Russell Farm – Southeast Georgetown

Functional Servicing Report and Area Servicing Plan

FIRST SUBMISSION ▪ MARCH 2025

REPORT PREPARED FOR

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1 INTRODUCTION

TYLin International Canada Inc. has been retained by Russell Pines Property Corp. to prepare a Functional Servicing Report (FSR) an Area Servicing Plan (ASP) in support of the Draft Plan (Dated February 13th, 2025) of Subdivision application.

The subject site is a 51.86 ha residential development located on the east side of 10th Line, and north of 10 Side Road in Georgetown in Town of Halton Hills.

This report has been developed in accordance with applicable design criteria and requirements of the Town of Halton Hills (Town), the Region of Halton (Halton), and the Credit Valley Conservation Authority (CVC). This report also accounts for the recommendations proposed in the Southeast Georgetown Scoped Subwatershed Study prepared by WSP (dated September 16, 2024) and the Southeast Georgetown Secondary Plan Preferred Land Use Alternative Paper prepared by SGL Planning and Design Inc. (dated September 2024).

Per discussions with the Region, the FSR will include sections related to the overall servicing strategy of the Southeast Georgetown Secondary Plan area, which consists of the Russell Pines residential subdivision. The intention of this report is to satisfy the requirements of an ASP that the Region typically requires at a Secondary Plan Stage.

This report will provide the following for the subject site:

- Background information,
- Summary of existing conditions,
- Information on the proposed development,
- Description of existing and proposed municipal services to service the subject site,
- Preliminary design of the watermain distribution system, storm sewers, and sanitary sewers within the subdivision,
- Preliminary grading plans with discussions related to earthwork quantities and impact on Natural Heritage System (NHS) features,
- Evaluation of the proposed sewage pumping station, including potential locations, size and layout, storage capacity, emergency overflow, and cost estimate,
- Preliminary design of the forcemain from the proposed sewage pumping station, including cost estimates, constructability review, and
- Analysis and impact of the proposed development on the Region’s water and wastewater infrastructure based on the Region’s latest water and wastewater models.

1.1 Study Area

The subject site is located along the southeastern limits of Georgetown, bound by Greenbelt lands to the north and east, 10 Side Road to the south, and 10th Line to the west. The subject site is currently utilized for agricultural purposes with a farmhouse located on the site. The Greenbelt lands adjacent to the site include NHS features such as woodlots, and drainage draws to Silver Creek. The property is described as part of Lots 11 and 12, Concession 11, within the Regional Municipality of Halton and is illustrated in **Appendix A**.

Figure 1 – Location Plan

1.2 Project Background

The Southeast Georgetown area was identified for future development and included into the Urban Area of the Town of Halton Hills as part of the Regional Official Plan Amendment No. 38 and the Halton Hills Official Plan Amendment (OPA) No 10.

The Town of Halton Hills has undertaken a number of studies in support of the Southeast Georgetown Secondary Plan process. The vision for the Southeast Georgetown Secondary Plan area is to develop into a mixed used residential community that provides for parks, trails, and respects the natural and cultural heritage of the site. The proposed development will incorporate Low Impact Development (LID) measures for stormwater management, active transportation modes within the proposed street network, and Norval Bypass through the site. As part of the Secondary Plan process, the Town of Halton Hills retained WSP to prepare a Scoped Subwatershed Study and SGL Planning and Design Inc. to prepare a Preferred Land Use Alternative Paper. The Secondary Plan was approved by the Town Council in March 2025.

The FSR integrates findings from the Southeast Georgetown Scoped Subwatershed Study (Phase 4), conducted by WSP and finalized on September 16, 2024. The study assesses stormwater management needs, emphasizing erosion control, flood protection, and water quality treatment through Low Impact Development (LID) measures like bioswales, infiltration trenches, and stormwater ponds. Furthermore, to maintain drainage and protect headwater drainage features (HDFs), the study also recommends grading strategies to direct runoff toward Levi Creek, Silver Creek and Credit River while minimizing impacts on sensitive areas.

Halton Region completed the 2022 Development Charges Background Study as part of the broader Sustainable Halton Water and Wastewater Master Plan, assessing the capacity of existing infrastructure and outlining strategies to support anticipated development through 2031. Recent updates indicate a transition from a stream-based wastewater system to a lake-based system, with the decommissioning of the Georgetown Wastewater Treatment Plant (WWTP) and redirection of flows to the Mid-Halton WWTP. To support new Greenfield growth areas in southwest Georgetown, a lake-based trunk wastewater main infrastructure will be developed, including new wastewater pumping stations and forcemains. Similarly, a new lake-based pressure zone (Zone G6L) will be introduced to accommodate growth and transition South Georgetown to a lake-based supply, ensuring groundwater sustainability through expanded reservoirs and upgraded feeder mains along Trafalgar Road. The Halton water and wastewater strategy is presented in **Appendix E**.

The ASP component of this report will highlight the Capital Works projects that are required to service the Southeast Georgetown Secondary Plan area and provide a preliminary design and cost estimate. The proposed infrastructure identified in the Sustainable Halton Water and Wastewater Master Plan to service Southeast Georgetown Secondary Plan area include a sewage pumping station and associated forcemains along 10 Side Road, and trunk watermain along 10 Side Road.

In addition to water and wastewater upgrades, Halton Region’s Transportation Master Plan outlines significant road infrastructure investments, including road widenings, new alignments, railway grade separations, and improved freeway interchanges to accommodate rising traffic demand.

One of the major pieces of infrastructure being proposed is the Norval Bypass connecting Mississauga Road, 10 Side Road, and Guelph Street. The proposed Norval Bypass alignment passes through the subject site. TYLin has obtained the preliminary road profile from the Region and has incorporated it into the preliminary grading plan and design of the stormwater management (SWM) pond.

1.3 Existing Conditions

The existing topography within the subject site ranges from 231.50m to 205.50m in elevation. Existing site topography falls north to south and west to east. A portion of the site drains to the northeast towards Silver Creek, but the majority of the site flows south towards 10 Side Road, and subsequently towards Levi Creek headwater features. The existing land use is predominantly agricultural and rural in nature.

2 PROPOSED DEVELOPMENT

The proposed development land uses include detached residential units, detached dual frontage units, dual frontage and street townhouses, back-to-back townhouses, commercial / mixed-use block, park and open space blocks, stormwater management (SWM) facilities, greenbelt lands road widening, and Norval Bypass corridor. The proposed development will consist of 274 detached units, and 470 townhouse units of several types. Refer to Appendix A for the Draft Plan of Subdivision.

Table 1 – Proposed Land Uses and Areas in Russell Pines Property

Land Use	Lots / Blocks	Area (ha)
Detached Residential Units	7-79, 150-274	6.95
Detached Dual Frontage Residential Units	1-6, 80-149	2.57
Dual Frontage Townhouses	275-294	2.61
Street Townhouses	295-325	3.73
Back-to-back Townhouses	326-340	1.85
Residential Reserve	341-344	0.32
Commercial / Mixed Use	345	1.37
Park, Open Space, Walkway/Buffer	346-358	2.47
SWM Pond	359	2.83
Greenbelt Lands	360,361	6.22
Table Lands within Greenbelt	362,363	5.10
Grading Area to Accommodate Norval Bypass	364,365	1.67
Road Widening along Adamson Street	366	14.17
Public Rights-of-Way within Draft Plan of Subdivision		11.34
Norval Bypass		2.66
Total		**51.86**

Russell Pines Property Corp. will apply for a Draft Plan of Subdivision application in first quarter of 2025 with Draft Plan Approval anticipated in early 2026. The detailed design process will continue through 2026. It is anticipated the earthworks will commence in Spring 2026 through a Site Alteration Permit process and continue through end of 2026. Site servicing works will commence in early 2027 and conclude at base asphalt by end of 2027. The home building program is anticipated to start in early 2028 with first occupancies by end of 2028.

The proposed development will depend on timely delivery of several Capital Works projects by the Region. These projects will be discussed in the following sections. However, at this point we would like to highlight that the Region's timeline for these projects do not align with the Russell Pines Property Corp development schedule. Russell Pines Property Corp. is open to discussing alternative delivery methods for these Capital Works projects with the Region to better align with the above noted development timelines.

3 PROPOSED GRADING

As mentioned previously, the existing topography falls north to south and west to east. A portion of the site drains to the northeast towards Silver Creek, but most of the site flows south towards 10 Side Road, and subsequently towards Levi Creek headwater features.

The proposed grading design follows the recommendations of the Scoped Subwatershed Study in maintaining the existing drainage patterns to Silver Creek and Levi Creek to the extent possible.

A preliminary grading plan for the proposed development has been prepared and presented on **Figure 3** of **Appendix B**. Key design features of the proposed grading plan are summarized below.

- The site has been graded into two distinct drainage areas based on existing watershed boundaries. The northern half of the site is designed to drain into Silver Creek to maintain natural flow patterns. The grading design is integrated with proposed LID features within the Greenbelt table lands that provide stormwater quality and quantity controls. The southern half of the site is graded to drain into the proposed SWM pond east of the future Norval Bypass. The proposed SWM pond will ultimately discharge into the Credit River, ensuring that post-development flows align with existing watershed conditions.
- The proposed roads are graded to convey runoff from major storm events overland to the LID feature in the Greenbelt table lands to the north or to the SWM pond along Norval Bypass.
- The proposed roads are designed with slopes ranging between 0.50% - 5.00%. The proposed roads are designed to provide a minimum 2.5m of cover above the storm sewers.
- A retaining wall with a maximum height of 2.0m is proposed along the northern terminus of Street ‘C’ to accommodate grading transitions to the existing ground elevations. The lands adjacent to the cul-de-sac at the northern terminus of Street ‘C’ is part of the future 10th Line right-of-way. However, there are no plans currently to extend 10th Line north of Argyll Road, therefore, a temporary 3:1 sloping into the right-of-way can be considered in lieu of a retaining wall.
- The units proposed along 10th Line are dual frontage type and as such will have access off 10th Line. Hence it is anticipated that the boulevard on the east side of 10th Line will be filled to provide an urbanized cross-section (currently the eastern boulevard is not graded per Town standards). The proposed grading plan has accounted for the boulevard being filled with a 2% slope towards the curb. The proposed grading design illustrates the future elevations along 10th Line.
- The intersection of Street ‘A’ and 10th Line has been designed to accommodate the existing elevations along 10th Line with all the drainage from Street ‘A’ captured in storm sewers and conveyed to the proposed SWM along Norval Bypass.
- Currently 10th Line turns west into Argyll Road, forming an elbow. However, the proposed development with introduction of Street ‘E’ will turn this road alignment into a ‘T’ intersection. The intersection of Street ‘E’ and Argyll Road / 10th Line has been designed to accommodate the existing elevations along 10th Line and Argyll Road with all the drainage from Street ‘E’ captured in storm sewers and conveyed to the LID features within the Greenbelt Tablelands.
- Street ‘B’ has been designed to connect to the existing elevations along 10 Side Road. However, in the future 10 Side Road will be re-aligned as part of the Norval Bypass work. It is assumed that the future elevations of 10 Side Road will be similar to current elevations and major changes to Street ‘B’ design will not be required.
- The lots, blocks, and streets adjacent to the Norval Bypass have been designed to incorporate the Norval By-pass profile information obtained from the Region.
- No proposed grading encroachments are proposed within existing or future public rights-of-way.
- The proposed grades will match the existing elevations around the heritage farmhouse, if retained in situ, preserving the sites relationship with the landscape.
- Per the SWM report prepared by TYLin (dated March 2025), the rooftop run-off from the commercial block is to be discharged to the culvert crossing 10 Side Road. This drainage pattern is recommended to ensure post development run-off volumes to Levi Creek match pre-development levels. Hence the grading plan presented in the FSR shows overland drainage for the commercial block discharging to the roadside ditch along 10 Side Road.

4 STORM SERVICING

4.1 Existing Storm Sewer System

The subject site is bound by 10th Line to the west and 10 Side Road / Adamson Street to the south. These public rights-of-way are serviced by storm sewers, however, the existing storm sewers on these public rights-of-way are not designed to convey any run-off from the subject site.

4.2 Minor System

Drainage will be managed through a dual major/minor drainage network aligned with the site's Subwatershed boundaries. A preliminary storm servicing and drainage plan for the proposed development has been prepared and presented on **Figure 4** of **Appendix B**. The storm sewer design sheet is included in **Appendix C.**

Key design features of the proposed storm sewer network are summarized below.

- The storm sewers are designed to convey runoff from a 5-year storm event. The rainfall Intensity Duration Frequency (IDF) curves from the Town of Halton Hills design criteria were not legible as the standards are dated. TYLin has used the Town of Milton IDF curves in lieu of the Town of Halton Hills standards to determine run-off in the storm sewers.
- The northern portion of the site will drain into the Silver Creek watershed. Run-off will be collected in storm sewers and conveyed to an LID system within Block 362 via an oil-grit separator (OGS) unit in Block 348. The LID and OGS systems will provide the requisite quality and quantity controls, refer to SWM report by TYLin (March 2025) for details.
- The southern portion of the site will drain into the Credit River with runoff directed to a SWM pond in Block 359 for quantity and quality control. Discharge from the SWM pond, including the emergency overflow, will be conveyed via an 1200mm-dia storm sewer along Adamson Street to the Credit River. Refer to **Figure 5** of **Appendix B** for preliminary profile of the SWM pond outlet.
- The minor system will consist of pipes ranging in size from 300mm-dia to 1800x1200 box culverts. The storm sewers are designed to operate a maximum capacity of 90% while conveying runoff from the 5-year event.
- The storm sewers have been designed with cover ranging from 2.2m-2.5m. However, along streets 'T' & 'R' and portions of Street 'M', the pipes will be at 1.50m of cover. Lots and Blocks on street 'T' & 'R' and portion of Street 'M' will require sump pumps.
- The storm sewers along Norval Bypass are designed to capture and convey flows from a portion of the bypass. The design of this section of storm sewers will be coordinate with the Region during the Norval West Bypass EA process.

4.3 Major System

Key design features of the proposed storm sewer network are summarized below.

- Runoff from storm events exceeding the 5-year return period will be conveyed overland along the internal road network toward designated low points. Refer to **Figure 4** of **Appendix B** for details.
- Overland flow directed to the SWM pond will be captured in the storm sewers on either side of Norval Bypass. The storm sewers along Norval Bypass are designed to capture and convey both the minor and major system flows to the SWM pond.
- Overland flow directed to the LID will be captured in the storm sewers and the pipe segment upstream of the LID will be designed to convey the 100-yr flows.
- Rooftop drainage from the commercial / mixed-use block will be directed to Levi Creek via existing 450mm diameter culvert under 10 Side Road, maintaining pre-development flow conditions and ensuring compliance with stormwater management requirements.

5 SANITARY SERVICING

5.1 Existing Wastewater Infrastructure

The existing residential community west of the subject site is serviced by a sanitary sewer network that discharges into an existing Wastewater Pumping Station (WWPS) at the northwest corner of 10^{th} Line and 10 Side Road. There is an existing 200mm-dia sanitary sewer along 10^{th} Line that conveys wastewater flows from the residential community west of the subject site the WWPS. Per discussions with the Region and our review of the WWPS design reports and drawings, the existing wastewater infrastructure does not have the capacity to service the proposed development at Russell Pines.

5.2 Planned Wastewater Infrastructure

In addition to the above, the Region has identified through Sustainable Halton Water and Wastewater Master Plan the need for a WWPS to service the Southeast Georgetown Secondary Plan area (Region DC Project No.6589). Flows from the WWPS will be discharged to the 1200mm-dia trunk sanitary sewer on 9^{th} Line via a proposed forcemain (Region DC Project No. 6496). Detailed design of these Regional projects is slated to start in 2028 and commissioned by 2031. The Region has allocated a budget for both these projects.

5.3 Design Criteria and Wastewater Flows

TYLin assessed wastewater flows to be generated by the proposed development using the Halton Region's Linear Design Manual (dated 2024) and the Halton Region Development Charges Background Study (dated 2022). The difference between the two methods lie in how the population generated by the proposed development is determined. Population determined by the Linear Design Manual is based on area, whereas population determined by the DC Background Study is based on the units. **Tabel 2 and Table 3** summarize the two design criteria.

Table 2 – Wastewater Design Criteria – Halton Region Linear Design Manual

Parameter	Value
Average Residential Flow	215 x Peak Flow (l/c/d)
Average Commercial Flow	185 x Peak Flow (l/c/d)
Inflow and Infiltration Design Allowance	0.286 l/s/h
Single Family	95 person/ha
Street Townhouse, Intensification Area Townhouse, or Back-to-Back	260 person/ha
Stacked Townhouses Low/Mid-Rise Apartments outside Strategic Growth Areas	420 person/ha
Light Commercial Areas	90 person/ha
Community Services	40 person/ha

Table 3 – Wastewater Design Criteria – Halton Region DC Background Study

Parameter	Value
Average Residential Flow	215 x Peak Flow (l/c/d)
Average Commercial Flow	185 x Peak Flow (l/c/d)
Inflow and Infiltration Design Allowance	0.286 l/s/ha
Single Family	3.772 ppu
Street Townhouse, Intensification Area Townhouse, or Back-to-Back	2.851 ppu
Light Commercial Areas	90 persons/ha
Community Services	40 persons/ha

Based on the above design criteria, the peak wastewater flows based on the Linear Design Manual will be 44.1L/s and based on the DC Background study will be 32.5 L/s. Refer to sanitary sewer design sheets in **Appendix D**.

The criteria stipulated in the Linear Design Manual is appropriate to use when the details of the proposed development are not clear. However, in the case of Russell Pines Property Corp. subdivision the number of units and unit types are specified; therefore, it is more appropriate to use the design criteria based on the DC Background Study.

5.4 Proposed Infrastructure

The proposed sanitary sewer network has been designed in accordance with the Region's design guidelines. A preliminary sanitary servicing and drainage plan for the proposed development has been prepared and presented on **Figure 6** of **Appendix B**. The sanitary sewer design sheet is included in **Appendix D.**

Key design features of the proposed sanitary sewer network are summarized below.

- The sanitary sewers have been designed with a minimum size of 200mm-dia per the Region standards.
- The sanitary sewers have been designed with a minimum cover of 3.25m to ensure all basements can be serviced.
- The sanitary sewers have been designed with sufficient slopes to ensure the Region's minimum velocity is met.
- The sanitary sewers will discharge into the proposed WWPS located along the Norval West Bypass in the commercial block. The depth of the sanitary sewers at the WWPS will be 5.0m.
- A WWPS with a capacity of 32.5 L/s is required, along with twin 250mm-dia discharging to the existing 1200mm-dia trunk sewer on 9th Line at 10 Side Road.

As mentioned previously, the WWPS and associated forcemain will be ready by 2031. However, if the proposed development moves forward prior to the construction of the Regional DC projects, Russell Pines Property Corp. would like to explore alternative delivery methods with the Region.

5.5 Wastewater Area Servicing Plan

5.5.1 Wastewater Modelling

As part of the Region's requirement to prepare an Area Servicing Plan (ASP) TYLin assessed the impact of the proposed development on the existing and proposed Regional infrastructure. TYLin obtained the Region's latest wastewater model and added the following parameters to the model to simulate the impact of the proposed development. Refer to **Appendix F** for details of wastewater modelling.

- A WWPS was added in the southeast corner of Southeast Georgetown Secondary Plan area.
- A forcemain along 10 Side Road from Adamson Road to Ninth Line.
- A discharge rate of 32.5 L/s from the WWPS.
- Model the dry and wet weather scenarios.

However, the Region's latest wastewater model does not include the recently constructed trunk sanitary sewer along Ninth Line that eventually discharges to the mid-Halton sewage treatment plant. Therefore, we could not assess the impact of proposed development on the existing Regional infrastructure; however, the discharge from the Southeast Georgetown WWPS is miniscule in comparison to the capacity of the 1200mm-dia trunk sewer.

A detailed sanitary discharge report will not be provided, as this is a typical residential subdivision. The sewage runoff will follow the standard parameters set by the Halton Guidelines, ensuring compliance with Regional design criteria.

5.5.2 Proposed Wastewater Pumping Station Location

The proposed WWPS will play a crucial role in managing wastewater from the proposed development. TYLin has assessed several potential locations for the proposed WWPS. The potential locations of these WWPS are illustrated in **Figure 7** of **Appendix B** and described below.

- **Option 1**: The WWPS is to be located within the commercial/mixed use Block 345 and adjacent to Norval West Bypass.
- **Option 2**: WWPS to be located within the SWM pond Block 359 and adjacent to Norval West Bypass.
- **Option 3**: WWPS to be located within the Greenbelt lands in Block 360 and adjacent to Adamson Street.
- **Option 4**: WWPS to be located outside the Russell Pine Property Corp and south 10 Side Road near the future Norval West Bypass roundabout.

Each of the above options were evaluated based on the following criteria, a detailed assessment of these locations can be undertaken during WWPS Municipal Class Environmental Assessment (MCEA) process:

- Ease of obtaining property
- Impact on associated forcemain to 9th Line trunk sewer
- Access during Norval Bypass construction
- Provisions for emergency overflow
- Impact on future residential properties

It is assumed that the construction cost of each option would be similar as they are all proposed within generally the same area and the WWPS capacity will remain the same between all options.

Table 4 – Comparison of the WWPS Location Options

Evaluation Criteria	Option 1	Option 2	Option 3	Option 4
Property Acquisition	Within Draft Plan of Subdivision	Within Draft Plan of Subdivision	Within Draft Plan of Subdivision	Property acquisition would be required
Impact on Forcemain	Shortest length of FM	Additional 50m length of FM	Additional 200m length of FM	Additional 50m length of FM
Access to WWSP	Interim access off commercial block, future access off Norval Bypass	Future access off Norval Bypass, but interim access would have to be coordinated during construction of Norval Bypass	Interim access from proposed subdivision, future access off Norval Bypass	Future access off Norval Bypass, interim access off 10 Side Road would have to be coordinated during construction of Norval Bypass
Emergency Overflow	SWM pond outlet pipe can be used as emergency overflow	SWM pond outlet pipe can be used as emergency overflow	SWM pond outlet pipe can be used as emergency overflow	Would require a longer pipe overflow pipe to Credit River
Impact on Residents	WWPS would be located away from residents and impact on commercial block will be minimal	WWPS would be located away from residents, but it will take space from SWM pond and reduce its capacity. Future expansion of pond will have to account for WWPS	WWPS would be located near residential units, with odour being an issue. The location of WWPS may also impact Parks operations	WWPS would be located away from residents and impact on commercial block will be minimal.

Based on the above cursory evaluation, we believe that the WWPS should be located within the future commercial / mixed use block within the Draft Plan of Subdivision. This location has the following advantages.

- The property required for the WWPS is within the Draft Plan of Subdivision and the Region would not have to expropriate it from an adjacent landowner that has no plans to develop their site.
- The length of associated forcemain would be the shortest compared to other options.
- The WWPS can be accessed through the subdivision via the commercial block without interfering with the construction of Norval West Bypass. Once the bypass is constructed an additional access can be provided from the new Regional road.
- The emergency overflow from the WWPS can be provided via the adjacent SWM pond outlet pipe, only requiring the construction of a short section of pipe across the Norval West Bypass corridor.
- The WWPS would be located further from the residential blocks, thereby reducing impact from odor.

5.5.3 Proposed Wastewater Pumping Station

The proposed WWPS will play a crucial role in managing wastewater from the proposed development. Based on the peak wastewater flows from the proposed subdivision. The WWPS will require a 7mx7m building within a 20mx20m block of land to be transferred to the Region.

The WWPS is designed to handle an incoming flowrate of 32.5 L/s. This station will collect and convey wastewater from the new development, ensuring effective integration into the broader sewage system. The forcemain will discharge to the existing trunk sewer on 9th Line and 10 Side Road.

Design Guidelines

The SPS will be designed in accordance with the “Design Guidelines for Sewage Works, Ministry of the Environment, PIBS 6879, 2008” (MOE Guidelines) and Halton Region - Water and Wastewater Facilities Design Manual (May 2021).

Design Basis

Halton Design Manual note that Design 3 as shown in **Figure 2** should be used for stations handling peak flows between 26 L/s and 53 L/s. In this design, three submersible pumps (lead/lag/standby) will be installed in a wet well with a separate control building to house electrical and control equipment, plus below-grade valve chamber. The building will have an emergency generator sized for all connected loads.

Site Elevations

Relevant site elevations for the SPS are:

- Grade elevation of pumping station: ~224.40 m
- Influent Invert Elevation: ~219.43 m
- Forcemain Tie-in Invert Elevation: ~238.70 m

The WWPS will include:

- Three sewage pumps
- Lifting mechanism for removal of equipment and pumps
- Standby diesel generator
- At least one metre of space around major equipment for access and servicing
- Odour control unit

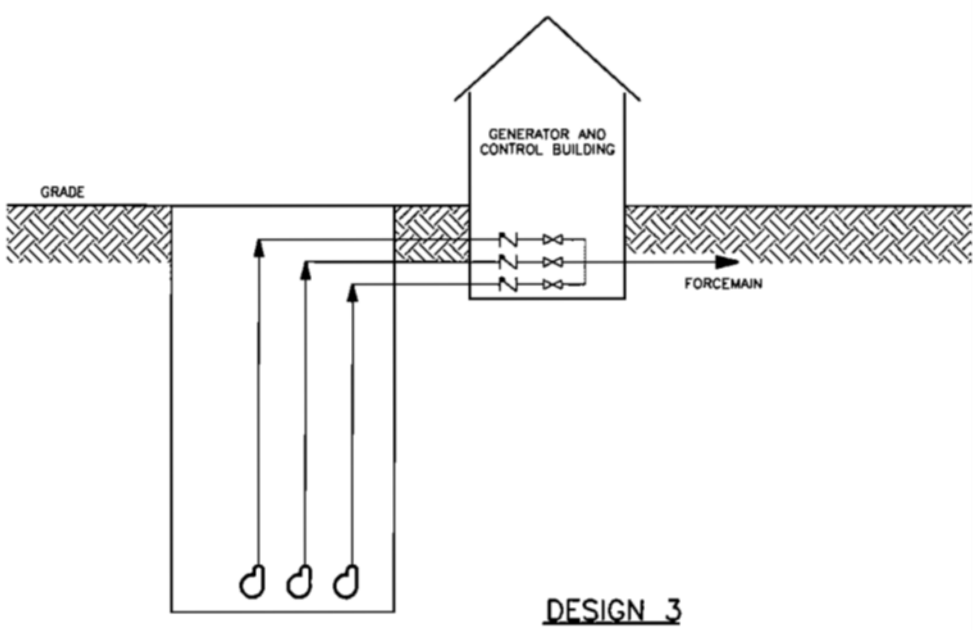


Figure 2 – Halton Region Design Standards – Design 3

Emergency Storage

Emergency storage provides response time prior to overflows or basement flooding should both pumps and emergency generator fail. Halton Design Manual require at least 1 hour of emergency storage within the wet well for pumping stations following Design 3 as described above.

At the peak flow of 32.5 L/s, 117 m^3 of emergency storage volume is required to meet 1 hour of emergency storage. A 6.00 m diameter wet well with a functional depth of 4.5 m was selected at this stage for the pumping station to meet this requirement.

Emergency Overflow

The adjacent SWM pond in Block 359 will be designed with an outlet pipe conveying stormwater run-off along Adamson Street to Credit River. The proposed WWPS will be designed within an emergency overflow pipe that will discharge into the SWM pond outlet pipe. This arrangement will ensure the WWPS has an emergency outlet while avoiding construction of a dedicated overflow pipe for the WWPS.

Forcemain Size

Per Halton Design Manual, a twinned forcemain will be designed with flow velocities between 0.8 m/s to 2.5 m/s. Maintaining a minimum velocity is critical in a forcemain since lower velocities will result in settling of sediment within the lines.

The design will include a 250 mm diameter forcemain will provide a velocity of 0.66 m/s at the peak flow of 32.5 L/s. The forcemain is approximately 2000 m long.

The total dynamic head through a forcemain of this size, with consideration for the static head induced by the change in elevation from the suction elevation of 213.43 m to the forcemain discharge invert elevation of 238.70 is estimated at 30.4, corresponding to a 20 kW pump at the 32.5 L/s peak flowrate.

Emergency Generator

The Pumping Station will include an emergency generator with an Automatic Transfer Switch (ATS) that will automatically start in case of a power outage. The generator will be sized for all connected loads. A fuel storage tank will provide the generator sufficient diesel for a 24-hour power outage situation. Based on generator size and selection, the fuel tank will likely be sub-base to minimize building footprint. A level indicator will alert to SCADA the volume of diesel available.

The size of the diesel generator will be determined during detailed design. The initial pumps selected are 20 kW (24hp). At this stage, it is estimated that the generator will require 100 kW to power all connected loads.

Cost Estimate

The Class 5 budgetary construction cost estimate for the proposed works is **$6 million**, based on previous project experience.

The following assumptions have been made for the cost estimate:

- All values are in 2025 dollars.
- Cost increase on commodities, exchange rates, and other force majeure impacts are not considered.
- Level of Accuracy is between -50% / +100%.
- The cost estimate excludes all soft and detailed design costs.

5.5.4 Proposed Wastewater Pumping Station Forcemain

Discharge from the proposed WWPS will be conveyed to the existing 1200mm-dia trunk sewer on 9th Line via a twin 250mm-dia forcemain along 10 Side Road.

TYLin has obtained plan & profile drawings of 10 Side Road in PDF format and super imposed a preliminary layout for the proposed FM along the route. Below are key design elements of the FM design. Refer to drawings in **Appendix G** for details.

- The proposed FM will be constructed along the southern limits of 10 Side Road to avoid high voltage lines along the northern boulevard.
- The FM will be constructed through open-cut methods, except for crossings at the round about at 10th Line and 10 Side Road (250m), box culverts at Hartwell Road (120m), and intersection of 9th Line and 10 Side Road (100m). The proposed alignment has been selected to ensure there are minimal disruptions to 10 Side Road.
- The open cut sections will require relocating existing light poles along the south boulevard. Other utility relocations have also been identified, such as Bell, traffic lights, guy wires, etc.
- The proposed design envisions a 300mm-dia sanitary sewer from 120m east of 9th Line to the existing trunk sewer stub at the southwest quadrant of the intersection. The proposed FM will discharge to this new sanitary sewer.
- The proposed FM will require one drain valve chamber west of Hartwall Road and an air release valve chamber east of Hartwall Road.
- We anticipate the proposed FM will cost **$3.5 million** in 2025 dollars.

5.5.5 Project Delivery Timeline

As mentioned previously, the Region has identified the need for a WWPS and associated forcemain to service the Southeast Georgetown Secondary Plan area (Region DC Project No.6589 and 6496). The Region has confirmed that the WWPS would be subject to a Municipal Class Environmental Assessment (MCEA) which will start in 2025. These projects are to go through detailed design process in 2028 and commissioned by 2031. However, the Region’s project delivery timeline does not align with the proposed development timeline with occupancy envisioned by end of 2028. Russell Pines Property Corp. is open to discussing alternative project delivery methods whereby TYLin can undertake the MCEA, detailed design, and contract administration of the project.

6 WATER SERVICING

6.1 Existing Water Distribution Network

The existing water network around the subject property consists of a 300mm watermain that runs along 10th Line from Argyll Road to 10 Side Road and continues along 10 Side Road to Ninth Line, and 600mm-dia watermain along 10 Side Road that terminates at 10th Line and 10 Side Road.

6.2 Planned Water Distribution Network Upgrades

A future watermain project (DC project #6613, 6614, and6615) is planned to enhance the network's capacity, involving the installation of a 600mm watermain along 10 Side Road from 10th Line to Guelph Street. This project is scheduled to be commissioned in 2029. These improvements will not only enhance the capacity and reliability of the water supply infrastructure but also provide sufficient capacity to accommodate the development of the subject site. The existing and future network is shown on **Figure 6** of **Appendix E**.

The Region's project delivery timeline does not align with the proposed development timeline with occupancy envisioned by end of 2028. Russell Pines Property Corp. is open to discussing alternative project delivery methods whereby TYLin can undertake the detailed design, and contract administration of the project.

6.3 Design Criteria

The Region's design criteria are summarised in **Table 4**. These criteria were used in this analysis.

Table 5 – Water Design Criteria

Parameter	Value
Average Residential Flow	275 l/c/d
Average commercial Flow	225 l/c/d
Residential Density (Low)	3.772 persons/unit
Residential Density (Medium)	2.851 person/unit
Equivalent Population Commercial	90 persons/ha
Equivalent Population Park	40 persons/ha

6.4 Analysis Methodology

To assess the water servicing requirements for the proposed subdivision, Halton Region provided TYLin with its latest water model. The analysis was conducted using hydraulic modeling software to evaluate system pressures, flow rates, and fire flow capacity under various demand scenarios, including average day, peak hour, and maximum day demand with fire flow conditions. Refer to the water and wastewater model presented in **Appendix F**.

The evaluation considered existing and future water infrastructure, including the planned 600mm CPP watermain along 10 Side Road, to ensure the proposed development will have adequate water supply and pressure. The analysis also reviewed redundancy and looping within the network to enhance system reliability.

A detailed Water Usage Report will not be provided, as this is a typical residential subdivision. The water demand will follow the standard parameters set by the Halton Guidelines, ensuring compliance with regional design criteria.

6.5 Proposed Water Network

The proposed development will be serviced by 300mm-dia watermain on Streets ‘A’ and ‘B’ which will connect to the proposed 600mm-dia CPP watermain on 10 Side Road and the existing 300mm-dia watermains on at Danby Road and Argyll Road.

All the other streets within the proposed subdivision will contain 150mm and 200mm-dia watermain, where the development north of the pond block will be serviced by two watermain connections through the bypass road.

A preliminary watermain network plan for the proposed development has been prepared and presented on **Figure 8** in **Appendix B**.

7 PROPOSED RIGHT-OF-WAYS AND TRAILS

The proposed subdivision consists of 20, 23, and 26m public rights-of-way. The 20m right-of-way will be designed as per Town of Halton Hills standard No. 402, with sidewalk on one side of the ROW.

The 23m ROW will be designed to accommodate vehicular traffic while balancing space for other transportation modes. There will be two travel lanes (3.5m wide), one on each direction. The ROW will include one 1.8m wide bike lane per direction, ensuring dedicated space for cyclists on both sides of the roadway. There will be on-street parking on one side of the ROW. Sidewalks in the 23m ROW will be 1.8 to 2.1 meters wide on both sides of the street, providing pedestrian access while maintaining efficient land use. These sidewalks will be separated by a boulevard, depending on space constraints.

For the 26m ROW, the increased width will allow for more dedicated space for cycling and parking. This configuration will include one bike lane in each direction, similar to the 23m ROW, but with additional buffer space, making cycling safer and more comfortable. The bike lanes will be 1.8 meters wide, providing improved accessibility for cyclists. In terms of parking, the wider ROW permits the inclusion of dedicated parking lanes on both sides of the roadway, each 2.4 meters wide. Sidewalks will be 1.8 to 2.1 meters wide on both sides of the street and vehicular travel lanes will be 3.5 meters wide per lane.

A trail network is proposed within the subdivision as well, connecting the NHS, parks, and Greenbelt lands.

Refer to **Figures 9-10** in **Appendix B** for cross-sections of the public rights-of-way and layout of sidewalks and trails.

8 CONCLUSION

Based on our review of the Draft Plan of Subdivision and analysis of existing and future infrastructure, we can conclude the proposed subdivision can be serviced per Town of Halton Hills and Halton Region design guidelines and standards. A summary of findings is as follows:

- The proposed grading design will follow the WSP Scoped Subwatershed Study, ensuring proper drainage to the Credit River, Levi Creek, and Silver Creek, while aligning with regional water resource policies and minimizing disruption to the surrounding land.
- The minor system will effectively manage runoff from a 5-year storm event with a storm sewer network operating at maximum 90% capacity. The major system will handle storms exceeding the 5-year event by directing overland flows to an LID system in the Greenbelt lands or south to a SWM pond east of Norval Bypass.
- The proposed sanitary system is designed for gravity flow and complies with Region of Halton design criteria. The development is expected to generate an incoming flowrate of 32.5 l/s. Per Region of Halton Capital Works Project, a WWPS is required to service Southeast Georgetown Secondary Plan area. The proposed WWPS will be generally in line with the Region estimate, cost wise, and a 250mm-dia forcemain will be required to convey flows from the WWPS to the 1200mm-dia trunk sewer on 9th Line.
- The proposed development will connect to a proposed 600mm-dia CPP watermain along 10 Side Road and the existing 300mm-dia watermains at Danby Road and Argyll Road. Internal watermains will range between 150-300mm dia.
- A portion of the Norval Bypass will be serviced by both storm and sanitary sewer systems, with the design for these systems to be coordinated with the Region to ensure effective integration and proper conveyance
- This report should be reviewed alongside other related documents supporting the proposed draft plan, specifically the Traffic Impact Study and Stormwater Management Report by TYLin.

We trust that this is sufficient for your purposes. If you have any questions or comments, please contact the undersigned.

Yours truly,

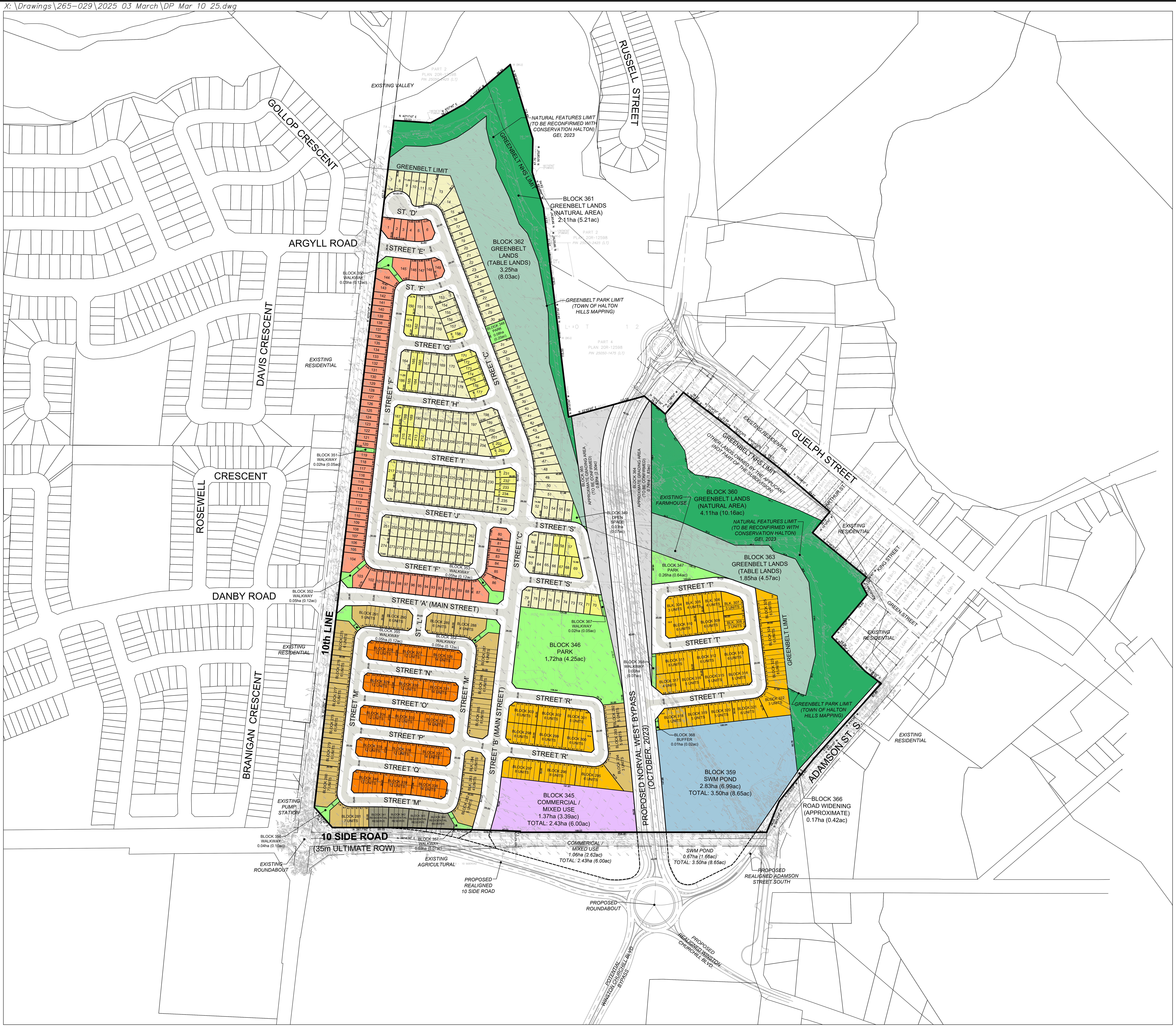
TYLIN.

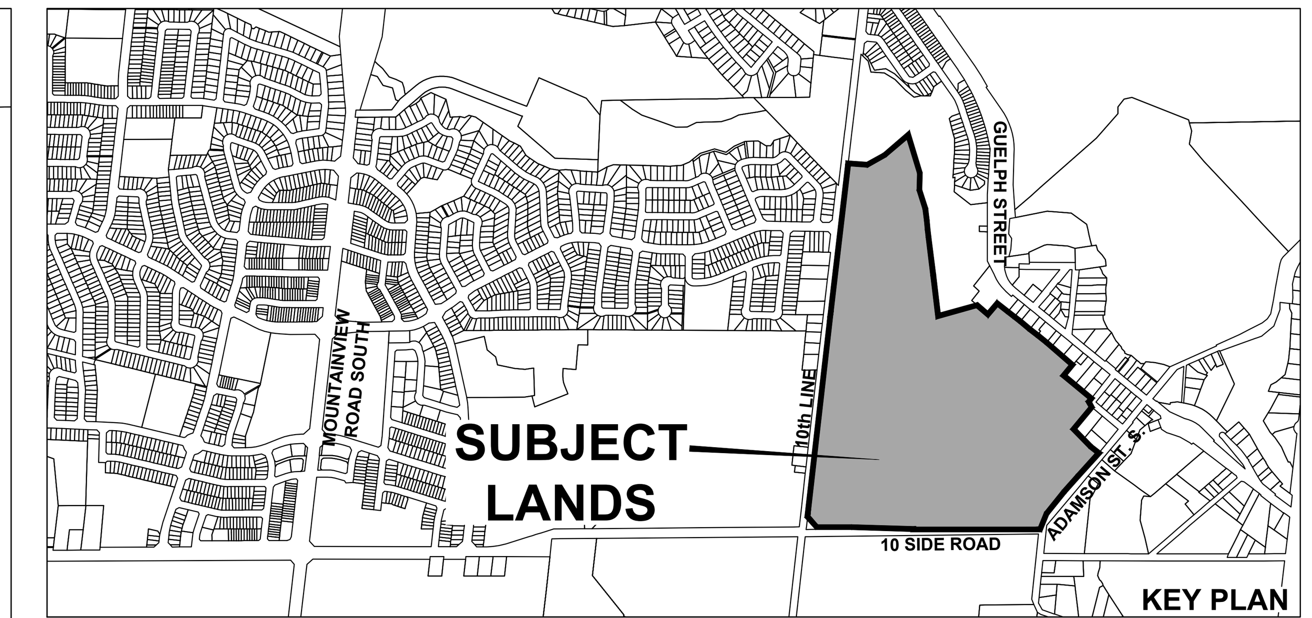
Prepared By:	Reviewed By:
Denise Morales,	Abdul Ahmadzai, P.Eng.
Project Manager	Director Land of Development

APPENDIX A

Draft Plan of Subdivision

X: \Drawings\265-029\2025 03 March\DP Mar 10 25.dwg





DRAFT PLAN OF SUBDIVISION

FILE # __________

RUSSELL PINES PROPERTY CORP.

PART OF LOTS 11 & 12, CONCESSION 11,
(GEOGRAPHIC TOWNSHIP OF ESQUESING)
FORMERLY THE VILLAGE OF NORVAL, NOW IN THE
TOWN OF HALTON HILLS
REGIONAL MUNICIPALITY OF HALTON

OWNERS CERTIFICATE

I HEREBY AUTHORIZE GLEN SCHNARR & ASSOCIATES INC. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE TOWN OF HALTON HILLS FOR APPROVAL.

SIGNED __________ DATE NOV. 13, 2024

JACK EISENBERGER
RUSSELL PINES PROPERTY CORP.

SURVEYORS 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 Nov. 1, 2024

SUNIL PERERA, O.L.S., O.L.I.P.
J.D. BARNES LIMITED
PROJECT SUPERVISOR
401 WHEELABRATOR WAY, SUITE A, MILTON
E:sperera@jdbarnes.com
T:905 875 9955

ADDITIONAL INFORMATION

(UNDER SECTION 51(17) OF THE PLANNING ACT) INFORMATION REQUIRED BY CLAUSES A,B,C,D,E,F,G, J & L ARE SHOWN ON THE DRAFT AND KEY PLANS.

H) MUNICIPAL AND PIPED WATER TO BE PROVIDED
I) SANDY LOAM AND CLAY LOAM
K) SANITARY AND STORM SEWERS TO BE PROVIDED

LAND USE SCHEDULE

LAND USE	LOTS / BLOCKS	AREA (ha)	AREA (ac)	UNITS	DENSITY (UPHA)
DETACHED - 9.15m (30')	1-274	1.21	2.99	39	13.04
DETACHED - 11.00m (36')		5.74	14.18	159	11.21
DETACHED (DUAL FRONTAGE) - 9.80m (32')		2.57	6.35	76	11.97
DUAL FRONTAGE TOWNHOUSES-6.10m (20')	275-294	2.61	6.45	111	17.21
STREET TOWNHOUSES - 6.10m (20')	295-325	3.73	9.22	169	18.34
BACK-TO-BACK TOWNHOUSES	326-340	1.85	4.57	190	41.56
RESIDENTIAL RESERVE	341-344	0.32	0.79		
COMMERCIAL / MIXED USE	345	1.37	3.39		
PARK	346-348	2.06	5.09		
OPEN SPACE / BUFFER	349,368	0.03	0.07		
WALKWAY	350-358,367	0.38	0.94		
SWM POND	359	2.83	6.99		
GREENBELT LANDS	360,361	6.22	15.37		
TABLE LAND GREENBELT	362,363	5.10	12.60		
GRADING AREA	364,365	1.67	4.13		
ROAD WIDENING	366	0.17	0.42		
20.0m LOCAL ROW (4,019m)		8.23	20.34		
23.0m COLLECTOR ROW (212m)		0.50	1.24		
26.0m COLLECTOR ROW (993m)		2.61	6.45		
42.0m NORVAL WEST BYPASS		2.66	6.57		
TOTAL	**368**	**51.86**	**128.15**	**744**	**42.01**

NOTES

- LOCAL TO LOCAL DAYLIGHT TRIANGLES = 4.5m x 4.5m
- LOCAL OR COLLECTOR TO COLLECTOR DAYLIGHT TRIANGLES = 7.0m x 7.0m
- LOCAL OR COLLECTOR TO ARTERIAL DAYLIGHT TRIANGLES = 15.0m x 15.0m

SCALE: 1:2500
(24 x 36)
MARCH 10, 2025

GSAI
Glen Schnarr & Associates Inc.

APPENDIX B

Preliminary Design Figures

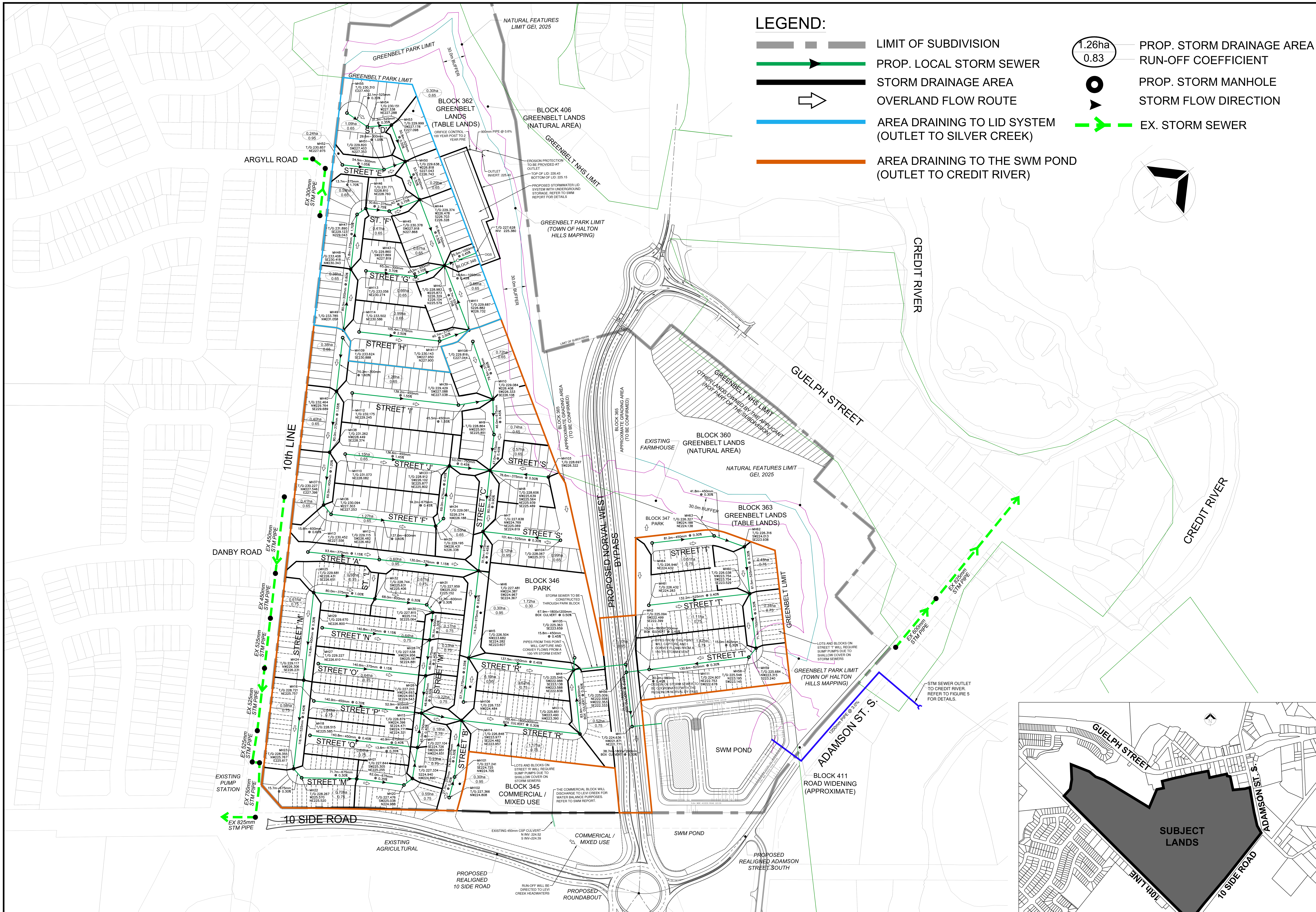
TYLin

3381 Steeles Avenue East, Suite 315
Toronto, ON
M2H 3S8
p: 905.738.5700

RUSSELL PINES PROPERTY CORP.

FUNCTIONAL SERVICE REPORT
GRADING PLAN

SCALE: 1:1500		PROJECT No. 100160
DATE: MARCH 2025		FIGURE No. 3
DESIGNED BY: U.A	DRAWN BY: CAD	
CHECKED BY: A.A	CHECKED BY: A.A.	



TYLin

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Toronto, ON
M2H 3S8
p: 905.738.5700

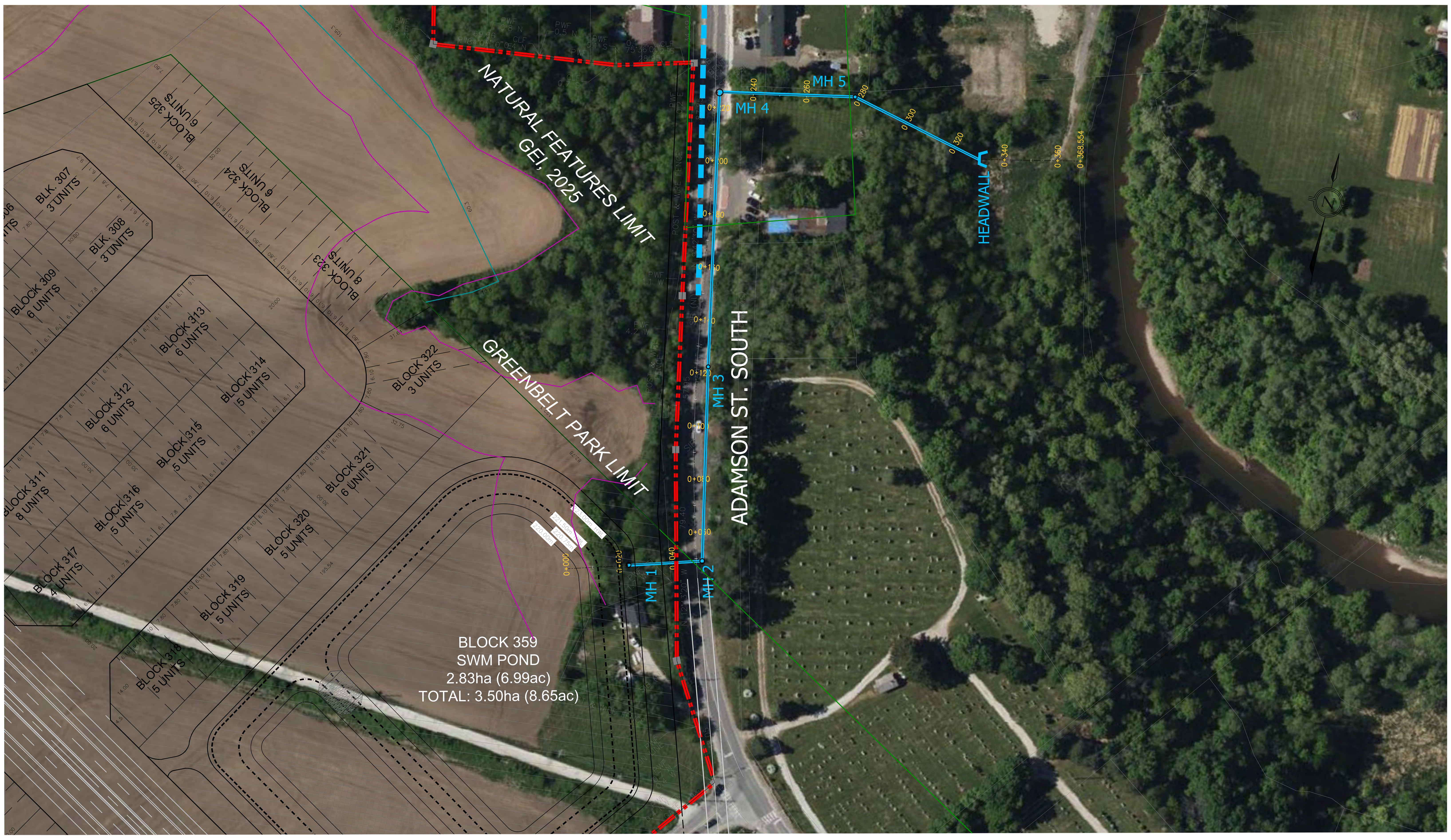
RUSSELL PINES PROPERTY CORP.

FUNCTIONAL SERVICE REPORT
STORM SERVICING AND DRAINGE PLAN

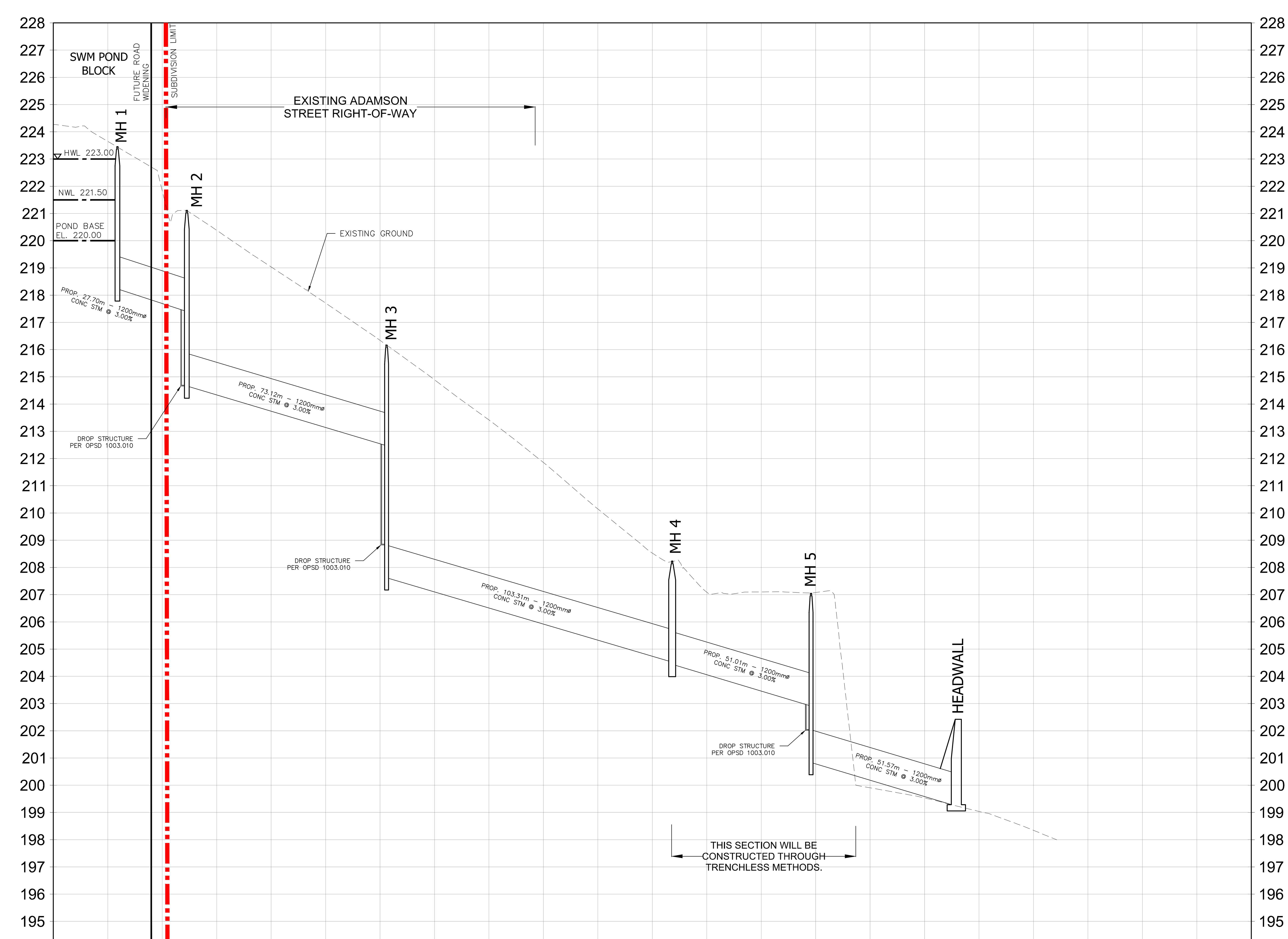
SCALE: 1:1500	
DATE: MARCH 2025	
DESIGNED BY: U.A	DRAWN BY: CAD
CHECKED BY: A.A	CHECKED BY: A.A.

PROJECT No. 100160

FIGURE No. 4



PROPOSED STORM OUTFALL

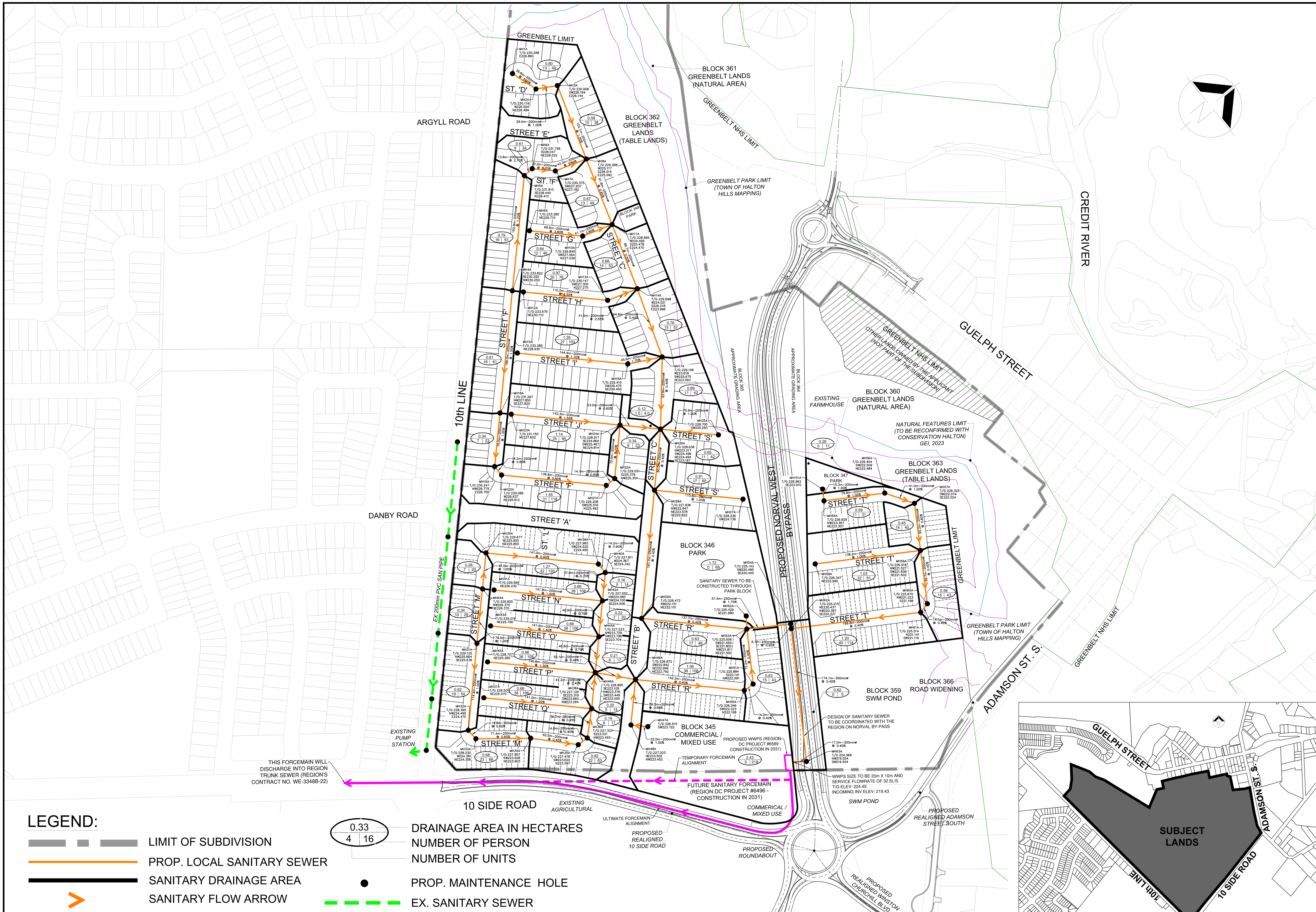


C/L CHAINAGE	EXISTING C/L ROAD
0+020	223.647
0+040	221.835
0+060	220.383
0+080	219.036
0+100	217.709
0+120	216.340
0+140	214.892
0+160	213.418
0+180	211.852
0+200	210.148
0+220	208.527
0+240	207.092
0+260	207.101
0+280	207.079
0+300	199.906
0+320	199.532
0+340	199.036
0+360	198.342
0+380	
0+400	
0+420	
0+440	

TYLin

SWM POND DISCHARGE PIPE
RUSSELL PINES PROPERTY COPR.

SCALE: HOR 1:1000 VER 1:100		PROJECT No.	100160
DATE: MARCH 2025			
DESIGNED BY: U.A.	DRAWN BY: U.A.	FIGURE No.	5
CHECKED BY: D.M.	CHECKED BY: L.K.		



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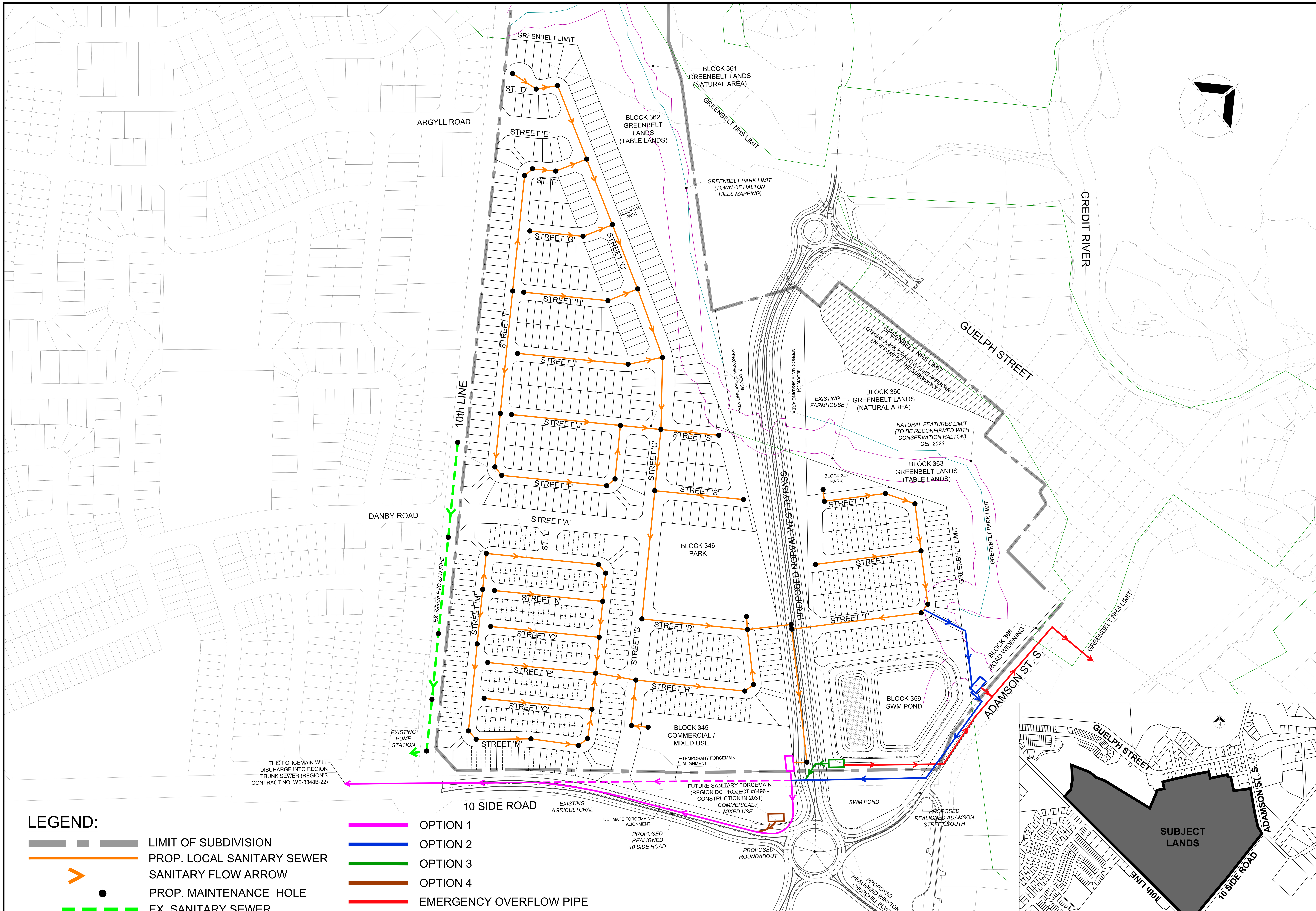
RUSSELL PINES PROPERTY CORP.

FUNCTIONAL SERVICE REPORT
SANITARY SERVICING AND DRAINAGE PLAN

SCALE: 1:1500		PROJECT No.	100160
DATE: MARCH 2025			
DESIGNED BY: U.A	DRAWN BY: CAD	FIGURE No.	6
CHECKED BY: A.A	CHECKED BY: A.A.		



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Toronto, ON
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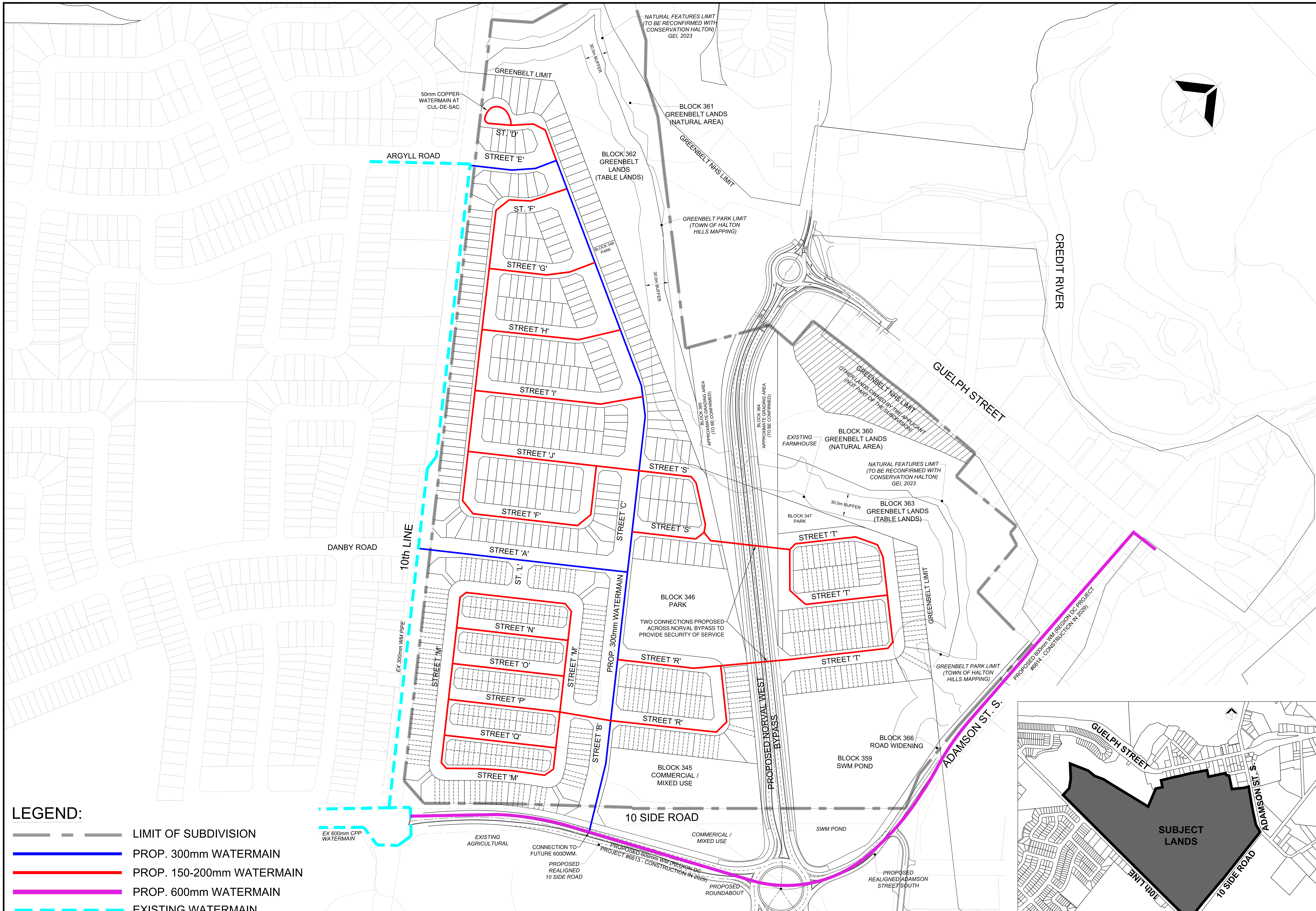
p: 905.738.5700

RUSSELL PINES PROPERTY CORP.

FUNCTIONAL SERVICE REPORT
PROPOSED WASTEWATER SEWAGE PUMPING STATION LOCATIONS

SCALE: 1:1500		PROJECT No.	100160
DATE: MARCH 2025			
DESIGNED BY: U.A	DRAWN BY: CAD	FIGURE No.	7
CHECKED BY: A.A	CHECKED BY: A.A.		



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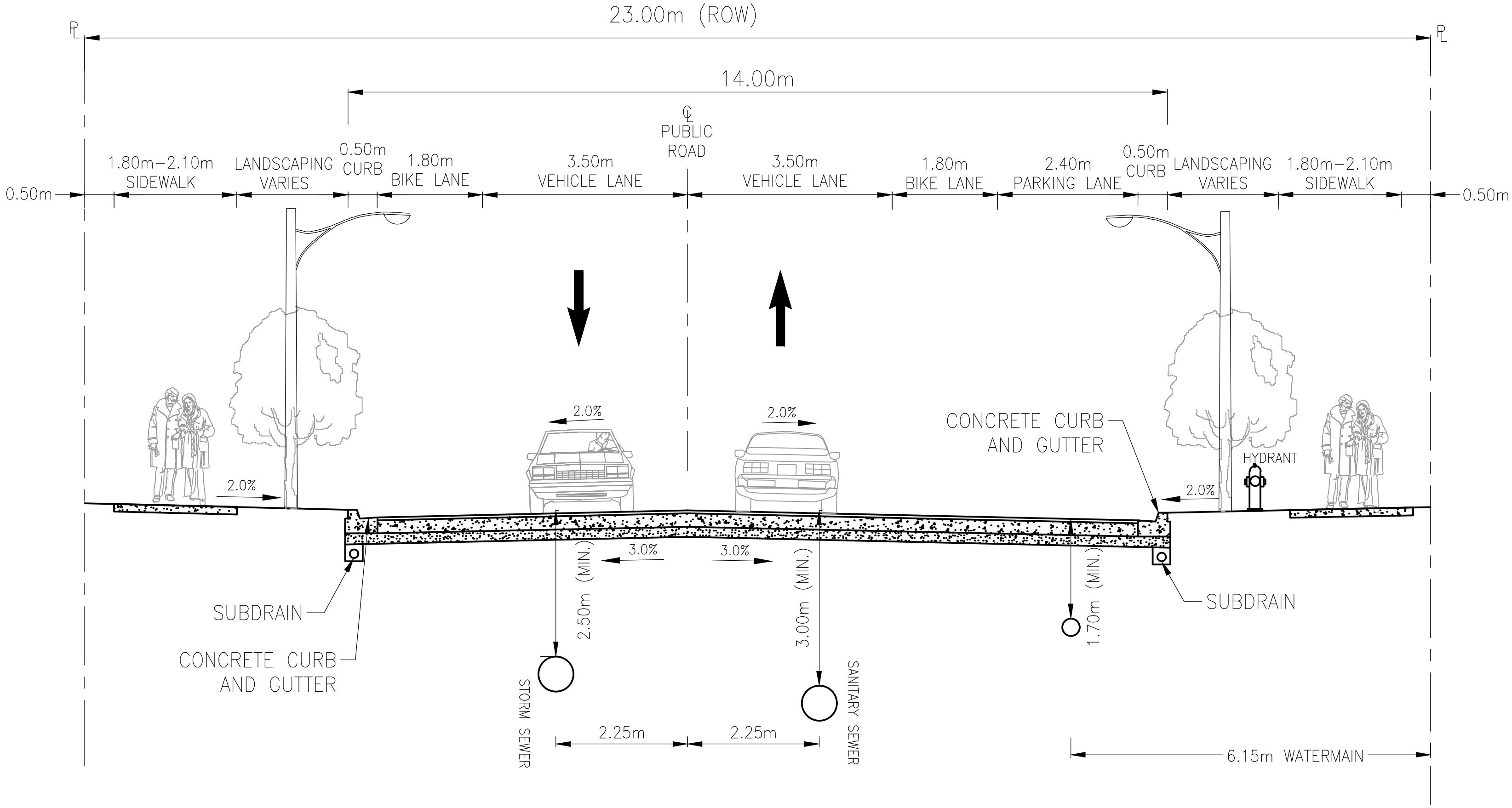
RUSSELL PINES PROPERTY CORP.

FUNCTIONAL SERVICE REPORT
WATERMAIN PLAN

SCALE: 1:1500	
DATE: MARCH 2025	
DESIGNED BY: U.A	DRAWN BY: CAD
CHECKED BY: A.A	CHECKED BY: A.A.

PROJECT No. 100160

FIGURE No. 8



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Toronto, ON
M2H 3S8
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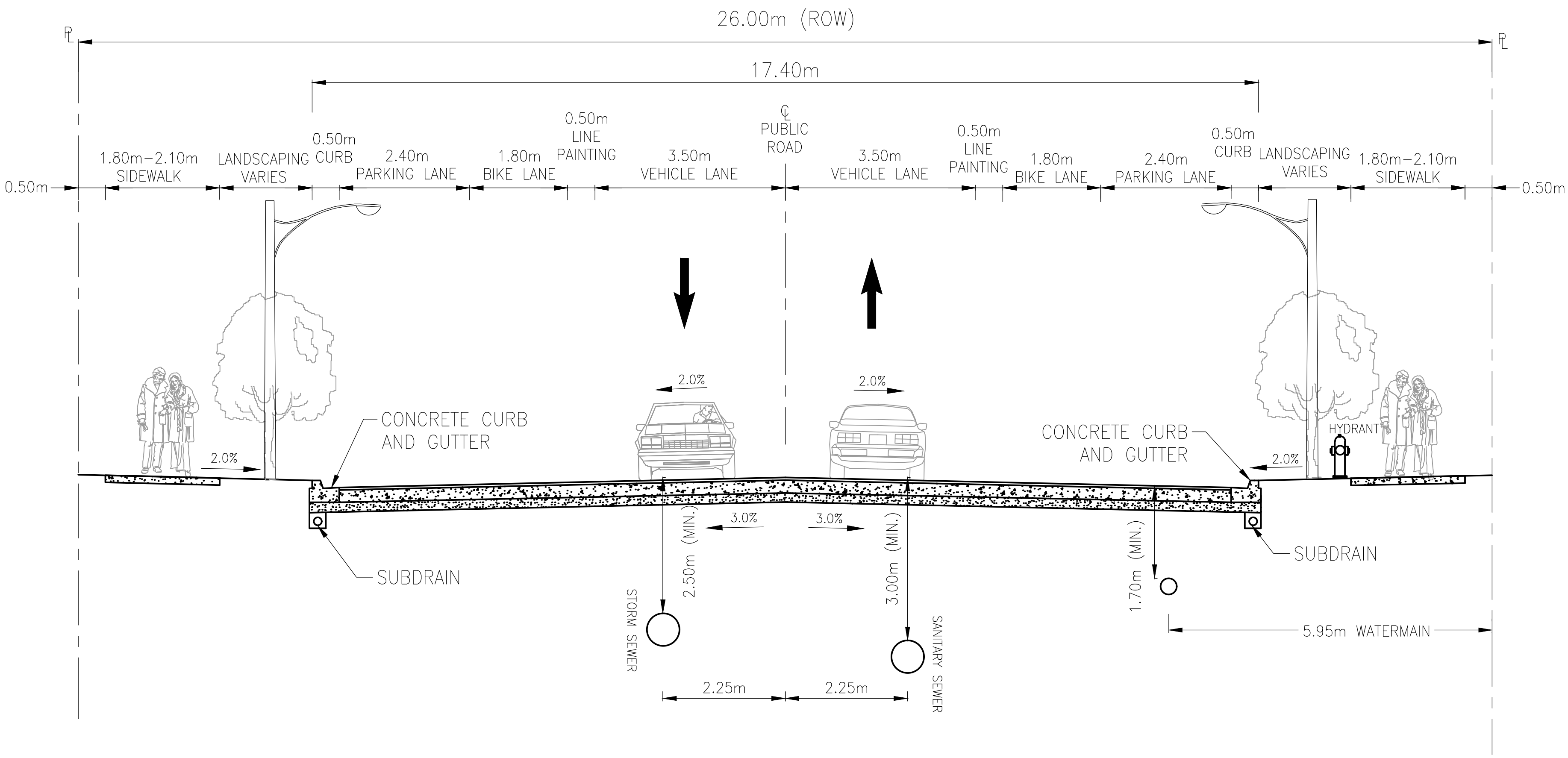
f: 905.738.0065

23.0m RIGHT-OF-WAY CROSS-SECTION

SCALE:	N.T.S.
DATE:	FEBRUARY 2025
DESIGNED BY:	U.A.
CHECKED BY:	D.M.

PROJECT No. 100160

FIGURE No. FIG-9A



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Suite 315
Toronto, ON
M2H 3S8

p: 905.738.5700
f: 905.738.0065

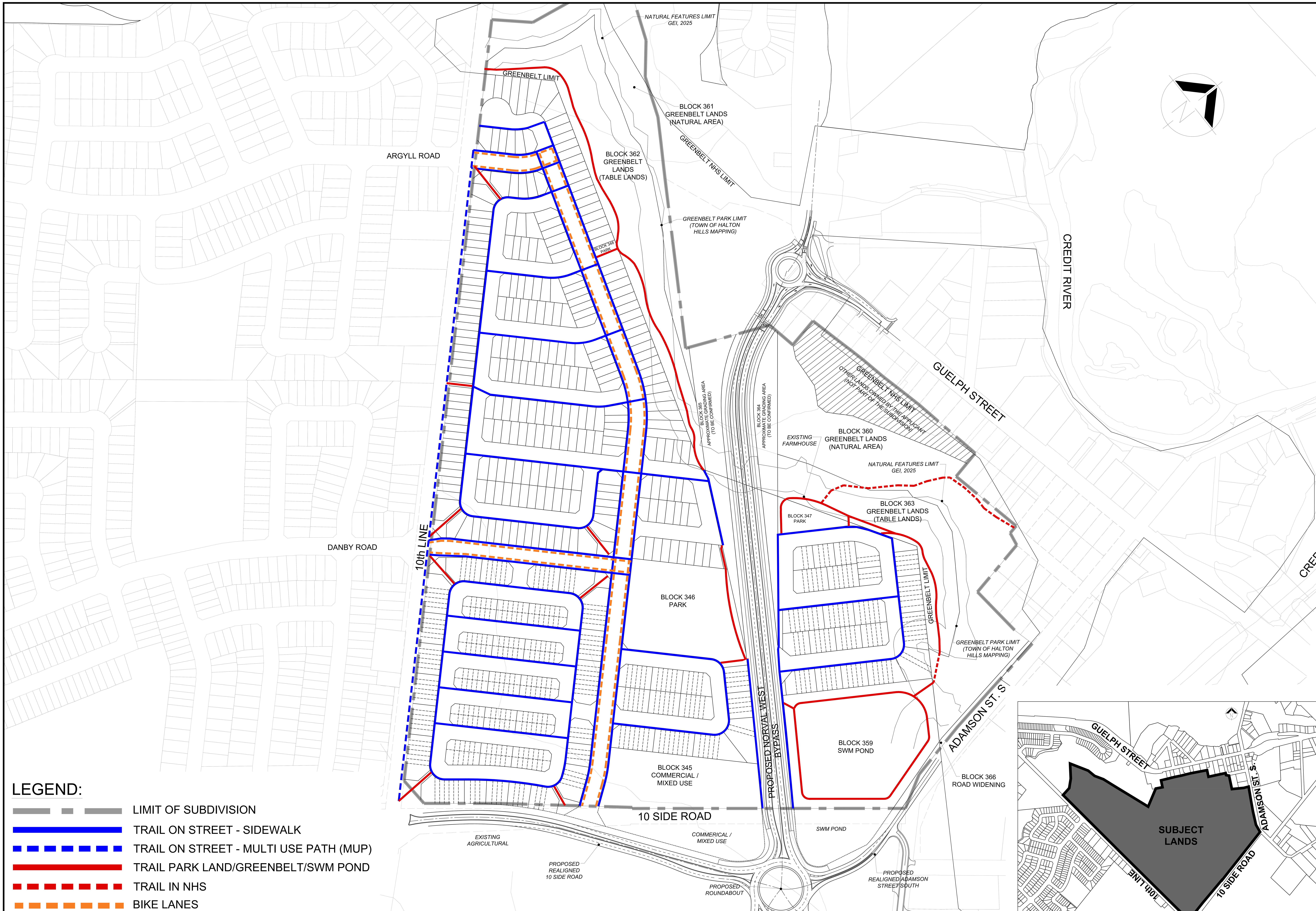
26.0m RIGHT-OF-WAY CROSS-SECTION

SCALE:	N.T.S.
DATE:	FEBRUARY 2025
DESIGNED BY:	U.A.
CHECKED BY:	D.M.

PROJECT No. 100160

FIGURE No. FIG-9B

File : G:\Projects\2024\100160 - Fieldgate - Russel Farms\Drawings\Report Figures\ROW Cross-sections.dwg, Layout : 26m-ROW Cross Section Date :Mar 17, 2025 - 10:38am, Edit By : umar.ayub



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Suite 315
Toronto, ON
M2H 3S8
p: 905.738.5700

RUSSELL PINES
PROPERTY CORP.

FUNCTIONAL SERVICE REPORT
ACTIVE TRANSPORTATION PLAN

SCALE: 1:1500	
DATE: MARCH 2025	
DESIGNED BY: U.A	DRAWN BY: CAD
CHECKED BY: A.A	CHECKED BY: A.A.

PROJECT No. 100160

FIGURE No. 10

APPENDIX C

Storm Sewer Design Sheet

Town of Halton Hills
STORM DESIGN SHEET

Project No. 100160
Location Georgetown

Date February 2025
Designed By U.A
Checked By D.M

Street	From	To	Area 'A' ha	Runoff Coefficient 'C'	A x R ha	Accum. AR ha	Rainfall Intensity 'I' 5-yr mm/hr	Flow 'Q' L/s	Pipe Length m	Slope %	Dia. mm	Full Flow Capacity L/s	Full Flow Velocity m/s	Flow Time in Pipe min	Time of Conc. min	Time of Conc. Down-stream m	Q/Qf %
AREA DRAINING TO THE SWM POND																	
STREET C	MH108	MH10	0.72	0.65	0.47	0.47	105.25	**136.9**	76.5	0.80%	375	156.8	1.42	0.90	10.00	10.90	87.3
STREET I	MH112	MH10	1.28	0.65	0.83	0.83	105.25	**243.4**	185.4	1.55%	450	355.0	2.23	1.38	10.00	11.38	68.6
STREET C	MH10	MH8	0.74	0.65	0.48	1.78	98.35	**487.0**	93.1	0.45%	675	563.9	1.58	0.98	11.38	12.37	86.4
STREET S	MH103	MH8	0.57	0.65	0.37	0.37	105.25	**108.4**	76.6	0.50%	375	124.0	1.12	1.14	10.00	11.14	87.4
STREET F	MH109	MH40	0.38	0.65	0.25	0.25	105.25	**72.3**	70.2	1.60%	300	122.3	1.73	0.68	10.00	10.68	59.1
	MH40	MH38	0.40	0.65	0.26	0.51	101.75	**143.4**	80.0	1.55%	375	218.3	1.98	0.67	10.68	11.35	65.7
	MH38	MH37	0.41	0.65	0.27	0.77	98.51	**211.8**	69.0	1.20%	450	312.3	1.96	0.59	11.35	11.94	67.8
	MH37	MH35	1.27	0.65	0.83	1.60	95.87	**426.2**	152.8	0.60%	600	475.6	1.68	1.51	11.94	13.45	89.6
	MH35	MH33	0.54	0.65	0.35	1.95	89.74	**486.5**	83.2	0.45%	675	563.9	1.58	0.88	13.45	14.33	86.3
STREET J	MH110	MH33	1.15	0.65	0.75	0.75	105.25	**218.7**	136.6	1.45%	450	343.3	2.16	1.05	10.00	11.05	63.7
STREET J	MH33	MH8	0.11	0.65	0.07	2.77	86.57	**666.4**	53.0	0.45%	750	746.8	1.69	0.52	14.33	14.85	89.2
STREET C	MH8	MH7	0.19	0.95	0.18	5.10	84.79	**1202.5**	80.0	0.90%	825	1361.8	2.55	0.52	14.85	15.38	88.3
STREET S	MH104	MH7	0.99	0.65	0.64	0.64	105.25	**188.3**	101.4	0.30%	525	235.6	1.09	1.55	10.00	11.55	79.9
STREET C	MH7	MH6	0.12	0.95	0.11	5.86	83.10	**1353.4**	51.5	0.45%	975	1510.0	2.02	0.42	15.38	15.80	89.6
STREET A	MH13	MH6	0.60	0.95	0.57	0.57	105.25	**166.8**	223.0	1.15%	375	188.0	1.70	2.18	10.00	12.18	88.7
STREET B	MH6	MH5	0.30	0.95	0.29	6.71	81.78	**1526.3**	114.0	0.60%	975	1735.9	2.33	0.82	15.80	16.62	87.9
STREET B	MH106	MH5	0.19	0.95	0.18	0.18	105.25	**52.8**	57.7	0.30%	375	96.0	0.87	1.11	10.00	11.11	55.0
STREET R	MH5	MH4	0.62	0.75	0.47	7.36	79.37	**1623.8**	137.5	0.45%	1050	1831.8	2.12	1.08	16.62	17.70	88.6
PARK	MH105	MH4	1.72	0.30	0.52	0.52	105.25	**151.0**	15.8	0.45%	450	191.3	1.20	0.22	10.00	10.22	78.9
STREET M	MH25	MH24	0.61	0.75	0.46	0.46	105.25	**133.9**	114.8	0.30%	450	156.2	0.98	1.95	10.00	11.95	85.7
	MH24	MH23	0.58	0.75	0.44	0.89	95.82	**237.7**	116.1	0.40%	525	272.0	1.26	1.54	11.95	13.49	87.4
	MH23	MH21	0.70	0.75	0.53	1.42	89.60	**353.1**	87.4	0.30%	675	460.4	1.29	1.13	13.49	14.62	76.7
	MH21	MH19	0.55	0.75	0.41	1.83	85.57	**435.3**	75.8	0.35%	675	497.3	1.39	0.91	14.62	15.53	87.5
	MH19	MH17	0.23	0.75	0.17	2.00	82.62	**459.9**	40.9	0.40%	675	531.6	1.49	0.46	15.53	15.99	86.5

Town of Halton Hills
STORM DESIGN SHEET

Project No. 100160
Location Georgetown

Date February 2025
Designed By U.A
Checked By D.M

Street	From	To	Area 'A'	Runoff Coefficient 'C'	A x R	Accum. AR	Rainfall Intensity 'I' 5-yr	Flow 'Q'	Pipe Length	Slope	Dia.	Full Flow Capacity	Full Flow Velocity	Flow Time in Pipe	Time of Conc.	Time of Conc. Down-stream	Q/Qf
			ha		ha	ha	mm/hr	L/s	m	%	mm	L/s	m/s	min	min	m	%
STREET Q	MH18	MH17	0.64	0.90	0.58	0.58	105.25	**168.5**	140.8	0.45%	450	191.3	1.20	1.95	10.00	11.95	88.1
STREET M	MH17	MH15	0.18	0.75	0.14	2.71	81.21	**612.6**	45.0	0.40%	750	704.1	1.59	0.47	15.99	16.46	87.0
STREET P	MH16	MH15	0.64	0.90	0.58	0.58	105.25	**168.5**	140.8	0.70%	450	238.5	1.50	1.56	10.00	11.56	70.7
STREET M	MH25	MH32	0.58	0.75	0.44	0.44	105.25	**127.3**	80.0	1.00%	375	175.3	1.59	0.84	10.00	10.84	72.6
	MH32	MH30	0.67	0.75	0.50	0.94	100.94	**263.1**	80.7	0.30%	600	336.3	1.19	1.13	10.84	11.97	78.2
	MH30	MH28	0.17	0.75	0.13	1.07	95.72	**283.4**	36.1	0.30%	600	336.3	1.19	0.51	11.97	12.48	84.3
STREET N	MH29	MH28	0.64	0.90	0.58	0.58	105.25	**168.5**	140.8	1.15%	375	188.0	1.70	1.38	10.00	11.38	89.6
STREET M	MH28	MH26	0.23	0.75	0.17	1.81	93.58	**471.8**	46.9	0.40%	675	531.6	1.49	0.53	12.48	13.00	88.7
STREET O	MH27	MH26	0.64	0.90	0.58	0.58	105.25	**168.5**	140.6	1.15%	375	188.0	1.70	1.38	10.00	11.38	89.6
STREET M	MH26	MH15	0.22	0.75	0.17	2.55	91.46	**649.5**	48.9	0.30%	825	786.2	1.47	0.55	13.00	13.56	82.6
STREET P	MH15	MH14	0.07	0.95	0.07	5.91	79.83	**1311.7**	52.9	0.65%	900	1459.5	2.29	0.38	16.46	16.84	89.9
STREET B	MH102	MH14	0.30	0.95	0.29	0.29	105.25	**83.4**	101.0	0.30%	375	96.0	0.87	1.94	10.00	11.94	86.8
STREET R	MH14	MH3	1.17	0.75	0.88	7.07	78.73	**1548.1**	155.0	0.30%	1800x900	3058.8	1.99	1.30	16.84	18.14	50.6
	MH3	MH4	0.52	0.75	0.39	7.46	75.27	**1561.6**	83.9	0.30%	1800x900	3058.8	1.99	0.70	18.14	18.85	51.1
						Storm Sewers Beyond This Point (i.e. Along the Norval By-pass) Will Convey the 100-yr Run-off											
NORVAL BYPASS	MH4	MH2	0.00	0.00	0.00	15.34	122.01	**5198.2**	67.9	0.50%	1800x1200	5583.2	2.68	0.42	18.85	19.27	93.1
	MH2	MH56	0.00	0.00	0.00	15.34	120.37	**5128.6**	10.2	0.45%	1800x1200	5296.6	2.55	0.07	19.27	19.34	96.8
STREET T	MH64	MH62	0.51	0.75	0.38	0.38	105.25	**111.9**	123.0	0.30%	450	156.2	0.98	2.09	10.00	12.09	71.7
	MH62	MH60	0.45	0.75	0.34	0.72	95.22	**190.6**	61.4	0.30%	525	235.6	1.09	0.94	12.09	13.03	80.9
STREET T	MH61	MH60	1.11	0.75	0.83	0.83	105.25	**243.6**	132.0	0.40%	525	272.0	1.26	1.75	10.00	11.75	89.6
STREET T	MH60	MH59	0.34	0.75	0.26	1.81	91.36	**459.1**	71.4	0.30%	750	609.8	1.38	0.86	13.03	13.89	75.3
	MH59	MH111	1.42	0.75	1.07	2.87	88.12	**703.7**	146.3	0.30%	825	786.2	1.47	1.66	13.89	15.55	89.5
						Storm Sewers Beyond This Point (i.e. Along the Norval By-pass) Will Convey the 100-yr Run-off											
STREET T	MH111	MH56	0.00	0.75	0.00	2.87	136.79	**1092.4**	30.0	0.40%	900	1144.9	1.80	0.28	15.55	15.83	95.4
NORVAL BYPASS	MH56	MH1	0.00	0.00	0.00	18.21	120.12	**6076.3**	71.0	0.65%	1800x1200	6365.8	3.06	0.39	19.34	19.72	95.5
	MH1	SWM POND	1.10	0.95	1.05	19.26	118.67	**6347.5**	38.7	0.70%	1800x1200	6606.1	3.18	0.20	19.72	19.93	96.1

Town of Halton Hills
STORM DESIGN SHEET

Project No. 100160
Location Georgetown

Date February 2025
Designed By U.A
Checked By D.M

Street	From	To	Area 'A' (ha)	Runoff Coefficient 'C'	A x R (ha)	Accum. AR (ha)	Rainfall Intensity 'I' 5-yr (mm/hr)	Flow 'Q' (L/s)	Pipe Length (m)	Slope (%)	Dia. (mm)	Full Flow Capacity (L/s)	Full Flow Velocity (m/s)	Flow Time in Pipe (min)	Time of Conc. (min)	Time of Conc. Down-stream (m)	Q/Qf (%)
AREA DRAINING TO LID SYSTEM																	
STREET H	MH114	MH11	0.99	0.65	0.64	0.64	105.25	**188.3**	146.8	2.30%	375	265.9	2.41	1.02	10.00	11.02	70.8
STREET C	MH11	MH42	0.66	0.65	0.43	1.07	100.09	**298.4**	89.7	0.70%	525	359.8	1.66	0.90	11.02	11.92	82.9
STREET G	MH113	MH42	0.66	0.65	0.43	0.43	105.25	**125.5**	105.5	3.70%	300	186.0	2.63	0.67	10.00	10.67	67.5
STREET D	MH55	MH53	1.09	0.65	0.71	0.71	105.25	**207.3**	63.4	0.35%	525	254.4	1.18	0.90	10.00	10.90	81.5
	MH53	MH50	0.30	0.65	0.20	0.90	100.65	**252.8**	50.8	0.55%	525	318.9	1.47	0.57	10.90	11.47	79.3
STREET E	MH52	MH50	0.24	0.95	0.23	0.23	105.25	**66.7**	84.2	1.05%	300	99.1	1.40	1.00	10.00	11.00	67.3
STREET C	MH50	MH44	0.29	0.65	0.19	1.32	97.94	**359.1**	53.0	0.50%	600	434.2	1.54	0.58	11.47	12.05	82.7
STREET F	MH49	MH48	0.38	0.65	0.25	0.25	105.25	**72.3**	80.0	0.80%	300	86.5	1.22	1.09	10.00	11.09	83.6
	MH48	MH46	0.59	0.65	0.38	0.63	99.73	**174.8**	85.5	1.70%	375	228.6	2.07	0.69	11.09	11.78	76.5
	MH46	MH44	0.41	0.65	0.27	0.90	96.57	**240.8**	73.0	2.75%	375	290.8	2.63	0.46	11.78	12.24	82.8
STREET C	MH44	MH42	0.67	0.65	0.44	2.65	94.57	**697.3**	91.8	0.50%	750	787.2	1.78	0.86	12.24	13.10	88.6
						Storm Sewers Beyond This Point Will Convey the 100-yr Run-off											
	MH42	OGS	0.00	0.00	0.00	4.15	150.78	**1741.2**	18.6	0.45%	1050	1831.8	2.12	0.15	13.10	13.25	95.1

<u>RUNOFF COEFFICIENTS (R)</u>

PARKS - OPEN SPACES	0.30
DETACHED HOMES	0.65
TOWNHOUSES	0.75
ROADS - PAVED AREAS	0.95

Mannings "n" - 0.013
Entry Time - 10.00

Design Storm	**100-YR**	**5-YR**
A -	1435	959
B -	5.2	5.7
C -	0.7751	0.8024

APPENDIX D

Sanitary Sewer Design Sheets

SANITARY SEWER DESIGN SHEET

The Regional Municipality of Halton

TYLIN Project No. 100160
Project Location Georgetown, Town of Halton Hills

Date March 2025
Designed By U.A
Checked By D.M

Street	Manhole From	Manhole To	Length (m)	Tributary Area (ha) Increment Residential S.F.	Tributary Area (ha) Increment Residential Townhouse	Tributary Area (ha) Increment Comm.	Tributary Area (ha) Increment Road	Tributary Area (ha) Increment Community	Tributary Area (ha) Total	No. of Units Increment Residential S.F.	No. of Units Increment Residential Townhouse	No. of Units Total	Population Tributary Increment Residential S.F.	Population Tributary Increment Residential Townhouse	Population Tributary Increment Comm.	Population Tributary Increment Community	Population Tributary Total	Flow Rate Average Increment (L/s)	Flow Rate Average Total (L/s)	Flow Rate Peaking Factor	Flow Rate Peak. Flow (L/s)	Flow Rate Infiltration (L/s)	Flow Rate Design Flow (L/s)	Sewer Design Size (mm)	Sewer Design Slope (%)	Sewer Design Q (L/s)	Velocity (m/s) Full Flow	Velocity (m/s) Act. Flow	CAPACITY
STREET C	MH1A	MH3A	64.6	0.80					0.80	13		13	49				49	0.12	0.12	4.32	0.53	0.23	0.76	200	1.00	32.80	1.04	0.24	2.30%
	MH3A	MH8A	102.7	0.58					1.38	10		23	38				87	0.09	0.22	4.26	0.92	0.40	1.32	200	1.00	32.80	1.04	0.42	4.01%
STREET F	MH4A	MH5A	150.8	0.79					0.79	16		16	60				60	0.15	0.15	4.30	0.65	0.23	0.87	200	1.20	35.93	1.14	0.27	2.42%
	MH5A	MH8A	87.1	0.61					1.40	9		25	34				94	0.08	0.23	4.25	1.00	0.40	1.40	200	2.70	53.89	1.72	0.43	2.59%
STREET C	MH8A	MH11A	91.8	0.67					3.45	13		61	49				230	0.12	0.57	4.13	2.36	0.99	3.35	200	0.65	26.44	0.84	0.56	12.67%
STREET G	MH9A	MH11A	110.7	0.64					0.64	12		12	45				45	0.11	0.11	4.32	0.49	0.18	0.67	200	3.80	63.94	2.04	0.20	1.05%
STREET C	MH11A	MH14A	89.7	0.66					4.75	14		87	53				328	0.13	0.82	4.06	3.32	1.36	4.68	200	0.50	23.19	0.74	0.57	20.16%
STREET H	MH12A	MH14A	151.7	0.97					0.97	20		20	75				75	0.19	0.19	4.28	0.80	0.28	1.08	200	2.55	52.37	1.67	0.33	2.06%
STREET C	MH14A	MH17A	94.6	0.76					6.48	15		122	57				460	0.14	1.15	3.99	4.57	1.85	6.43	200	0.40	20.74	0.66	0.58	30.98%
STREET I	MH15A	MH17A	190.0	1.26					1.26	27		27	102				102	0.25	0.25	4.24	1.07	0.36	1.44	200	1.70	42.76	1.36	0.45	3.36%
STREET C	MH17A	MH26A	93.9	0.69					8.43	11		160	41				604	0.10	1.50	3.93	5.90	2.41	8.32	200	0.40	20.74	0.66	0.62	40.09%
STREET F	MH4A	MH18A	160.0	0.81					0.81	16		16	60				60	0.15	0.15	4.30	0.65	0.23	0.88	200	1.50	40.17	1.28	0.27	2.18%
	MH18A	MH19A	70.0	0.34					1.15	7		23	26				87	0.07	0.22	4.26	0.92	0.33	1.25	200	1.50	40.17	1.28	0.40	3.11%
	MH19A	MH22A	165.3	1.55					2.70	31		54	117				204	0.29	0.51	4.15	2.10	0.77	2.87	200	0.80	29.34	0.93	0.58	9.79%
	MH22A	MH24A	70.0	0.34					3.04	6		60	23				226	0.06	0.56	4.13	2.32	0.87	3.19	200	0.70	27.44	0.87	0.57	11.64%
STREET J	MH23A	MH24A	142.3	1.14					1.14	25		25	94				94	0.23	0.23	4.25	1.00	0.33	1.32	200	1.50	40.17	1.28	0.41	3.29%
STREET J	MH24A	MH26A	53.0	0.12					4.30	1		86	4				324	0.01	0.81	4.06	3.28	1.23	4.51	200	0.60	25.41	0.81	0.60	17.75%
STREET S	MH25A	MH26A	75.6	0.65					0.65	11		11	41				41	0.10	0.10	4.33	0.45	0.19	0.63	200	1.00	32.80	1.04	0.20	1.93%
STREET C	MH26A	MH28A	80.0				0.16		13.54			257					969	0.00	2.41	3.81	9.19	3.87	13.06	200	0.40	20.74	0.66	0.69	62.96%
STREET S	MH27A	MH28A	115.8	0.91					0.91	17		17	64				64	0.16	0.16	4.29	0.68	0.26	0.95	200	1.00	32.80	1.04	0.29	2.88%
STREET C	MH28A	MH29A	167.7				0.99		15.44	0		274					1034	0.00	2.57	3.79	9.75	4.42	14.17	200	0.40	20.74	0.66	0.70	68.29%
STREET R	MH29A	MH53A	137.7		0.63				16.07		17	291		48			1082	0.12	2.69	3.78	10.17	4.60	14.77	250	0.40	37.61	0.77	0.72	39.27%
STREET M	MH64A	MH31A	70.6		0.34				0.34		10	10		29			29	0.07	0.07	4.36	0.31	0.10	0.41	200	1.00	32.80	1.04	0.13	1.24%
	MH31A	MH32	114.4		0.62				0.96		19	29		54			83	0.13	0.21	4.27	0.88	0.27	1.15	200	1.00	32.80	1.04	0.37	3.51%
	MH32A	MH34A	86.2		0.68				1.64		23	52		66			148	0.16	0.37	4.19	1.55	0.47	2.01	200	0.60	25.41	0.81	0.46	7.93%
	MH34A	MH36A	62.5		0.62				2.26		22	74		63			211	0.16	0.52	4.14	2.17	0.64	2.82	200	0.45	22.00	0.70	0.47	12.81%
	MH36A	MH38A	38.7		0.19				2.45		6	80		17			228	0.04	0.57	4.13	2.34	0.70	3.04	200	0.45	22.00	0.70	0.48	13.82%
STREET Q	MH37A	MH38A	141.0		0.66				0.66		38	38		108			108	0.27	0.27	4.23	1.14	0.19	1.33	200	1.00	32.80	1.04	0.42	4.06%
STREET M	MH38A	MH46A	38.7		0.20				3.31		5	123		14			351	0.04	0.87	4.05	3.53	0.95	4.48	200	0.40	20.74	0.66	0.52	21.59%
STREET M	MH64A	MH30A	47.0		0.26				0.26		7	7		20			20	0.05	0.05	4.38	0.22	0.07	0.29	200	1.00	32.80	1.04	0.08	0.89%
	MH30A	MH40A	147.0		1.27				1.53		42	49		120			140	0.30	0.35	4.20	1.46	0.44	1.90	200	0.90	31.12	0.99	0.52	6.10%
	MH40A	MH42A	37.0		0.16				1.69		5	54		14			154	0.04	0.38	4.19	1.60	0.48	2.09	200	0.70	27.44	0.87	0.49	7.61%
STREET N	MH41A	MH42A	141.8		0.66				0.66		38	38		108			108	0.27	0.27	4.23	1.14	0.19	1.33	200	1.50	40.17	1.28	0.42	3.31%
STREET M	MH42	MH44A	46.9		0.22				2.57		7	99		20			282	0.05	0.70	4.09	2.87	0.74	3.61	200	0.70	27.44	0.87	0.59	13.15%
STREET O	MH43A	MH44A	141.6		0.66				0.66		38	38		108			108	0.27	0.27	4.23	1.14	0.19	1.33	200	1.40	38.81	1.24	0.42	3.43%
STREET M	MH44A	MH46A	46.8		0.21				3.44		6	143		17			408	0.04	1.01	4.02	4.08	0.98	5.06	200	0.70	27.44	0.87	0.66	18.44%

SANITARY SEWER DESIGN SHEET

The Regional Municipality of Halton

TYLIN Project No. 100160
Project Location Georgetown, Town of Halton Hills

Date March 2025
Designed By U.A
Checked By D.M

Street	Manhole From	Manhole To	Length (m)	Tributary Area (ha) Increment Residential S.F.	Tributary Area (ha) Increment Residential Townhouse	Tributary Area (ha) Increment Comm.	Tributary Area (ha) Increment Road	Tributary Area (ha) Increment Community	Tributary Area (ha) Total	No. of Units Increment Residential S.F.	No. of Units Increment Residential Townhouse	No. of Units Total	Population Tributary Increment Residential S.F.	Population Tributary Increment Residential Townhouse	Population Tributary Increment Comm.	Population Tributary Increment Community	Population Tributary Total	Flow Rate Average Increment L/s	Flow Rate Average Total L/s	Flow Rate Peaking Factor	Flow Rate Peak. Flow L/s	Flow Rate Infiltration L/s	Flow Rate Design Flow L/s	Sewer Design Size (mm)	Sewer Design Slope (%)	Sewer Design Q (L/s)	Sewer Design Velocity (m/s) Full Flow	Sewer Design Velocity (m/s) Act. Flow	CAPACITY
STREET P	MH45A	MH46A	140.8		0.66				0.66		38	38		108			108	0.27	0.27	4.23	1.14	0.19	1.33	200	1.30	37.40	1.19	0.42	3.56%
	MH46A	MH49A	53.1				0.09		7.49			304					867	0.00	2.16	3.84	8.28	2.14	10.42	200	0.40	20.74	0.66	0.65	50.25%
COMMERCIAL BLOCK	MH47A	MH48A	22.0			2.43			2.43						219		219	0.47	0.47	4.13	1.94	0.69	2.63	200	1.00	32.80	1.04	0.60	8.02%
STREET B	MH48A	MH49A	59.5				0.37		2.80			0					219	0.00	0.47	4.13	1.94	0.80	2.74	200	0.85	30.24	0.96	0.58	9.05%
STREET R	MH49A	MH50A	142.3		1.06				11.35		38	342		108			1194	0.27	2.89	3.75	10.85	3.25	14.10	200	0.40	20.74	0.66	0.70	67.97%
	MH50A	MH53A	86.4		0.63				11.98		15	357		43			1237	0.11	3.00	3.74	11.22	3.43	14.65	200	0.40	20.74	0.66	0.70	70.61%
PARK BLOCK	MH52A	MH53A	20.0					1.72	1.72							69	69	0.00	0.00	4.28	0.00	0.49	0.49	200	1.00	32.80	1.04	0.15	1.50%
	MH53A	MH54A	57.4	0.00					29.78	0		648					2387	0.00	5.69	3.52	20.07	8.52	28.58	200	1.75	43.39	1.38	1.45	65.88%
NORVAL BYPASS	MH54A	MH62A	6.1	0.00					29.78	0		648					2387	0.00	5.69	3.52	20.07	8.52	28.58	250	0.95	57.96	1.18	1.17	49.32%
PARK BLOCK	MH101A	MH55A	20.0					0.26	0.26							10	10	0.00	0.00	4.41	0.00	0.07	0.07	200	1.00	32.80	1.04	0.02	0.23%
STREET T	MH55A	MH57A	120.8		0.59				0.85		11	11		31			42	0.08	0.08	4.33	0.34	0.24	0.58	200	1.00	32.80	1.04	0.18	1.77%
	MH57A	MH59A	62.2		0.45				1.30		14	25		40			82	0.10	0.18	4.27	0.76	0.37	1.13	200	0.80	29.34	0.93	0.35	3.85%
STREET T	MH58A	MH59A	138.2		1.03				1.03		32	32		91			91	0.23	0.23	4.25	0.97	0.29	1.26	200	1.00	32.80	1.04	0.40	3.84%
STREET T	MH59A	MH61A	83.8		0.56				2.89		15	72		43			216	0.11	0.51	4.14	2.11	0.83	2.94	200	0.40	20.74	0.66	0.46	14.17%
	MH61A	MH62A	169.9		1.20				4.09		40	112		114			330	0.28	0.79	4.06	3.23	1.17	4.40	200	0.40	20.74	0.66	0.52	21.20%
NORVAL BYPASS	MH62A	MH63A	174.1					0.82	34.69			760					2717	0.00	6.49	3.48	22.57	9.92	32.49	300	0.45	64.87	0.92	0.91	50.09%
	MH63A	SPS	17.0					0.00	34.69			760					2717	0.00	6.49	3.48	22.57	9.92	32.49	300	0.45	64.87	0.92	0.91	50.09%

Residential Design Parameters:

Flow (m3/cap./day) - 0.215 Per Halton Region Linear Design Manual
Single Family Density (pers/unit) - 3.77 Per Halton Region Development Charges Background Study (2022)
Townhouse Density (pers/unit) - 2.85 Per Halton Region Development Charges Background Study (2022)
Minimum Pipe Size - 200 mm

Commercial Areas
Density (persons/ha) - 90
Flow (m3/cap./day) - 0.185

Community Areas (i.e. Park)
Density (persons/ha) - 40
Flow (m3/cap./day) - 0.215

Infiltration Rate - 0.286 L/s/ha
Mannings 'n' - 0.013

APPENDIX E

Halton Region Water and Wastewater Strategy Map

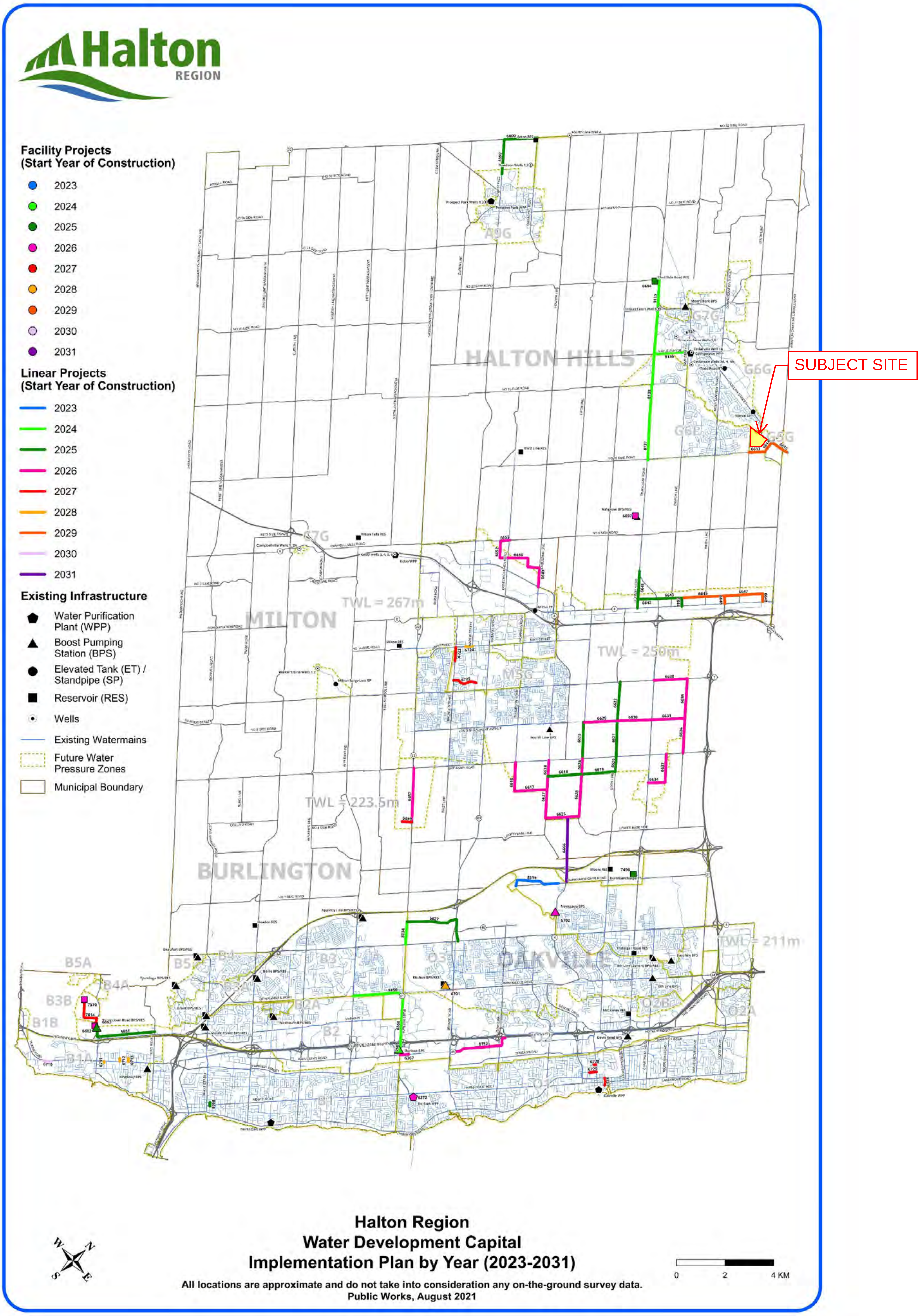


Figure ES1 – Water Development Capital Implementation Plan by Year (2023 to 2031)

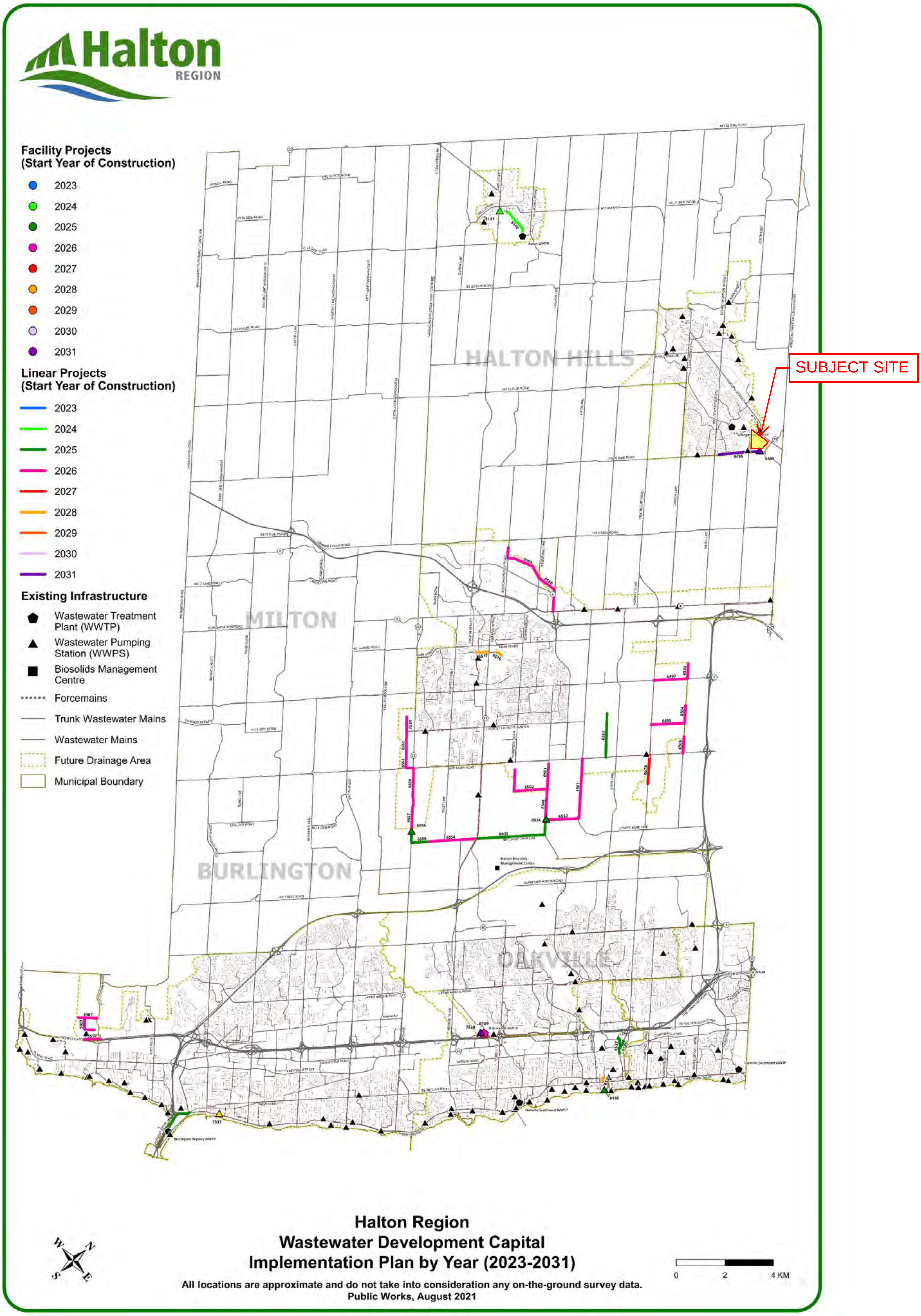


Figure ES2 – Wastewater Development Capital Implementation Plan by Year (2023 to 2031)

APPENDIX F

Water and Wastewater Modelling Memo

TYLin

Memorandum

Project:	Russell Pines Property Corp. – Southeast Georgetown
TYLin Project No.:	100160
Date	March 17, 2025
To	Town of Halton Hills and Halton Region
From	TYLin International Canada Inc.
Subject	Russell Pines Functional Servicing Report - Water and Sanitary Servicing Review

1 DEVELOPMENT REVIEW

1.1 Introduction and Background

T. Y. Lin International Canada Inc. (TYLin) was retained by Russell Pines Property Corp. to conduct a review of water and sanitary servicing for the proposed Russell Pines residential subdivision. The Functional Servicing Report (FSR) prepared by TYLin and data provided by the Town of Halton Hills serve as the basis for the hydraulic capacity analysis.

The proposed development is located on the southeast corner of the Town of Halton Hills and spans over an area of 51.86 ha. As shown in **Figure 1**, the subject site is located at the intersection of 10 Side Road and 10^{th} Line in Georgetown.

This memo outlines the project details, documents the applied design criteria, and presents the findings of the wastewater and water hydraulic analysis. Autodesk InfoWater Pro and InfoWorks ICM have been utilized as the tools for the analysis.

Figure 1 – Approximate Delineation of the Proposed Site (From FSR)

1.2 Site Information and Statistics

The property spans multiple blocks, incorporating residential, commercial/mixed-use, and parkland areas. The details of the proposed development used for servicing analysis are outlined in **Table 1**. There are 274 detached units, 470 townhouse units, 2.06ha of parkland, and 1.37 ha of commercial/mixed-use land. The information on residential units and area were utilized to estimate the population for the following analysis. **Figure 2** displays the land use layout of the subdivision.

Table 1 – Development Land Use Schedule Details (From Draft Plan of the Subdivision)

LAND USE SCHEDULE

LAND USE	LOTS / BLOCKS	AREA (ha)	AREA (ac)	UNITS	DENSITY (UPHA)
DETACHED - 9.15m (30')	1-274	1.21	2.99	39	13.04
DETACHED - 11.00m (36')		5.74	14.18	159	11.21
DETACHED (DUAL FRONTAGE) - 9.80m (32')		2.57	6.35	76	11.97
DUAL FRONTAGE TOWNHOUSES-6.10m (20')	275-294	2.61	6.45	111	17.21
STREET TOWNHOUSES - 6.10m (20')	295-325	3.73	9.22	169	18.34
BACK-TO-BACK TOWNHOUSES	326-340	1.85	4.57	190	41.56
RESIDENTIAL RESERVE	341-344	0.32	0.79		
COMMERCIAL / MIXED USE	345	1.37	3.39		
PARK	346-348	2.06	5.09		
OPEN SPACE / BUFFER	349,368	0.03	0.07		
WALKWAY	350-358,367	0.38	0.94		
SWM POND	359	2.83	6.99		
GREENBELT LANDS	360,361	6.22	15.37		
TABLE LAND GREENBELT	362,363	5.10	12.60		
GRADING AREA	364,365	1.67	4.13		
ROAD WIDENING	366	0.17	0.42		
20.0m LOCAL ROW (4,019m)		8.23	20.34		
23.0m COLLECTOR ROW (212m)		0.50	1.24		
26.0m COLLECTOR ROW (993m)		2.61	6.45		
42.0m NORVAL WEST BYPASS		2.66	6.57		
TOTAL	**368**	**51.86**	**128.15**	**744**	**42.01**

Figure 2 – Draft Plan of Subdivision (From Glen Schnarr & Associates Inc.)

1.3 Design Criteria

The Halton Region Water and Wastewater Linear Design Manual was utilized to establish servicing needs for the proposed subdivision. **Table 2** summarizes the design criteria for population estimates, water and wastewater design factors.

Table 2 – Halton Region Water and Wastewater Design Criteria

Equivalent Population by Unit (per Halton Region 2022 Development Charges Background Study)	
Single Family or Semi-Detached	3.772 person/unit
Townhouse	2.851 person/unit
Equivalent Population by Area (per Halton Region Linear Design Manual)	
Single Family	95 persons/hectare
Street Townhouse	260 persons/hectare
Back-to-Back Townhouse	420 persons/hectare

Light Commercial	90 persons/hectare
Design Criteria - Water	
Average Residential Water Supply Demand	275 L/cap/day
Maximum Day Factor	2.25
Residential Peak Hour Factor	4
ICI Peak Hour Factor	2.25
Design Criteria - Wastewater	
Residential Unit Sewage Flow: Q	215L/cap/day
Light Commercial Areas Sewage Flow: Q	185L/cap/day
Extraneous Flow: I	0.286 L/s/Ha (Infiltration)
Harmon Peaking Factor: M	K_{av} * (1+14/(4+$\sqrt{P}$+P_e)
Sanitary Design Flow	Q × M + I

1.4 Proposed Servicing Requirements

Water demands were estimated using the calculated population based on residential units and the area for commercial / mix use areas. According to the Halton Region Design Criteria, the fire flow availability should be in accordance with the Fire Underwriters Survey. The fire flow requirement calculations were based on the land use type, unit counts, and block area from the draft plan. The assumed floor areas are 150 m^2 for townhouses and 250 m^2 for detached homes. The wastewater design flow from FSR was utilized for the wastewater modelling, please reference to FSR for the detailed calculations. As mentioned in the FSR, the population used to determine water demand and wastewater run-off were calculated based on two criteria, populations per unit from the Halton Region 2022 Development Charges Background Study, and the populations per area from the Halton Region Linear Design Manual. For the purposes of this modelling exercise, the water demand and wastewater run-off were calculated based on populations per unit.

The requirements established for water and wastewater servicing for the development are summarized in **Table 3**.

Table 3 – Proposed Servicing Needs based on Design Criteria

Domestic Water & Fire Flow Demand						
Land Use	**Population**	**Average Day Demand (L/s)**	**Maximum Day Demand (L/s)**	**Peak Hour Demand (L/s)**	**Fire Flow (L/s)**	**Maximum Day Plus Fire Flow (L/s)**
Detached	1,034	3.29	7.40	13.16	117	130.16
Townhouse*	1,386	4.41	9.92	17.64	330	339.92
Commercial/ Mix use	-	0.39	0.88	0.88	283	283.88

Wastewater Flows								
Manhole		**Population**	**Site Area (ha)**	**Average Daily Flow (L/s)**	**Harmon Peaking Factor**	**Peak Daily Flow (L/s)**	**Infiltration (L/s)**	**Design Flow (L/s)**
From	**To**							
MH63A to SPS		2717	51.86	6.49	3.48	22.57	9.92	32.49

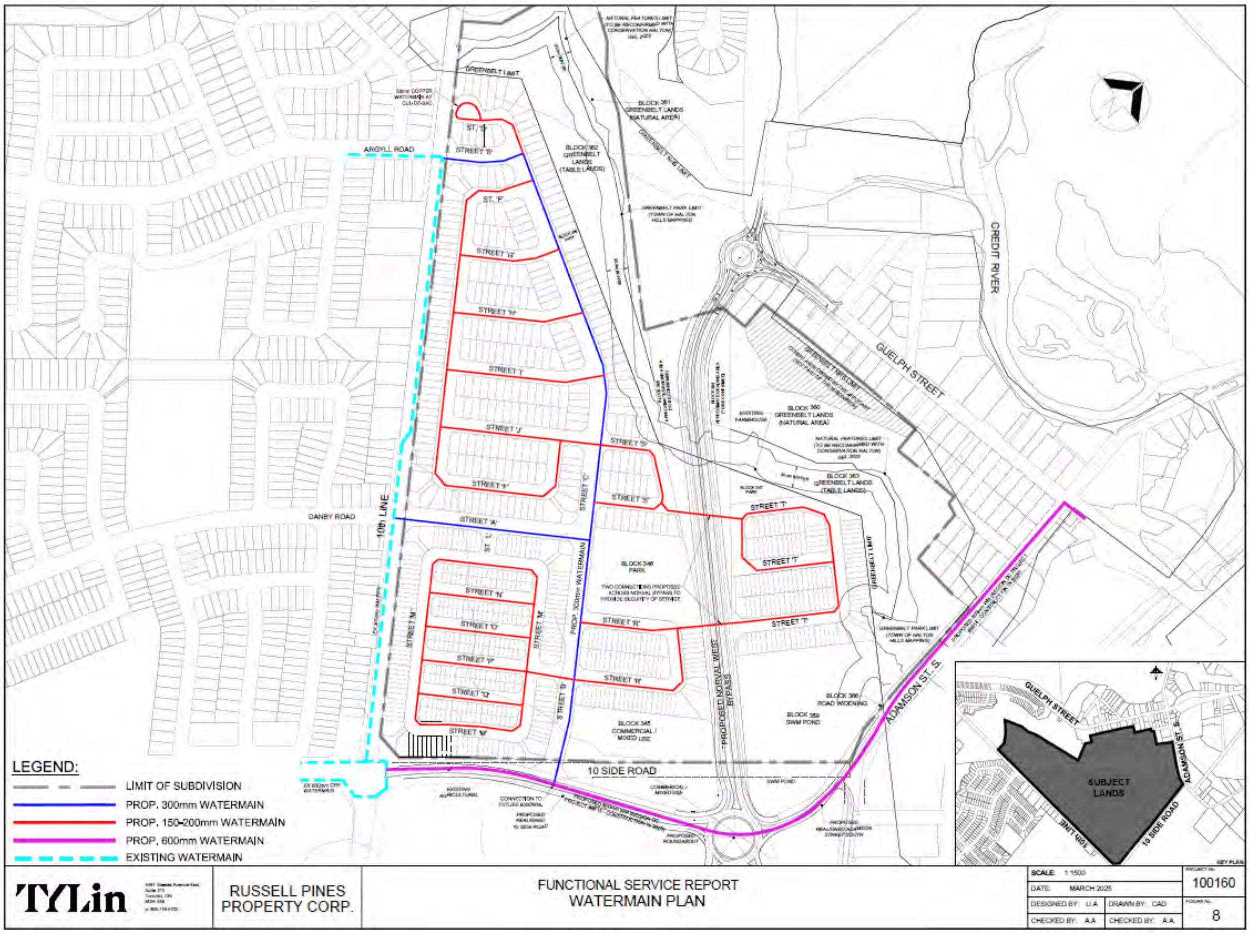
**Required fire flow for back-to-back townhouse is 330 L/s.*

1.5 Proposed Water Servicing

The FSR mentions that an ongoing construction project is underway to install a 600mm CPP watermain along 10 Side Road from 10th Line to 9th Line. This project is scheduled for completion by December 2025. Furthermore, a future watermain project (DC project #6613) is planned to enhance the network's capacity, involving the installation of a 600mm watermain along 10 Side Road from Adamson Street South to 10th Line. This project is scheduled to commence in 2029. These improvements will not only enhance the capacity and reliability of the water supply infrastructure but also provide sufficient capacity to accommodate the development of the subject site.

The proposed development will be serviced by 300mm watermain on Streets 'A' and 'B', which in turn will connect to the proposed 600mm CPP watermain on 10 Side Road and existing 300mm watermain on 10th Line at Danby Road and Argyll Road. All the other streets within the proposed development will contain 150-200mm-dia watermain. The portion of the subdivision east of Norval West Bypass will be serviced by two watermain connections through the bypass road. **Figure 3** shows the watermain plan within the subject site.

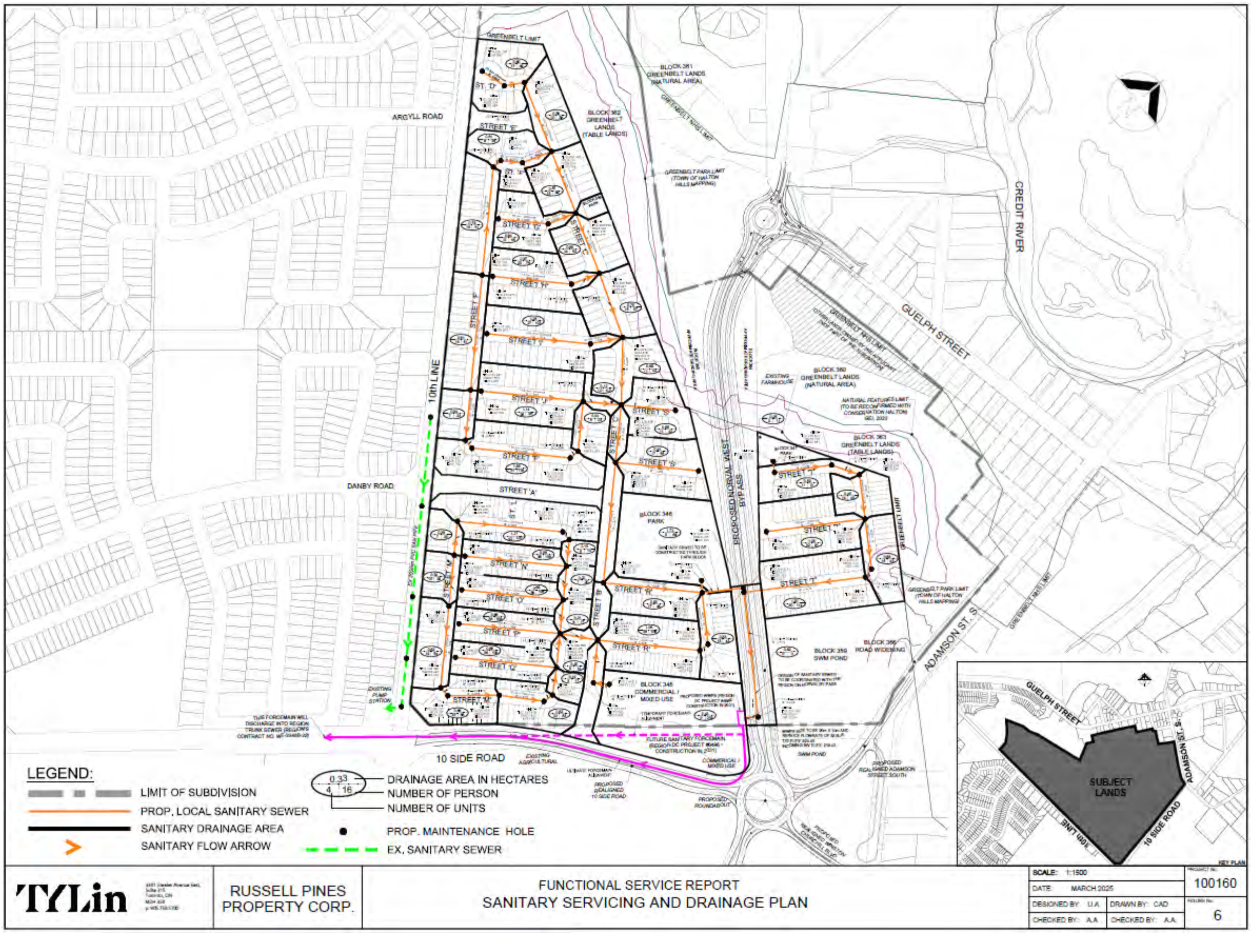
Figure 3 – Watermain Servicing Plan (From FSR)



1.6 Proposed Wastewater Servicing

The existing sanitary sewer infrastructure servicing the area follows 10th Line to an existing sanitary pumping station (SPS) and further extends along 10 Side Road to Barber Drive. The FSR indicates that the capacity of the current SPS is insufficient to accommodate the anticipated sanitary flows generated by the subject property. To address future demands, twinned 250mm sanitary forcemain (Regions DC project#6496) and a wastewater pumping station (Regions DC project #6589) are planned for construction along 10 Side Road, spanning from Adamson Street South to existing sanitary on Ninth Line. This project is scheduled to commence in 2031, with the potential to start as early as 2029. Once operational, this new infrastructure will provide adequate capacity to service the subject site effectively.

Figure 4 – Sanitary Servicing Plan (From FSR)



2 ASSESSMENT OF SERVICING IMPACTS

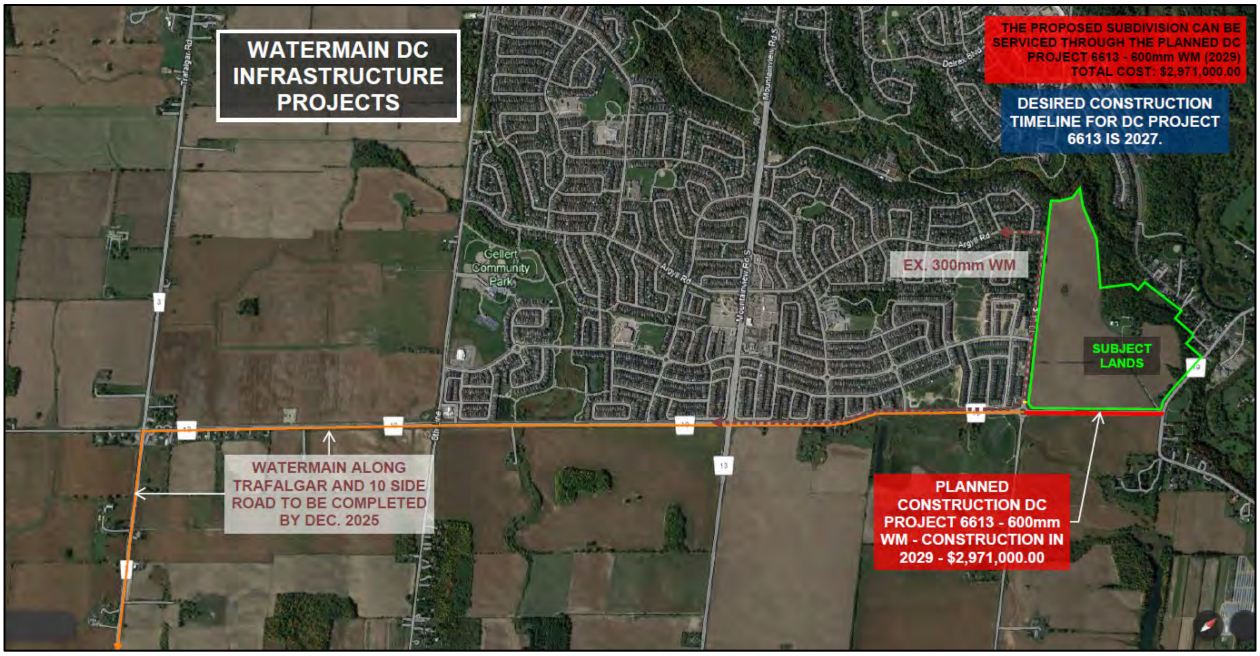
2.1 Water System

The following four scenarios were analyzed to assess the system performance and conformance with the pressure level of service:

- Average Day Demand (ADD)
- Maximum Day Demand (MDD)
- Peak Hour Demand (PHD)
- Maximum Day plus Fire Flow Demand (MDD+FF)

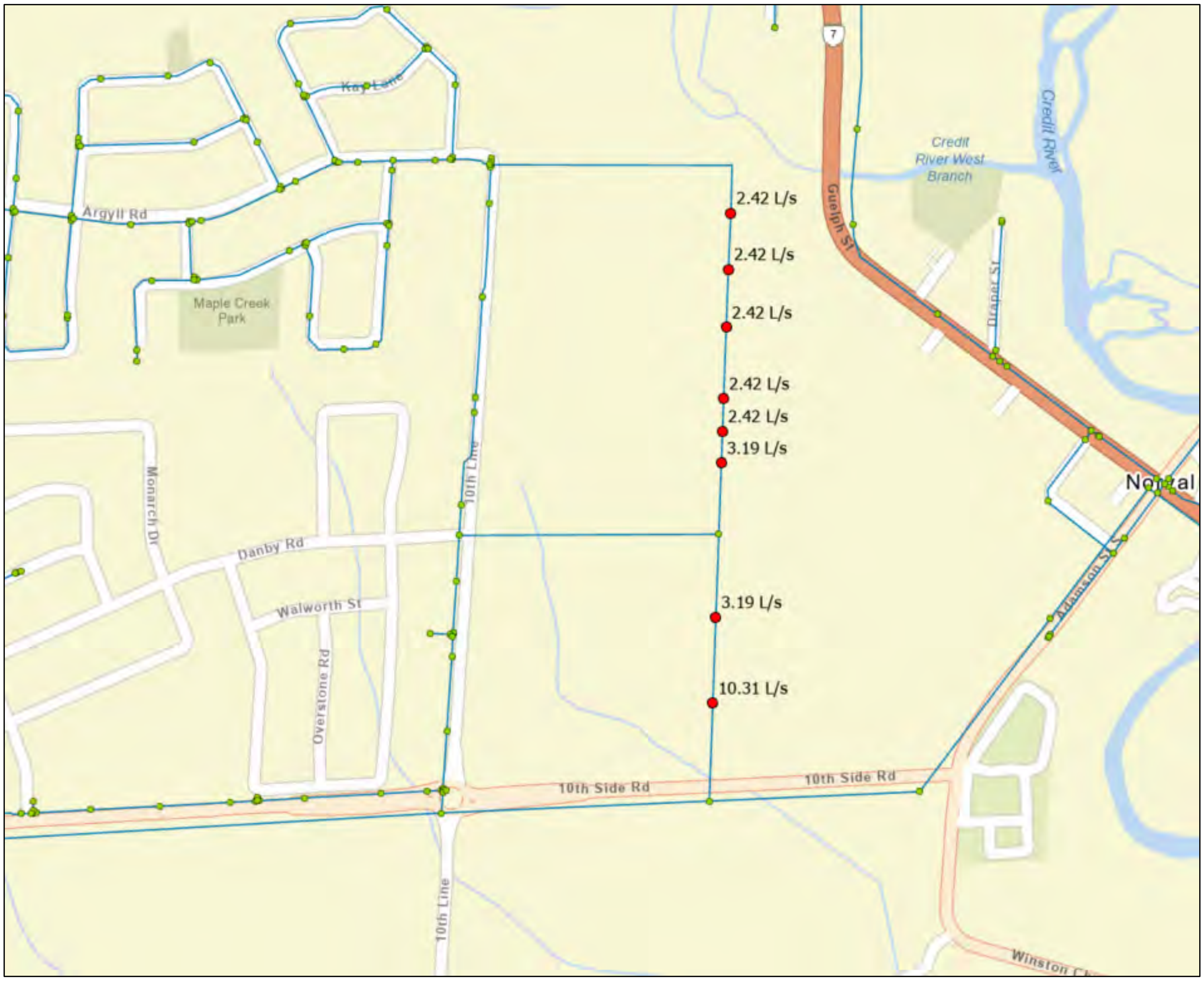
The water model provided by the Halton Region (the Region) includes three time horizons: 2021 (existing), 2026 (future), and 2031 (future). The future scenarios incorporate both existing and planned infrastructure for its respective planning year. The proposed subdivision is planned to be serviced through the planed DC Project No. 6613 (i.e. 600 mm-dia watermain along 10 Side Road), which is going to be constructed in 2029. Therefore, the 2031 future scenario was modelled for the capacity analysis. **Figure 5** shows the details of the DC infrastructure projects near the subject site.

Figure 5 – Watermain DC Infrastructure Projects



The 300 mm watermain skeleton was modeled, while the 150-200mm-dia internal looping were not included in the model. Based on the water service connection from the FSR (see **Figure 3**), the water demands were assigned to the according junctions along the proposed 300 mm water services. **Figure 6** shows the locations of these junctions, which carry the water demands measured in liters per second. The calculations were based on the land use type and unit counts.

Figure 6 – Water Demands Allocation Map



According to the Region's Design Criteria, the maximum working pressures under normal condition should be less than 689 kPa (100 psi). **Figure 7 and Figure 8** display the modelled pressures under MDD and PHD scenarios. It can be observed that the modelled pressures are within the range of 620 kPa (90 psi) to 689 kPa (100 psi) under PHD scenario. **Figure 9** shows the simulated available fire hydrant flow under MDD demand condition. The service connection junction, with a minimum modeled fire flow of 326 L/s according to the draft plan, serves detached homes that have a fire flow requirement of 117 L/s. The results indicate that the available fire flow meets the fire flow requirements for all residential types within the proposed subdivision.

Figure 7 – Modelled Pressures under 2031 MDD Scenario

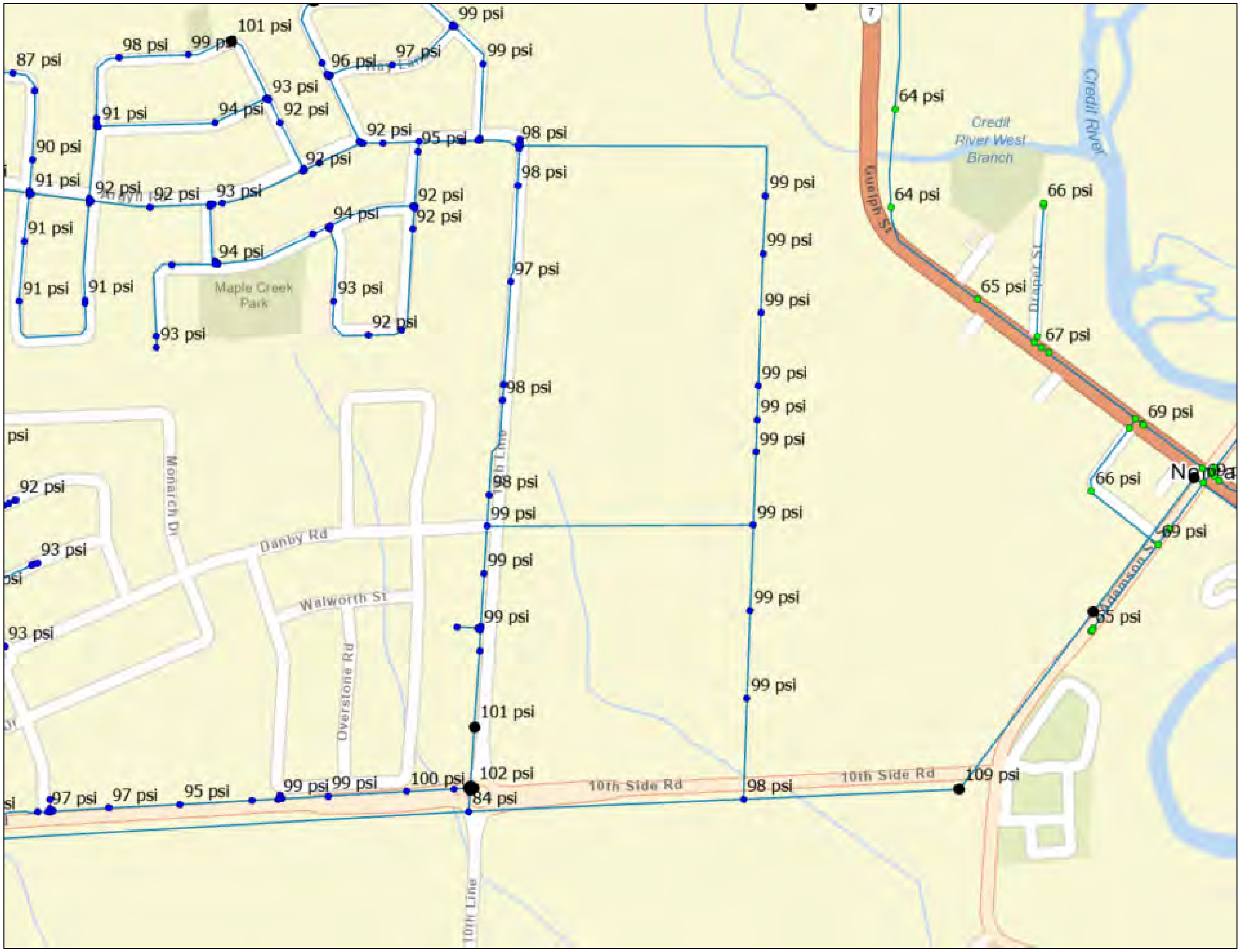


Figure 8 – Modelled Pressures under 2031 PHD Scenario

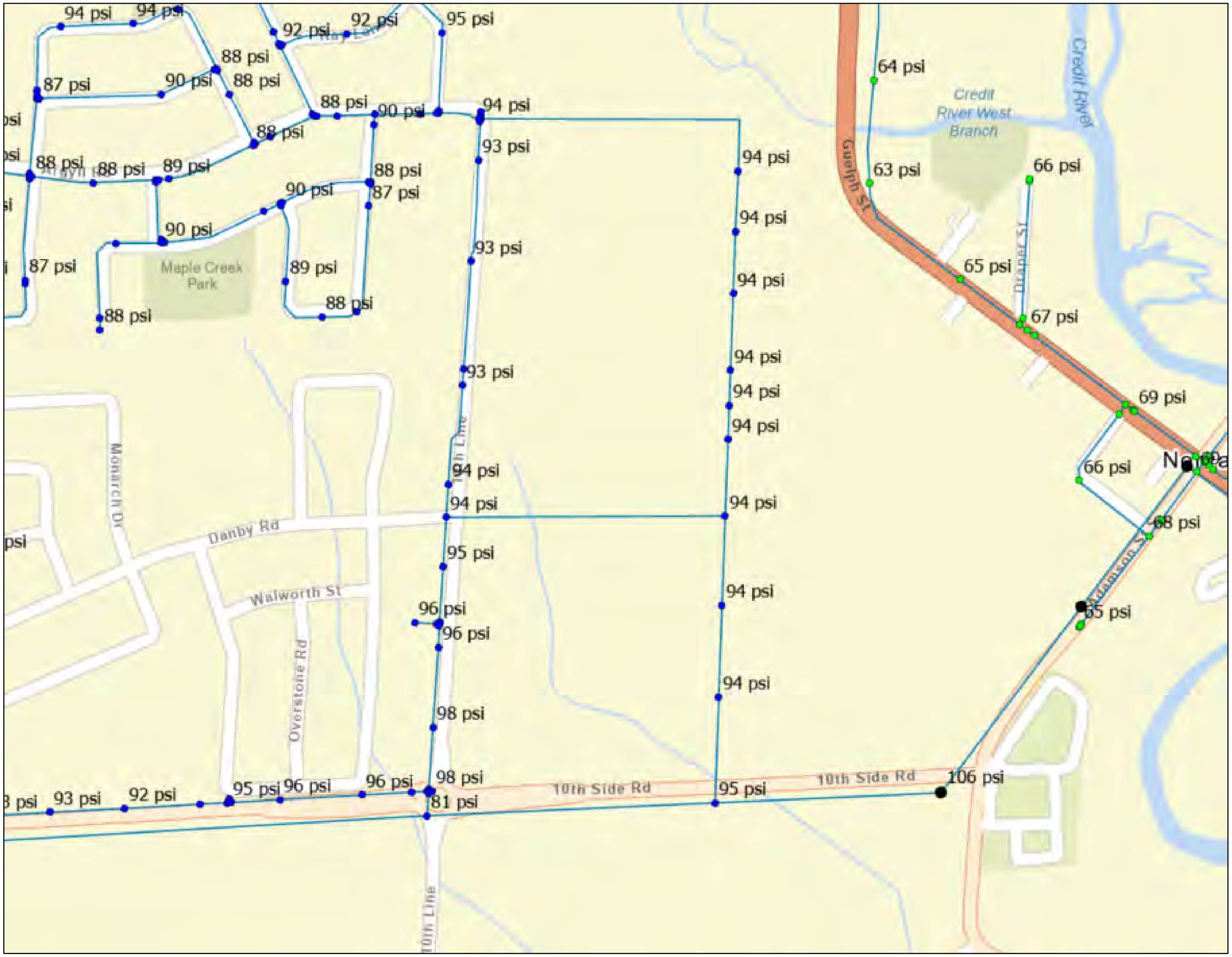


Figure 9 – Modelled Available Fire Flow under 2031 MDD+FF Scenario

Table 4 – Water Hydraulic Model Results

Scenario	Condition	Modelled Pressure Range within Subject Site	Criteria
Maximum Day Demand	2031	84 psi to 102 psi	Node pressure is between 275 kPa and 690 kPa
Peak Hour Demand - Minimum Pressure	2031	81 psi to 98 psi	Node pressure is > 275 kPa and < 690 kPa
Scenario	**Condition**	**Modelled Available Fire Flow Range within Subject Site**	**Criteria**
Maximum Day Demand plus Fire Flow	2031	326 L/s to 965 L/s	Available flow is greater than required 347 L/s

2.2 Wastewater Capacity Analysis

TYLin assessed the capacity of the sewers downstream using the Region's updated 2022 Wastewater Model. According to the FSR, the proposed development is expected to generate an incoming flowrate of 32.49 L/s to the proposed sanitary pumping station. The wastewater will then be conveyed through the proposed twinned 250 mm forcemains and discharge to the existing sanitary on Ninth Line. **Figure 10** shows details of the sanitary DC infrastructure projects. The subcatchment highlighted in red representing the proposed subdivision in the model and the proposed forcemains are shown in **Figure 11**.

Based on the Region's drawings, the proposed twinned forcemains will connect to the 1200mm diameter trunk sewer along 10 Side Road. However, the received sanitary model does not include the trunk sewers, and TYLin lacks information about the sewersheds. To address this, the segment of the 1200 mm diameter trunk sewer between MH 110 and MH 101 was added to the model for the Wet Weather Flow scenario analysis. Please note that the received sanitary flow along the segment was unknown therefore was disregarded in the model.

Figure 10 – Sanitary DC Infrastructure Projects

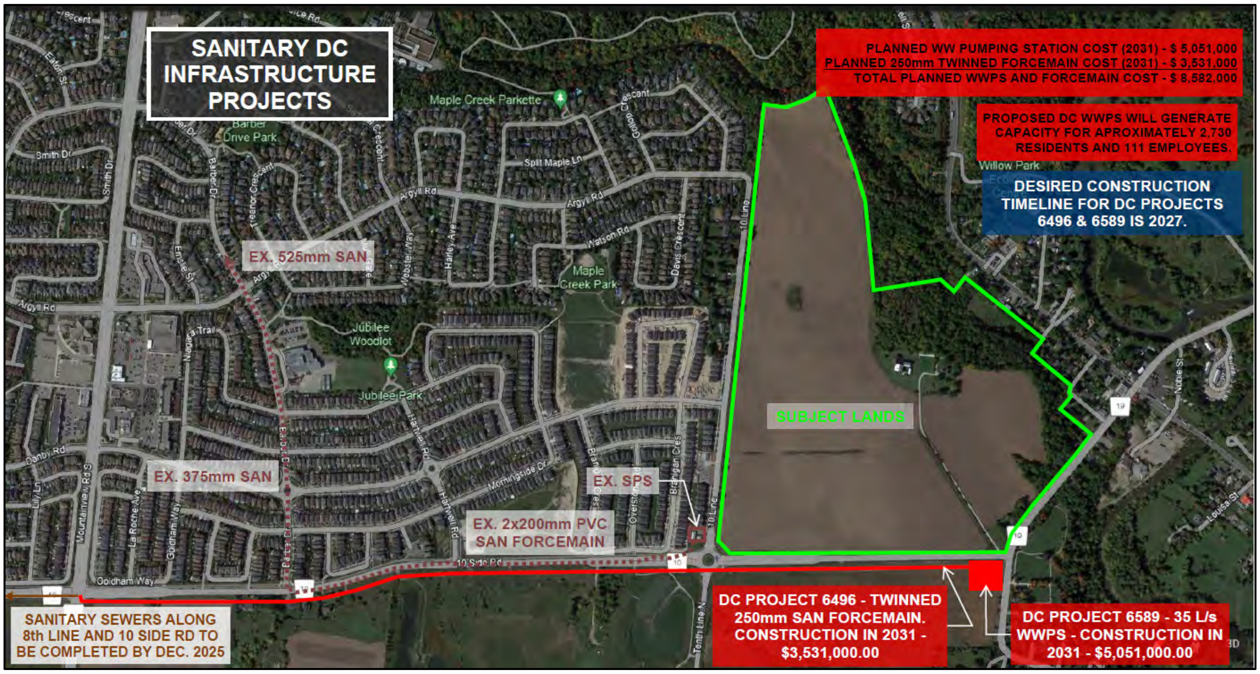
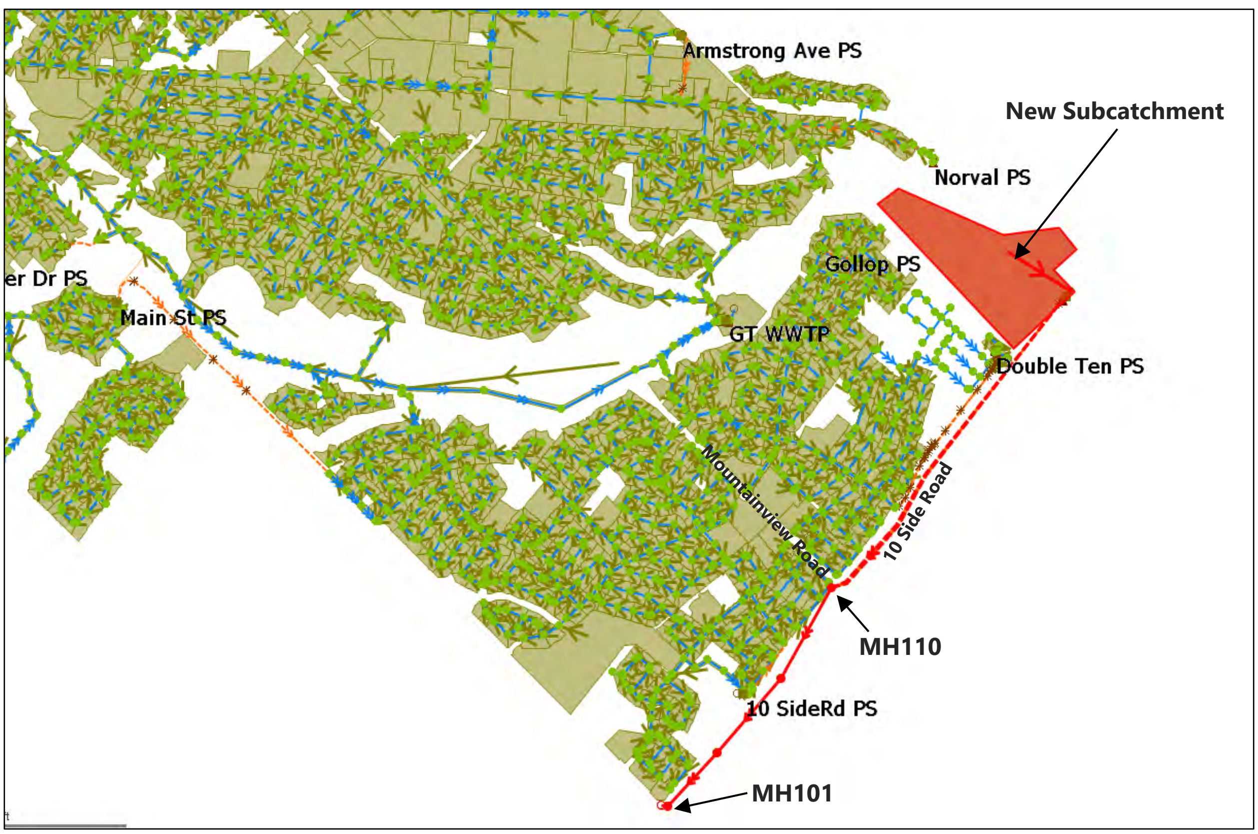


Figure 11 – Proposed Sub-catchment and Forcemain



The analysis assessed the capacity of downstream sewers under Wet Weather Flow (WWF) conditions, considering two rainfall events: a 2-year, 24-hour storm and a 10-year, 24-hour storm. **Figure 12 and Figure 13** show the hyetograph of the two rainfall events.

Figure 12 – 2-Year 24-Hour Storm Event

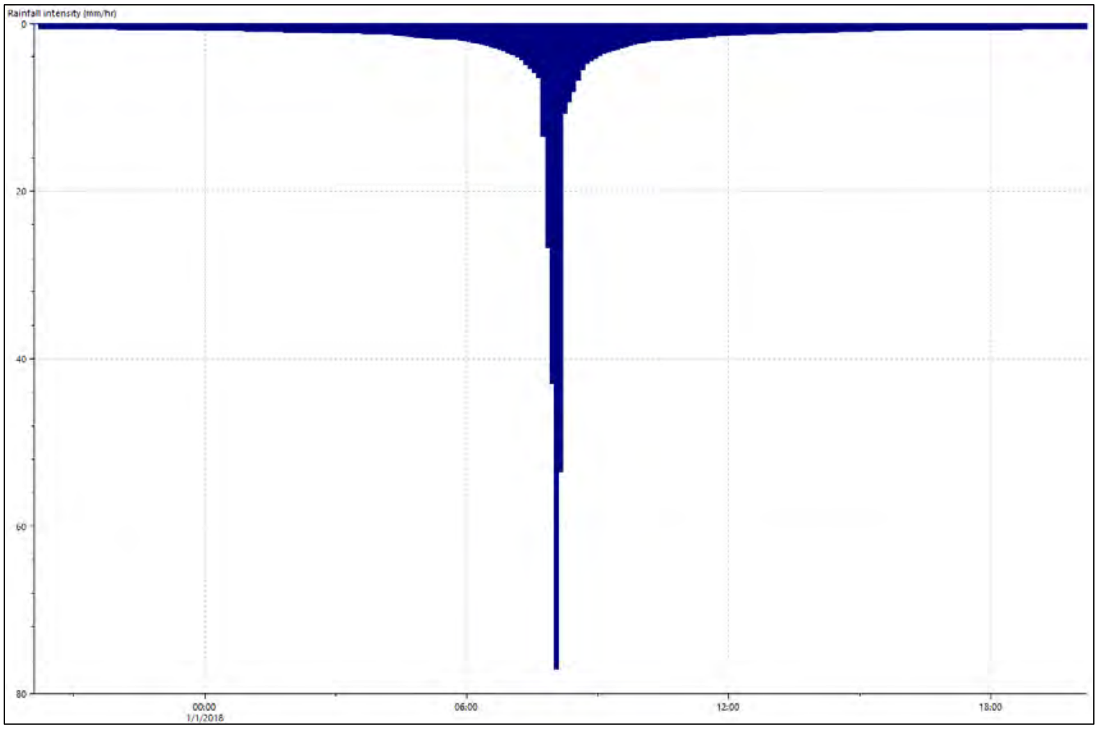
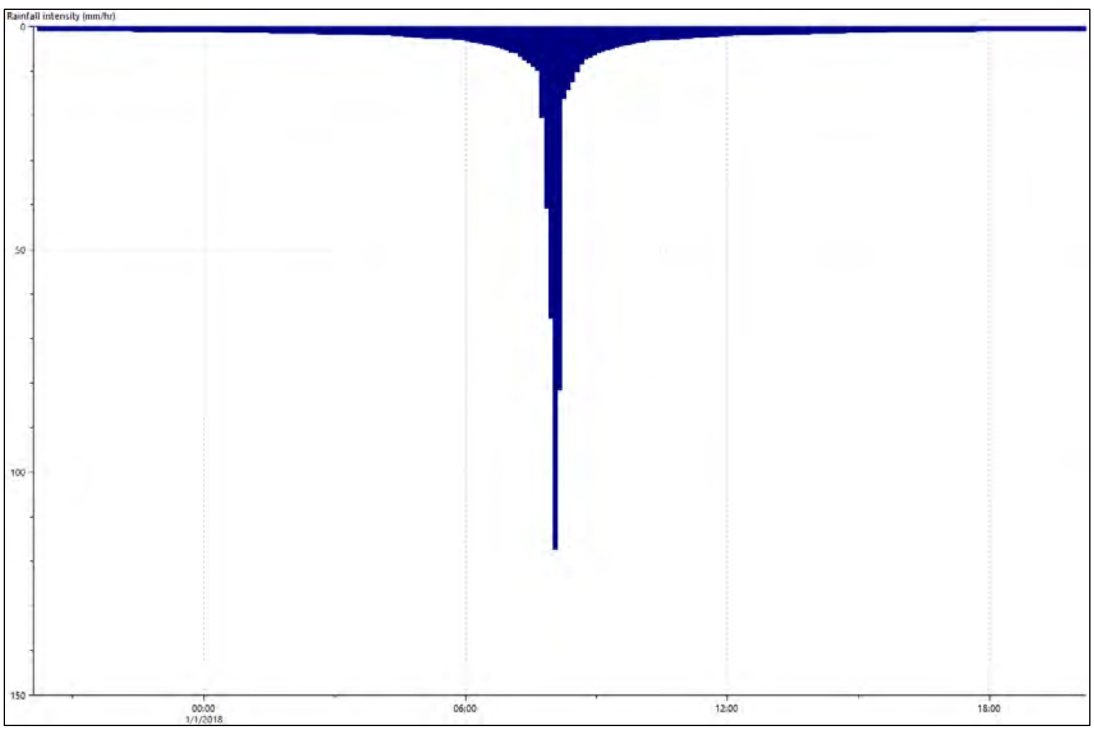


Figure 13 – 10-Year 24-Hour Storm Event



The simulation results indicate that the forcemains will convey a peak flow of 32.5 L/s under the Dry Weather Flow (DWF) scenario. Halton Region's 2022 Development Charges Background Study, which accounts for future development Georgetown, ensures that wastewater infrastructure is designed to support growth. As part of this planning, the 1200 mm trunk sewer has been designed to accommodate anticipated flows, including up to 35 L/s from this development. This confirms that the existing infrastructure can efficiently manage the projected demand, supporting the successful implementation of the proposed SPS. **Figure 14** and **Figure 15** show the Hydraulic Grade Line (HGL) profiles of the segment of the 1200 mm trunk sewer between MH 110 to MH 101. Figure 14 depicts the HGL under a 2-year, 24-hour storm condition, while Figure 15 presents the HGL under a 10-year, 24-hour storm condition. It can be observed from the results that the freeboard exceeds 1.8 meters for all the modelled manholes, indicating that there is no surcharge under the WWF scenario.

Figure 14 – HGL Profile for the 1200 mm Trunk Sewer under WWF 2-Year 24-Hour Condition

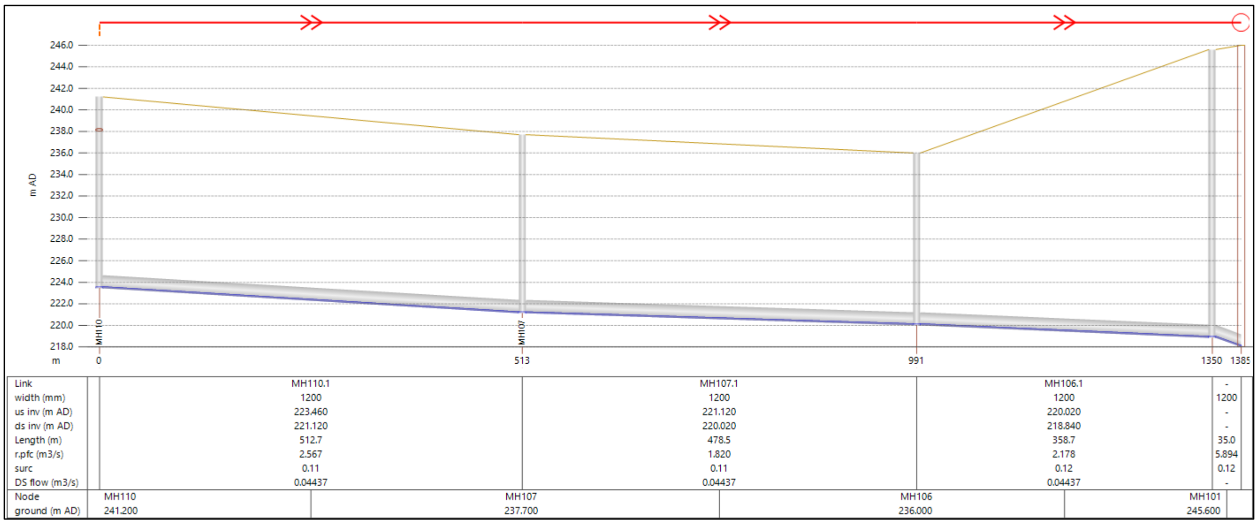
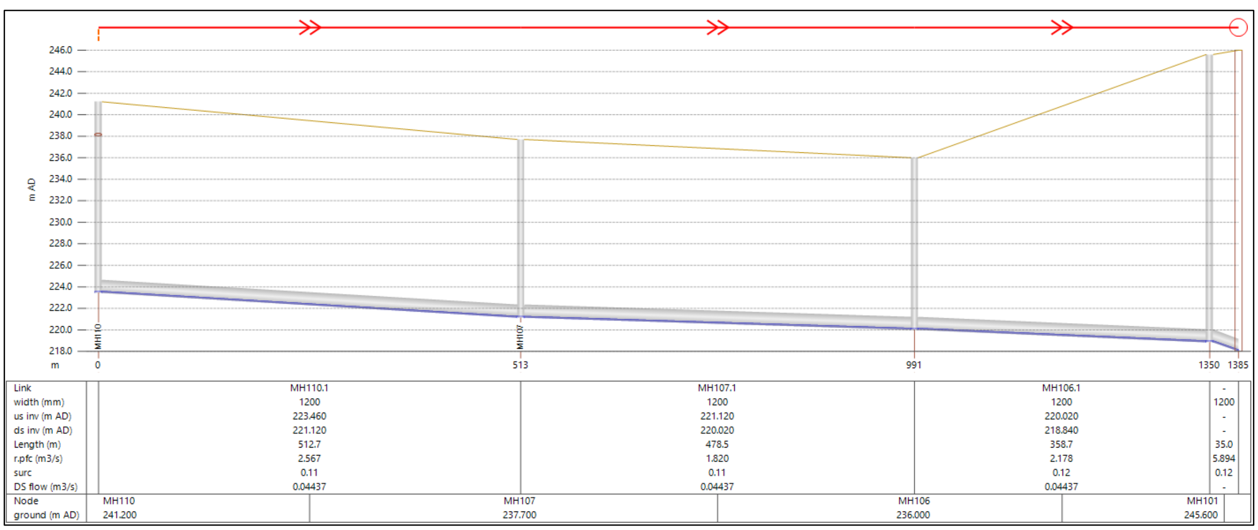


Figure 15 – HGL Profile for the 1200 mm Trunk Sewer under WWF 10-Year 24-Hour Condition



3 ASSESMENT OF REQUIRED UPGRADES

3.1 Water

The modelling results indicate that the levels of service (flow and pressure) meet the minimum requirements identified by the design criteria. As such, the proposed watermain infrastructure has sufficient capacity to accommodate the proposed subdivision.

3.2 Wastewater

Under DWF scenario, the 1200 mm diameter trunk sewer is capable of accommodating the flow resulting from the proposed subdivision. In WWF scenario, there is no surcharge in any of the pipes within the study area, and all manhole freeboards are over 1.8 meters. This indicates that the system is handling the increased flow from wet weather conditions well, with sufficient capacity and no risk of overflow.

Please feel free to contact the undersized with any questions or concerns.

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Reviewed By:

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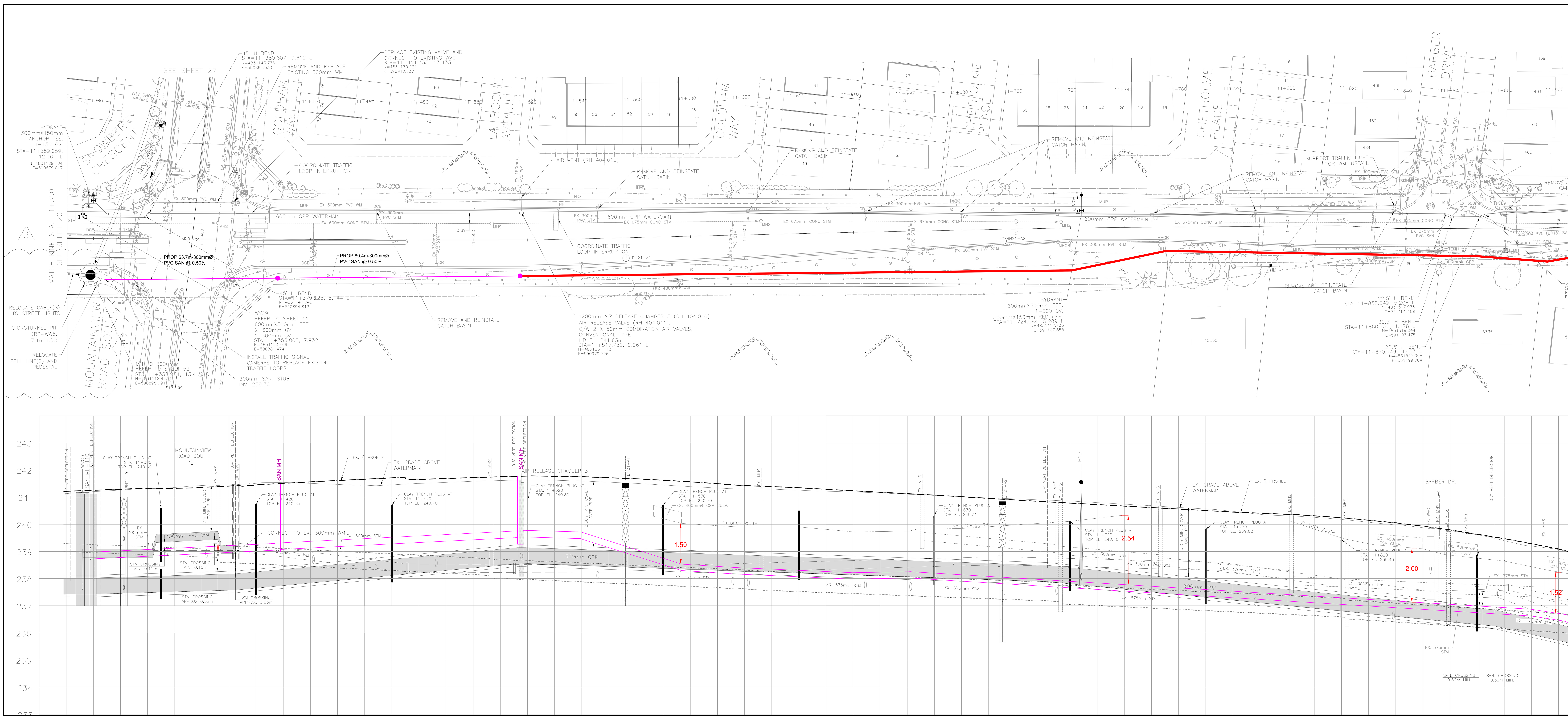
APPENDIX G

Preliminary Forcemain Design



SEE SHEET 27
MATCH LINE STA. 11+350
SEE SHEET 20
SNOWBERRY CRESCENT
MOUNTAINVIEW ROAD SOUTH
GOLDHAM WAY
LA ROCHE AVENUE
CHETHOLME PLACE
BARBER DRIVE
45° H BEND
REPLACE EXISTING VALVE AND CONNECT TO EXISTING WVC
REMOVE AND REPLACE EXISTING 300mm WM
HYDRANT 300mmX150mm ANCHOR TEE, 1-150 GV,
COORDINATE TRAFFIC LOOP INTERRUPTION
AIR VENT (RH 404.012)
REMOVE AND REINSTATE CATCH BASIN
SUPPORT TRAFFIC LIGHT FOR WM INSTALL
PROP 63.7m-300mmØ PVC SAN @ 0.50%
PROP 89.4m-300mmØ PVC SAN @ 0.50%
600mm CPP WATERMAIN
EX 600mm CONC STM
EX 675mm CONC STM
EX 300mm PVC WM
RELOCATE CABLE(S) TO STREET LIGHTS
MICROTUNNEL PIT (RP-WM5, 7.1m I.D.)
RELOCATE BELL LINE(S) AND PEDESTAL
WVC9 REFER TO SHEET 41
INSTALL TRAFFIC SIGNAL CAMERAS TO REPLACE EXISTING TRAFFIC LOOPS
300mm SAN. STUB INV. 238.70
1200mm AIR RELEASE CHAMBER 3 (RH 404.010) AIR RELEASE VALVE (RH 404.011), C/W 2 X 50mm COMBINATION AIR VALVES, CONVENTIONAL TYPE
LID EL. 241.63m
HYDRANT 600mmX300mm TEE, 1-300 GV, 300mmX150mm REDUCER,
22.5° H BEND
EX. 400mmØ CSP
CLAY TRENCH PLUG AT
EX. GRADE ABOVE WATERMAIN
EX. ℄ PROFILE
SAN MH
600mm CPP
CONNECT TO EX. 300mm WM
STM CROSSING
WM CROSSING
SAN. CROSSING 0.52m MIN.
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2.54
2.00
1.52
243
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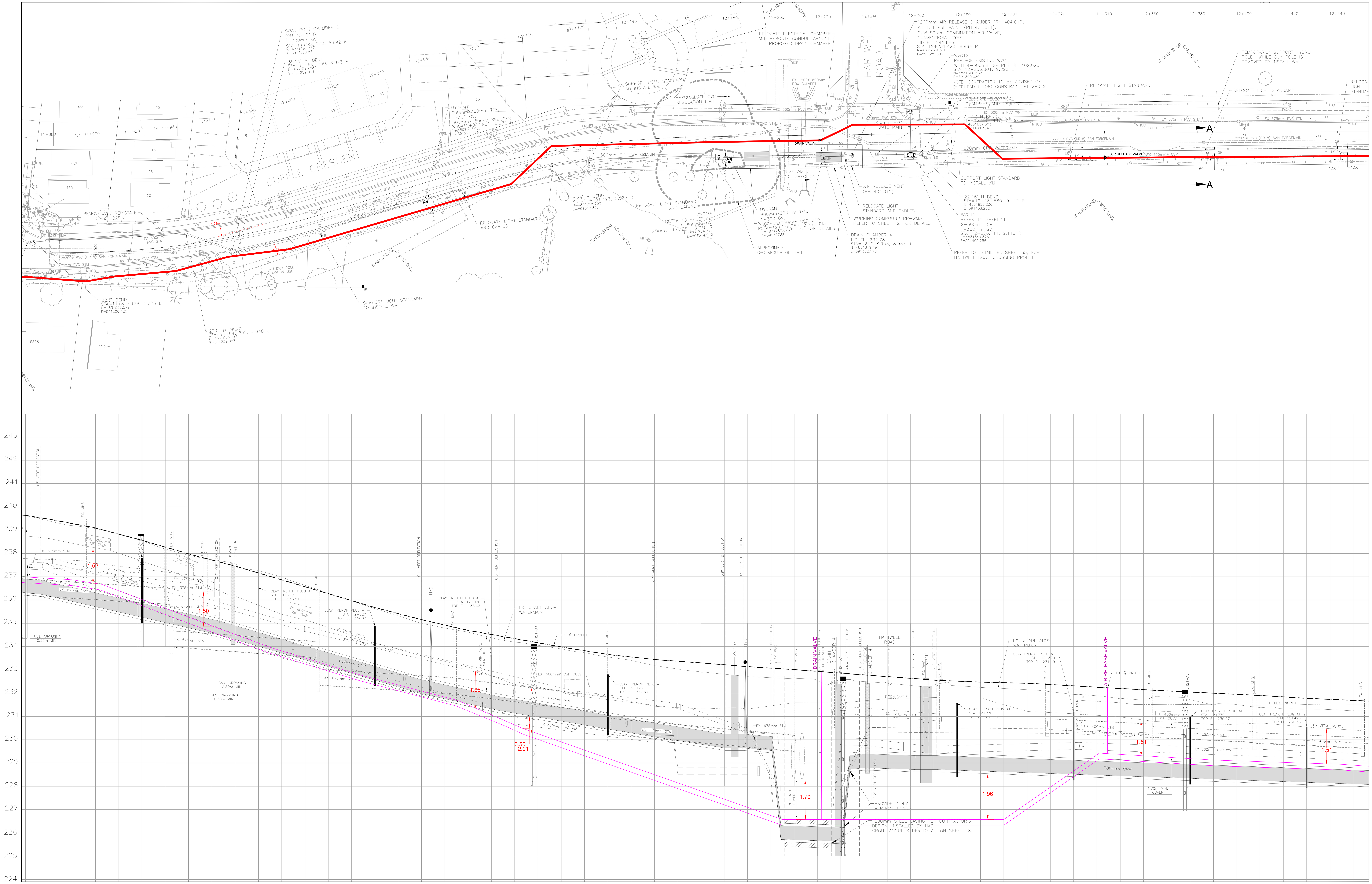
DUFFLE CRESCENT
HARTWELL ROAD
CULCO COURT
600mm CPP WATERMAIN
DRAIN VALVE
AIR RELEASE VALVE
A
A
11+880
11+900
11+920
11+940
11+980
12+000
12+020
12+040
12+060
12+100
12+120
12+140
12+160
12+180
12+200
12+220
12+240
12+260
12+280
12+300
12+320
12+340
12+360
12+380
12+400
12+420
12+440
APPROXIMATE CVC REGULATION LIMIT
SUPPORT LIGHT STANDARD TO INSTALL WM
RELOCATE LIGHT STANDARD
RELOCATE LIGHT STANDARD AND CABLES
REMOVE AND REINSTATE CATCH BASIN
AIR RELEASE VENT (RH 404.012)
WORKING COMPOUND RP-WM3 REFER TO SHEET 72 FOR DETAILS
REFER TO DETAIL "E", SHEET 35, FOR HARTWELL ROAD CROSSING PROFILE
TEMPORARILY SUPPORT HYDRO POLE WHILE GUY POLE IS REMOVED TO INSTALL WM
1200mm STEEL CASING PLY CONTRACTOR'S DESIGN, INSTALLED BY HAB. GROUT ANNULUS PER DETAIL ON SHEET 48.
PROVIDE 2-45° VERTICAL BENDS
EX. GRADE ABOVE WATERMAIN
EX. ℄ PROFILE
600mm CPP
1.52
1.50
1.65
0.50
2.01
1.70
1.96
1.51
1.51
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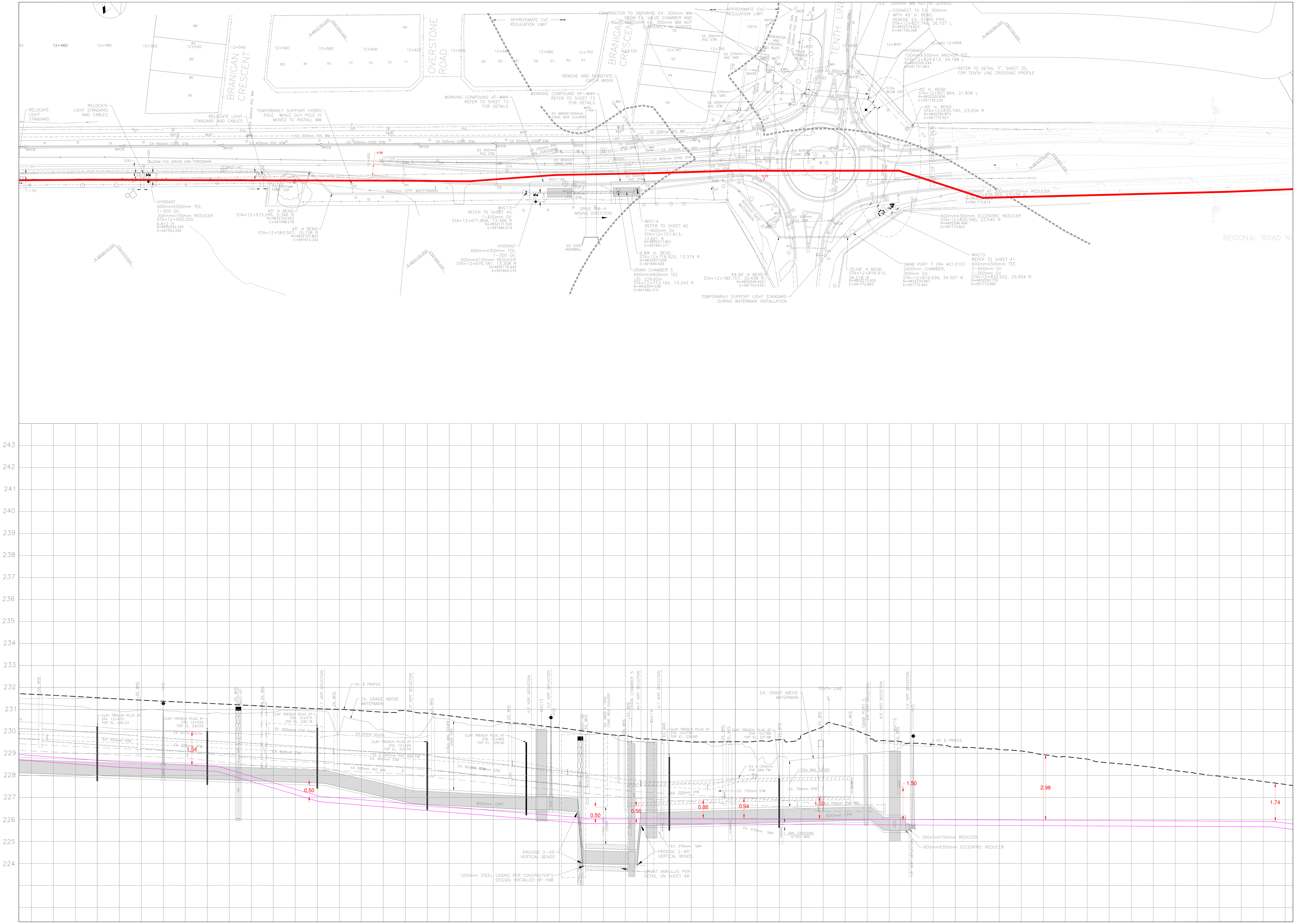

BRANIGAN CRESCENT
OVERSTONE ROAD
TENTH LINE
REGIONAL ROAD
APPROXIMATE CVC REGULATION LIMIT
CONTRACTOR TO SEPARATE EX. 300mm WM FROM EX. VALVE CHAMBER AND RE-COMMISSION EX. 300mm WM NOT CURRENTLY IN SERVICE
RELOCATE LIGHT STANDARD
RELOCATE LIGHT STANDARD AND CABLES
TEMPORARILY SUPPORT HYDRO POLE WHILE GUY POLE IS MOVED TO INSTALL WM
WORKING COMPOUND JP-WM4 REFER TO SHEET 73 FOR DETAILS
WORKING COMPOUND RP-WM4 REFER TO SHEET 73 FOR DETAILS
REMOVE AND REINSTATE CATCH BASIN
REFER TO DETAIL 'F', SHEET 35, FOR TENTH LINE CROSSING PROFILE
600mm CPP WATERMAIN
DRIVE WM-4 MINING DIRECTION
WVC13 REFER TO SHEET 40
WVC14 REFER TO SHEET 40
WVC15 REFER TO SHEET 41
DRAIN CHAMBER 5 600mmX600mm TEE
SWAB PORT 7 (RH 401.010) 2400mm CHAMBER, 300mm GV,
600mmX300mm ECCENTRIC REDUCER
TEMPORARILY SUPPORT LIGHT STANDARD DURING WATERMAIN INSTALLATION
EX. E PROFILE
EX. GRADE ABOVE WATERMAIN
600mm CPP
PROVIDE 2-45° VERTICAL BENDS
1200mm STEEL CASING PER CONTRACTOR'S DESIGN, INSTALLED BY HAB
GROUT ANNULUS PER DETAIL ON SHEET 48
300mmX150mm REDUCER
600mmX300mm ECCENTRIC REDUCER
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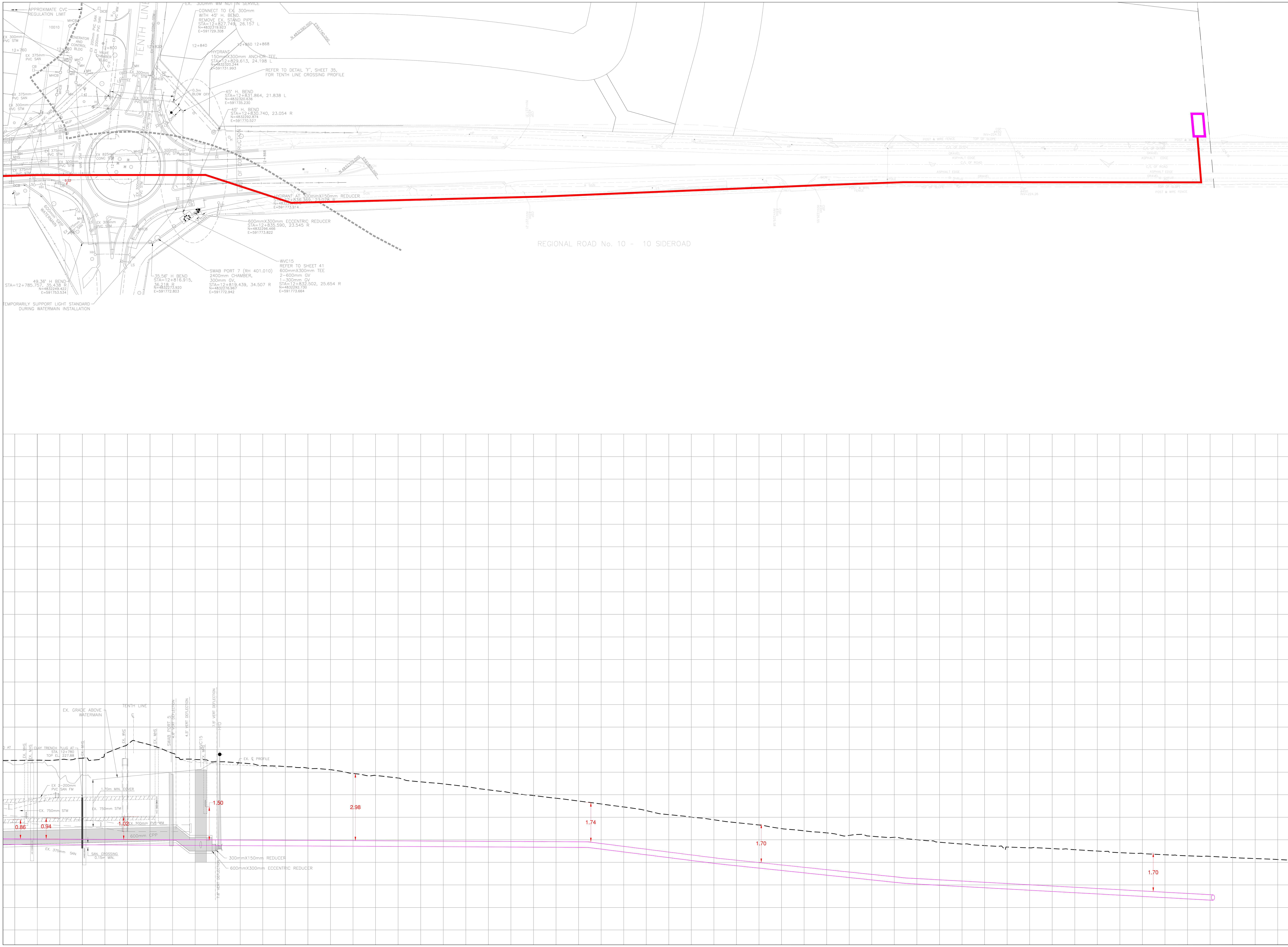
APPROXIMATE CVC REGULATION LIMIT
TENTH LINE
EX. 300mm WM NOT IN SERVICE
CONNECT TO EX. 300mm
WITH 45° H. BEND.
REMOVE EX. STAND PIPE.
STA=12+827.749, 26.157 L
N=4832319.923
E=591729.308
12+840
12+860 12+868
HYDRANT
150mmX300mm ANCHOR TEE,
STA=12+829.613, 24.198 L
N=4832320.244
E=591731.993
REFER TO DETAIL 'F', SHEET 35,
FOR TENTH LINE CROSSING PROFILE
0.3m BLOW OFF
45° H. BEND
STA=12+831.864, 21.838 L
N=4832320.636
E=591735.230
45° H. BEND
STA=12+830.740, 23.054 R
N=4832292.874
E=591770.527
N 4832390.000
E591740.000
N 4832370.000
E591800.000
LIMIT OF CONSTRUCTION
HYDRANT AT 300mmX150mm REDUCER
STA=12+836.369, 23.078 R
E=591773.914
600mmX300mm ECCENTRIC REDUCER
STA=12+835.590, 23.545 R
N=4832296.466
E=591773.822
WVC15
REFER TO SHEET 41
600mmX300mm TEE
2-600mm GV
1-300mm GV
STA=12+832.502, 25.654 R
N=4832292.730
E=591773.664
SWAB PORT 7 (RH 401.010)
2400mm CHAMBER,
300mm GV,
STA=12+819.439, 34.507 R
N=4832276.967
E=591772.942
35.56° H BEND
STA=12+816.915,
36.218 R
N=4832273.920
E=591772.803
49.36° H BEND
STA=12+785.757, 35.438 R
N=4832249.422
E=591753.534
TEMPORARILY SUPPORT LIGHT STANDARD
DURING WATERMAIN INSTALLATION
REGIONAL ROAD No. 10 - 10 SIDEROAD
243
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225
224
EX. GRADE ABOVE WATERMAIN
TENTH LINE
EX. ℄ PROFILE
1.70m MIN. COVER
EX. 750mm STM
EX. 300mm PVC WM
600mm CPP
300mmX150mm REDUCER
600mmX300mm ECCENTRIC REDUCER
SAN. CROSSING 0.15m MIN.
0.86
0.94
1.02
1.50
2.98
1.74
1.70
1.70