140 kPa (20 psi) at any point in the water system under fire flow conditions.
3. Under normal operating conditions, the water system shall have a target minimum static pressure of 345 kPa (50 psi). Under no operating conditions shall the static pressure within a distribution main fall below 275 kPa (40 psi).
4. The normal method of reduction of pressures to comply with the Ontario Building Code (reduction of pressures to 550 kPa, 80 psi) is by pressure reducing valves to be installed on individual services.

4.2 Watermain Sizing

The Region of Halton also stipulates minimum pipe sizes and requires that all watermains are adequately sized to maintain demand flows at the required pressures without causing excessive energy loss or result in water quality decay. The watermain system must therefore be designed to accommodate the greater of the following:

- Maximum day plus fire demand
- Peak hour demand

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The minimum pipe size for commercial and industrial areas shall be 300 mm diameter and for residential areas the minimum pipe size shall be 150 mm diameter. For distribution systems providing fire protection the minimum pipe size shall be 150 mm diameter in accordance with Ministry of the Environment, Conservation and Parks (MECP) and NFPA requirements.

To provide appropriate fire protection, reliable supply and pressures the water distribution system should be looped wherever possible to improve supply security and water quality.

4.3 Watermain C-Factor

In designing and modeling of the pipes the Coefficient of Roughness (C-Factor) factors from the Region's design manual were utilized. The Coefficient of Roughness assigned to each pipe size in summarized in **Table 5** below.

Table 5 - Hazen-Williams Coefficient of Roughness (C-Factors)

Size of Pipe (Diameter in mm)	Pipe Material	Coefficient of Roughness (C)
50 mm	Copper	120
100 mm to 400 mm	PVC/HDPE	130
Greater Than 400 mm	Concrete Lined	110

Source: Region of Halton Water and Wastewater Linear Design Manual, October 2019

Section 5 – ANALYSIS & MODELING RESULTS

In order to conduct the hydraulic water analysis for the proposed development the water demands were estimated by MES using the design criteria previously discussed and incorporated the demands into the existing Region of Halton InfoWater model (August 2022) which was provided by the Region and confirmed as most recent. The following sections discusses the model setup and results.

5.1 Model Setup

The Palermo development is located within Zone O3 which will not be changed through the Region's zone realignment. Elevations for the Palermo site range from 153.7 m to 165 m which are at the top and slightly above the Zone O3 service elevations range between 153.7 m to 164.4 m.

The development was modeled under 2026 and 2031 conditions with all of the development watermains west of Bronte Road completed. The future 600 mm Regional feedermain was considered to be in place from the 1200 mm feedermain along Dundas Street West, along Bronte Road to the continuation of William Halton Parkway, then westward to the western boundary of the development in 2026 and completed westward to Tremaine Road in 2031. Connections to the local system were considered at the future local Dundas Street West watermain for the future lands and at the first development street west of Bronte for the initial lands. A second connection to the 1200 mm Dundas Street West was considered for the major north/south road in the development.

New nodes were created to add the flow demands and service elevation information from the development to the Region of Halton's existing Infowater hydraulic water distribution model system and the system analysis was carried out. Friction factor for the pipes were assigned according to **Table 4**.

5.2 Watermain Sizing and System Pressures

The analysis was conducted under 2026 and 2031 servicing conditions for Average Day, Maximum Day, Peak Hour and Maximum day plus Fire demands to size the watermains and meet the pressure requirements. The pipe size and layout are shown in **Appendix B**.

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The watermains were sized between 200 mm to 300 mm according to the results of average day, maximum day, maximum day plus fire, and peak hour scenarios. A 300 mm supply was considered to the existing Temple on Bronte Road south of Highway 407.

With the development elevations falling near or above the zone service range upper limit, during peak hour conditions, the pressures are near the Region's minimum static pressure of 40 psi (275 kPa) and in some cases below this limit. Additional areas are below the Region's preferred target minimum static pressure of 345 kPa (50 psi). In 2031, with the inclusion of the future development areas, more nodes are near these limits. Schematics showing the peak hour pressures are included in **Appendix B**.

It is likely that other nearby developments will have similar challenges of low pressures on the higher elevations. Possible options to improve the situation for Palermo and possibly the other areas:

- A local Region booster pumping station to supplement peak hour pressures to the higher elevation freehold single-family homes and townhomes.
- A connection to the RR25 900 mm watermain with a PRV to reduce the pressures from Zone 267 HGL to Zone O3 HGL.
- Extension of Zone O4 infrastructure (Future Zone 223.5) to the west.
- Adjusting the Zone O3 operation to supply an increased HGL during peak hour conditions.
- Townhouses within Blocks A & B could be designed as condominium blocks with booster pumps at the supply connection. Higher density buildings and the existing Temple would also have booster pumps.

It is suggested that the various options be discussed with the Region. The preferred option(s) would be further explored for the next submission.

Modeled service pressures for the development are summarized in **Table 6**. All pressures lie within the required operating range under average day, maximum day, and peak hour demands.

Detailed pipe and node tables for the various scenarios modelled are attached to this report in **Appendix B**.

Table 6 - Modeled Service Pressures

Scenario	Average Day	Maximum Day	Peak Hour	Max. Day + Fire
2026	46.8 – 65.8 psi (323 to 454 kPa)	48.5 – 67.7 psi (344 to 467 kPa)	39.2 to 58.7 psi (270 to 405 kPa)	324 to 2,417 L/s @ 20 psi
2031	46.5 – 65.5 psi (321 to 452 kPa)	50.4 – 69.5 psi 347 to 479 kPa)	37.0 to 56.4 psi (255 to 389 kPa)	320 to 2,285 L/s @ 20 psi

Section 6 – CONCLUSIONS

The results are summarized below.

- The service pressures are expected to range between 39.2 psi to 67.7 psi (270 kPa to 467 kPa) in 2021 and between 37.0 psi to 69.5 psi (255 kPa to 479 kPa) in 2031.
- The available fire flow meets the preliminary fire flow demands at the minimum pressure of 140.
- Under some operating conditions, pressures will be under the Region's preferred target minimum static pressure of 345 kPa (50 psi) and under the Region's minimum static pressure of 275 kPa (40 psi) at the Temple.
- The options to address the low pressures during peak hour must be discussed with the Region. The preferred options resulting from this meeting will be explored in more detail for the next submission.

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- The available fire flow meets or exceeds the preliminary fire flow demands utilized for this assessment at the minimum pressure of 140 kPa based on the proposed watermain supply and assumptions made within this report but should be confirmed when additional information becomes available. Once building designs/configurations are known, the fire flows must be confirmed using the FUS formula. Building construction and sprinkler systems may need to be designed to suit the available flow and pressure.
- As the development design is at the initial stages, the findings and recommendations in this report are considered preliminary. As more information is available on the watermain and building layout, all building assumptions and the fire flow demands must be reviewed and updated to confirm that the water supply is adequate. A more detailed water modeling report will need to be completed at the detailed design stage to confirm watermain sizes and pressures available.
- This report, including all modeling assumptions used, is to be submitted to and reviewed by the water operating authority (municipality) to confirm that the modeling parameters used are acceptable to the operating authority and/or confirm if modified domestic or fire flow requirements are required or should be implemented for this particular development.

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Appendix A

Demands

Equivalent Population by Unit

(2022 Development Charges Update, Table A-2 - Anticipated PPU for New Housing 2021 to 2031)

Type of Development	Equivalent Population Density *(Person/Unit)*
Single Family or Semi-Detached	3.750
Townhouse	2.820
Apartment	1.830

Equivalent Population by Area

Type of Development	Equivalent Population Density *(Person/Hectare)*	Average Day Demands *(m3/ha/day)*
Single Family	55	15.13
Semi-detached duplex and 4-plex	100	27.50
Townhouse, Maisonette (<6 stories)	135	37.13
Apartments (>6 stories)	285	78.38
Light Commercial Areas	90	24.75
Community Services	40	11.00
Light Industrial Areas	125	34.38
Hospitals (persons/bed)	4	

Water Design Factors

Average Daily Demand (m3/capita)	0.275
Maximum Daily Demand P.F.	2.25
Maximum Hourly Demand P.F.	
Residential	*4*
I/C/I	*2.25*

Cofficient of Roughness

Size of Pipe (mm Dia.)	Material	Coefficient of Roughness (C)
50	Copper	120
100-400	PVC/HDPE	130
Over 400	Concrete Lined	110

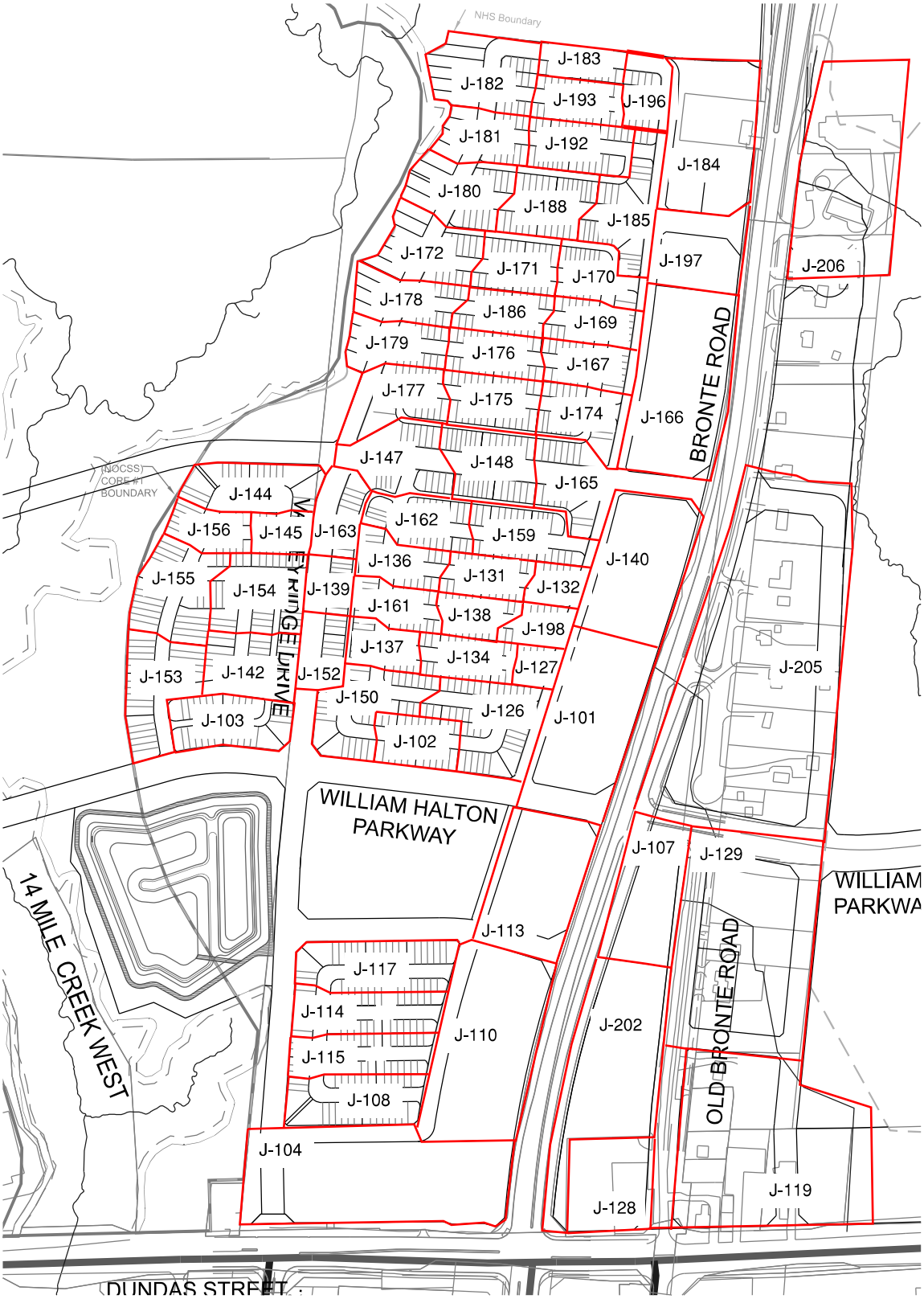
Minimum Pipe Size

Type of Development	Size of Pipe (mm Dia.)
Residential	150
Commercial/Industrial/Community	300

Working Pressures

Parameter	Pressure
Normal Condition	
Minimum Pressure	275 kPa (40 psi)
Target Pressure	350 kPa (50 psi)
Maximum (Building Code)	550 kPa (80 psi)
Maximum (Halton)	690 kPa (100 psi)
Fire Flow Conditions	
Minimum Pressure	140 kPa (20 psi)

Demand Layout



Water Demand
Palermo Developments, Oakville On
September 25, 2023

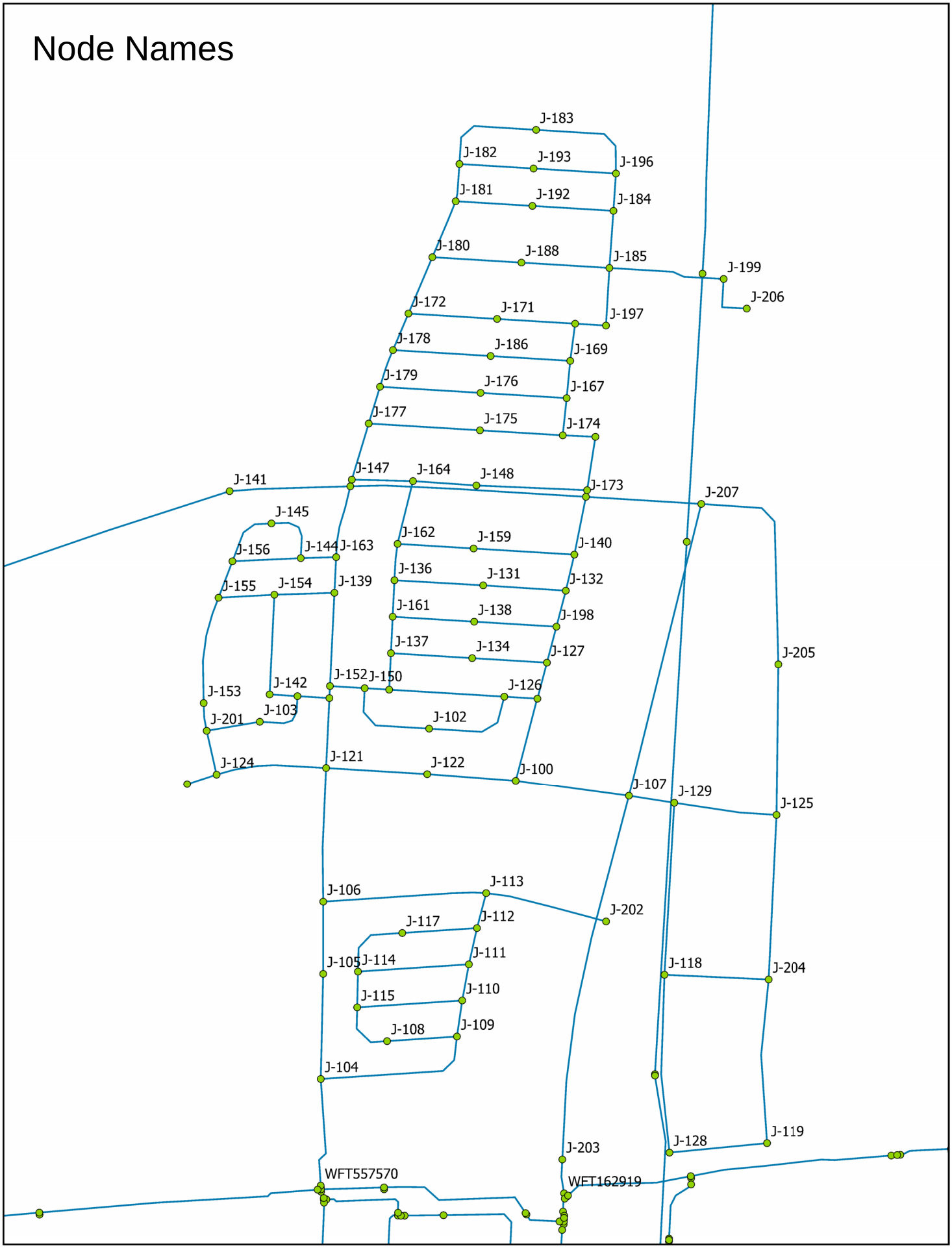
Node	Phase	Site/Block	Elevation	Type of Development							Equivalent Population		Demands			Fire Flow Demands
				Single Family	Semi-Detached	Townhouse	Apartment	Commercial	Community	Industrial	Total Population	Total Population	ADD	MDD	PHD	
			(m)	*(units)*	*(units)*	*(units)*	(units)	*(ha)*	*(ha)*	*(ha)*	*(Residential)*	*(ICI)*	*(L/s)*	*(L/s)*	*(L/s)*	*(L/s)*
J-100	1	Argo	*157.71*								0	0	0.00	0.00	0.00	273
J-101	1	Argo Blk 3	*158.41*				615				1125	0	3.58	8.06	14.33	283
J-102	1	Argo	*158.15*			24					68	0	0.22	0.48	0.86	283
J-103	2	Zenon	*156.12*			29					82	0	0.26	0.59	1.04	250
J-104	1	Argo Blk 5B	*154.45*				1025				1876	0	5.97	13.43	23.88	273
J-105	1	Argo	*153.86*								0	0	0.00	0.00	0.00	250
J-106	1	Argo	*154.07*								0	0	0.00	0.00	0.00	250
J-107	2	East	*156.78*				488				893	0	2.84	6.40	11.37	273
J-108	2	Argo Ph2	*155.24*			31					87	0	0.28	0.63	1.11	283
J-109	1	Argo	*156.19*								0	0	0.00	0.00	0.00	283
J-110	1	Argo Blk 5A	*155.98*				873				1598	0	5.08	11.44	20.34	283
J-111	1	Argo	*155.77*								0	0	0.00	0.00	0.00	283
J-112	1	Argo	*155.56*								0	0	0.00	0.00	0.00	283
J-113	1	Argo Blk 4	*155.59*				634				1160	0	3.69	8.31	14.77	273
J-114	2	Argo Ph2	*154.20*			34					96	0	0.31	0.69	1.22	283
J-115	2	Argo Ph2	*154.50*			34					96	0	0.31	0.69	1.22	283
J-117	2	Argo Ph2	*154.56*			38					107	0	0.34	0.77	1.36	283
J-118	2	East	*156.10*								0	0	0.00	0.00	0.00	273
J-119	2	East Blk 12/13	*154.40*				1112				2035	0	6.48	14.57	25.91	273
J-120	2	Argo Ph2	*155.26*								0	0	0.00	0.00	0.00	250
J-121	1	Argo	*155.76*								0	0	0.00	0.00	0.00	250
J-122	1	Argo	*156.48*								0	0	0.00	0.00	0.00	250
J-124	1	Argo	*156.13*								0	0	0.00	0.00	0.00	250
J-125	2	East	*157.10*								0	0	0.00	0.00	0.00	273
J-126	1	Argo	*158.17*			40					113	0	0.36	0.81	1.44	283
J-127	1	Argo	*158.77*			10					28	0	0.09	0.20	0.36	283
J-128	2	East Blk 11	*154.46*				372				681	0	2.17	4.88	8.67	273
J-129	2	East Blk 10	*157.50*				617				1129	0	3.59	8.09	14.38	273
J-130	1	Argo	*158.13*								0	0	0.00	0.00	0.00	283
J-131	1	Argo	*159.79*			24					68	0	0.22	0.48	0.86	283
J-132	1	Argo	*159.54*			12					34	0	0.11	0.24	0.43	283
J-134	1	Argo	*158.58*			27					76	0	0.24	0.55	0.97	283
J-136	1	Argo	*159.37*			20					56	0	0.18	0.40	0.72	283
J-137	1	Argo	*158.34*			16					45	0	0.14	0.32	0.57	283
J-138	1	Argo	*159.50*			20					56	0	0.18	0.40	0.72	283
J-139	1	Argo	*157.16*			10					28	0	0.09	0.20	0.36	283
J-140	1	Argo Blk 3	*159.75*				614				1124	0	3.58	8.05	14.31	283
J-141	1	Argo	*159.24*								0	0	0.00	0.00	0.00	
J-142	2	Zenon	*156.35*			21					59	0	0.19	0.42	0.75	250
J-143	2	Zenon	*156.50*								0	0	0.00	0.00	0.00	250
J-144	2	Zenon	*158.58*			13					37	0	0.12	0.26	0.47	283
J-145	2	Zenon	*157.56*			23					65	0	0.21	0.46	0.83	283
J-146	1	Argo	*158.00*								0	0	0.00	0.00	0.00	
J-147	1	Argo	*158.15*			17					48	0	0.15	0.34	0.61	250
J-148	1	Argo	*160.24*			30					85	0	0.27	0.61	1.08	250
J-150	1	Argo	*157.49*			33					93	0	0.30	0.67	1.18	283
J-151	1	Argo	*156.05*								0	0	0.00	0.00	0.00	250
J-152	1	Argo	*156.18*			9					25	0	0.08	0.18	0.32	250
J-153	2	Zenon	*156.50*			23					65	0	0.21	0.46	0.83	250
J-154	2	Zenon	*157.15*			33					93	0	0.30	0.67	1.18	283
J-155	2	Zenon	*156.96*			25					71	0	0.22	0.50	0.90	283

Water Demand
Palermo Developments, Oakville On
September 25, 2023

Node	Phase	Site/Block	Elevation	Type of Development							Equivalent Population		Demands			Fire Flow Demands
				Single Family	Semi-Detached	Townhouse	Apartment	Commercial	Community	Industrial	Total Population	Total Population	ADD	MDD	PHD	
			(m)	*(units)*	*(units)*	*(units)*	(units)	*(ha)*	*(ha)*	*(ha)*	*(Residential)*	*(ICI)*	*(L/s)*	*(L/s)*	*(L/s)*	*(L/s)*
J-156	2	Zenon	*157.18*			15					42	0	0.13	0.30	0.54	283
J-159	1	Argo	*158.99*			29					82	0	0.26	0.59	1.04	283
J-161	1	Argo	*158.89*			19					54	0	0.17	0.38	0.68	283
J-162	1	Argo	*159.86*			23					65	0	0.21	0.46	0.83	283
J-163	1	Argo	*157.46*			10					28	0	0.09	0.20	0.36	283
J-164	1	Argo	*159.86*								0	0	0.00	0.00	0.00	250
J-165	1	Argo	*160.18*			18					51	0	0.16	0.36	0.65	250
J-166	1	Argo Blk 2	*161.16*				770				1409	0	4.48	10.09	17.94	273
J-167	1	Argo	*160.22*			20					56	0	0.18	0.40	0.72	283
J-169	1	Argo	*160.74*			19					54	0	0.17	0.38	0.68	283
J-170	1	Argo	*161.10*			17					48	0	0.15	0.34	0.61	283
J-171	1	Argo	*160.32*			23					65	0	0.21	0.46	0.83	283
J-172	1	Argo	*159.54*	6		12					56	0	0.18	0.40	0.72	283
J-173	1	Argo	*160.18*								0	0	0.00	0.00	0.00	
J-174	1	Argo	*160.00*			19					54	0	0.17	0.38	0.68	283
J-175	1	Argo	*159.57*			27					76	0	0.24	0.55	0.97	283
J-176	1	Argo	*159.66*			27					76	0	0.24	0.55	0.97	283
J-177	1	Argo	*158.85*			18					51	0	0.16	0.36	0.65	283
J-178	1	Argo	*159.32*	4		12					49	0	0.16	0.35	0.62	283
J-179	1	Argo	*159.09*	4		14					54	0	0.17	0.39	0.69	283
J-180	1	Argo	*159.88*	4		12					49	0	0.16	0.35	0.62	250
J-181	1	Argo	*160.22*	4		11					46	0	0.15	0.33	0.59	283
J-182	1	Argo	*160.64*	6		15					65	0	0.21	0.46	0.83	283
J-183	1	Argo	*162.41*			12					34	0	0.11	0.24	0.43	283
J-184	1	Argo Blk 1A	*164.43*				620				1135	0	3.61	8.13	14.45	283
J-185	1	Argo	*164.37*			24					68	0	0.22	0.48	0.86	250
J-186	1	Argo	*160.04*			25					71	0	0.22	0.50	0.90	283
J-188	1	Argo	*162.13*			26					73	0	0.23	0.53	0.93	250
J-192	1	Argo	*162.33*			30					85	0	0.27	0.61	1.08	283
J-193	1	Argo	*162.43*			25					71	0	0.22	0.50	0.90	283
J-196	1	Argo	*164.21*			15					42	0	0.13	0.30	0.54	283
J-197	1	Argo Blk 1B	*162.37*				214				392	0	1.25	2.80	4.99	273
J-198	1	Argo	*159.33*			14					39	0	0.13	0.28	0.50	283
J-199	2		*163.63*								0	0	0.00	0.00	0.00	273
J-201	2	Zenon	*156.04*								0	0	0.00	0.00	0.00	250
J-202	2	East	*155.44*					*1.32*			0	119	0.38	0.85	0.85	273
J-203	2	East	*153.67*								0	0	0.00	0.00	0.00	273
J-204	2	East	*156.50*								0	0	0.00	0.00	0.00	273
J-205	2	East Blk 8	*160.00*				944				1728	0	5.50	12.37	21.99	273
J-206	2	East	*162.98*						*2.00*		0	80	0.25	0.57	0.57	273
J-207	2	East	*160.28*								0	0	0.00	0.00	0.00	273
Total				**28**	**0**	**1127**	**8898**	**1.32**	**2.00**	**0.00**	**19566**	**199**	**62.91**	**141.55**	**250.53**	
Argo				**28**	**0**	**945**	**5365**	**0.00**	**0.00**	**0.00**	**12588**	**0**	**40.07**	**90.15**	**160.26**	
Zenon				**0**	**0**	**182**	**0**	**0.00**	**0.00**	**0.00**	**513**	**0**	**1.63**	**3.68**	**6.53**	
East of Bronte				**0**	**0**	**0**	**3533**	**1.32**	**2.00**	**0.00**	**6465**	**199**	**21.21**	**47.73**	**83.74**	
Initial Buildout				**28**	**0**	**808**	**5365**	**0.00**	**0.00**	**0.00**	**12202**	**0**	**38.84**	**87.38**	**155.34**	
Future Buildout				**0**	**0**	**319**	**3533**	**1.32**	**2.00**	**0.00**	**7365**	**199**	**24.07**	**54.17**	**95.19**	

Appendix B

Model Results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J-203
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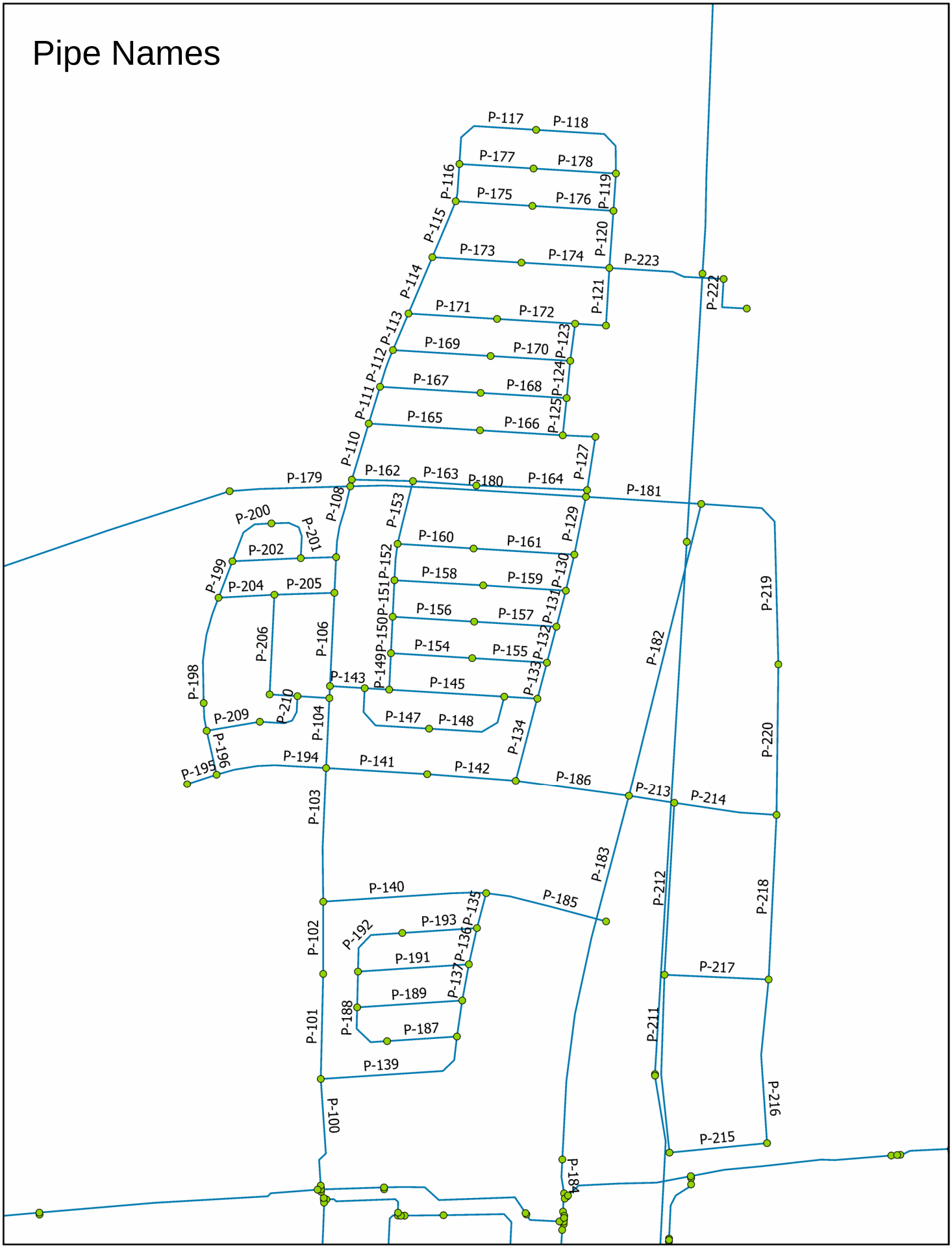
J-119
WFT557570
WFT162919

Pipe Names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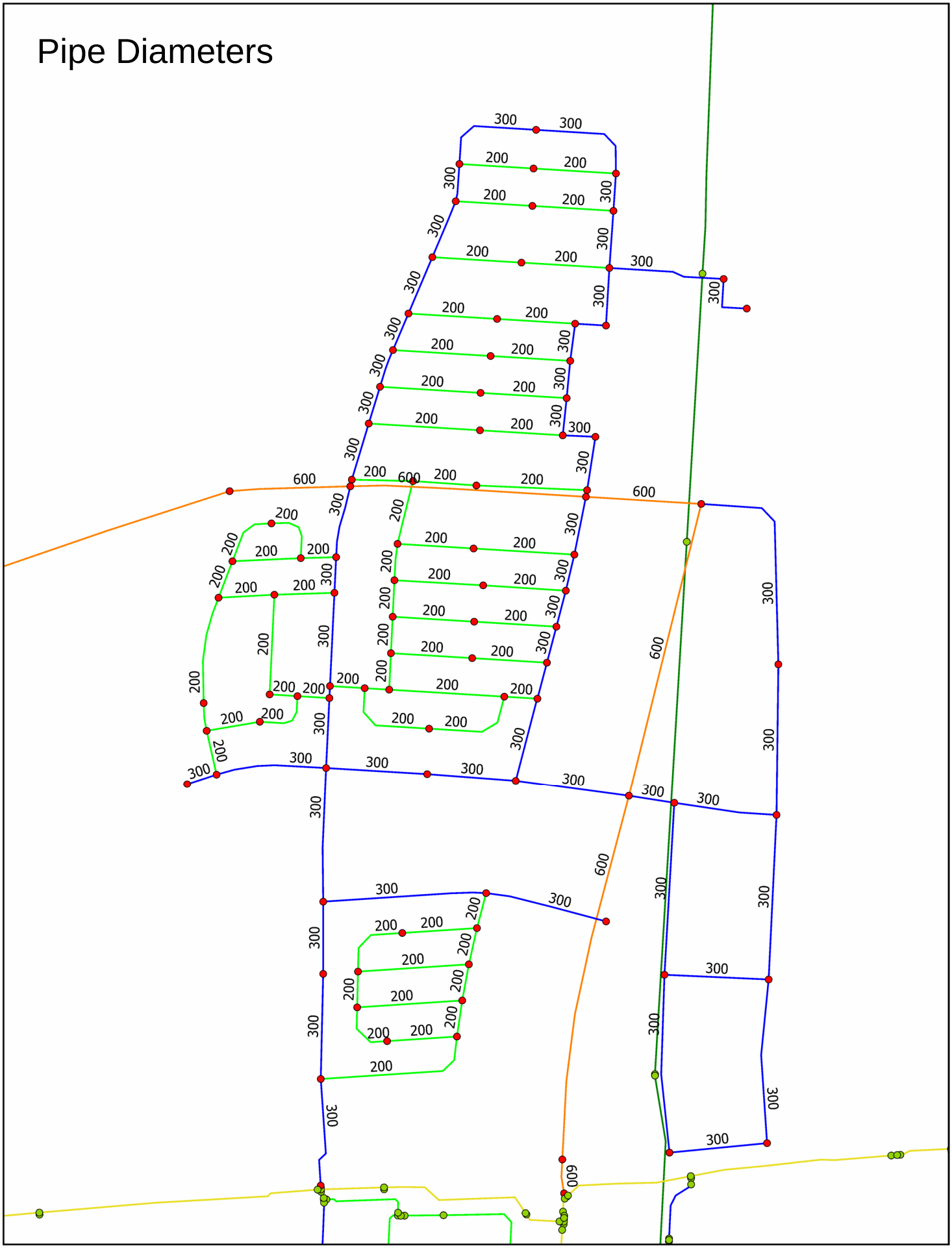
P-137

Pipe Diameters



2026 Conditions
Palermo Developments, Oakville On
September 26, 2021

Municipal Engineering Solutions

Average Day

Node Table

ID	Demand	Elevation	Head	Pressure
	(L/s)	*(m)*	*(m)*	*(psi)*
J-100	0.00	157.71	197.38	56.40
J-101	3.58	158.41	197.38	55.40
J-102	0.22	158.15	197.38	55.77
J-104	5.97	154.45	197.38	61.03
J-105	0.00	153.86	197.38	61.87
J-106	0.00	154.07	197.38	61.57
J-107	0.00	156.78	197.39	57.73
J-109	0.00	156.19	197.37	58.54
J-110	5.08	155.98	197.37	58.84
J-111	0.00	155.77	197.37	59.14
J-112	0.00	155.56	197.37	59.44
J-113	3.69	155.59	197.37	59.40
J-121	0.00	155.76	197.38	59.17
J-122	0.00	156.48	197.38	58.14
J-126	0.36	158.17	197.38	55.74
J-127	0.09	158.77	197.38	54.89
J-130	0.00	158.13	197.38	55.80
J-131	0.22	159.79	197.38	53.44
J-132	0.11	159.54	197.38	53.79
J-134	0.24	158.58	197.38	55.16
J-136	0.18	159.37	197.38	54.03
J-137	0.14	158.34	197.38	55.50
J-138	0.18	159.50	197.38	53.85
J-139	0.09	157.16	197.38	57.18
J-140	3.58	159.75	197.38	53.49
J-146	0.00	158.00	197.38	55.98
J-147	0.15	158.15	197.38	55.77
J-148	0.27	160.24	197.38	52.80
J-150	0.30	157.49	197.38	56.71
J-151	0.00	156.05	197.38	58.76
J-152	0.08	156.18	197.38	58.57
J-159	0.26	158.99	197.38	54.57
J-161	0.17	158.89	197.38	54.72
J-162	0.21	159.86	197.38	53.34
J-163	0.09	157.46	197.38	56.75
J-164	0.00	159.86	197.38	53.34
J-165	0.16	160.18	197.38	52.88
J-166	4.48	161.16	197.38	51.49
J-167	0.18	160.22	197.38	52.82
J-169	0.17	160.74	197.38	52.08
J-170	0.15	161.10	197.38	51.57
J-171	0.21	160.32	197.38	52.68
J-172	0.18	159.54	197.38	53.79
J-173	0.00	160.18	197.38	52.88
J-174	0.17	160.00	197.38	53.14
J-175	0.24	159.57	197.38	53.75
J-176	0.24	159.66	197.38	53.62
J-177	0.16	158.85	197.38	54.77
J-178	0.16	159.32	197.38	54.10
J-179	0.17	159.09	197.38	54.43
J-180	0.16	159.88	197.38	53.30
J-181	0.15	160.22	197.37	52.82
J-182	0.21	160.64	197.37	52.22
J-183	0.11	162.41	197.37	49.71
J-184	3.61	164.43	197.37	46.83
J-185	0.22	164.37	197.37	46.92
J-186	0.22	160.04	197.38	53.08
J-188	0.23	162.13	197.37	50.10
J-192	0.27	162.33	197.37	49.82
J-193	0.22	162.43	197.37	49.68
J-196	0.13	164.21	197.37	47.15
J-197	1.25	162.37	197.38	49.76
J-198	0.13	159.33	197.38	54.09
J-203	0.00	153.67	197.40	62.16
J-207	0.00	160.28	197.38	52.75
WFT162919	0.03	153.50	197.40	62.40
WFT557570	1.56	151.09	197.40	65.83
MIN		**151.09**		**46.83**
MAX		**164.43**		**65.83**

Pipe Table

ID	From Node	To Node	Length	Diameter	Roughness	Flow	Velocity
			(m)	*(mm)*	*(C)*	*(ML/d)*	*(m/s)*
P-100	WFT557570	J-104	122.87	300	130	1.10	0.18
P-101	J-104	J-105	117.71	300	130	0.33	0.05
P-102	J-105	J-106	80.86	300	130	0.33	0.05
P-103	J-106	J-121	150.42	300	130	-0.18	0.03
P-104	J-121	J-151	78.46	300	130	0.02	0.00
P-105	J-151	J-152	13.50	300	130	0.02	0.00
P-106	J-152	J-139	104.58	300	130	-0.07	0.01
P-107	J-139	J-163	40.02	300	130	-0.08	0.01
P-108	J-163	J-146	81.22	300	130	-0.08	0.01
P-109	J-146	J-147	7.65	300	130	0.55	0.09
P-110	J-147	J-177	65.66	300	130	0.50	0.08
P-111	J-177	J-179	43.11	300	130	0.42	0.07
P-112	J-179	J-178	43.62	300	130	0.36	0.06
P-113	J-178	J-172	44.45	300	130	0.31	0.05
P-114	J-172	J-180	68.58	300	130	0.26	0.04
P-115	J-180	J-181	67.93	300	130	0.20	0.03
P-116	J-181	J-182	42.01	300	130	0.14	0.02
P-117	J-182	J-183	118.82	300	130	0.08	0.01
P-118	J-183	J-196	125.82	300	130	0.07	0.01
P-119	J-196	J-184	41.90	300	130	0.08	0.01
P-120	J-184	J-185	64.15	300	130	-0.21	0.03
P-121	J-185	J-197	64.65	300	130	-0.20	0.03
P-122	J-197	J-170	34.60	300	130	-0.31	0.05
P-123	J-170	J-169	42.01	300	130	-0.31	0.05
P-124	J-169	J-167	41.92	300	130	-0.30	0.05
P-125	J-167	J-174	41.94	300	130	-0.29	0.05
P-126	J-174	J-166	36.64	300	130	-0.26	0.04
P-127	J-166	J-165	60.52	300	130	-0.64	0.11
P-128	J-165	J-173	7.55	300	130	-0.71	0.12
P-129	J-173	J-140	66.04	300	130	0.36	0.06
P-130	J-140	J-132	41.51	300	130	0.04	0.01
P-131	J-132	J-198	41.69	300	130	0.01	0.00
P-132	J-198	J-127	41.71	300	130	-0.01	0.00
P-133	J-127	J-101	41.71	300	130	-0.04	0.01
P-134	J-101	J-100	95.77	300	130	-0.36	0.06
P-135	J-113	J-112	40.45	200	130	0.19	0.07
P-136	J-112	J-111	41.58	200	130	0.19	0.07
P-137	J-111	J-110	41.16	200	130	0.19	0.07
P-138	J-110	J-109	40.80	200	130	-0.25	0.09
P-139	J-109	J-104	181.26	200	130	-0.25	0.09
P-140	J-106	J-113	182.87	300	130	0.51	0.08
P-141	J-121	J-122	113.48	300	130	-0.20	0.03
P-142	J-122	J-100	99.47	300	130	-0.20	0.03
P-143	J-152	J-150	38.95	200	130	0.09	0.03
P-144	J-150	J-130	27.50	200	130	0.04	0.01
P-145	J-130	J-126	129.53	200	130	0.01	0.00
P-146	J-126	J-101	37.17	200	130	-0.02	0.01
P-147	J-150	J-102	107.07	200	130	0.02	0.01
P-148	J-102	J-126	109.57	200	130	0.00	0.00
P-149	J-130	J-137	40.90	200	130	0.03	0.01
P-150	J-137	J-161	40.90	200	130	0.01	0.00
P-151	J-161	J-136	40.90	200	130	-0.01	0.00
P-152	J-136	J-162	40.94	200	130	-0.02	0.01
P-153	J-162	J-164	72.42	200	130	-0.05	0.02
P-154	J-137	J-134	91.18	200	130	0.01	0.00
P-155	J-134	J-127	83.88	200	130	-0.02	0.01
P-156	J-161	J-138	91.48	200	130	0.00	0.00
P-157	J-138	J-198	92.29	200	130	-0.01	0.01
P-158	J-136	J-131	99.59	200	130	0.00	0.00
P-159	J-131	J-132	92.75	200	130	-0.02	0.01
P-160	J-162	J-159	85.32	200	130	0.01	0.00
P-161	J-159	J-140	113.10	200	130	-0.01	0.00
P-162	J-147	J-164	68.54	200	130	0.03	0.01
P-163	J-164	J-148	71.19	200	130	-0.02	0.01
P-164	J-148	J-165	124.16	200	130	-0.05	0.02
P-165	J-177	J-175	124.86	200	130	0.07	0.02
P-166	J-175	J-174	92.90	200	130	0.05	0.02
P-167	J-179	J-176	112.86	200	130	0.05	0.02
P-168	J-176	J-167	96.60	200	130	0.03	0.01
P-169	J-178	J-186	109.63	200	130	0.04	0.01
P-170	J-186	J-169	89.31	200	130	0.02	0.01

Average Day

Node Table

ID	Demand	Elevation	Head	Pressure
	(L/s)	*(m)*	*(m)*	*(psi)*

Pipe Table

ID	From Node	To Node	Length	Diameter	Roughness	Flow	Velocity
			(m)	*(mm)*	*(C)*	*(ML/d)*	*(m/s)*
P-171	J-172	J-171	99.48	200	130	0.03	0.01
P-172	J-171	J-170	87.61	200	130	0.02	0.01
P-173	J-180	J-188	100.00	200	130	0.05	0.02
P-174	J-188	J-185	98.70	200	130	0.03	0.01
P-175	J-181	J-192	86.05	200	130	0.05	0.02
P-176	J-192	J-184	90.96	200	130	0.03	0.01
P-177	J-182	J-193	83.17	200	130	0.04	0.01
P-178	J-193	J-196	92.46	200	130	0.02	0.01
P-180	J-146	J-173	264.30	600	120	-0.63	0.03
P-181	J-173	J-207	129.41	600	120	-1.69	0.07
P-182	J-207	J-107	337.37	600	120	-1.69	0.07
P-183	J-107	J-203	411.58	600	120	-2.26	0.09
P-184	J-203	WFT162919	42.11	600	120	-2.26	0.09
P-186	J-100	J-107	127.97	300	130	-0.56	0.09

Maximum Day

Node Table

ID	Demand	Elevation	Head	Pressure
	(L/s)	*(m)*	*(m)*	*(psi)*
J-100	0.00	157.71	198.55	58.06
J-101	8.06	158.41	198.55	57.06
J-102	0.48	158.15	198.55	57.43
J-104	13.43	154.45	198.58	62.74
J-105	0.00	153.86	198.56	63.55
J-106	0.00	154.07	198.55	63.23
J-107	0.00	156.78	198.57	59.41
J-109	0.00	156.19	198.52	60.18
J-110	11.44	155.98	198.51	60.46
J-111	0.00	155.77	198.51	60.76
J-112	0.00	155.56	198.52	61.07
J-113	8.31	155.59	198.53	61.04
J-121	0.00	155.76	198.55	60.83
J-122	0.00	156.48	198.55	59.81
J-126	0.81	158.17	198.55	57.40
J-127	0.20	158.77	198.55	56.55
J-130	0.00	158.13	198.55	57.46
J-131	0.48	159.79	198.55	55.10
J-132	0.24	159.54	198.55	55.45
J-134	0.55	158.58	198.55	56.82
J-136	0.40	159.37	198.55	55.69
J-137	0.32	158.34	198.55	57.16
J-138	0.40	159.50	198.55	55.51
J-139	0.20	157.16	198.55	58.84
J-140	8.05	159.75	198.55	55.15
J-146	0.00	158.00	198.55	57.65
J-147	0.34	158.15	198.55	57.43
J-148	0.61	160.24	198.55	54.46
J-150	0.67	157.49	198.55	58.37
J-151	0.00	156.05	198.55	60.42
J-152	0.18	156.18	198.55	60.23
J-159	0.59	158.99	198.55	56.23
J-161	0.38	158.89	198.55	56.38
J-162	0.46	159.86	198.55	55.00
J-163	0.20	157.46	198.55	58.41
J-164	0.00	159.86	198.55	55.00
J-165	0.36	160.18	198.55	54.55
J-166	10.09	161.16	198.54	53.13
J-167	0.40	160.22	198.53	54.46
J-169	0.38	160.74	198.53	53.72
J-170	0.34	161.10	198.53	53.21
J-171	0.46	160.32	198.53	54.31
J-172	0.40	159.54	198.53	55.42
J-173	0.00	160.18	198.55	54.55
J-174	0.38	160.00	198.53	54.78
J-175	0.55	159.57	198.54	55.39
J-176	0.55	159.66	198.53	55.26
J-177	0.36	158.85	198.54	56.42
J-178	0.35	159.32	198.53	55.74
J-179	0.39	159.09	198.53	56.07
J-180	0.35	159.88	198.52	54.94
J-181	0.33	160.22	198.52	54.45
J-182	0.46	160.64	198.52	53.85
J-183	0.24	162.41	198.52	51.34
J-184	8.13	164.43	198.52	48.46
J-185	0.48	164.37	198.52	48.55
J-186	0.50	160.04	198.53	54.72
J-188	0.53	162.13	198.52	51.74
J-192	0.61	162.33	198.52	51.45
J-193	0.50	162.43	198.52	51.31
J-196	0.30	164.21	198.52	48.78
J-197	2.80	162.37	198.52	51.40
J-198	0.28	159.33	198.55	55.75
J-203	0.00	153.67	198.61	63.88
J-207	0.00	160.28	198.56	54.42
WFT162919	0.06	153.50	198.61	64.13
WFT557570	2.96	151.09	198.69	67.66
MIN		**151.09**		**48.46**
MAX		**164.43**		**67.66**

Pipe Table

ID	From Node	To Node	Length	Diameter	Roughness	Flow	Velocity
			(m)	*(mm)*	*(C)*	*(ML/d)*	*(m/s)*
P-100	WFT557570	J-104	122.87	300	130	2.91	0.48
P-101	J-104	J-105	117.71	300	130	1.14	0.19
P-102	J-105	J-106	80.86	300	130	1.14	0.19
P-103	J-106	J-121	150.42	300	130	0.04	0.01
P-104	J-121	J-151	78.46	300	130	0.36	0.06
P-105	J-151	J-152	13.50	300	130	0.36	0.06
P-106	J-152	J-139	104.58	300	130	0.10	0.02
P-107	J-139	J-163	40.02	300	130	0.08	0.01
P-108	J-163	J-146	81.22	300	130	0.06	0.01
P-109	J-146	J-147	7.65	300	130	1.24	0.20
P-110	J-147	J-177	65.66	300	130	1.14	0.19
P-111	J-177	J-179	43.11	300	130	0.95	0.16
P-112	J-179	J-178	43.62	300	130	0.81	0.13
P-113	J-178	J-172	44.45	300	130	0.69	0.11
P-114	J-172	J-180	68.58	300	130	0.58	0.10
P-115	J-180	J-181	67.93	300	130	0.45	0.07
P-116	J-181	J-182	42.01	300	130	0.30	0.05
P-117	J-182	J-183	118.82	300	130	0.18	0.03
P-118	J-183	J-196	125.82	300	130	0.16	0.03
P-119	J-196	J-184	41.90	300	130	0.17	0.03
P-120	J-184	J-185	64.15	300	130	-0.47	0.08
P-121	J-185	J-197	64.65	300	130	-0.45	0.07
P-122	J-197	J-170	34.60	300	130	-0.69	0.11
P-123	J-170	J-169	42.01	300	130	-0.68	0.11
P-124	J-169	J-167	41.92	300	130	-0.68	0.11
P-125	J-167	J-174	41.94	300	130	-0.64	0.11
P-126	J-174	J-166	36.64	300	130	-0.57	0.09
P-127	J-166	J-165	60.52	300	130	-1.44	0.24
P-128	J-165	J-173	7.55	300	130	-1.57	0.26
P-129	J-173	J-140	66.04	300	130	0.76	0.12
P-130	J-140	J-132	41.51	300	130	0.04	0.01
P-131	J-132	J-198	41.69	300	130	-0.01	0.00
P-132	J-198	J-127	41.71	300	130	-0.06	0.01
P-133	J-127	J-101	41.71	300	130	-0.11	0.02
P-134	J-101	J-100	95.77	300	130	-0.82	0.13
P-135	J-113	J-112	40.45	200	130	0.39	0.14
P-136	J-112	J-111	41.58	200	130	0.39	0.14
P-137	J-111	J-110	41.16	200	130	0.39	0.14
P-138	J-110	J-109	40.80	200	130	-0.60	0.22
P-139	J-109	J-104	181.26	200	130	-0.60	0.22
P-140	J-106	J-113	182.87	300	130	1.10	0.18
P-141	J-121	J-122	113.48	300	130	-0.32	0.05
P-142	J-122	J-100	99.47	300	130	-0.32	0.05
P-143	J-152	J-150	38.95	200	130	0.24	0.09
P-144	J-150	J-130	27.50	200	130	0.12	0.04
P-145	J-130	J-126	129.53	200	130	0.04	0.01
P-146	J-126	J-101	37.17	200	130	-0.01	0.00
P-147	J-150	J-102	107.07	200	130	0.07	0.02
P-148	J-102	J-126	109.57	200	130	0.02	0.01
P-149	J-130	J-137	40.90	200	130	0.08	0.03
P-150	J-137	J-161	40.90	200	130	0.04	0.01
P-151	J-161	J-136	40.90	200	130	0.00	0.00
P-152	J-136	J-162	40.94	200	130	-0.05	0.02
P-153	J-162	J-164	72.42	200	130	-0.12	0.04
P-154	J-137	J-134	91.18	200	130	0.02	0.01
P-155	J-134	J-127	83.88	200	130	-0.03	0.01
P-156	J-161	J-138	91.48	200	130	0.01	0.00
P-157	J-138	J-198	92.29	200	130	-0.03	0.01
P-158	J-136	J-131	99.59	200	130	0.01	0.00
P-159	J-131	J-132	92.75	200	130	-0.03	0.01
P-160	J-162	J-159	85.32	200	130	0.03	0.01
P-161	J-159	J-140	113.10	200	130	-0.02	0.01
P-162	J-147	J-164	68.54	200	130	0.07	0.03
P-163	J-164	J-148	71.19	200	130	-0.04	0.02
P-164	J-148	J-165	124.16	200	130	-0.09	0.03
P-165	J-177	J-175	124.86	200	130	0.16	0.06
P-166	J-175	J-174	92.90	200	130	0.11	0.04
P-167	J-179	J-176	112.86	200	130	0.11	0.04
P-168	J-176	J-167	96.60	200	130	0.07	0.02
P-169	J-178	J-186	109.63	200	130	0.08	0.03
P-170	J-186	J-169	89.31	200	130	0.04	0.01

Maximum Day

Node Table

ID	Demand	Elevation	Head	Pressure
	(L/s)	*(m)*	*(m)*	*(psi)*

Pipe Table

ID	From Node	To Node	Length	Diameter	Roughness	Flow	Velocity
			(m)	*(mm)*	*(C)*	*(ML/d)*	*(m/s)*
P-171	J-172	J-171	99.48	200	130	0.08	0.03
P-172	J-171	J-170	87.61	200	130	0.04	0.01
P-173	J-180	J-188	100.00	200	130	0.10	0.04
P-174	J-188	J-185	98.70	200	130	0.06	0.02
P-175	J-181	J-192	86.05	200	130	0.11	0.04
P-176	J-192	J-184	90.96	200	130	0.06	0.02
P-177	J-182	J-193	83.17	200	130	0.09	0.03
P-178	J-193	J-196	92.46	200	130	0.04	0.02
P-180	J-146	J-173	264.30	600	120	-1.18	0.05
P-181	J-173	J-207	129.41	600	120	-3.50	0.14
P-182	J-207	J-107	337.37	600	120	-3.50	0.14
P-183	J-107	J-203	411.58	600	120	-4.64	0.19
P-184	J-203	WFT162919	42.11	600	120	-4.64	0.19
P-186	J-100	J-107	127.97	300	130	-1.13	0.19

Peak Hour

Node Table

ID	Demand	Elevation	Head	Pressure
	(L/s)	*(m)*	*(m)*	*(psi)*
J-100	0.00	157.71	192.12	48.92
J-101	14.33	158.41	192.10	47.90
J-102	0.86	158.15	192.10	48.26
J-104	23.88	154.45	192.14	53.58
J-105	0.00	153.86	192.12	54.38
J-106	0.00	154.07	192.10	54.06
J-107	0.00	156.78	192.19	50.34
J-109	0.00	156.19	191.99	50.89
J-110	20.34	155.98	191.95	51.14
J-111	0.00	155.77	191.98	51.47
J-112	0.00	155.56	192.00	51.80
J-113	14.77	155.59	192.02	51.79
J-121	0.00	155.76	192.11	51.67
J-122	0.00	156.48	192.12	50.66
J-126	1.44	158.17	192.10	48.24
J-127	0.36	158.77	192.10	47.38
J-130	0.00	158.13	192.10	48.29
J-131	0.86	159.79	192.10	45.93
J-132	0.43	159.54	192.10	46.29
J-134	0.97	158.58	192.10	47.65
J-136	0.72	159.37	192.10	46.53
J-137	0.57	158.34	192.10	47.99
J-138	0.72	159.50	192.10	46.35
J-139	0.36	157.16	192.11	49.68
J-140	14.31	159.75	192.10	45.99
J-146	0.00	158.00	192.11	48.49
J-147	0.61	158.15	192.11	48.27
J-148	1.08	160.24	192.11	45.30
J-150	1.18	157.49	192.10	49.20
J-151	0.00	156.05	192.11	51.26
J-152	0.32	156.18	192.11	51.07
J-159	1.04	158.99	192.10	47.07
J-161	0.68	158.89	192.10	47.21
J-162	0.83	159.86	192.10	45.83
J-163	0.36	157.46	192.11	49.26
J-164	0.00	159.86	192.10	45.84
J-165	0.65	160.18	192.11	45.39
J-166	17.94	161.16	192.07	43.94
J-167	0.72	160.22	192.06	45.26
J-169	0.68	160.74	192.05	44.51
J-170	0.61	161.10	192.04	43.99
J-171	0.83	160.32	192.04	45.10
J-172	0.72	159.54	192.05	46.21
J-173	0.00	160.18	192.12	45.40
J-174	0.68	160.00	192.06	45.58
J-175	0.97	159.57	192.07	46.20
J-176	0.97	159.66	192.06	46.06
J-177	0.65	158.85	192.08	47.24
J-178	0.62	159.32	192.05	46.53
J-179	0.69	159.09	192.06	46.88
J-180	0.62	159.88	192.04	45.71
J-181	0.59	160.22	192.03	45.22
J-182	0.83	160.64	192.03	44.62
J-183	0.43	162.41	192.03	42.11
J-184	14.45	164.43	192.03	39.23
J-185	0.86	164.37	192.03	39.32
J-186	0.90	160.04	192.05	45.51
J-188	0.93	162.13	192.03	42.51
J-192	1.08	162.33	192.03	42.22
J-193	0.90	162.43	192.03	42.08
J-196	0.54	164.21	192.03	39.55
J-197	4.99	162.37	192.04	42.18
J-198	0.50	159.33	192.10	46.59
J-203	0.00	153.67	192.30	54.92
J-207	0.00	160.28	192.14	45.29
WFT162919	0.09	153.50	192.32	55.18
WFT557570	4.68	151.09	192.37	58.68
MIN		**151.09**		**39.23**
MAX		**164.43**		**58.68**

Pipe Table

ID	From Node	To Node	Length	Diameter	Roughness	Flow	Velocity
			(m)	*(mm)*	*(C)*	*(ML/d)*	*(m/s)*
P-100	WFT557570	J-104	122.87	300	130	4.43	0.73
P-101	J-104	J-105	117.71	300	130	1.37	0.22
P-102	J-105	J-106	80.86	300	130	1.37	0.22
P-103	J-106	J-121	150.42	300	130	-0.67	0.11
P-104	J-121	J-151	78.46	300	130	0.13	0.02
P-105	J-151	J-152	13.50	300	130	0.13	0.02
P-106	J-152	J-139	104.58	300	130	-0.25	0.04
P-107	J-139	J-163	40.02	300	130	-0.28	0.05
P-108	J-163	J-146	81.22	300	130	-0.31	0.05
P-109	J-146	J-147	7.65	300	130	2.18	0.36
P-110	J-147	J-177	65.66	300	130	2.02	0.33
P-111	J-177	J-179	43.11	300	130	1.69	0.28
P-112	J-179	J-178	43.62	300	130	1.43	0.23
P-113	J-178	J-172	44.45	300	130	1.23	0.20
P-114	J-172	J-180	68.58	300	130	1.03	0.17
P-115	J-180	J-181	67.93	300	130	0.80	0.13
P-116	J-181	J-182	42.01	300	130	0.54	0.09
P-117	J-182	J-183	118.82	300	130	0.31	0.05
P-118	J-183	J-196	125.82	300	130	0.28	0.05
P-119	J-196	J-184	41.90	300	130	0.31	0.05
P-120	J-184	J-185	64.15	300	130	-0.83	0.14
P-121	J-185	J-197	64.65	300	130	-0.80	0.13
P-122	J-197	J-170	34.60	300	130	-1.23	0.20
P-123	J-170	J-169	42.01	300	130	-1.22	0.20
P-124	J-169	J-167	41.92	300	130	-1.21	0.20
P-125	J-167	J-174	41.94	300	130	-1.16	0.19
P-126	J-174	J-166	36.64	300	130	-1.03	0.17
P-127	J-166	J-165	60.52	300	130	-2.58	0.42
P-128	J-165	J-173	7.55	300	130	-2.83	0.46
P-129	J-173	J-140	66.04	300	130	1.43	0.23
P-130	J-140	J-132	41.51	300	130	0.14	0.02
P-131	J-132	J-198	41.69	300	130	0.05	0.01
P-132	J-198	J-127	41.71	300	130	-0.06	0.01
P-133	J-127	J-101	41.71	300	130	-0.15	0.02
P-134	J-101	J-100	95.77	300	130	-1.45	0.24
P-135	J-113	J-112	40.45	200	130	0.76	0.28
P-136	J-112	J-111	41.58	200	130	0.76	0.28
P-137	J-111	J-110	41.16	200	130	0.76	0.28
P-138	J-110	J-109	40.80	200	130	-0.99	0.37
P-139	J-109	J-104	181.26	200	130	-0.99	0.37
P-140	J-106	J-113	182.87	300	130	2.04	0.33
P-141	J-121	J-122	113.48	300	130	-0.80	0.13
P-142	J-122	J-100	99.47	300	130	-0.80	0.13
P-143	J-152	J-150	38.95	200	130	0.35	0.13
P-144	J-150	J-130	27.50	200	130	0.16	0.06
P-145	J-130	J-126	129.53	200	130	0.04	0.02
P-146	J-126	J-101	37.17	200	130	-0.06	0.02
P-147	J-150	J-102	107.07	200	130	0.09	0.03
P-148	J-102	J-126	109.57	200	130	0.02	0.01
P-149	J-130	J-137	40.90	200	130	0.11	0.04
P-150	J-137	J-161	40.90	200	130	0.04	0.02
P-151	J-161	J-136	40.90	200	130	-0.02	0.01
P-152	J-136	J-162	40.94	200	130	-0.10	0.04
P-153	J-162	J-164	72.42	200	130	-0.21	0.08
P-154	J-137	J-134	91.18	200	130	0.02	0.01
P-155	J-134	J-127	83.88	200	130	-0.06	0.02
P-156	J-161	J-138	91.48	200	130	0.00	0.00
P-157	J-138	J-198	92.29	200	130	-0.06	0.02
P-158	J-136	J-131	99.59	200	130	0.01	0.01
P-159	J-131	J-132	92.75	200	130	-0.06	0.02
P-160	J-162	J-159	85.32	200	130	0.04	0.02
P-161	J-159	J-140	113.10	200	130	-0.05	0.02
P-162	J-147	J-164	68.54	200	130	0.12	0.04
P-163	J-164	J-148	71.19	200	130	-0.09	0.03
P-164	J-148	J-165	124.16	200	130	-0.19	0.07
P-165	J-177	J-175	124.86	200	130	0.27	0.10
P-166	J-175	J-174	92.90	200	130	0.19	0.07
P-167	J-179	J-176	112.86	200	130	0.20	0.07
P-168	J-176	J-167	96.60	200	130	0.11	0.04
P-169	J-178	J-186	109.63	200	130	0.15	0.05
P-170	J-186	J-169	89.31	200	130	0.07	0.03

Municipal Engineering Solutions

Peak Hour

Node Table

ID	Demand	Elevation	Head	Pressure
	(L/s)	*(m)*	*(m)*	*(psi)*

Pipe Table

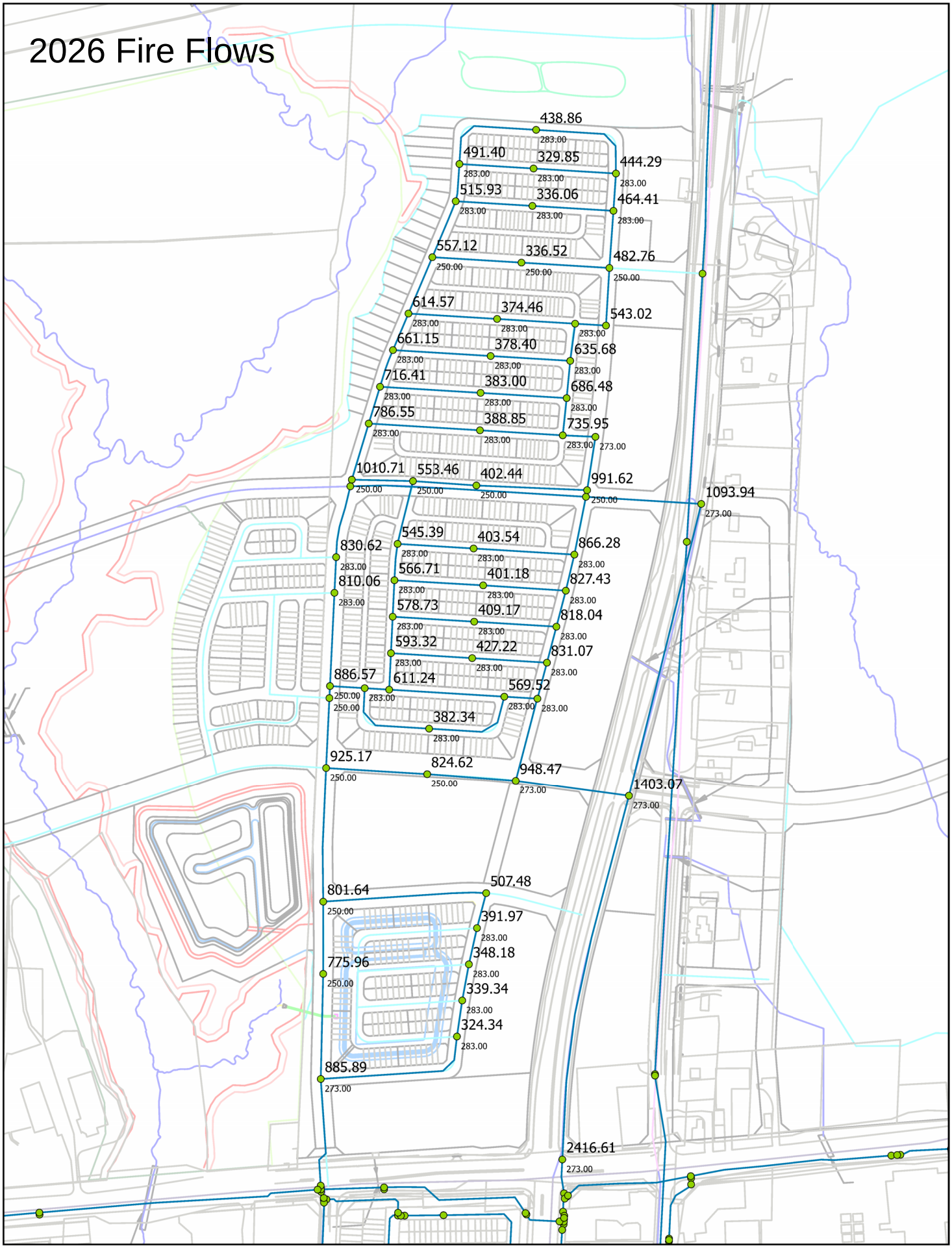
ID	From Node	To Node	Length	Diameter	Roughness	Flow	Velocity
			(m)	*(mm)*	*(C)*	*(ML/d)*	*(m/s)*
P-171	J-172	J-171	99.48	200	130	0.14	0.05
P-172	J-171	J-170	87.61	200	130	0.06	0.02
P-173	J-180	J-188	100.00	200	130	0.19	0.07
P-174	J-188	J-185	98.70	200	130	0.10	0.04
P-175	J-181	J-192	86.05	200	130	0.20	0.07
P-176	J-192	J-184	90.96	200	130	0.11	0.04
P-177	J-182	J-193	83.17	200	130	0.16	0.06
P-178	J-193	J-196	92.46	200	130	0.08	0.03
P-180	J-146	J-173	264.30	600	120	-2.50	0.10
P-181	J-173	J-207	129.41	600	120	-6.75	0.28
P-182	J-207	J-107	337.37	600	120	-6.75	0.28
P-183	J-107	J-203	411.58	600	120	-8.99	0.37
P-184	J-203	WFT162919	42.11	600	120	-8.99	0.37
P-186	J-100	J-107	127.97	300	130	-2.25	0.37

2026 Conditions
Palermo Developments, Oakville On
September 26, 2021

Municipal Engineering Solutions

Fire Flow Table			
ID	Total Demand *(L/s)*	Available Flow *(L/s)*	Fire Flow Met?
J-100	273.00	948.47	TRUE
J-101	291.06	860.60	TRUE
J-102	283.48	382.34	TRUE
J-104	286.43	885.89	TRUE
J-105	250.00	775.96	TRUE
J-106	250.00	801.64	TRUE
J-107	273.00	1403.07	TRUE
J-109	283.00	324.34	TRUE
J-110	294.44	339.34	TRUE
J-111	283.00	348.18	TRUE
J-112	283.00	391.97	TRUE
J-113	281.31	507.48	TRUE
J-121	250.00	925.17	TRUE
J-122	250.00	824.62	TRUE
J-126	283.81	569.52	TRUE
J-127	283.20	831.07	TRUE
J-130	283.00	611.24	TRUE
J-131	283.48	401.18	TRUE
J-132	283.24	827.43	TRUE
J-134	283.55	427.22	TRUE
J-136	283.40	566.71	TRUE
J-137	283.32	593.32	TRUE
J-138	283.40	409.17	TRUE
J-139	283.20	810.06	TRUE
J-140	291.05	866.28	TRUE
J-147	250.34	1010.71	TRUE
J-148	250.61	402.44	TRUE
J-150	283.67	640.55	TRUE
J-151	250.00	881.28	TRUE
J-152	250.18	886.57	TRUE
J-159	283.59	403.54	TRUE
J-161	283.38	578.73	TRUE
J-162	283.46	545.39	TRUE
J-163	283.20	830.62	TRUE
J-164	250.00	553.46	TRUE
J-165	250.36	991.62	TRUE
J-166	283.09	761.75	TRUE
J-167	283.40	686.48	TRUE
J-169	283.38	635.68	TRUE
J-170	283.34	591.40	TRUE
J-171	283.46	374.46	TRUE
J-172	283.40	614.57	TRUE
J-174	283.38	735.95	TRUE
J-175	283.55	388.85	TRUE
J-176	283.55	383.00	TRUE
J-177	283.36	786.55	TRUE
J-178	283.35	661.15	TRUE
J-179	283.39	716.41	TRUE
J-180	250.35	557.12	TRUE
J-181	283.33	515.93	TRUE
J-182	283.46	491.40	TRUE
J-183	283.24	438.86	TRUE
J-184	291.13	464.41	TRUE
J-185	250.48	482.76	TRUE
J-186	283.50	378.40	TRUE
J-188	250.53	336.52	TRUE
J-192	283.61	336.06	TRUE
J-193	283.50	329.85	TRUE
J-196	283.30	444.29	TRUE
J-197	275.80	543.02	TRUE
J-198	283.28	818.04	TRUE
J-203	273.00	2416.61	TRUE
J-207	273.00	1093.94	TRUE

MIN	**324.34**
MAX	**2416.61**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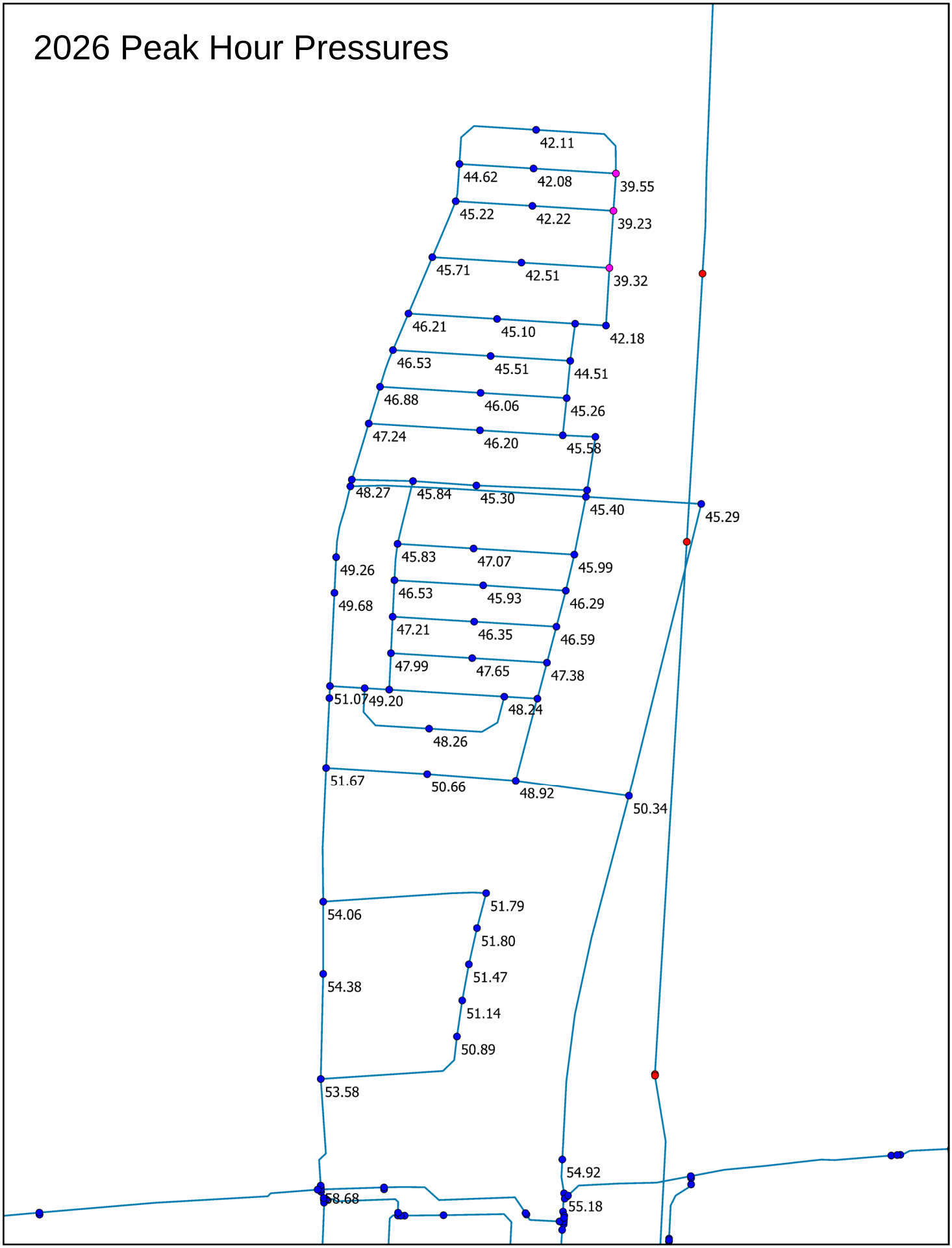
830.62
866.28
283.00
283.00
283.00
283.00
566.71
401.18
810.06
827.43
283.00
283.00
283.00
283.00
578.73
409.17
818.04
283.00
283.00
283.00
593.32
427.22
831.07
283.00
283.00
283.00
886.57
611.24
569.52
250.00
283.00
283.00
250.00
382.34
283.00
925.17
824.62
948.47
250.00
250.00
273.00
1403.07
273.00
801.64
507.48
250.00
391.97
283.00
348.18
775.96
283.00
250.00
339.34
283.00
324.34
283.00
885.89
273.00
2416.61
273.00

2026 Peak Hour Pressures



2031 Conditions
Palermo Developments, Oakville On
September 26, 2021

Municipal Engineering Solutions

Average Day

Node Table

ID	Demand	Elevation	Head	Pressure
	(L/s)	*(m)*	*(m)*	*(psi)*
J-100	0.00	157.71	197.14	56.06
J-101	3.58	158.41	197.14	55.06
J-102	0.22	158.15	197.14	55.43
J-103	0.26	156.12	197.14	58.32
J-104	5.97	154.45	197.14	60.69
J-105	0.00	153.86	197.14	61.53
J-106	0.00	154.07	197.14	61.23
J-107	2.84	156.78	197.15	57.38
J-108	0.28	155.24	197.13	59.55
J-109	0.00	156.19	197.13	58.20
J-110	5.08	155.98	197.13	58.49
J-111	0.00	155.77	197.13	58.79
J-112	0.00	155.56	197.13	59.10
J-113	3.69	155.59	197.13	59.06
J-114	0.31	154.20	197.13	61.03
J-115	0.31	154.50	197.13	60.60
J-117	0.34	154.56	197.13	60.52
J-118	0.00	156.10	197.13	58.33
J-119	6.48	154.40	197.13	60.75
J-120	0.00	155.26	197.14	59.54
J-121	0.00	155.76	197.14	58.83
J-122	0.00	156.48	197.14	57.81
J-124	0.00	156.13	197.14	58.30
J-125	0.00	157.10	197.14	56.92
J-126	0.36	158.17	197.14	55.40
J-127	0.09	158.77	197.14	54.55
J-128	2.17	154.46	197.13	60.66
J-129	3.59	157.50	197.14	56.35
J-130	0.00	158.13	197.14	55.46
J-131	0.22	159.79	197.14	53.10
J-132	0.11	159.54	197.14	53.45
J-134	0.24	158.58	197.14	54.82
J-136	0.18	159.37	197.14	53.70
J-137	0.14	158.34	197.14	55.16
J-138	0.18	159.50	197.14	53.51
J-139	0.09	157.16	197.14	56.84
J-140	3.58	159.75	197.14	53.16
J-141	0.00	159.24	197.15	53.89
J-142	0.19	156.35	197.14	57.99
J-143	0.00	156.50	197.14	57.78
J-144	0.12	158.58	197.14	54.82
J-145	0.21	157.56	197.14	56.27
J-146	0.00	158.00	197.14	55.65
J-147	0.15	158.15	197.14	55.43
J-148	0.27	160.24	197.14	52.46
J-150	0.30	157.49	197.14	56.37
J-151	0.00	156.05	197.14	58.42
J-152	0.08	156.18	197.14	58.23
J-153	0.21	156.50	197.14	57.78
J-154	0.30	157.15	197.14	56.85
J-155	0.22	156.96	197.14	57.12
J-156	0.13	157.18	197.14	56.81
J-159	0.26	158.99	197.14	54.24
J-161	0.17	158.89	197.14	54.38
J-162	0.21	159.86	197.14	53.00
J-163	0.09	157.46	197.14	56.41
J-164	0.00	159.86	197.14	53.00
J-165	0.16	160.18	197.14	52.55
J-166	4.48	161.16	197.14	51.15
J-167	0.18	160.22	197.14	52.48
J-169	0.17	160.74	197.14	51.74
J-170	0.15	161.10	197.14	51.23
J-171	0.21	160.32	197.14	52.34
J-172	0.18	159.54	197.14	53.45
J-173	0.00	160.18	197.14	52.55
J-174	0.17	160.00	197.14	52.80
J-175	0.24	159.57	197.14	53.41

Pipe Table

ID	From Node	To Node	Length	Diameter	Roughness	Flow	Velocity
			(m)	*(mm)*	*(C)*	*(ML/d)*	*(m/s)*
P-100	WFT557570	J-104	122.87	300	130	1.18	0.19
P-101	J-104	J-105	117.71	300	130	0.37	0.06
P-102	J-105	J-106	80.86	300	130	0.37	0.06
P-103	J-106	J-121	150.42	300	130	-0.24	0.04
P-104	J-121	J-151	78.46	300	130	-0.07	0.01
P-105	J-151	J-152	13.50	300	130	-0.08	0.01
P-106	J-152	J-139	104.58	300	130	-0.16	0.03
P-107	J-139	J-163	40.02	300	130	-0.22	0.04
P-108	J-163	J-146	81.22	300	130	-0.31	0.05
P-109	J-146	J-147	7.65	300	130	0.63	0.10
P-110	J-147	J-177	65.66	300	130	0.54	0.09
P-111	J-177	J-179	43.11	300	130	0.45	0.07
P-112	J-179	J-178	43.62	300	130	0.38	0.06
P-113	J-178	J-172	44.45	300	130	0.32	0.05
P-114	J-172	J-180	68.58	300	130	0.27	0.04
P-115	J-180	J-181	67.93	300	130	0.20	0.03
P-116	J-181	J-182	42.01	300	130	0.14	0.02
P-117	J-182	J-183	118.82	300	130	0.08	0.01
P-118	J-183	J-196	125.82	300	130	0.07	0.01
P-119	J-196	J-184	41.90	300	130	0.08	0.01
P-120	J-184	J-185	64.15	300	130	-0.20	0.03
P-121	J-185	J-197	64.65	300	130	-0.21	0.03
P-122	J-197	J-170	34.60	300	130	-0.32	0.05
P-123	J-170	J-169	42.01	300	130	-0.31	0.05
P-124	J-169	J-167	41.92	300	130	-0.31	0.05
P-125	J-167	J-174	41.94	300	130	-0.29	0.05
P-126	J-174	J-166	36.64	300	130	-0.25	0.04
P-127	J-166	J-165	60.52	300	130	-0.63	0.10
P-128	J-165	J-173	7.55	300	130	-0.68	0.11
P-129	J-173	J-140	66.04	300	130	0.43	0.07
P-130	J-140	J-132	41.51	300	130	0.12	0.02
P-131	J-132	J-198	41.69	300	130	0.10	0.02
P-132	J-198	J-127	41.71	300	130	0.07	0.01
P-133	J-127	J-101	41.71	300	130	0.06	0.01
P-134	J-101	J-100	95.77	300	130	-0.27	0.04
P-135	J-113	J-112	40.45	200	130	0.26	0.09
P-136	J-112	J-111	41.58	200	130	0.16	0.06
P-137	J-111	J-110	41.16	200	130	0.15	0.06
P-138	J-110	J-109	40.80	200	130	-0.21	0.08
P-139	J-109	J-104	181.26	200	130	-0.29	0.11
P-140	J-106	J-113	182.87	300	130	0.61	0.10
P-141	J-121	J-122	113.48	300	130	-0.16	0.03
P-142	J-122	J-100	99.47	300	130	-0.16	0.03
P-143	J-152	J-150	38.95	200	130	0.07	0.03
P-144	J-150	J-130	27.50	200	130	0.02	0.01
P-145	J-130	J-126	129.53	200	130	0.01	0.01
P-146	J-126	J-101	37.17	200	130	-0.02	0.01
P-147	J-150	J-102	107.07	200	130	0.02	0.01
P-148	J-102	J-126	109.57	200	130	0.00	0.00
P-149	J-130	J-137	40.90	200	130	0.01	0.00
P-150	J-137	J-161	40.90	200	130	-0.02	0.01
P-151	J-161	J-136	40.90	200	130	-0.03	0.01
P-152	J-136	J-162	40.94	200	130	-0.06	0.02
P-153	J-162	J-164	72.42	200	130	-0.10	0.04
P-154	J-137	J-134	91.18	200	130	0.01	0.00
P-155	J-134	J-127	83.88	200	130	-0.01	0.00
P-156	J-161	J-138	91.48	200	130	0.00	0.00
P-157	J-138	J-198	92.29	200	130	-0.01	0.00
P-158	J-136	J-131	99.59	200	130	0.01	0.00
P-159	J-131	J-132	92.75	200	130	-0.01	0.00
P-160	J-162	J-159	85.32	200	130	0.02	0.01
P-161	J-159	J-140	113.10	200	130	0.00	0.00
P-162	J-147	J-164	68.54	200	130	0.08	0.03
P-163	J-164	J-148	71.19	200	130	-0.01	0.01
P-164	J-148	J-165	124.16	200	130	-0.04	0.01
P-165	J-177	J-175	124.86	200	130	0.08	0.03
P-166	J-175	J-174	92.90	200	130	0.06	0.02

Municipal Engineering Solutions

Average Day

Node Table

ID	Demand	Elevation	Head	Pressure
	(L/s)	*(m)*	*(m)*	*(psi)*
J-176	0.24	159.66	197.14	53.28
J-177	0.16	158.85	197.14	54.43
J-178	0.16	159.32	197.14	53.76
J-179	0.17	159.09	197.14	54.09
J-180	0.16	159.88	197.14	52.97
J-181	0.15	160.22	197.14	52.48
J-182	0.21	160.64	197.14	51.88
J-183	0.11	162.41	197.14	49.37
J-184	3.61	164.43	197.14	46.50
J-185	0.22	164.37	197.14	46.58
J-186	0.22	160.04	197.14	52.74
J-188	0.23	162.13	197.14	49.77
J-192	0.27	162.33	197.14	49.48
J-193	0.22	162.43	197.14	49.34
J-196	0.13	164.21	197.14	46.81
J-197	1.25	162.37	197.14	49.43
J-198	0.13	159.33	197.14	53.75
J-199	0.00	163.63	197.14	47.63
J-201	0.00	156.04	197.14	58.43
J-202	0.38	155.44	197.13	59.27
J-203	0.00	153.67	197.16	61.82
J-204	0.00	156.50	197.13	57.77
J-205	5.50	160.00	197.14	52.79
J-206	0.25	162.98	197.14	48.56
J-207	0.00	160.28	197.14	52.41
WFT162919	0.04	153.50	197.16	62.07
WFT557570	1.25	151.09	197.16	65.50

MIN		**151.09**		**46.50**
MAX		**164.43**		**65.50**

Pipe Table

ID	From Node	To Node	Length	Diameter	Roughness	Flow	Velocity
			(m)	*(mm)*	*(C)*	*(ML/d)*	*(m/s)*
P-167	J-179	J-176	112.86	200	130	0.06	0.02
P-168	J-176	J-167	96.60	200	130	0.03	0.01
P-169	J-178	J-186	109.63	200	130	0.04	0.02
P-170	J-186	J-169	89.31	200	130	0.02	0.01
P-171	J-172	J-171	99.48	200	130	0.04	0.01
P-172	J-171	J-170	87.61	200	130	0.02	0.01
P-173	J-180	J-188	100.00	200	130	0.05	0.02
P-174	J-188	J-185	98.70	200	130	0.03	0.01
P-175	J-181	J-192	86.05	200	130	0.05	0.02
P-176	J-192	J-184	90.96	200	130	0.03	0.01
P-177	J-182	J-193	83.17	200	130	0.04	0.01
P-178	J-193	J-196	92.46	200	130	0.02	0.01
P-179	J-141	J-146	135.37	600	120	1.38	0.06
P-180	J-146	J-173	264.30	600	120	0.44	0.02
P-181	J-173	J-207	129.41	600	120	-0.67	0.03
P-182	J-207	J-107	337.37	600	120	-1.13	0.05
P-183	J-107	J-203	411.58	600	120	-2.88	0.12
P-184	J-203	WFT162919	42.11	600	120	-2.88	0.12
P-185	J-113	J-202	138.18	300	130	0.03	0.01
P-186	J-100	J-107	127.97	300	130	-0.43	0.07
P-187	J-109	J-108	78.43	200	130	0.08	0.03
P-188	J-108	J-115	64.11	200	130	0.06	0.02
P-189	J-115	J-110	117.94	200	130	0.08	0.03
P-190	J-115	J-114	40.06	200	130	-0.05	0.02
P-191	J-114	J-111	124.48	200	130	-0.01	0.00
P-192	J-114	J-117	81.74	200	130	-0.06	0.02
P-193	J-117	J-112	83.87	200	130	-0.09	0.03
P-194	J-121	J-124	123.89	300	130	-0.01	0.00
P-195	J-124	J-120	34.69	300	130	0.00	0.00
P-196	J-124	J-201	50.43	200	130	-0.01	0.00
P-197	J-201	J-153	31.36	200	130	-0.01	0.00
P-198	J-153	J-155	120.47	200	130	-0.03	0.01
P-199	J-155	J-156	43.72	200	130	-0.04	0.02
P-200	J-156	J-145	68.90	200	130	-0.02	0.01
P-201	J-145	J-144	66.82	200	130	-0.04	0.01
P-202	J-156	J-144	76.59	200	130	-0.04	0.01
P-203	J-144	J-163	39.67	200	130	-0.08	0.03
P-204	J-155	J-154	62.64	200	130	-0.01	0.00
P-205	J-154	J-139	67.33	200	130	-0.06	0.02
P-206	J-154	J-142	111.83	200	130	0.03	0.01
P-207	J-142	J-143	31.20	200	130	0.01	0.00
P-208	J-143	J-151	35.87	200	130	-0.01	0.00
P-209	J-201	J-103	60.38	200	130	0.00	0.00
P-210	J-103	J-143	65.40	200	130	-0.02	0.01
P-211	J-128	J-118	199.68	300	130	-0.35	0.06
P-212	J-118	J-129	192.90	300	130	-0.42	0.07
P-213	J-107	J-129	51.42	300	130	1.08	0.18
P-214	J-129	J-125	115.43	300	130	0.35	0.06
P-215	J-128	J-119	109.81	300	130	0.17	0.03
P-216	J-119	J-204	183.88	300	130	-0.39	0.06
P-217	J-118	J-204	116.83	300	130	0.07	0.01
P-218	J-125	J-204	184.46	300	130	0.33	0.05
P-219	J-207	J-205	248.91	300	130	0.46	0.07
P-220	J-205	J-125	169.35	300	130	-0.02	0.00
P-222	J-199	J-206	59.52	300	130	0.02	0.00
P-223	J-199	J-185	129.37	300	130	-0.02	0.00

Municipal Engineering Solutions

Maximum Day

Node Table

ID	Demand	Elevatio	Head	Pressure
	(L/s)	*(m)*	*(m)*	*(psi)*
J-100	0.00	157.71	199.90	59.97
J-101	8.06	158.41	199.89	58.97
J-102	0.48	158.15	199.89	59.34
J-103	0.59	156.12	199.89	62.23
J-104	13.43	154.45	199.90	64.61
J-105	0.00	153.86	199.89	65.44
J-106	0.00	154.07	199.89	65.13
J-107	6.40	156.78	199.91	61.31
J-108	0.63	155.24	199.83	63.39
J-109	0.00	156.19	199.83	62.04
J-110	11.44	155.98	199.83	62.33
J-111	0.00	155.77	199.83	62.64
J-112	0.00	155.56	199.84	62.94
J-113	8.31	155.59	199.85	62.92
J-114	0.69	154.20	199.83	64.87
J-115	0.69	154.50	199.83	64.44
J-117	0.77	154.56	199.83	64.36
J-118	0.00	156.10	199.86	62.20
J-119	14.57	154.40	199.84	64.60
J-120	0.00	155.26	199.89	63.45
J-121	0.00	155.76	199.89	62.74
J-122	0.00	156.48	199.90	61.72
J-124	0.00	156.13	199.89	62.22
J-125	0.00	157.10	199.87	60.80
J-126	0.81	158.17	199.89	59.31
J-127	0.20	158.77	199.89	58.46
J-128	4.88	154.46	199.84	64.51
J-129	8.09	157.50	199.88	60.24
J-130	0.00	158.13	199.89	59.37
J-131	0.48	159.79	199.89	57.01
J-132	0.24	159.54	199.89	57.37
J-134	0.55	158.58	199.89	58.73
J-136	0.40	159.37	199.89	57.61
J-137	0.32	158.34	199.89	59.07
J-138	0.40	159.50	199.89	57.42
J-139	0.20	157.16	199.90	60.76
J-140	8.05	159.75	199.90	57.07
J-141	0.00	159.24	199.92	57.83
J-142	0.42	156.35	199.90	61.90
J-143	0.00	156.50	199.90	61.69
J-144	0.26	158.58	199.90	58.74
J-145	0.46	157.56	199.90	60.19
J-146	0.00	158.00	199.91	59.57
J-147	0.34	158.15	199.91	59.36
J-148	0.61	160.24	199.90	56.38
J-150	0.67	157.49	199.89	60.28
J-151	0.00	156.05	199.90	62.33
J-152	0.18	156.18	199.90	62.15
J-153	0.46	156.50	199.90	61.69
J-154	0.67	157.15	199.90	60.77
J-155	0.50	156.96	199.90	61.04
J-156	0.30	157.18	199.90	60.73
J-159	0.59	158.99	199.90	58.15
J-161	0.38	158.89	199.89	58.29
J-162	0.46	159.86	199.90	56.91
J-163	0.20	157.46	199.90	60.33
J-164	0.00	159.86	199.90	56.92
J-165	0.36	160.18	199.90	56.47
J-166	10.09	161.16	199.89	55.06
J-167	0.40	160.22	199.88	56.39
J-169	0.38	160.74	199.88	55.64
J-170	0.34	161.10	199.88	55.13
J-171	0.46	160.32	199.88	56.24
J-172	0.40	159.54	199.88	57.35
J-173	0.00	160.18	199.90	56.47
J-174	0.38	160.00	199.89	56.70
J-175	0.55	159.57	199.89	57.32

Pipe Table

ID	From Node	To Node	Length	Diameter	Roughness	Flow	Velocity
			(m)	*(mm)*	*(C)*	*(ML/d)*	*(m/s)*
P-100	WFT557570	J-104	122.87	300	130	2.58	0.42
P-101	J-104	J-105	117.71	300	130	0.77	0.13
P-102	J-105	J-106	80.86	300	130	0.77	0.13
P-103	J-106	J-121	150.42	300	130	-0.60	0.10
P-104	J-121	J-151	78.46	300	130	-0.25	0.04
P-105	J-151	J-152	13.50	300	130	-0.26	0.04
P-106	J-152	J-139	104.58	300	130	-0.44	0.07
P-107	J-139	J-163	40.02	300	130	-0.61	0.10
P-108	J-163	J-146	81.22	300	130	-0.85	0.14
P-109	J-146	J-147	7.65	300	130	1.53	0.25
P-110	J-147	J-177	65.66	300	130	1.25	0.20
P-111	J-177	J-179	43.11	300	130	1.03	0.17
P-112	J-179	J-178	43.62	300	130	0.86	0.14
P-113	J-178	J-172	44.45	300	130	0.73	0.12
P-114	J-172	J-180	68.58	300	130	0.61	0.10
P-115	J-180	J-181	67.93	300	130	0.46	0.08
P-116	J-181	J-182	42.01	300	130	0.32	0.05
P-117	J-182	J-183	118.82	300	130	0.18	0.03
P-118	J-183	J-196	125.82	300	130	0.16	0.03
P-119	J-196	J-184	41.90	300	130	0.19	0.03
P-120	J-184	J-185	64.15	300	130	-0.45	0.07
P-121	J-185	J-197	64.65	300	130	-0.47	0.08
P-122	J-197	J-170	34.60	300	130	-0.71	0.12
P-123	J-170	J-169	42.01	300	130	-0.69	0.11
P-124	J-169	J-167	41.92	300	130	-0.67	0.11
P-125	J-167	J-174	41.94	300	130	-0.62	0.10
P-126	J-174	J-166	36.64	300	130	-0.51	0.08
P-127	J-166	J-165	60.52	300	130	-1.38	0.23
P-128	J-165	J-173	7.55	300	130	-1.47	0.24
P-129	J-173	J-140	66.04	300	130	1.00	0.16
P-130	J-140	J-132	41.51	300	130	0.31	0.05
P-131	J-132	J-198	41.69	300	130	0.27	0.04
P-132	J-198	J-127	41.71	300	130	0.22	0.04
P-133	J-127	J-101	41.71	300	130	0.19	0.03
P-134	J-101	J-100	95.77	300	130	-0.52	0.08
P-135	J-113	J-112	40.45	200	130	0.58	0.21
P-136	J-112	J-111	41.58	200	130	0.37	0.14
P-137	J-111	J-110	41.16	200	130	0.35	0.13
P-138	J-110	J-109	40.80	200	130	-0.46	0.17
P-139	J-109	J-104	181.26	200	130	-0.65	0.24
P-140	J-106	J-113	182.87	300	130	1.37	0.23
P-141	J-121	J-122	113.48	300	130	-0.29	0.05
P-142	J-122	J-100	99.47	300	130	-0.29	0.05
P-143	J-152	J-150	38.95	200	130	0.17	0.06
P-144	J-150	J-130	27.50	200	130	0.05	0.02
P-145	J-130	J-126	129.53	200	130	0.05	0.02
P-146	J-126	J-101	37.17	200	130	-0.01	0.00
P-147	J-150	J-102	107.07	200	130	0.06	0.02
P-148	J-102	J-126	109.57	200	130	0.01	0.01
P-149	J-130	J-137	40.90	200	130	0.01	0.00
P-150	J-137	J-161	40.90	200	130	-0.05	0.02
P-151	J-161	J-136	40.90	200	130	-0.10	0.04
P-152	J-136	J-162	40.94	200	130	-0.15	0.06
P-153	J-162	J-164	72.42	200	130	-0.25	0.09
P-154	J-137	J-134	91.18	200	130	0.03	0.01
P-155	J-134	J-127	83.88	200	130	-0.01	0.01
P-156	J-161	J-138	91.48	200	130	0.01	0.00
P-157	J-138	J-198	92.29	200	130	-0.02	0.01
P-158	J-136	J-131	99.59	200	130	0.02	0.01
P-159	J-131	J-132	92.75	200	130	-0.02	0.01
P-160	J-162	J-159	85.32	200	130	0.06	0.02
P-161	J-159	J-140	113.10	200	130	0.01	0.00
P-162	J-147	J-164	68.54	200	130	0.25	0.09
P-163	J-164	J-148	71.19	200	130	0.00	0.00
P-164	J-148	J-165	124.16	200	130	-0.06	0.02
P-165	J-177	J-175	124.86	200	130	0.18	0.07
P-166	J-175	J-174	92.90	200	130	0.14	0.05

Municipal Engineering Solutions

Maximum Day

Node Table

ID	Demand	Elevatio	Head	Pressure
	(L/s)	*(m)*	*(m)*	*(psi)*
J-176	0.55	159.66	199.89	57.18
J-177	0.36	158.85	199.89	58.35
J-178	0.35	159.32	199.88	57.67
J-179	0.39	159.09	199.89	58.00
J-180	0.35	159.88	199.88	56.86
J-181	0.33	160.22	199.88	56.37
J-182	0.46	160.64	199.88	55.78
J-183	0.24	162.41	199.87	53.26
J-184	8.13	164.43	199.87	50.39
J-185	0.48	164.37	199.88	50.47
J-186	0.50	160.04	199.88	56.64
J-188	0.53	162.13	199.88	53.66
J-192	0.61	162.33	199.87	53.37
J-193	0.50	162.43	199.87	53.23
J-196	0.30	164.21	199.87	50.70
J-197	2.80	162.37	199.88	53.32
J-198	0.28	159.33	199.89	57.67
J-199	0.00	163.63	199.88	51.53
J-201	0.00	156.04	199.89	62.34
J-202	0.85	155.44	199.85	63.13
J-203	0.00	153.67	199.95	65.79
J-204	0.00	156.50	199.86	61.64
J-205	12.37	160.00	199.87	56.68
J-206	0.57	162.98	199.88	52.45
J-207	0.00	160.28	199.90	56.33
WFT162919	0.07	153.50	199.95	66.04
WFT557570	2.37	151.09	199.99	69.51

MIN		**151.09**		**50.39**
MAX		**164.43**		**69.51**

Pipe Table

ID	From Node	To Node	Length	Diameter	Roughness	Flow	Velocity
			(m)	*(mm)*	*(C)*	*(ML/d)*	*(m/s)*
P-167	J-179	J-176	112.86	200	130	0.13	0.05
P-168	J-176	J-167	96.60	200	130	0.09	0.03
P-169	J-178	J-186	109.63	200	130	0.10	0.04
P-170	J-186	J-169	89.31	200	130	0.06	0.02
P-171	J-172	J-171	99.48	200	130	0.09	0.03
P-172	J-171	J-170	87.61	200	130	0.05	0.02
P-173	J-180	J-188	100.00	200	130	0.11	0.04
P-174	J-188	J-185	98.70	200	130	0.07	0.03
P-175	J-181	J-192	86.05	200	130	0.12	0.04
P-176	J-192	J-184	90.96	200	130	0.07	0.02
P-177	J-182	J-193	83.17	200	130	0.09	0.03
P-178	J-193	J-196	92.46	200	130	0.05	0.02
P-179	J-141	J-146	135.37	600	120	4.29	0.18
P-180	J-146	J-173	264.30	600	120	1.91	0.08
P-181	J-173	J-207	129.41	600	120	-0.56	0.02
P-182	J-207	J-107	337.37	600	120	-1.63	0.07
P-183	J-107	J-203	411.58	600	120	-5.36	0.22
P-184	J-203	WFT162919	42.11	600	120	-5.36	0.22
P-185	J-113	J-202	138.18	300	130	0.07	0.01
P-186	J-100	J-107	127.97	300	130	-0.80	0.13
P-187	J-109	J-108	78.43	200	130	0.18	0.07
P-188	J-108	J-115	64.11	200	130	0.13	0.05
P-189	J-115	J-110	117.94	200	130	0.18	0.07
P-190	J-115	J-114	40.06	200	130	-0.11	0.04
P-191	J-114	J-111	124.48	200	130	-0.03	0.01
P-192	J-114	J-117	81.74	200	130	-0.14	0.05
P-193	J-117	J-112	83.87	200	130	-0.21	0.08
P-194	J-121	J-124	123.89	300	130	-0.07	0.01
P-195	J-124	J-120	34.69	300	130	0.00	0.00
P-196	J-124	J-201	50.43	200	130	-0.07	0.02
P-197	J-201	J-153	31.36	200	130	-0.05	0.02
P-198	J-153	J-155	120.47	200	130	-0.09	0.03
P-199	J-155	J-156	43.72	200	130	-0.13	0.05
P-200	J-156	J-145	68.90	200	130	-0.05	0.02
P-201	J-145	J-144	66.82	200	130	-0.09	0.03
P-202	J-156	J-144	76.59	200	130	-0.10	0.04
P-203	J-144	J-163	39.67	200	130	-0.22	0.08
P-204	J-155	J-154	62.64	200	130	-0.01	0.00
P-205	J-154	J-139	67.33	200	130	-0.15	0.06
P-206	J-154	J-142	111.83	200	130	0.09	0.03
P-207	J-142	J-143	31.20	200	130	0.05	0.02
P-208	J-143	J-151	35.87	200	130	-0.01	0.00
P-209	J-201	J-103	60.38	200	130	-0.01	0.00
P-210	J-103	J-143	65.40	200	130	-0.06	0.02
P-211	J-128	J-118	199.68	300	130	-0.80	0.13
P-212	J-118	J-129	192.90	300	130	-0.93	0.15
P-213	J-107	J-129	51.42	300	130	2.37	0.39
P-214	J-129	J-125	115.43	300	130	0.74	0.12
P-215	J-128	J-119	109.81	300	130	0.38	0.06
P-216	J-119	J-204	183.88	300	130	-0.88	0.14
P-217	J-118	J-204	116.83	300	130	0.14	0.02
P-218	J-125	J-204	184.46	300	130	0.75	0.12
P-219	J-207	J-205	248.91	300	130	1.08	0.18
P-220	J-205	J-125	169.35	300	130	0.01	0.00
P-222	J-199	J-206	59.52	300	130	0.05	0.01
P-223	J-199	J-185	129.37	300	130	-0.05	0.01

Peak Hour

Node Table

ID	Demand	Elevation	Head	Pressure
	(L/s)	*(m)*	*(m)*	*(psi)*
J-100	0.00	157.71	190.50	46.61
J-101	14.33	158.41	190.49	45.60
J-102	0.86	158.15	190.49	45.97
J-103	1.04	156.12	190.49	48.86
J-104	23.88	154.45	190.51	51.26
J-105	0.00	153.86	190.48	52.06
J-106	0.00	154.07	190.47	51.74
J-107	11.37	156.78	190.54	47.99
J-108	1.11	155.24	190.30	49.85
J-109	0.00	156.19	190.31	48.51
J-110	20.34	155.98	190.29	48.77
J-111	0.00	155.77	190.30	49.09
J-112	0.00	155.56	190.32	49.41
J-113	14.77	155.59	190.36	49.43
J-114	1.22	154.20	190.30	51.32
J-115	1.22	154.50	190.30	50.89
J-117	1.36	154.56	190.31	50.82
J-118	0.00	156.10	190.39	48.74
J-119	25.91	154.40	190.34	51.09
J-120	0.00	155.26	190.49	50.08
J-121	0.00	155.76	190.49	49.37
J-122	0.00	156.48	190.49	48.35
J-124	0.00	156.13	190.49	48.84
J-125	0.00	157.10	190.42	47.37
J-126	1.44	158.17	190.49	45.94
J-127	0.36	158.77	190.49	45.09
J-128	8.67	154.46	190.34	51.01
J-129	14.38	157.50	190.45	46.84
J-130	0.00	158.13	190.49	46.00
J-131	0.86	159.79	190.49	43.64
J-132	0.43	159.54	190.49	44.00
J-134	0.97	158.58	190.49	45.36
J-136	0.72	159.37	190.49	44.24
J-137	0.57	158.34	190.49	45.70
J-138	0.72	159.50	190.49	44.05
J-139	0.36	157.16	190.50	47.39
J-140	14.31	159.75	190.49	43.70
J-141	0.00	159.24	190.53	44.48
J-142	0.75	156.35	190.49	48.53
J-143	0.00	156.50	190.49	48.32
J-144	0.47	158.58	190.49	45.37
J-145	0.83	157.56	190.49	46.82
J-146	0.00	158.00	190.52	46.22
J-147	0.61	158.15	190.51	46.00
J-148	1.08	160.24	190.50	43.02
J-150	1.18	157.49	190.49	46.91
J-151	0.00	156.05	190.49	48.96
J-152	0.32	156.18	190.49	48.77
J-153	0.83	156.50	190.49	48.32
J-154	1.18	157.15	190.49	47.40
J-155	0.90	156.96	190.49	47.67
J-156	0.54	157.18	190.49	47.36
J-159	1.04	158.99	190.49	44.78
J-161	0.68	158.89	190.49	44.92
J-162	0.83	159.86	190.49	43.54
J-163	0.36	157.46	190.50	46.97
J-164	0.00	159.86	190.50	43.56
J-165	0.65	160.18	190.51	43.11
J-166	17.94	161.16	190.47	41.66
J-167	0.72	160.22	190.46	42.98
J-169	0.68	160.74	190.45	42.23
J-170	0.61	161.10	190.44	41.71
J-171	0.83	160.32	190.44	42.82
J-172	0.72	159.54	190.45	43.93
J-173	0.00	160.18	190.51	43.12
J-174	0.68	160.00	190.46	43.30
J-175	0.97	159.57	190.47	43.92

Pipe Table

ID	From Node	To Node	Length	Diameter	Roughness	Flow	Velocity
			(m)	*(mm)*	*(C)*	*(ML/d)*	*(m/s)*
P-100	WFT557570	J-104	122.87	300	130	4.52	0.74
P-101	J-104	J-105	117.71	300	130	1.33	0.22
P-102	J-105	J-106	80.86	300	130	1.33	0.22
P-103	J-106	J-121	150.42	300	130	-1.07	0.18
P-104	J-121	J-151	78.46	300	130	-0.35	0.06
P-105	J-151	J-152	13.50	300	130	-0.40	0.07
P-106	J-152	J-139	104.58	300	130	-0.67	0.11
P-107	J-139	J-163	40.02	300	130	-0.95	0.16
P-108	J-163	J-146	81.22	300	130	-1.33	0.22
P-109	J-146	J-147	7.65	300	130	2.54	0.42
P-110	J-147	J-177	65.66	300	130	2.13	0.35
P-111	J-177	J-179	43.11	300	130	1.77	0.29
P-112	J-179	J-178	43.62	300	130	1.49	0.24
P-113	J-178	J-172	44.45	300	130	1.27	0.21
P-114	J-172	J-180	68.58	300	130	1.06	0.17
P-115	J-180	J-181	67.93	300	130	0.81	0.13
P-116	J-181	J-182	42.01	300	130	0.55	0.09
P-117	J-182	J-183	118.82	300	130	0.32	0.05
P-118	J-183	J-196	125.82	300	130	0.28	0.05
P-119	J-196	J-184	41.90	300	130	0.32	0.05
P-120	J-184	J-185	64.15	300	130	-0.81	0.13
P-121	J-185	J-197	64.65	300	130	-0.82	0.13
P-122	J-197	J-170	34.60	300	130	-1.25	0.21
P-123	J-170	J-169	42.01	300	130	-1.23	0.20
P-124	J-169	J-167	41.92	300	130	-1.20	0.20
P-125	J-167	J-174	41.94	300	130	-1.12	0.18
P-126	J-174	J-166	36.64	300	130	-0.96	0.16
P-127	J-166	J-165	60.52	300	130	-2.51	0.41
P-128	J-165	J-173	7.55	300	130	-2.72	0.44
P-129	J-173	J-140	66.04	300	130	1.74	0.28
P-130	J-140	J-132	41.51	300	130	0.51	0.08
P-131	J-132	J-198	41.69	300	130	0.42	0.07
P-132	J-198	J-127	41.71	300	130	0.33	0.05
P-133	J-127	J-101	41.71	300	130	0.25	0.04
P-134	J-101	J-100	95.77	300	130	-1.05	0.17
P-135	J-113	J-112	40.45	200	130	1.05	0.39
P-136	J-112	J-111	41.58	200	130	0.67	0.25
P-137	J-111	J-110	41.16	200	130	0.62	0.23
P-138	J-110	J-109	40.80	200	130	-0.81	0.30
P-139	J-109	J-104	181.26	200	130	-1.13	0.42
P-140	J-106	J-113	182.87	300	130	2.40	0.39
P-141	J-121	J-122	113.48	300	130	-0.64	0.11
P-142	J-122	J-100	99.47	300	130	-0.64	0.11
P-143	J-152	J-150	38.95	200	130	0.24	0.09
P-144	J-150	J-130	27.50	200	130	0.07	0.02
P-145	J-130	J-126	129.53	200	130	0.06	0.02
P-146	J-126	J-101	37.17	200	130	-0.07	0.02
P-147	J-150	J-102	107.07	200	130	0.07	0.03
P-148	J-102	J-126	109.57	200	130	0.00	0.00
P-149	J-130	J-137	40.90	200	130	0.01	0.00
P-150	J-137	J-161	40.90	200	130	-0.08	0.03
P-151	J-161	J-136	40.90	200	130	-0.15	0.06
P-152	J-136	J-162	40.94	200	130	-0.24	0.09
P-153	J-162	J-164	72.42	200	130	-0.41	0.15
P-154	J-137	J-134	91.18	200	130	0.04	0.02
P-155	J-134	J-127	83.88	200	130	-0.04	0.02
P-156	J-161	J-138	91.48	200	130	0.01	0.00
P-157	J-138	J-198	92.29	200	130	-0.05	0.02
P-158	J-136	J-131	99.59	200	130	0.03	0.01
P-159	J-131	J-132	92.75	200	130	-0.05	0.02
P-160	J-162	J-159	85.32	200	130	0.09	0.03
P-161	J-159	J-140	113.10	200	130	0.00	0.00
P-162	J-147	J-164	68.54	200	130	0.35	0.13
P-163	J-164	J-148	71.19	200	130	-0.06	0.02
P-164	J-148	J-165	124.16	200	130	-0.15	0.06
P-165	J-177	J-175	124.86	200	130	0.30	0.11
P-166	J-175	J-174	92.90	200	130	0.22	0.08

Peak Hour

Node Table

ID	Demand	Elevation	Head	Pressure
	(L/s)	*(m)*	*(m)*	*(psi)*
J-176	0.97	159.66	190.46	43.78
J-177	0.65	158.85	190.48	44.96
J-178	0.62	159.32	190.45	44.26
J-179	0.69	159.09	190.46	44.60
J-180	0.62	159.88	190.44	43.44
J-181	0.59	160.22	190.43	42.95
J-182	0.83	160.64	190.43	42.35
J-183	0.43	162.41	190.43	39.83
J-184	14.45	164.43	190.43	36.95
J-185	0.86	164.37	190.43	37.05
J-186	0.90	160.04	190.45	43.23
J-188	0.93	162.13	190.43	40.23
J-192	1.08	162.33	190.43	39.94
J-193	0.90	162.43	190.43	39.80
J-196	0.54	164.21	190.43	37.27
J-197	4.99	162.37	190.44	39.90
J-198	0.50	159.33	190.49	44.29
J-199	0.00	163.63	190.43	38.10
J-201	0.00	156.04	190.49	48.97
J-202	0.85	155.44	190.36	49.64
J-203	0.00	153.67	190.71	52.66
J-204	0.00	156.50	190.39	48.17
J-205	21.99	160.00	190.42	43.25
J-206	0.57	162.98	190.43	39.02
J-207	0.00	160.28	190.51	42.98
WFT162919	0.11	153.50	190.73	52.92
WFT557570	3.75	151.09	190.75	56.37

MIN		**151.09**		**36.95**
MAX		**164.43**		**56.37**

Pipe Table

ID	From Node	To Node	Length	Diameter	Roughness	Flow	Velocity
			(m)	*(mm)*	*(C)*	*(ML/d)*	*(m/s)*
P-167	J-179	J-176	112.86	200	130	0.22	0.08
P-168	J-176	J-167	96.60	200	130	0.14	0.05
P-169	J-178	J-186	109.63	200	130	0.17	0.06
P-170	J-186	J-169	89.31	200	130	0.09	0.03
P-171	J-172	J-171	99.48	200	130	0.15	0.06
P-172	J-171	J-170	87.61	200	130	0.08	0.03
P-173	J-180	J-188	100.00	200	130	0.20	0.07
P-174	J-188	J-185	98.70	200	130	0.12	0.04
P-175	J-181	J-192	86.05	200	130	0.21	0.08
P-176	J-192	J-184	90.96	200	130	0.11	0.04
P-177	J-182	J-193	83.17	200	130	0.16	0.06
P-178	J-193	J-196	92.46	200	130	0.08	0.03
P-179	J-141	J-146	135.37	600	120	5.81	0.24
P-180	J-146	J-173	264.30	600	120	1.95	0.08
P-181	J-173	J-207	129.41	600	120	-2.51	0.10
P-182	J-207	J-107	337.37	600	120	-4.35	0.18
P-183	J-107	J-203	411.58	600	120	-11.31	0.46
P-184	J-203	WFT162919	42.11	600	120	-11.31	0.46
P-185	J-113	J-202	138.18	300	130	0.07	0.01
P-186	J-100	J-107	127.97	300	130	-1.69	0.28
P-187	J-109	J-108	78.43	200	130	0.32	0.12
P-188	J-108	J-115	64.11	200	130	0.22	0.08
P-189	J-115	J-110	117.94	200	130	0.32	0.12
P-190	J-115	J-114	40.06	200	130	-0.20	0.08
P-191	J-114	J-111	124.48	200	130	-0.05	0.02
P-192	J-114	J-117	81.74	200	130	-0.26	0.10
P-193	J-117	J-112	83.87	200	130	-0.38	0.14
P-194	J-121	J-124	123.89	300	130	-0.07	0.01
P-195	J-124	J-120	34.69	300	130	0.00	0.00
P-196	J-124	J-201	50.43	200	130	-0.07	0.03
P-197	J-201	J-153	31.36	200	130	-0.06	0.02
P-198	J-153	J-155	120.47	200	130	-0.14	0.05
P-199	J-155	J-156	43.72	200	130	-0.19	0.07
P-200	J-156	J-145	68.90	200	130	-0.08	0.03
P-201	J-145	J-144	66.82	200	130	-0.15	0.05
P-202	J-156	J-144	76.59	200	130	-0.16	0.06
P-203	J-144	J-163	39.67	200	130	-0.35	0.13
P-204	J-155	J-154	62.64	200	130	-0.03	0.01
P-205	J-154	J-139	67.33	200	130	-0.25	0.09
P-206	J-154	J-142	111.83	200	130	0.12	0.04
P-207	J-142	J-143	31.20	200	130	0.05	0.02
P-208	J-143	J-151	35.87	200	130	-0.04	0.02
P-209	J-201	J-103	60.38	200	130	-0.01	0.00
P-210	J-103	J-143	65.40	200	130	-0.10	0.04
P-211	J-128	J-118	199.68	300	130	-1.42	0.23
P-212	J-118	J-129	192.90	300	130	-1.68	0.27
P-213	J-107	J-129	51.42	300	130	4.29	0.70
P-214	J-129	J-125	115.43	300	130	1.37	0.22
P-215	J-128	J-119	109.81	300	130	0.67	0.11
P-216	J-119	J-204	183.88	300	130	-1.57	0.26
P-217	J-118	J-204	116.83	300	130	0.26	0.04
P-218	J-125	J-204	184.46	300	130	1.31	0.21
P-219	J-207	J-205	248.91	300	130	1.84	0.30
P-220	J-205	J-125	169.35	300	130	-0.06	0.01
P-222	J-199	J-206	59.52	300	130	0.05	0.01
P-223	J-199	J-185	129.37	300	130	-0.05	0.01

2031 Conditions
Palermo Developments, Oakville On
September 26, 2021

Municipal Engineering Solutions

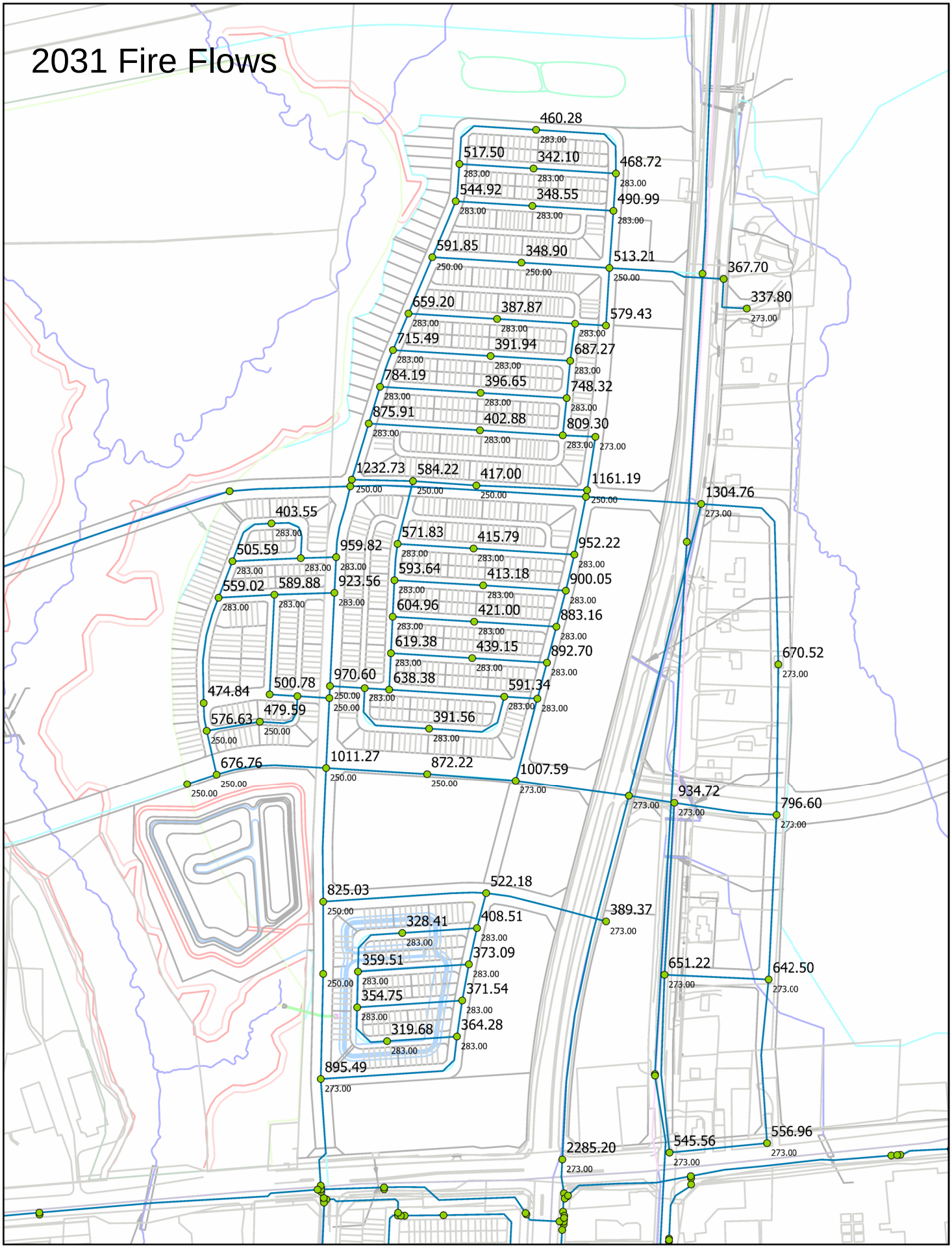
Fire Flow Table			
ID	Total Demand (L/s)	Available Flow (L/s)	Fire Flow Met?
J-100	273.00	1007.59	TRUE
J-101	291.06	920.61	TRUE
J-102	283.48	391.56	TRUE
J-103	250.59	479.59	TRUE
J-104	286.43	895.49	TRUE
J-105	250.00	788.91	TRUE
J-106	250.00	825.03	TRUE
J-107	279.40	1612.12	TRUE
J-108	283.63	319.68	TRUE
J-109	283.00	364.28	TRUE
J-110	294.44	371.54	TRUE
J-111	283.00	373.09	TRUE
J-112	283.00	408.51	TRUE
J-113	281.31	522.18	TRUE
J-114	283.69	359.51	TRUE
J-115	283.69	354.75	TRUE
J-117	283.77	328.41	TRUE
J-118	273.00	651.22	TRUE
J-119	287.57	556.96	TRUE
J-120	250.00	599.65	TRUE
J-121	250.00	1011.27	TRUE
J-122	250.00	872.22	TRUE
J-124	250.00	676.76	TRUE
J-125	273.00	796.60	TRUE
J-126	283.81	591.34	TRUE
J-127	283.20	892.70	TRUE
J-128	277.88	545.56	TRUE
J-129	281.09	934.72	TRUE
J-130	283.00	638.38	TRUE
J-131	283.48	413.18	TRUE
J-132	283.24	900.05	TRUE
J-134	283.55	439.15	TRUE
J-136	283.40	593.64	TRUE
J-137	283.32	619.38	TRUE
J-138	283.40	421.00	TRUE
J-139	283.20	923.56	TRUE
J-140	291.05	952.22	TRUE
J-142	250.42	500.78	TRUE
J-143	250.00	631.01	TRUE
J-144	283.26	522.97	TRUE
J-145	283.46	403.55	TRUE
J-147	250.34	1232.73	TRUE
J-148	250.61	417.00	TRUE
J-150	283.67	670.69	TRUE
J-151	250.00	973.42	TRUE
J-152	250.18	970.60	TRUE
J-153	250.46	474.84	TRUE
J-154	283.67	589.88	TRUE
J-155	283.50	559.02	TRUE
J-156	283.30	505.59	TRUE
J-159	283.59	415.79	TRUE
J-161	283.38	604.96	TRUE
J-162	283.46	571.83	TRUE
J-163	283.20	959.82	TRUE
J-164	250.00	584.22	TRUE
J-165	250.36	1161.19	TRUE
J-166	283.09	843.83	TRUE
J-167	283.40	748.32	TRUE
J-169	283.38	687.27	TRUE
J-170	283.34	634.52	TRUE
J-171	283.46	387.87	TRUE
J-172	283.40	659.20	TRUE
J-174	283.38	809.30	TRUE
J-175	283.55	402.88	TRUE
J-176	283.55	396.65	TRUE
J-177	283.36	875.91	TRUE
J-178	283.35	715.49	TRUE
J-179	283.39	784.19	TRUE

2031 Conditions
Palermo Developments, Oakville On
September 26, 2021

Municipal Engineering Solutions

Fire Flow Table			
ID	Total Demand *(L/s)*	Available Flow *(L/s)*	Fire Flow Met?
J-100	273.00	1007.59	TRUE
J-180	250.35	591.85	TRUE
J-181	283.33	544.92	TRUE
J-182	283.46	517.50	TRUE
J-183	283.24	460.28	TRUE
J-184	291.13	490.99	TRUE
J-185	250.48	513.21	TRUE
J-186	283.50	391.94	TRUE
J-188	250.53	348.90	TRUE
J-192	283.61	348.55	TRUE
J-193	283.50	342.10	TRUE
J-196	283.30	468.72	TRUE
J-197	275.80	579.43	TRUE
J-198	283.28	883.16	TRUE
J-199	273.00	367.70	TRUE
J-201	250.00	576.63	TRUE
J-202	273.85	389.37	TRUE
J-203	273.00	2285.20	TRUE
J-204	273.00	642.50	TRUE
J-205	285.37	670.52	TRUE
J-206	273.57	337.80	TRUE
J-207	273.00	1304.76	TRUE

MIN	319.68
MAX	2285.20


2031 Fire Flows
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283.00
517.50
342.10
468.72
544.92
348.55
490.99
591.85
348.90
513.21
367.70
337.80
659.20
387.87
579.43
715.49
391.94
687.27
784.19
396.65
748.32
875.91
402.88
809.30
1232.73
584.22
417.00
1161.19
1304.76
403.55
505.59
959.82
571.83
415.79
952.22
559.02
589.88
923.56
593.64
413.18
900.05
604.96
421.00
883.16
619.38
439.15
892.70
670.52
474.84
500.78
970.60
638.38
591.34
576.63
479.59
391.56
676.76
1011.27
872.22
1007.59
934.72
796.60
825.03
522.18
389.37
328.41
408.51
359.51
373.09
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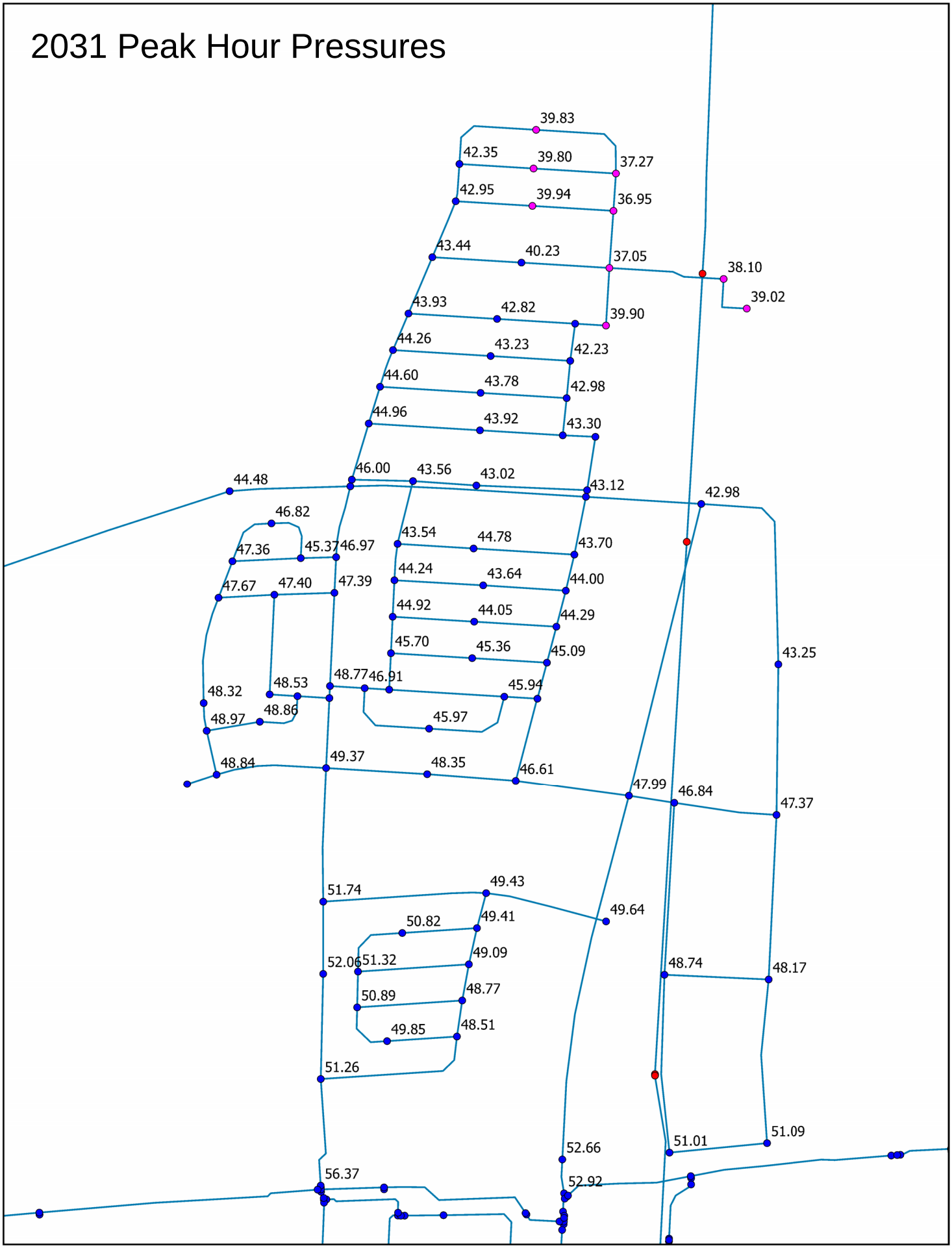
895.49
2285.20
545.56
556.96

2031 Peak Hour Pressures

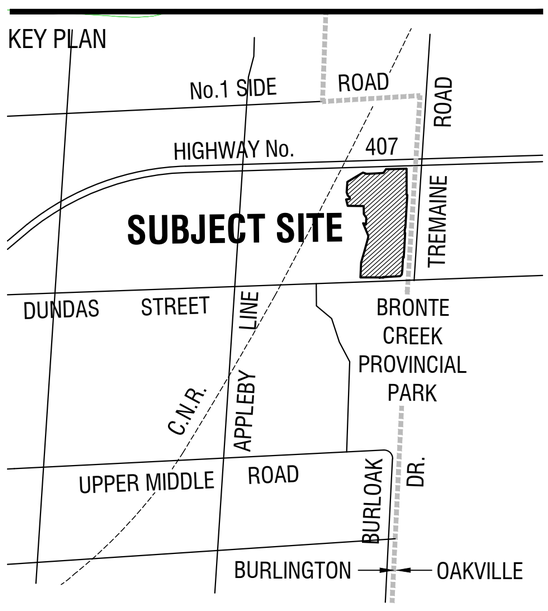


APPENDIX F

EVERGREEN DP OF SUBDIVISION (GERARD DESIGN & URBAN STRATEGIES INC., 2021)

DRAFT PLAN OF SUBDIVISION

PARTS OF LOTS 1 AND 2
CONCESSION 1 NORTH OF DUNDAS STREET
GEOGRAPHIC TOWNSHIP OF NELSON NOW IN THE
CITY OF BURLINGTON
REGIONAL MUNICIPALITY OF HALTON



SUBJECT SITE

NOT TO SCALE

PLANNING APPROVAL

APPROVED UNDER SECTION 51 OF THE PLANNING ACT, RSO 1990, AS AMENDED, BY THE DIRECTOR OF PLANNING FOR THE CITY OF BURLINGTON.

SIGNED: _____ THIS ___ DAY OF _____, 2020

DIRECTOR OF PLANNING

OWNER'S AUTHORIZATION

I HEREBY AUTHORIZE URBAN STRATEGIES INC. AND GERRARD DESIGN ASSOCIATES INC. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE CITY OF BURLINGTON FOR APPROVAL.

SIGNED: _____ DATE: _____

FABIO J. MAZZOCCO
EVERGREEN COMMUNITY (BURLINGTON) LTD.

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARY OF THE LAND ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LAND ARE ACCURATELY AND CORRECTLY SHOWN.

SIGNED: _____ DATE: _____

J.D. BARNES LTD.

ADDITIONAL INFORMATION

UNDER SECTION 51(17) OF THE PLANNING ACT

INFORMATION REQUIRED BY CLAUSES A, B, C, D, E, F, G, J ARE SHOWN ON THE DRAFT AND KEY PLAN

H - MUNICIPAL WATER
I - SILTY CLAY
K - MUNICIPAL SANITARY AND STORM SEWERS
L - SHOWN ON PLAN

LAND USE SCHEDULE

Land Use	Lots/Blocks	Block Total	Area (ha)	Units
○ Single Detached (10.4m)	1,14-15,28,41-42,55-56,68,71,151, 168,177,189,210,250,314,329-330, 349-350,368-369	23	0.88	23
△ Single Detached (11.0m)	2-4,11-13,16,40,43,54,57-58,65-67, 138,143,173-176,180-181,190, 216-219,224,251-254,284-287, 297-298,303,313,328,331-333, 336-339,367	50	1.68	50
□ Single Detached (11.60m)	5-8,10,17-22,29-33,35-39,44-46, 51-53,59-61,63-64,69-70,76-86, 100-106,120-137,144-148,152-157, 162-167,170-172,178,182-187,191, 193-197,202-203,208-209,215,220, 225,229-234,255-256,262-266,282-283, 288-296,299,302,304-312,315-322, 325-327,334-335,340-343,346-348, 351-360,366,370-372,375-377	182	6.35	182
⬠ Single Detached (12.50m)	9,23-27,34,47,50,62,72-75,87-91, 97-99,107-112,116-119,139,142, 149-150,158,161,169,179,188,198, 201,204,207,214,226-228,235-243, 257-258,260-261,267,272-281,300, 344,361,365	77	3.00	77
☆ Single Detached (13.72m)	48-49,92-96,113-115,140-141, 159-160,192,199-200,205-206, 211-213,221-223,244-249,259, 268-271,301,323-324,345, 362-364,373-374	45	1.92	45
Street Townhouses	378-413	36	3.92	160
Business Corridor	414-416	3	3.64	
Mixed Use Corridor - Employment	417	1	1.73	
Mixed Use Corridor - General	418	1	2.16	303
Medium/High Density Residential	419	1	1.49	63
Heritage Site	420	1	.50	
Park	421	1	2.00	
LID/SWM Pond	422-425	4	3.81	
Buffer	426 427	2	0.45	
NHS	428-433	6	17.73	
NHS Enhancement	434-446	13	1.54	
Road Widening	447-449	3	0.94	
0.3m Reserve	450-454	5	0.02	
17m ECO ROW (133m)			0.23	
17m ROW (3568m)			6.11	
22m ROW (3118m)			6.88	
Totals	454	454	66.98	903

NOTES

- ALL UNITS IN METRES UNLESS OTHERWISE NOTED.
- LOT FRONTAGE MEASURED AT 3.5m FRONT YARD SETBACK ON STANDARD DEPTH LOTS.
- CORNER RADIUS: 5m.
- DAYLIGHT TRIANGLES AS INDICATED ON PLAN.
- ROAD LENGTHS CALCULATED TO INTERSECTION EDGE.
- CONTOUR INTERVAL: 0.5m

PREPARED BY

URBAN STRATEGIES INC.

GERRARD DESIGN

DRAFT FOR DISCUSSION PURPOSES ONLY

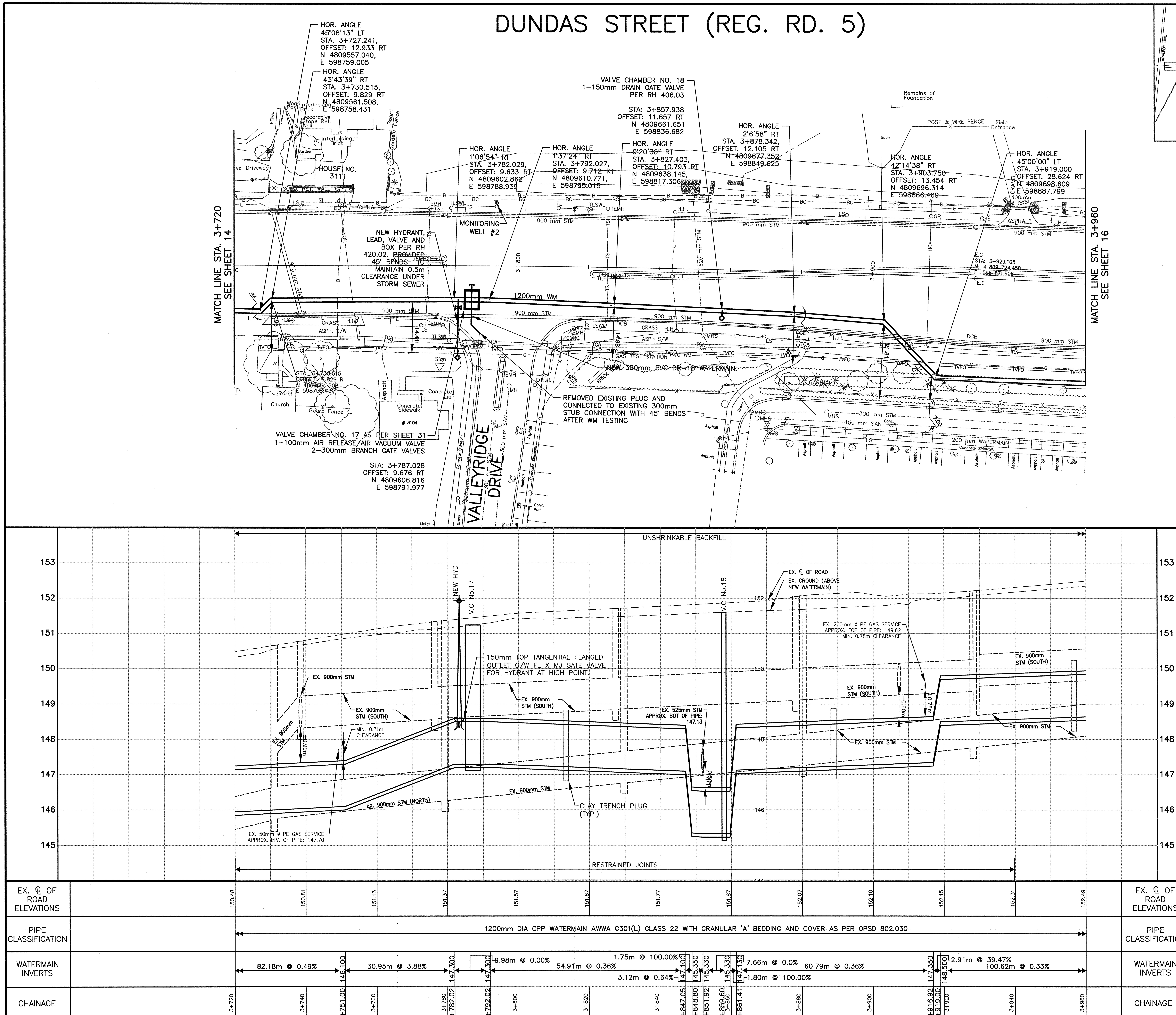
SCALE: 1:2000

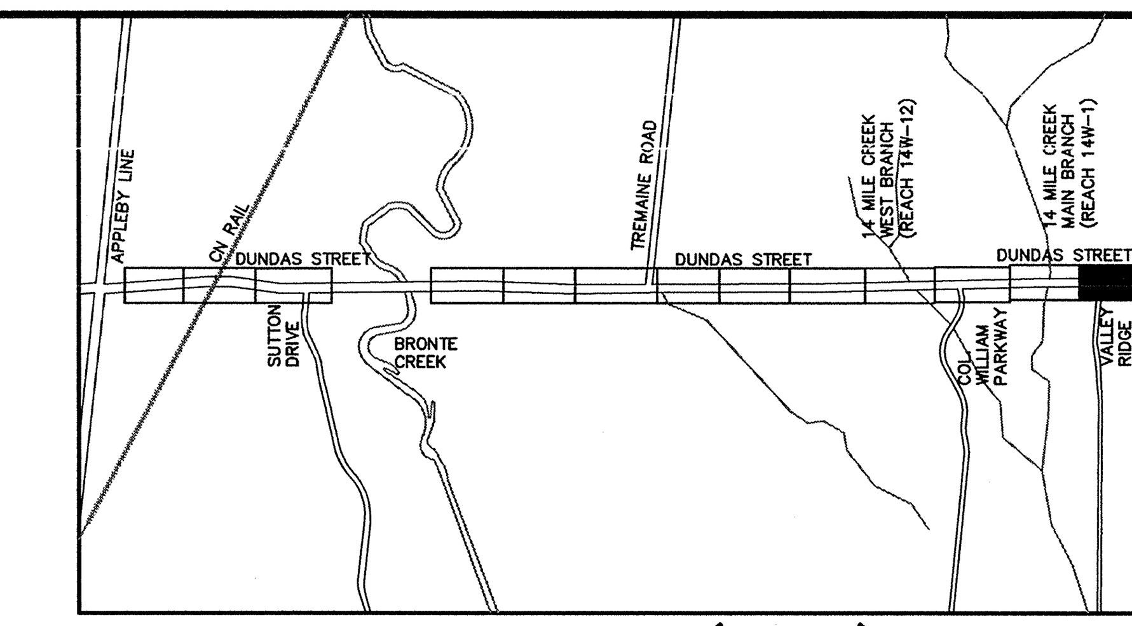
DWG DATE: May 8, 2020

APPENDIX G

DUNDAS STREET AS-BUILTS (R.V. ANDERSON ASSOCIATES, 2015)

DUNDAS STREET (REG. RD. 5)





KEY MAP (N.T.S)

CONTRACTOR	MORETTI EXCAVATING LIMITED
WORK COMMENCED	FEBRUARY 27, 2012
WORK COMPLETED	OCTOBER 3, 2014
INSPECTOR	JEHANZEB KHAN
INSPECTOR'S DIARIES	REFER TO DAILY REPORTS

NO	Date	By	REVISIONS	MANU	CAD
4	08/06/15	B.S.	AS-BUILT (LAYERS UPDATED)		
3	01/04/15	R.J.A.	AS-BUILT		
2	10/19/11	R.J.A.	ISSUED FOR CONSTRUCTION		
1	09/20/11	R.J.A.	ISSUED FOR TENDER		

Design	V.S	Ch'kd	K.W.	Date: SEPTEMBER 2011
Drawn	A.M.C	Ch'kd	V.S.	

Scale 1:500 Horiz. 1:50 Vert.

References

Regional — ACCEPTED FOR CONSTRUCTION OF REGIONAL INFRASTRUCTURE
Reviewed For Compliance With Regional Standards Only.

SEE SHEET 3 — Director

SEE SHEET 3 — Manager

Field Notes: REGION BOOK

Stamp: ORIGINAL SEALED BY V. SHANMUGANATHAN OCT 20/11

R.V. Anderson Associates Limited
engineering environment infrastructure

Halton REGION

1200mm WATERMAIN ON
DUNDAS STREET (REG. ROAD. 5)
TOWN OF OAKVILLE
FROM 1600m EAST OF TREMAINE ROAD
TO 80m WEST OF BRONTE ROAD
STA 3+720 TO 3+960

Consultant File NO 102155	Regional Drawing NO O-20537
CONTRACT NO W-2729B-11	Drawing NO SHEET 15 OF 44

W-2729B-11 15 OF 44

Drawing: R:\DESIGN\PR2729B\FINAL AS-CONSTRUCTED _ AUG_2015\AUGUST 10\W-2729 CAD AS-BUILTS\SHEET 9 TO 16 W-2729B-11 - PLAN & PROFILE.DWG
Layout Tab: 15 SHT
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